SHUTTLE COUNTDOWN - (LPS)

Element/End Item: **OV-103/104/105**
Flow/Usage: **ALL**
Facility: **PAD A/B**
Design Center Concurrence: **JSC/KSC/MSFC**
Category: **A**
OPR: **TCO**
TTL ORG: **OC**

This document contains HAZARDOUS operations.

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1.0 INFORMATION

NOTE

Calibration Data Is Detected

A keyword search performed on this WAD indicates it may contain calibration data recordings. This keyword search is limited and variations other than the USA Writer's Handbook (USA008777) approved format for calibration data recording may not be detected. Calibration data recordings in deviations, attachments, or Pen & Inks will not be detected.

1.1 Objective

Reference S0007.100 for Objective of all S0007 dot books

1.2 Special Instructions All Operations

S0007 is an integrated activity. All constraints for S0007 activities will be controlled by S0007.200. The S0007.100, S0007.300, S0007.400, S0007.500 and S0007.600 books are part of the S0007 family series and therefore they do not require a Task Team Readiness and will be controlled by S0007.200.

1.3 Operations List

Operation		Shop/ Cntl Rm Console	OPR	Haz (Y/N)	Duration (Hrs)	Page No.
No.	Title					
98	Preplanned Contingency Procedures ECS/PVD	CPVD/ C6	PVD	N	0.3	1
99	EPD (GSE)	EPD/ C10	EPD	Y	0.3	25
100	Swingarms (GSE)	ARM/ C7	ARM	N	0.3	37
101	HGDS Operations - Contingency	HWS/ C9	HWS	N	0.3	57
102	ET	LO2/LH 2/ C3, C4	LO2/ LH2	Y	1.0	73
103	SRB	DPS/ C10	DPS	N	1.0	153
104	MPS	MPS/ C3, C4	MPS	Y	1.0	211
105	SSME	SSME/ C3	SSM E	Y	1.0	223
106	PRSD/Fuel Cell	FCP, PRSD/ C6	FCP, PRS D	Y	1.0	229
107	OMS/RCS	ORP/ C7	ORP	N	1.0	279
108	APU	CAPU/ C8	CAP U	Y	4.0	295
109	HYD	HYD/ C8	HYD	N	1.0	377
110	ECLSS	ECL/ C5	ECL	N	1.0	389
111	DPS/BFS	DPS/ C12	DPS	N	1.0	439
112	COMM and Track	COM/ C2	COM	Y	1.0	503
113	Instrumentation	INS/ C9	INS	Y	1.0	571
114	EPDC	EPD/ C10	EPD	N	1.0	645

115	GNC	EFC/ C11	EFC	Y	1.0	741
116	Mechanisms	ALL/ C5	MEQ	N	1.0	843
117	Integrated Control Bus Drops	TPE/ ALL	TPE	N	0.5	1321
118	Payload Electrical and ROEU Contingencies	PLE/ C5	PLE	N	1.0	1419
119	Range Safety and SRB Securing (Post G9 Transition)	CBRS/ C2	CBR S	Y	0.5	1565
120	Integrated	NTD/ ALL	NTD	Y	1.0	1569
121	LPS Console Failure Recovery Procedures	LPS/ ALL	LPS	N	0.3	1629
122	FEP/LDB and Data Loss Troubleshooting	LPS/ ALL	LPS	N	0.3	1933
123	SRSS Contingency Options	CBRS/ C2	CBR S	Y	1.0	1999
124	GLS Real Time Contingency Functions	INTG/ INTG	OTC	N	0.5	2015
125	LCC Workaround for FIREX Loop and Tank T-3 Pressure Anomaly - LCC EGR-03, GSE-15	JBWC, JBFX/ C1	JBW C, JBFX	N	1.0	2061
126	Loss of Pad Operating Air Compressor	JBPN/ NA	JBPN	N	2.0	2069
127	Payload Procedures	PTC/ C1	PTC	N	1.0	2073
128	HIMS Loss After T-6 Hours	TPE/ ALL	INTG	N	2.0	2173
129	Contingency Plan for Loss of Power to Manually Operated Substations	PWRB/ C3	JBEP	N	0.5	2231
130	Contingency Plan for Total Cooling Loss to Pad/MLP, T-48 Hrs until T-0	HVAA/ C-2	JBA C	N	0.1	2239
131	Contingency Plan for Total Chilled Water Flow Loss to Pad A or Pad B, T-48 Hrs until T-0	HVAA/ C-2	JBA C	N	0.1	2243
132	Contingency Plan for Total Condenser Water Flow Loss to the Pad, T-48 Hrs until T-0	HVAA/ C-2	JBA C	N	0.1	2253

133	Contingency Plan for Reduced Chilled Water Flow to LCC, T-48 Hrs until T-0	HVAA/ C-2	JBA C	N	0.1	2257
134	Contingency Plan for Pressurization Air Loss to PTCR, T-48 Hrs until T-0	HVAA/ C-2	JBA C	N	0.1	2265
135	Contingency Plan for Total Pressurization Air Loss to Pad/MLP, T-48 Hrs until T-0	HVAA/ C-2	JBA C	N	0.1	2269
136	Contingency Plan for Pressurization Air Loss to Pad Flame Cells, T-48 Hrs until T-0	HVAA/ C-2	JBA C	N	0.1	2273
137	Contingency Plan for Pressurization Air Loss to FSS Elevator Machine Room (EMR) and RSS EMR/Hoist Machine Room (HMR), T-48 Hrs until T-0	HVAA/ C-2	JBA C	N	0.1	2277
138	INCS LCG/RD Loss After T-6 Hours	TPE/ ALL	INTG	N	8.0	2281
139	INCS Equipment Failure After T-6 Hours	TPE/ ALL	INTG	N	2.0	2319
140	Contingency Plan for Pneumatics Pressure Adjustment Pad/MLP, T-48 Hrs until T-0	PNSA/ C-1	JBPN	N	0.3	2339
141	Contingency Plan for Emergency Utility Annex Chiller Start on the EPP	ELEC/ C-2	JSEP	N	0.5	2345

2.0 SAFETY INFORMATION

2.2 Safety Requirements

	Operation
Safety requirements pertinent to this TOP are contained in the Operations Instructions.	All

2.4 Reference Safety Documentation

Number	Rev	Title
KNPR 8715.3	LI	KSC Safety Practices Procedural Requirements
FSOP 6100	LI	USA Florida Safety Operating Plan

3.0 STAGING REQUIREMENTS

3.1 Required Engineering Documentation

3.1.1 Drawings

OPERATION 116

Document No.	Rev	Title
V070-383121	(LI)	Purge & Vent Installation, Egress Hatch, Window

3.1.2 Documents

OPERATION 116

Document No.	Rev	Title
MA0106-328	(LI)	Installation/Protection of Seals
MA0101-301	(LI)	Installation of Threaded & Collared Fasteners
MA0608-301	(LI)	Application of Corrosion Protection

OPERATION 120

Document No.	Rev	Title
JOB PLAN Q3018.5	(LI)	Pad Elevator Contingency Plan

OPERATION 125

Document No.	Rev	Title
JOB PLAN M3189.210	(LI)	SS Elevated Tank Top-off without Field Support

OPERATION 140

Document No.	Rev	Title
JOB PLAN M3011.002	(LI)	Operational Check on Primary GN2 Regulation Pnl, S72-0694-02
JOB PLAN M3131.001	(LI)	Operational Check on Main GHe Regulation Panel, S72-0697-01
JOB PLAN M3054.001	(LI)	Operational Check on Haz and Camera Purge Panel
JOB PLAN M3011.001	(LI)	Operational Check of Pad GN2 Let Down Station
JOB PLAN M3067.003	(LI)	Cabin Air Panel Ops Check & Contingency Pressure Adjustment

JOB PLAN M3197.009	(LI)	MLP Primary GN2 Panel Contingency Pressure Adjustment
JOB PLAN M3197.010	(LI)	MLP GN2 Tertiary Panel Contingency Pressure Adjustment
JOB PLAN M3197.003	(LI)	Operational Check on MLP GN2 Purge Panel S72-1107-08

3.2 Parts, Materials, Equipment, and Special Tools

3.2.1 Flight Parts

OPERATION 116

Part No./Find No.	Nomenclature	Qty
MD112-1002-0305	screw	13
MD153-1002-0003	washer	13
NAS1581C3T2	screw	8
MD263-0009-0002	FRSI plug assy	6

3.2.2 Flight Materials

OPERATION 116

Part No./Find No.	Nomenclature	Qty	Unit
V070-332504-004|V070-332504-004 | |	seal	1	EA
V070-332504-003|V070-332504-003 | |	seal	1	EA

3.2.3 Non-Flight Parts

OPERATION 113

Part No./Find No.	Nomenclature	Qty
718-LAMP|624000K367436 | |	lamp	1

3.2.5 Shop Support Materials

OPERATION 106

Part No./Find No.	Nomenclature	Qty	Unit
8125012908864	bottle,screw cap,32oz,wide mouth	2	EA
664000K040244	cylinder,graduated	1	EA
8105010087056	bag,plastic	1	PG
831500K316884	tape,black,re-2-1/2in,pres,sensi	1	RO
6640013298806	litmus paper,asc	1	PG

OPERATION 116

Part No./Find No.	Nomenclature	Qty	Unit
6810005437915	Alcohol,Isopropyl,TT-I-735,Grade A	12	OZ
39-0664-07831|MIL-S-22473 GR H | |	loctite 78-31	2	BT
39-8492-12000|MB0120-083TY3 | |	sealant aeroglaze 9741, 4 oz. brushtop	2	OZ
8305-00-K30-2243	armalon	1	yd

3.2.6 Ground Support Equipment

OPERATION 106

Part No./Find No.	Nomenclature	Qty
L070-000101-003	QD Flexhose Assy	1

OPERATION 116

Part No./Find No.	Nomenclature	Qty
79K10243-2	adapter cable	1
79K10247-2	adapter cable	1
A70-0788-04	Test cable	1

3.2.7 Tools and Test Equipment

OPERATION 113

Part No./Find No.	Nomenclature	Qty
5120002888739	jeweler's screwdriver set	2

OPERATION 116

Part No./Find No.	Nomenclature	Qty
TORQUE TO	36-88 in. oz.	1
Torque To	20-30 in. lbs.	1
8020B	Fluke multimeter	1
G070-320074	leak check unit	1
6625-00-T00-1306	DMM, Fluke 8020B or Equivalent	1

3.2.8 Personal Protective Equipment

OPERATION 116	Nomenclature
	white nitrile gloves and safety glasses
	nitrile (N-Dex) gloves
	industrial goggles
	nitrile (Sol-Vex) gloves
	safety glasses or industrial goggles
	face shield
	long sleeve coveralls or shop coa

4.0 PLANNING REQUIREMENTS

OIR Required Yes [ ], No [X]

The constraints review for S0007.500 will be conducted as part of S0007.200.

Predecessors: None

Successors: None

Configuration Required: None

4.1 Critical Skill Requirements

Number	Course Title	Operation
028	ELECTRICAL CONNECTOR MATE/DEMATE	116
403	FLIGHT & GSE ELECTRICAL TESTING (INSPECTOR & TECHNICIAN)	116
242	TORQUE AND SAFETY WIRING	116
099	HATCH OPERATOR (ORBITER)	116
179	RSI PLUG INSTALLATION	116

4.4 Support Services, Commodities, and Equipment

4.4.8 Support

GSS Organization	Operation/Step
PWR	120-20
HVAA	120-40
PWR	120-42
PWR	120-43
HVAA	120-52
PNSA	120-55
PNSA	120-56
PNSA	120-57
PNSA	120-58
PNSA	120-59
PNSA	120-63
PNSA	120-68
PWR	120-70
PNSA	120-75
PNSA	120-76
PNSA	120-80
PNSA	120-81
PNSA	120-82
PNSA	120-83
PWR	120-84
PNSA	120-85
HVAA	120-85
PWR	120-86
PNSA	120-89
PNSA	120-91
PNSA	120-92
PNSA	120-93
PNSA	120-94
PNSA	120-95
PNSA	120-96
PNSA	120-97
PNSA	120-98
PNSA	120-99
PNSA	120-103
PNSA	120-104
PNSA	120-105
PNSA	120-106

PNSA	120-108
HVAA	120-108
PNSA	120-110
PNSA	120-111
PNSA	120-112
PNSA	120-113
CDPD	120-118
WSSA	125-1
WSSA	125-3
WSSA	125-4
WSSA	125-6
WSSA	125-9
CPNS	126-1
CPNS	126-2
CPNS	126-3
CPNS	126-4
CPNS	126-5
PWR	129-1
PWRB	129-1
PWR	129-2
PWR	129-3
PWRB	129-3
PWR	129-4
PWRB	129-4
PWR	129-5
PWR	129-6
PWRB	129-6
PWR	129-7
PWR	129-8
PWRB	129-8
PWR	129-9
PWRB	129-9
PWR	129-10
PWR	129-11
PWRB	129-11
PWR	129-12
PWR	129-13
PWRB	129-13
PWR	129-14
PWRB	129-14
PWR	129-15
PWR	129-16
PWRB	129-16
PWR	129-17
PWR	129-18

PWRB	129-18
PWR	129-19
PWRB	129-19
PWR	129-20
PWR	129-21
PWRB	129-21
PWR	129-22
PWR	129-23
PWRB	129-23
PWR	129-24
PWRB	129-24
PWR	129-25
PWR	129-26
PWRB	129-26
PWR	129-27
PWR	129-28
PWRB	129-28
PWR	129-29
PWRB	129-29
PWR	129-30
HVAA	130-1
HVAA	130-2
HVAA	130-3
HVAA	130-4
HVAA	130-5
HVAA	130-6
HVAA	131-1
HVAA	131-2
HVAA	131-3
HVAA	131-4
HVAA	131-5
HVAA	131-6
HVAA	131-7
HVAA	131-8
HVAA	131-9
HVAA	131-10
HVAA	132-1
HVAA	132-2
HVAA	132-3
HVAA	132-4
HVAA	132-5
HVAA	132-6
HVAA	133-1
HVAA	133-2
HVAA	133-3

HVAA	133-4
HVAA	133-5
HVAA	133-6
HVAA	133-7
HVAA	134-1
HVAA	134-2
HVAA	134-3
HVAA	134-4
HVAA	134-5
HVAA	135-1
HVAA	135-2
HVAA	135-3
HVAA	135-4
HVAA	135-5
HVAA	136-1
HVAA	136-2
HVAA	136-3
HVAA	136-4
HVAA	136-5
HVAA	137-1
HVAA	137-2
HVAA	137-3
HVAA	137-4
HVAA	137-5
PNSA	140-1
PNSA	140-2
PNSA	140-3
PNSA	140-4
PNSA	140-5
PNSA	140-6
PNSA	140-7
PNSA	140-8
HVAA	141-7
HVAA	141-8

ISC Organization	**Operation/Step**
LS	120-39
LS	120-53
AC	133-5
AC	133-7
ELEC	141-2
ELEC	141-3
AC	141-3
AC	141-4
ELEC	141-5

AC	141-5
AC	141-6
ELEC	141-7
AC	141-7
ELEC	141-8
AC	141-9
ELEC	141-10
AC	141-11
ELEC	141-11
AC	141-12

COMM Organization	**Operation/Step**
COMM	120-17
OISD	120-18
OTV	120-19
COMM	120-29
OISD	120-30
VCE	120-31
OTV	120-32
OISD	120-45
VCE	120-45
OISD	120-61
VCE	120-61

NPS Organization	**Operation/Step**
FIRE	112-96
FIRE	120-6
SEC	120-6
SEC	120-8
FIRE	120-9
FIRE	120-64
FIRE	120-66

4.5 Supporting Subtasks

Subtask Number	Haz Ind	Subtask Title / Function to be Performed	Calling Op / Step
S9001.104		SHUTTLE POWER UP/POWER DOWN - VAB/PAD - EPD OPTIONS	106-46
			106-51
V9001VL2		ORBITER POWER UP/POWER DOWN, DPS OPTIONS (LPS)	111-2
V1086.016	HAZ	MEC PREFLIGHT BITE LCC PREPLANNED CONTINGENCY PROCEDURES	114-48
S9001.104		SHUTTLE POWER UP/POWER DOWN - VAB/PAD - EPD OPTIONS	117-10
			117-15
			117-50
			117-55
			117-84
			117-89
			117-125
			117-130
			117-194
			117-199
			117-254
			117-262
			117-301
			117-306
			117-346
			117-351
			117-389
			117-396
M3197		HP GN2/GHE/COMPRESSED AIR/LPGN2 PREPS FOR LAUNCH/FRF/TANKING TEST	120-58
M3063		HP GN2/GHE, COMPRESSED AIR, LP GN2; MLP/PAD/VAB/REFURB OPERATIONS	120-95
M3089	HAZ	CHANGEOUT OF FLUID SYSTEM COMPONENTS, KSC/CCAFS	120-96
M3063		HP GN2/GHE, COMPRESSED AIR, LP GN2; MLP/PAD/VAB/REFURB OPERATIONS	120-98
			120-113

S1003	HAZ	MPS LOX SYSTEM AUTOMATIC LOAD AND DRAIN OPERATIONS	121-64 121-81 121-89 121-115 121-132 121-140 121-158 121-159
G3153	HAZ	LOX SYSTEM SECURING AFTER LAUNCH (LPS)	121-174
S1004	HAZ	MPS LH2 SYSTEM AUTOMATIC LOAD AND DRAIN OPERATIONS (LPS)	121-176 121-183 121-199 121-206 121-223 121-227 121-244
S1018	HAZ	LH2 SYSTEM SAFING AFTER DRAIN	121-259 121-267

5.0 CONFIGURATION ACCOUNTING AND VERIFICATION

5.1 Specific OMRS Requirements Satisfied by this TOP

OMRS NO.		NOMENCLATURE/ EFFECTIVITY	SEQ-STEP (CAP)
P507EB.500		GLACIER DC POWER ORBITER I/F VERIF.	127-060
	L01	PISS-ULF6	
S00E00.742		ENABLE RSRM IGNITER HEATER SYSTEM	103-031
	L02	BCN099-999;C	
S00E00.992		BELLOWS HTR CONTROL LO2 STOP FLOW/REVERT	102-196
	L01	TCN117-999;C	
S00E00.993		REACTIVATE BELLOWS HTR	102-200
	L01	TCN117-999;C	
S00E00.A15		BIPOD HEATER SLOT TEMP SENSOR FAILURE	102-034
	L01	TCN117-999;C	102-045
			102-056
			102-067
S00FA0.620		RSRM IGNITER HEATER SYSTEM	103-031
(1R)	L03	B099-999	
S00FA0.980		DEACTIVATE RSRM IGNITER HEATER SYSTEM	103-026
	L01	B030-999	103-036
V05AD0.010-B		SIDE HATCH INNER WINDOW CAVITY	116-793
	L02	V03F33-90	
		V05F21-90	
		V04F28-90	
		SIDE HATCH INNER WINDOW CAVITY	
	L01	V05F20	
		V04F27	
V05AD0.010-C		SIDE HATCH OUTER WINDOW CAVITY	116-793
	L02	V03F33-90	
		V05F21-90	
		V04F28-90	
		SIDE HATCH OUTER WINDOW CAVITY	
	L01	V05F20	
		V04F27	

```
V33AA0.035      I/E HATCH SEAL REPLACEMENT VALIDATION    116-722
            L01  VAF;C

V33AH0.010      I/E HATCH CLOSE & LATCH FOR FLT-VERT     116-741
            L04  V02F28-90                                116-811
                 V03F31-90
                 V04F27-90
                 V05F20-90

V33AH0.110      I/E HATCH SEAL LEAK CHECK FOR FLT        116-681
(1R  )      L01  V02F22-90                                116-682
                 V03F23-90                                116-690
                 V04F19-90                                116-691
                 V05F12-90                                116-730
                                                          116-731
                                                          116-815
                                                          116-816

V66AC0.143-H    INSPECT SORG/SORG AND SORG/ORB           106-035
            L01  VAFOMDP;C
```

5.2 General OMRS Requirements Applicable to this TOP

```
                NOMENCLATURE/                            SEQ-STEP
OMRS NO.        EFFECTIVITY                              (CAP)
--------------- -------------                            --------

S00GEN.780      CONTROL BUS DEACT OPER CONSTRAINTS          -
            L01  SAF;G
```

5.5 List of References

OPERATION 116

Reference No.	Rev	Title
USA004758	(LI)	Performance of Intrusion Electrical on Shuttle Flight Systems
MA0110-303	(B)	Solvent Cleaned Surfaces

OPERATION 98 Preplanned Contingency Procedures ECS/PVD

Shop: **CPVD**
Cntrl Rm Console: **C6**
OPR: **PVD**
Zone: **100**
Hazard (Y/N): **N**
Duration (Hrs): **0.3**

NOTE

This Operation may be run multiple times. Record all data and verifications in the Verification and Data recording table at the end of this Operation.

Orbiter Vent Door Indicator Anomaly Preplanned Trouble Shooting

NOTE
Perform this option to troubleshoot Orbiter Vent Door Indicator Anomalies.

Orbiter Vent Door Indicator Anomaly Preplanned Trouble Shooting (Not Performed:)

98-1 CPVD

Orbiter Vent Door Indicator Anomaly Preplanned Contingency Procedure:

1. LCC Requirement:

Continue Countdown if:

A. Confirmed instrumentation (talkback failure only).

B. Purge position limit switch failed ON.

C. Open position limit switch failed ON and total failures do not cause LCC violation.

D. Any position indication limit switch failed OFF, and confirmed dual motor operation between Open and Closed (Based on acceptable AC amperage draw and minimum required cycle times).

2. Crew Requirements: None

3. Time Requirements:

For anomalies confirmed as instrumentation or limit switches failed ON, approximately 5 minutes for troubleshooting.

For all other anomalies, 15 minutes.

4. Other Requirements:

A. LDB capability to send vent door commands and perform BITE tests.

B. Cycling vent doors could impact HGDS monitoring, GN_2 inerting of compartments, and O_2 levels in OAA white room.

5. Troubleshooting Plan:

A. **Perform** MCA Operational Status (OP STAT) Indicator Test -

Issue one vent door command in the direction of failed indicator. Response of MCA OP STAT indicator will determine if an instrumentation or limit switch failure has occurred.

B. **Verify** total failures do not violate the LCC (Ref Table 98-1).

C. **If Limit Switch failed OFF:**

Perform full cycle in both directions.

Verify vent door timing is 5 seconds or less from Open to Closed.

Verify amperage increases on each phase of a bus as the door(s) start to move from Open and decrease when door(s) stop at Closed. Vent doors use a separate bus for each of the two motors in a PDU.

98-2 **CPVD** **OTC**
OTC **CAFM**
CGLS

MCA OP STAT state changes may occur during PVD vent door troubleshooting.

NOTE
Hard copies obtained in next step are for quick reference use on console.

98-3 **CPVD**

CONSOLE KYBD (VAM65A)
For Failed Door Indicator,

Verify no CMD'S are ON and **obtain** list of CMD FD'S as follows:

1. 'BTE TST'
   XMIT Cursor Key - **Press**

2. **Make** hard copy of VAM65A PG A

3. **Verify** all CMD'S are OFF.

4. **Return** to PG B

MCA OP STAT Indicator Test

NOTE

Objective is to determine if there is an instrumentation or limit switch failure. Use 'A' CMD FD in direction of failed indicator for same motor as failed indicator. Refer to hard copies for FD's.

NOTE

Vent door(s) will not move during MCA OP STAT indicator test.

98-4 CPVD

Console KYBD (VAM65A)

1. HOME KEY - **Press**

2. CMD LINE: **Enter** - SET_('A' CMD FD)_ON
   XMIT CMD KEY - **Press**
   EXEC CMD KEY - **Press**

3. For vent door with failed indicator:
   CURSOR CNTL
   'BTE TEST'
   XMIT CURSOR KEY - **Press**

4. **Verify** 'A' CMD FD in the direction of failed indicator for the same motor as the failed indicator is 'ON'.

98-5 **CPVD**

VAM65A PG-B

IF FAILED INDICATOR is "ON" but should be "OFF",

THEN determine MCA OP STAT INDICATOR state:

- Remains Green ("ON"): Limit switch failed ON (closed)
- Inverts Green ("OFF"): Instrumentation circuit failure [between MCA relay and MDM or an instrumentation failure (i.e. MDM)].

CHECK ONE:
MCA OP STAT INDICATOR state:
(Remained Green [OP Stat "ON"] ___)
(Inverted Green [OP Stat "OFF"] ___)

(Not Performed:)

98-6 **CPVD**

VAM65A PG-B

IF FAILED INDICATOR is "OFF" but should be "ON",

THEN determine MCA OP STAT INDICATOR state:

- Remains Green ("ON"): Instrumentation circuit failure [between MCA relay and MDM or an instrumentation failure (i.e. MDM).

- Inverts Green ("OFF"): 1. Limit switch failed OFF (open).
  2. Demated connector.
  3. Vent door out of position.

CHECK ONE:
MCA OP STAT INDICATOR state:
(Remained Green [OP Stat "ON"] ___)
(Inverted Green [OP Stat "OFF"] ___)

(Not Performed:)

98-7 **CPVD**

CONSOLE KYBD

CMD LINE: **Enter** - SET_('A' CMD FD)_OFF
XMIT CMD KEY - **Press**
EXEC CMD KEY - **Press**

***** End of MCA OP STAT Indicator Test*****

Initial Troubleshooting Assessment

98-8 **CPVD** **CSPE**
OTC
NTD

IF MCA OP STAT Indicator Test confirmed an instrumentation circuit failure,

THEN Vent Door Preplanned Procedure is **complete**.

- Anomaly confirmed instrumentation only.
- Dual motor capability still exists.
- **LCC violation cleared.**
- **PVD recommends continue with count.** (Go to the last step in the Orbiter Vent Door Indicator Anomaly Preplanned Trouble Shooting).

(Not Performed:)

98-9 **CPVD** **CSPE**
OTC
NTD

IF anomaly is a purge limit switch failed "ON",

THEN Vent Door Preplanned Procedure is **complete**.

- Purge limit switch failed "ON" is not a LCC violation.
- Dual motor capability still exists.
- **LCC violation cleared.**
- **PVD recommends continue with count.** (Go to the last step in the Orbiter Vent Door Indicator Anomaly Preplanned Trouble Shooting).

(Not Performed:)

98-10 **CPVD** **CSPE**
OTC
NTD

IF anomaly is a CLOSED Limit Switch failed "ON",

THEN Vent Door Preplanned Procedure is **complete.**

- Anomaly is a CLOSED Limit Switch Failed ON.
- Dual-motor vent door closing capability for entry is lost.
- **LCC violation confirmed.**
- **PVD is NO GO for Launch.** (Go to the last step in the Orbiter Vent Door Indicator Anomaly Preplanned Trouble Shooting).

(Not Performed:)

98-11 **CPVD**

IF previous three steps were not performed,

THEN continue with troubleshooting plan for applicable anomaly listed below:

- OPEN Limit Switch Failed "ON".
- Any Limit Switch Failed "OFF".

(Not Performed:)

***** End of Initial Troubleshooting Assessment *****

OPEN Limit Switch Failed "ON" Analysis

NOTE
Perform the following Analysis if the anomaly is an OPEN Limit Switch Failed "ON", should be "OFF".

Open Limit Switch Failed ON Analysis (Not Performed:)

98-12 **CPVD**

Record any Open PR/IPR(s) related to Vent Door Ops (**Record** none if there are no open PR/IPRs):

Vent Dr 1&2	Vent Dr 3	Vent Dr 5 & 6	Vent Dr 8&9
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

98-13 **CPVD** **CSPE**
OTC
NTD

IF "NONE" was recorded in the previous step for the group(s) affecting the current failure,

THEN Vent Door Preplanned Procedure is complete.

- Anomaly is an OPEN Limit Switch failed ON with no other failures.
- Vent Doors 1 & 2 or 8 & 9: single-motor capability to OPEN vent doors, dual-motor capability on opposite side
- Vent Doors 3, 5 or 6: single-motor capability to OPEN vent door but dual-motor capability to close the vent door, all other mid body vent doors have dual-motor capability.
- **LCC violation cleared.**
- **PVD recommends continue with count.** (Go to the last step in the Orbiter Vent Door Indicator Anomaly Preplanned Trouble Shooting).

(Not Performed:)

98-14

IF there are any Open PR/IPR(s) related to Vent Door Ops,

THEN Perform analysis of the multiple failures per Table 98-1 to determine if violation of the LCC is confirmed.

(Not Performed:)

Table 98-1	
Vent Door / Position	**Failed ON Limit Switch Analysis**
Vent Door 1&2 or 8&9 **OPEN Limit Switch Failed ON**	**Verify**: 1. No existing failure for other side same Vent Doors that prevents dual-motor operation. **Then LCC violation cleared.** PVD recommends continue with count. **Else LCC violation confirmed.** PVD is No Go for Launch.
Vent Door 3 **OPEN Limit Switch Failed ON**	**Verify**: 1. No existing failures for Vent Doors 5&6 both sides that prevents dual motor Open operation. 2. Vent Door 3 both sides have at least single motor Open capability. **Then LCC violation cleared.** PVD recommends continue with count. **Else Verify**: 1. No existing failure for other side Vent Door 3 that prevents dual motor Open operation. 2. No existing failures for at least two of the remaining four PLB vent doors that prevent dual motor Open operation. **Then LCC violation cleared.** PVD recommends continue with count. **Else LCC violation confirmed.** PVD is No Go for Launch.

Vent Door 5 or 6 **OPEN Limit Switch Failed ON**	**Verify**: 1. No existing failures for Vent Door 3 either side that prevents dual motor OPEN operation. 2. At most two existing failures for the remaining three PLB vent doors that prevent dual motor OPEN operations. **Then LCC violation cleared.** PVD recommends continue with count. **Else Verify**: 1. At most one existing failure for Vent Doors 5 or 6 that prevents dual motor OPEN operation. 2. At most one existing failure for Vent Door 3 that prevents dual motor OPEN operation. **Then LCC violation cleared.** PVD recommends continue with count. **Else LCC violation confirmed.** PVD is No Go for Launch.

98-15 **CPVD** **CSPE**
OTC
NTD

IF both conditions are true: **Verify**

- There are open PR/IPR(s) related to Vent Door Ops
- There is no confirmed violation of the LCC in the previous step,

THEN Vent Door Preplanned Procedure is complete. ☐

- Anomaly is a failed "ON" limit switch with multiple failures not violating LCC AFM-30. (ref: Table 98-1)
- **LCC violation cleared.**
- **PVD recommends continue with count.** (Go to the last step in Vent Door Preplanned Trouble Shooting).

ELSE Vent Door Preplanned Procedure is complete. ☐

- Anomaly is a failed "ON" limit switch with multiple failures violating LCC AFM-30.
- **LCC violation confirmed.**
- **PVD is NO GO for Launch.** (Go to the last step in Vent Door Preplanned Trouble Shooting).

***** End of Open Limit Switch Failed "ON" Analysis *****

Any Limit Switch Failed "OFF" Analysis

NOTE
Perform the following analysis if the anomaly is any Limit Switch Failed "OFF", should be "ON".

Any Limit Switch Failed "OFF" Analysis (Not Performed:)

NOTE
This test verifies dual motor capability of vent door PDU from Open to Closed.

NOTE
AC Bus data retrievals (PCGOAL or SDC) are required for the next two steps.

98-16 **CPVD** **OTC**
OTC **CHGD**
PTC
CAFM
CGLS

Perform the following:

1. **Verify** cycling of vent door(s) _____will not adversely impact the following, and notify CPVD of concurrence to proceed.
   - HGDS monitoring
   - Compartment inerting (consider wind speed and direction, rain)
   - Payloads (Vent Doors 3, 5 and 6 only)
   - O_2 levels in OAA White Room (Vent Doors 1 and 2 only)

2. **Notify** CAFM and CGLS that MCA OPS stat state changes will occur during PVD vent door troubleshooting.

98-17 OTC CPVD

You have concurrence to proceed with vent door operations.

98-18 CPVD

CURSOR CONTROL (VAM65A PG-B)

IF trouble shooting Vent Doors 1&2 or 8&9,

THEN perform the following:

1. **Cursor** vent doors from PURGE (OR CLOSED) to OPEN, if not already open.

2. **Cursor** vent doors from OPEN TO CLOSE.

3. **Record** Time Measurement:_____ seconds (5 MAX) (SDC/PCG2 retrieval)

4. **Record** How Many AC Current Arrows are UP (GREEN):

   ___ONE ___TWO ___NONE

5. **Cursor** vent doors from CLOSE to OPEN.

6. **Command** vent doors to desired position if needed.
   - Use cursor control unless the failure requires a single motor operation.
   - If single motor is required, use command line to set the A & B commands for the good motor "ON"; reference the hard copy for FD's.

(Not Performed:)

98-19 **CPVD**

CURSOR CONTROL (VAM65A PG-B)

IF trouble shooting vent doors 3, 5 OR 6,

THEN perform the following:

1. **Cursor** vent door from CLOSE to OPEN.

2. **Cursor** vent door from OPEN to CLOSE.

3. **Record** Time Measurement:_____ seconds (5 MAX) (SDC/PCG2 retrieval)

4. **Record** how many AC current arrows are UP (GREEN)

___ONE ___TWO ___NONE

(Not Performed:)

98-20 **CPVD**

CURSOR CONTROL (VAM65A)

1. For Vent Door(S) With Failed Indicator:

   'BTE TEST'
   XMIT CURSOR KEY - **Press**

2. **Verify** no CMD FD'S are ON (PG A)

3. **Return** to PG B

98-21 **CPVD**

Perform SDC/PCGOAL data retrievals to record AC current (all three phases) increased when the vent door(s) operated then decreased after door movement stopped.

1. _____ **Verified** both AC Buses responded properly from OPEN to CLOSED and CLOSED to OPEN.

2. _____ **Verified** both AC Buses responded properly from OPEN to CLOSED and one responded properly from CLOSED to OPEN.

3. _____ **Unable to verify** either AC Bus responded properly (fail test).

98-22 **CPVD** **CSPE**
OTC
NTD

IF timing was 5 seconds or less and both AC Buses responded properly for OPEN to CLOSED cycle (Option 1 or 2 in previous step), **Verify**

THEN Vent Door Preplanned Procedure is complete. ☐

- **Verified** dual-motor capability between OPEN and CLOSED.
- **Verified** travel time between OPEN and CLOSED is 5 seconds or less.
- **Verified** AC current draw is good for both motors.
- **LCC violation cleared.**
- **PVD recommends continue with count.**

ELSE Vent Door Preplanned Procedure is complete. ☐

- **LCC violation confirmed.**
- **PVD is NO GO for Launch.**

***** End of Any Limit Switch Failed OFF Analysis *****

98-23 **Record** all known diminished motor capability for all vent doors (Example **RH3-O-1M** for Right Vent Door 3, 1 motor only operation to OPEN position):

_____
_____
_____
_____

***** End of Orbiter Vent Door Indicator Anomaly Preplanned Trouble Shooting *****

Vent Door Override Contingency Option

NOTE
Perform this option only by direction of OTC/NTD/SPE in order to change the override/mask of one or more Orbiter vent door indicator terminal count checks.

Vent Door Override Contingency Option (Not Performed:)

NOTE
The following steps can be worked multiple times to ensure the correct override word configuration.

98-24 **CPVD** **OTC** **132**

Verify GPC's are in G9 memory configuration.

98-25 **CPVD**

CRT (VAM09A PG-B)
VERIFY

"DLNK" IS 129 OR 160
AT LEAST ONE "DLST" IS 44 OR 60.

98-26 **CPVD**

PFP PNL AND CRT (VAM09A PG-A)

PRESS PFPK5 ONCE

VERIFY VDM06A "VENT DOOR OVERRIDE CONTROL"
DISPLAY IS ON PG-A.

98-27 **CPVD**

Record value of "V99J8836C1"

#_____F____00

Record changes required for vent door override.

Indicator	Current State	Required State
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

98-28 **CPVD**

CURSOR CNTL AND CRT

1. **TRANSMIT** CURSOR ON REQUIRED VENT DOOR INDICATOR TARGETS.

2. **VERIFY** REQUIRED VENT DOOR TARGET TEXT IS INVERT GREEN.

3. **RECORD** "NEW OVERRIDE" NO. #_____F____00.

4. **TRANSMIT** CURSOR ON "EXECUTE" TARGET.

5. **VERIFY** "V99J8836C1" EQUALS "NEW OVERRIDE" TRANSMIT CURSOR ON "TERM" TARGET.

6. **VERIFY** VDM06A "VENT DOOR OVERRIDE CONTROL" DISPLAY IS CLEARED.

98-29 **CPVD OTC 132**

Vent door override is complete.

***** End of Set Vent Door Override On *****

***** End of Vent Door Override Option (Contingency) *****

98-30 Orbiter Vent Door Indication Anomaly Preplanned Contingency Procedure (CPVD) complete.

Table 98-2 Multi Run Matrix for **Preplanned Contingency Procedures ECS/PVD**			
Step	RUN 1	RUN 2	RUN 3
Orbiter Vent Door Indicator Anomaly Preplanned Trouble Shooting (steps 1 thru 23)	**NP:**	**NP:**	**NP:**
98-1			
98-2			
98-3			
98-4			
98-5	Remained Green __ Inverted Green __ **NP:**	Remained Green __ Inverted Green __ **NP:**	Remained Green __ Inverted Green __ **NP:**
98-6	Remained Green __ Inverted Green __ **NP:**	Remained Green __ Inverted Green __ **NP**:	Remained Green __ Inverted Green __ **NP:**
98-7			
98-8	**NP:**	**NP:**	**NP:**
98-9	**NP:**	**NP:**	**NP:**
98-10	**NP:**	**NP:**	**NP:**
98-11	**NP:**	**NP:**	**NP:**
Open Limit Switch Failed ON Analysis (steps 12 thru 15)	**NP:**	**NP:**	**NP:**
98-12	Vt Dr 1&2 Vt DR 3 Vt Dr 5-6 Vt Dr 8&9	Vt Dr 1&2 Vt DR 3 Vt Dr 5-6 Vt Dr 8&9	Vt Dr 1&2 Vt DR 3 Vt Dr 5-6 Vt Dr 8&9

Table 98-2 Continued	RUN 1	RUN 2	RUN 3
98-13	**NP:**	**NP:**	**NP:**
98-14	**NP:**	**NP:**	**NP:**
98-15	T __ E __	T __ E __	T __ E __
Limit Switch Failed OFF Analysis (steps 16 thru 23)	**NP:**	**NP:**	**NP:**
98-16	Vnt Dr:	Vnt Dr:	Vnt Dr:
98-17			
98-18	Time _____ 1 __ 2 __ None __ **NP:**	Time _____ 1 __ 2 __ None __ **NP:**	Time _____ 1 __ 2 __ None __ **NP:**
98-19	Time _____ 1 __ 2 __ None __ **NP:**	Time _____ 1 __ 2 __ None __ **NP:**	Time _____ 1 __ 2 __ None __ **NP:**
98-20			
98-21	1.____ 2.____ 3.____	1.____ 2.____ 3.____	1.____ 2.____ 3.____
98-22	T __ E __	T __ E __	T __ E __
98-23 (Example RH3-O-1M for Right Vent Door 3, 1 motor only operation to OPEN position)			

Table 98-2 Continued	RUN 1	RUN 2	RUN 3
Vent Door Override Option (steps 24-29)	**NP:**	**NP:**	**NP:**
98-24			
98-25			
98-26			
98-27	#___F___00 Indicator Crnt State Rqrd State	#___F___00 Indicator Crnt State Rqrd State	#___F___00 Indicator Crnt State Rqrd State
98-28	#___F___00	#___F___00	#___F___00
98-29			
98-30			

*** End of Operation **98** ***

OPERATION 99 EPD (GSE)

Shop: **EPD**
Cntrl Rm Console: **C10**
OPR: **EPD**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **0.3**

Ground PIC Premature Arm Failure

NOTE

Do not perform this option for a hydrogen burn or lanyard premature PIC arm failure.

Ground PIC Premature Arm Failure Not Performed:_____

99-1 **CEPD** **OTC**

Request permission to perform LDB read for MEC preflight and OPS BITE.

99-2 **OTC** **CEPD**

Perform MEC preflight/OPS BITE.

WARNING

If Shuttle ordnance is connected, ordnance detonation may occur due to inadvertent PIC-LPS commands.

Personnel may suffer serious bodily injury or death

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99-3 **CEPD**

```
CURSOR CNTL (VWC10)
BITE OPS
XMIT CURSOR KEY - PRESS
```

99-4 **CEPD**

```
CURSOR (MEC AUTO TEST MENU)
LAUNCH PREFLT BITE
XMIT CURSOR KEY - PRESS

PFP (VSC24)
CONTINUE - PRESS

CRT
PORT 1 SUCCESSFUL
PORT 3 SUCCESSFUL
```

99-5 **CEPD**

Make hardcopy before terminating/clearing program.

99-6 **CEPD**

IF preflight BITE indicates Arm failure is within the MEC,

THEN hold and evaluate.

Not Performed:_____

99-7 **CEPD**

```
PFP (VSC24)
TERMINATE - PRESS
```

***** End of Ground PIC Premature Arm Failure *****

Ground PIC Rack Power Down/Up

NOTE

If failure is after T-5 min., then proceed with count and do not perform Ground PIC Rack Power Down/Up.

Ground PIC Rack Power Down/Up Not Performed:_____

99-8 **CEPD** **CGLS**

Ground PIC rack power down is about to proceed.
Configure GLS as required.

99-9 **CEPD**

```
CURSOR CNTL (VWC10)
GRD SYS - OFF
XMIT CURSOR KEY - PRESS

CRT
```

VERIFY H_2 AND LR SYS A AND B GND AND CPA VOLTAGES LESS THAN 1.5 VOLTS.

99-10 **CEPD** **OTC**

PIC Rack Power Down is complete.

T-5 Min

99-11 **CEPD** **CGLS**

Ground PIC rack power up is about to occur.
Configure GLS as required.

99-12 **CEPD**

```
CURSOR CNTL (VWC10)
GRD SYS - ON
XMIT CURSOR KEY - PRESS

CRT

VERIFY HYDROGEN AND LR SYS A AND B GND AND CPA
VOLTAGES GREATER THAN 26.0 VOLTS.
```

NOTE
Proceed with Countdown regardless of Arm status.

99-13 **CEPD** **OTC**

PIC Rack Power Up is complete.

***** End of Ground PIC Rack Power Down/Up *****

Launch Release PIC Fire 1 Anomaly (SSID GSE-25)

99-14 **CEPD** **OTC** **212**
CGLS

Request permission to perform LDB reads for MEC preflight/OPS BITE and to power down ground PIC rack.

99-15 **OTC** **CEPD** **212**

Perform MEC preflight and OPS BITE and power down ground PIC rack.

99-16 **CEPD**

```
CURSOR CNTL (VWC10)
BITE OPS
XMIT CURSOR KEY - PRESS

CRT (VWC10)

MAKE HARDCOPY
```

99-17 **CEPD**

```
CURSOR CNTL (VWC10)
BITE PREFLIGHT
XMIT CURSOR KEY - PRESS

CRT (VWC10)

MAKE HARDCOPY
```

99-18 CEPD

```
CURSOR CNTL (VWC10)
GRD SYS - OFF
XMIT CURSOR KEY - PRESS

CRT (VWC10)
```

VERIFY H_2 AND LR SYS A AND B GND AND CPA VOLTAGES ARE LESS THAN 1.5 VOLTS.

99-19 CEPD OTC 212

MEC BITE tests and GND PIC Rack Power Down is complete.

Launch Release/Hydrogen Burn System PIC Rack CPA DC Voltage Anomaly (SSID GSE-04 and GSE-08)

99-20 **CEPD** **OTC**
OTC **NTD**

Request concurrence to perform GSE PIC Resistance Test.

Verify BDA Clear

NOTE
Perform this option if BDA clear of all personnel.

Verify BDA Clear Not Performed:_____

99-21 **NTD** ***SCC**
***SCC** ***PSE**

Verify all personnel clear of BDA and Safety concurrence to proceed with GSE PIC Resistance Test.

99-22 ***PSE** ***SCC**
***SCC** **NTD**
NTD **OTC**

All personnel clear of BDA. You have Safety concurrence to perform GSE PIC Resistance Test.

***** End of Verify BDA Clear *****

Personnel Inside BDA

WARNING

If Shuttle ordnance is connected, ordnance detonation may occur due to inadvertent PIC-LPS commands.

Personnel may suffer serious bodily injury or death

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NOTE

Performing the GSE PIC Resistance Test with personnel inside the BDA requires approval of the Launch Director and SPOC and NASA Directors of Safety.

NOTE

Perform this option if personnel inside BDA.

Personnel Inside BDA Not Performed:_____

99-23 **NTD** ***SEC**

Verify Closeout Crew and Final Inspection (and Red Crew) Teams have passed the BDA roadblock.

99-24 **NTD** ***SCC**

Only Flight Crew on Pad. Orbiter side hatch closed for flight.
Request Safety concurrence to proceed with GSE PIC Resistance Test.

99-25 ***SCC** **NTD**

SPOC and NASA Directors of Safety approve request for GSE PIC Resistance Test. You have Safety concurrence to proceed.

***** End of Personnel Inside BDA *****

99-26 **NTD** **LD**

Request Launch Director concurrence to proceed with GSE PIC Resistance Test.

99-27 **LD** **NTD**

You have a GO to proceed.

99-28 **NTD** **OTC**
OTC **CEPD**

Perform GSE PIC Resistance Test. Report results.

99-29 **CEPD**

```
CURSOR CNTL (VWC10)
GND R/T - ON
XMIT CURSOR KEY - PRESS
```

99-30 **CEPD**

```
CRT (VWC10)
```

VERIFY RESISTANCE TEST INDICATIONS (G=ON, N=OFF)

Table 99-1 Resistance Test Indications

	Left Hand		Right Hand	
	Sys A	**Sys B**	**Sys A**	**Sys B**
	R	R	R	R
H_2 BURN				
ENG 1	G	-	-	G
ENG 2/3	G	G	G	G
LAUNCH REL				
HDP 5/1	G	G	G	G
HDP 6/2	G	G	G	G
HDP 7/3	G	G	G	G
HDP 8/4	G	G	G	G
ETVAS	-	-	G	G
H/O TSM	G	G	G	G
LANYARD	-	-	G	G

99-31 **CEPD**

```
CURSOR CNTL (VWC10)
GND R/T - OFF
XMIT CURSOR KEY - PRESS
```

99-32

CEPD	**OTC**
OTC	**NTD**
NTD	***SCC**

GSE PIC Resistance Test complete.

Results_____ (Acceptable/unacceptable)

*** End of Operation **99** ***

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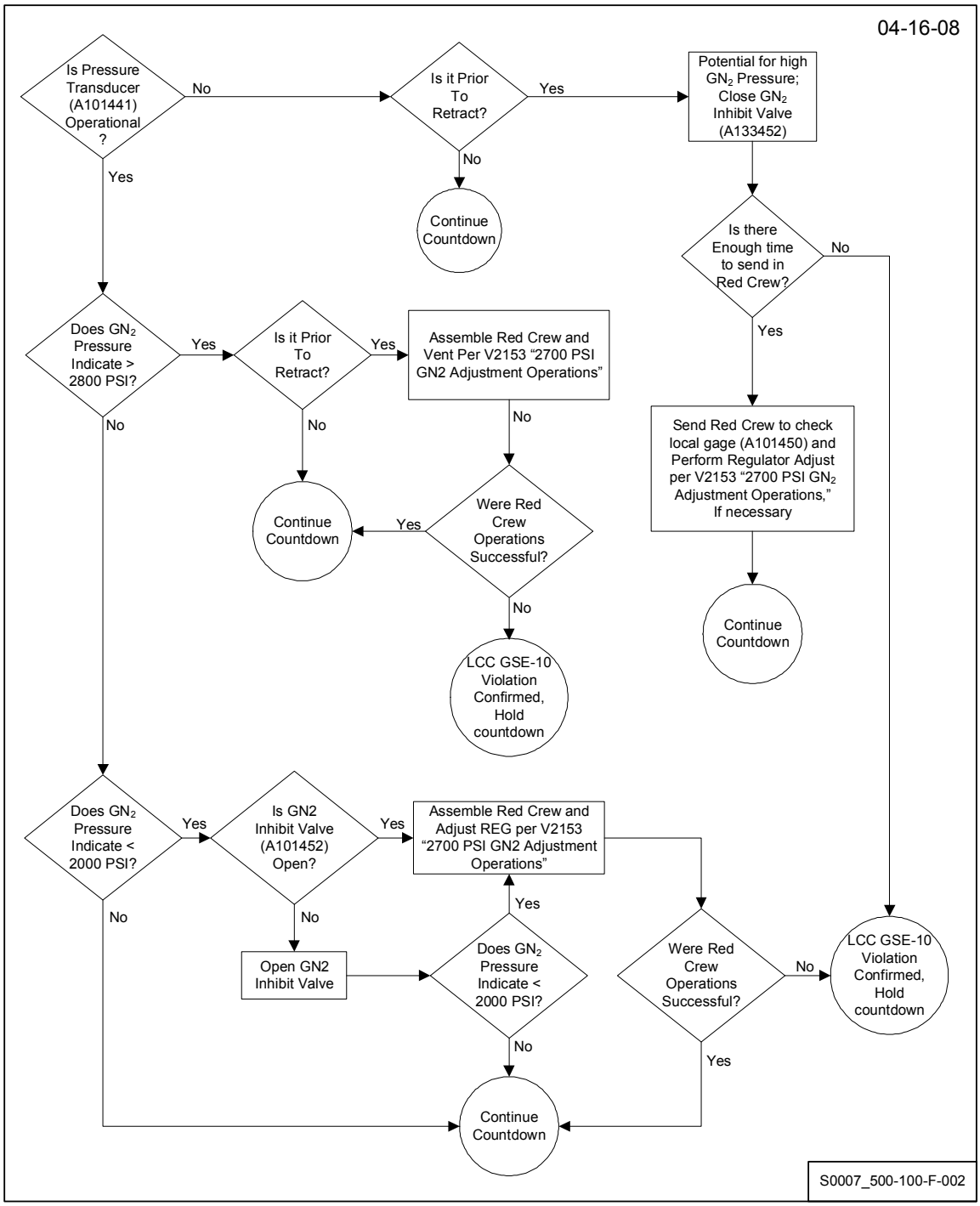
OPERATION 100 Swingarms (GSE)

Shop: **ARM**
Cntrl Rm Console: **C7**
OPR: **ARM**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.3**

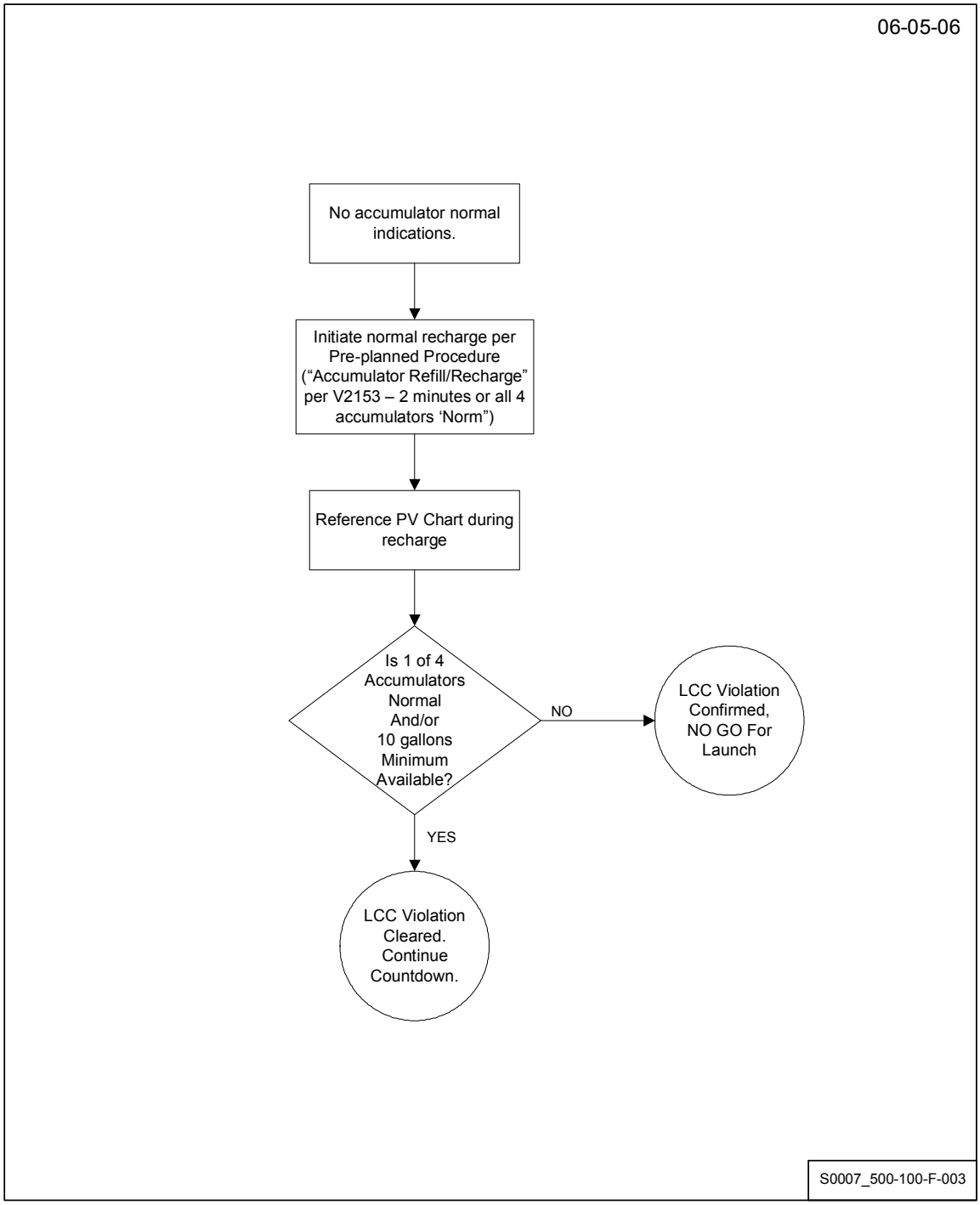
100-1

2700 PSIG GN_2 OAA Indication(s) Lost (SSID GSE-10)



100-2

OAA Accumulator Recharge Failure After Retract (SSID GSE-11)



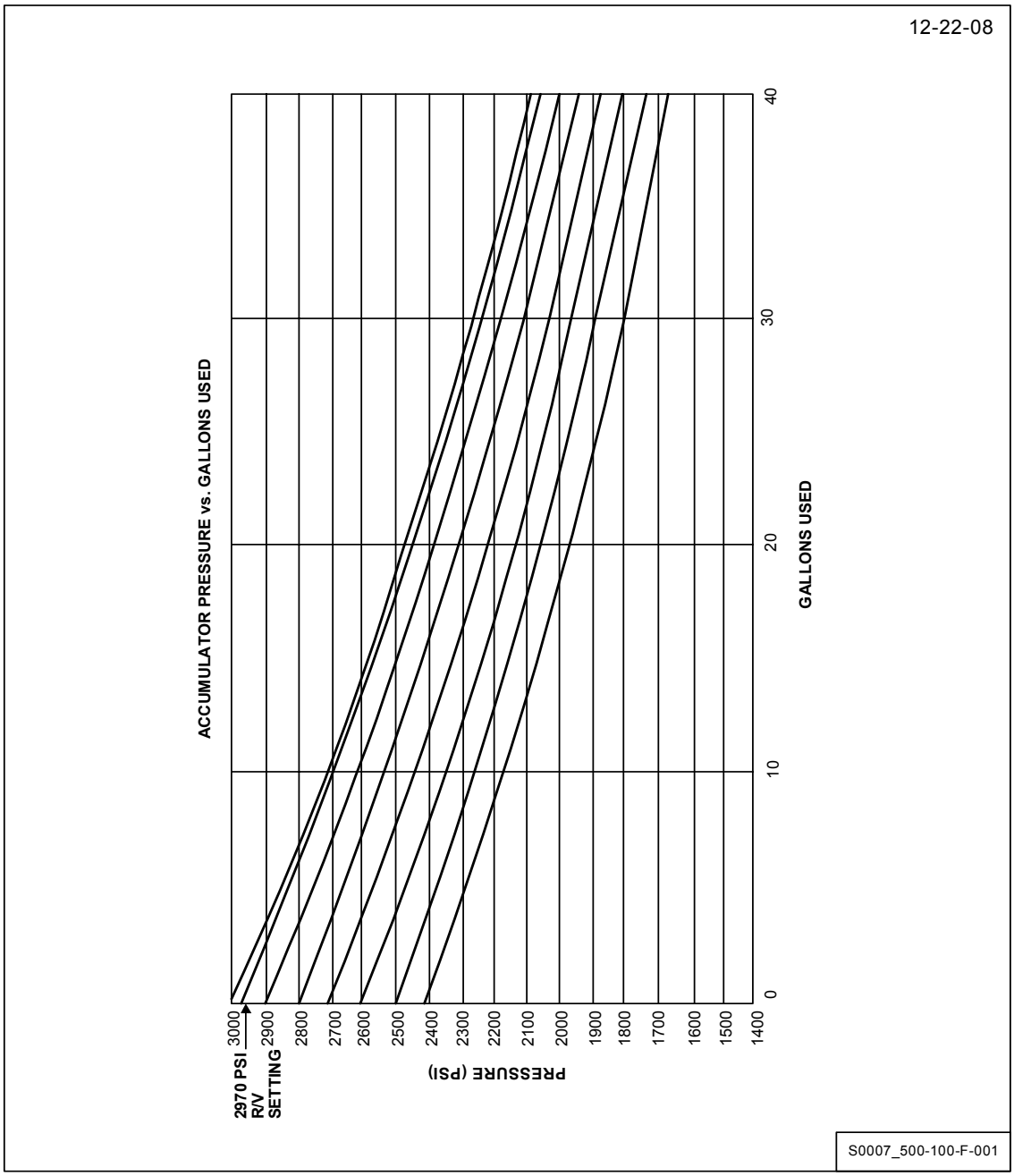
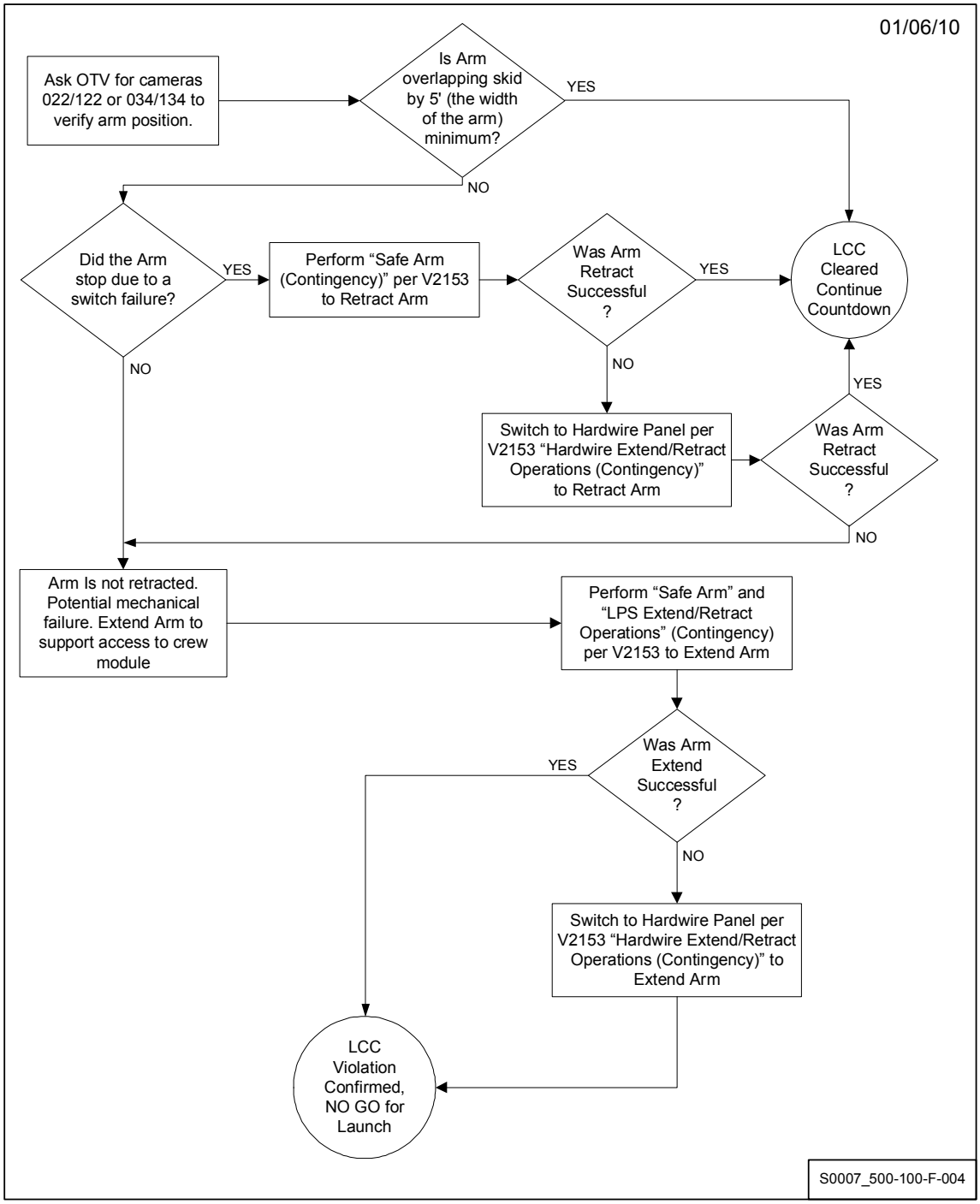


Figure 100-1 - OAA Accumulator Pressure vs. Volume

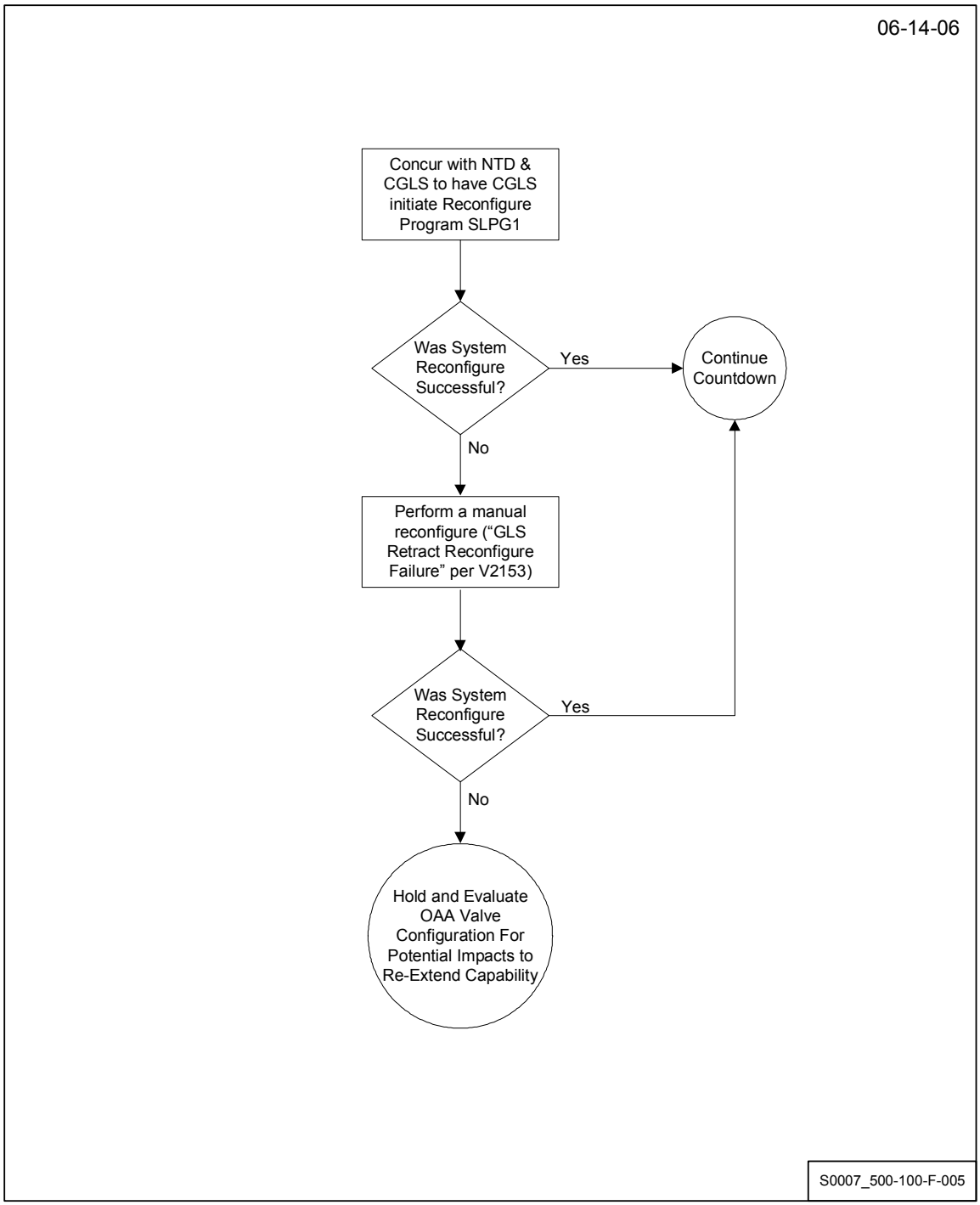
(For Reference Only)

100-3

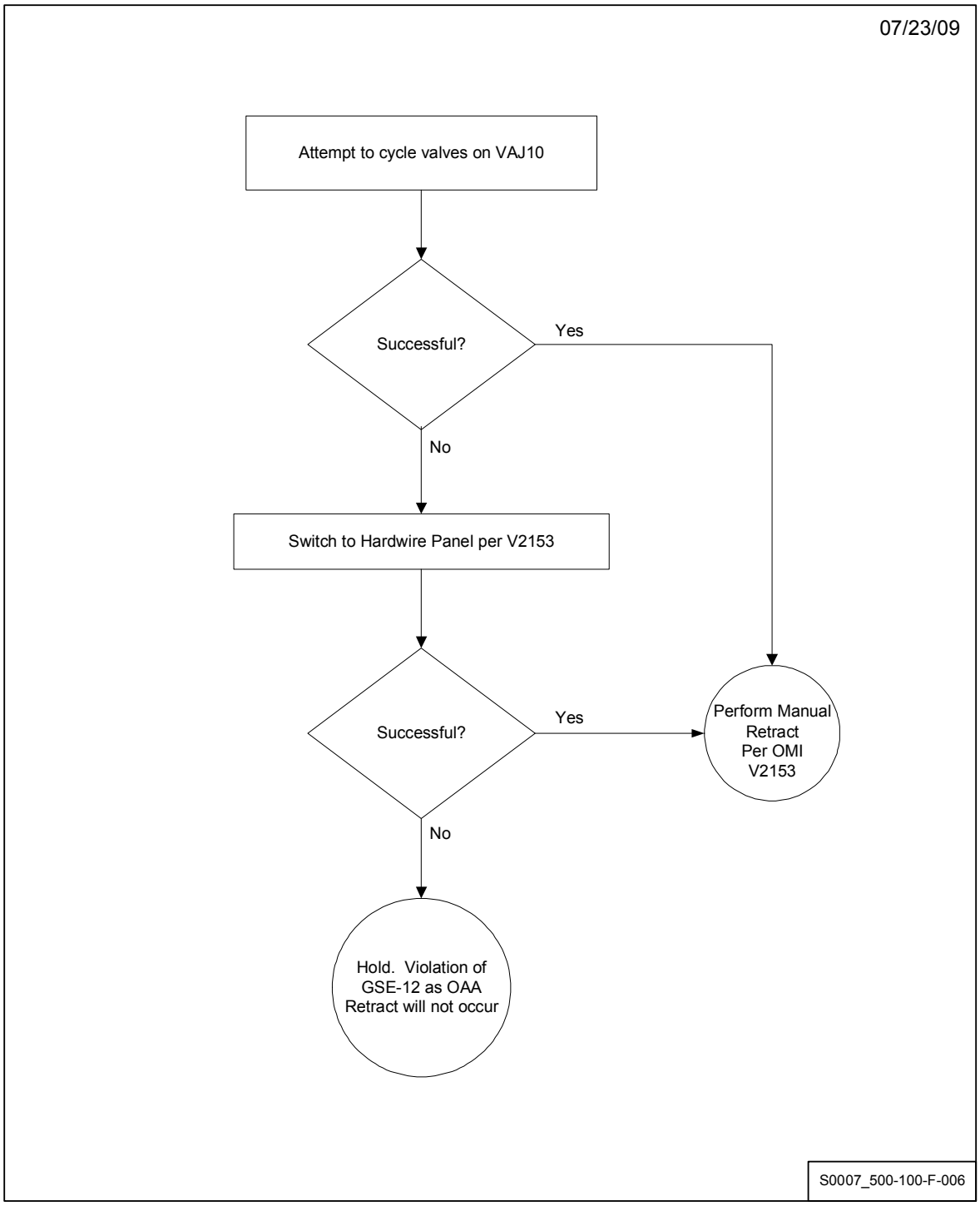
OAA Position Verification Failure After Retract (SSID GSE-12)



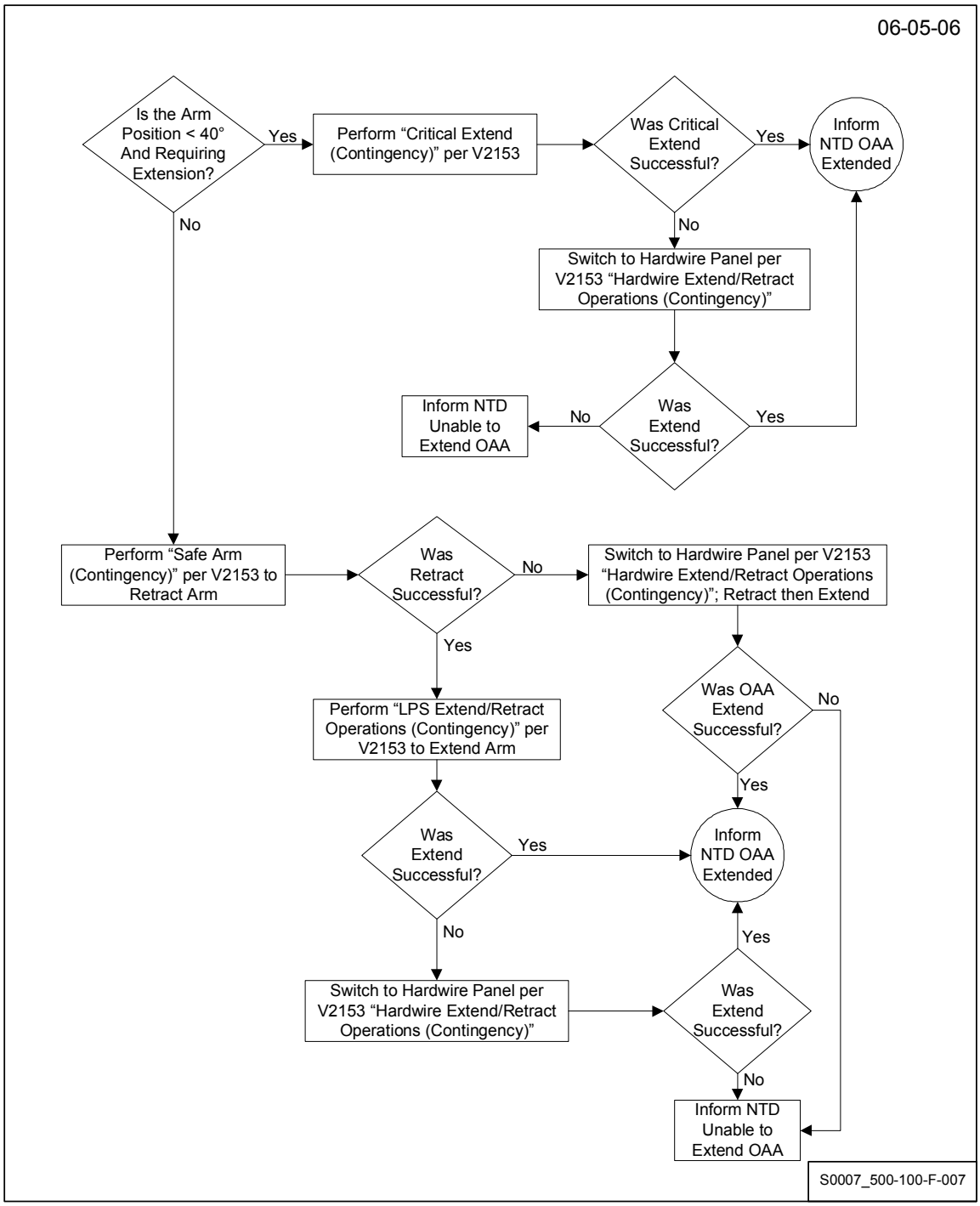
OAA Did Not Reconfigure (P005) After Retract



OAA Extend Lock/Retract Latch Failure at Retract

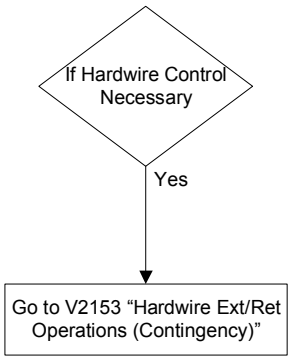


Emergency OAA LPS Extend Failure



OAA Safing Panel Operations

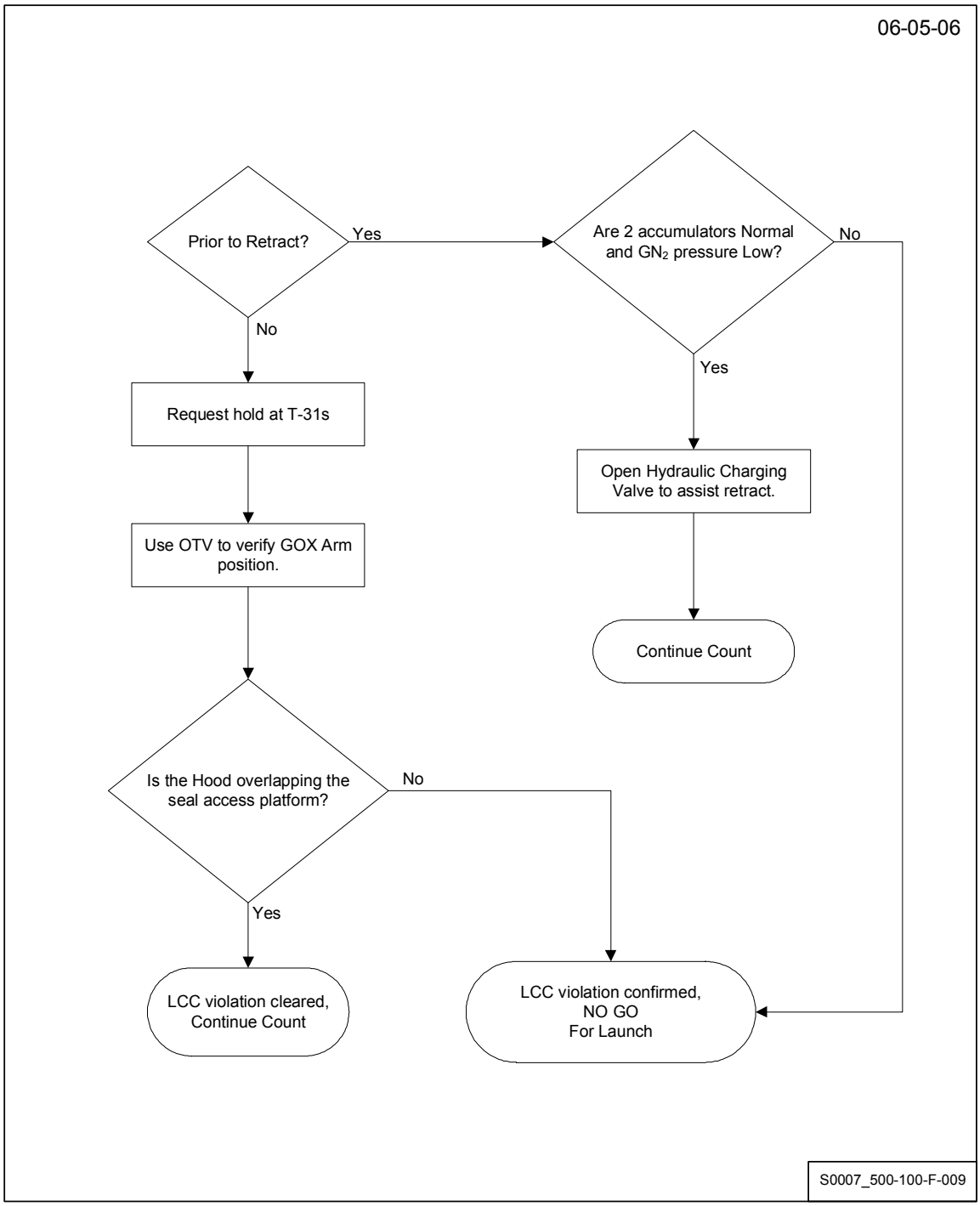
06-05-06



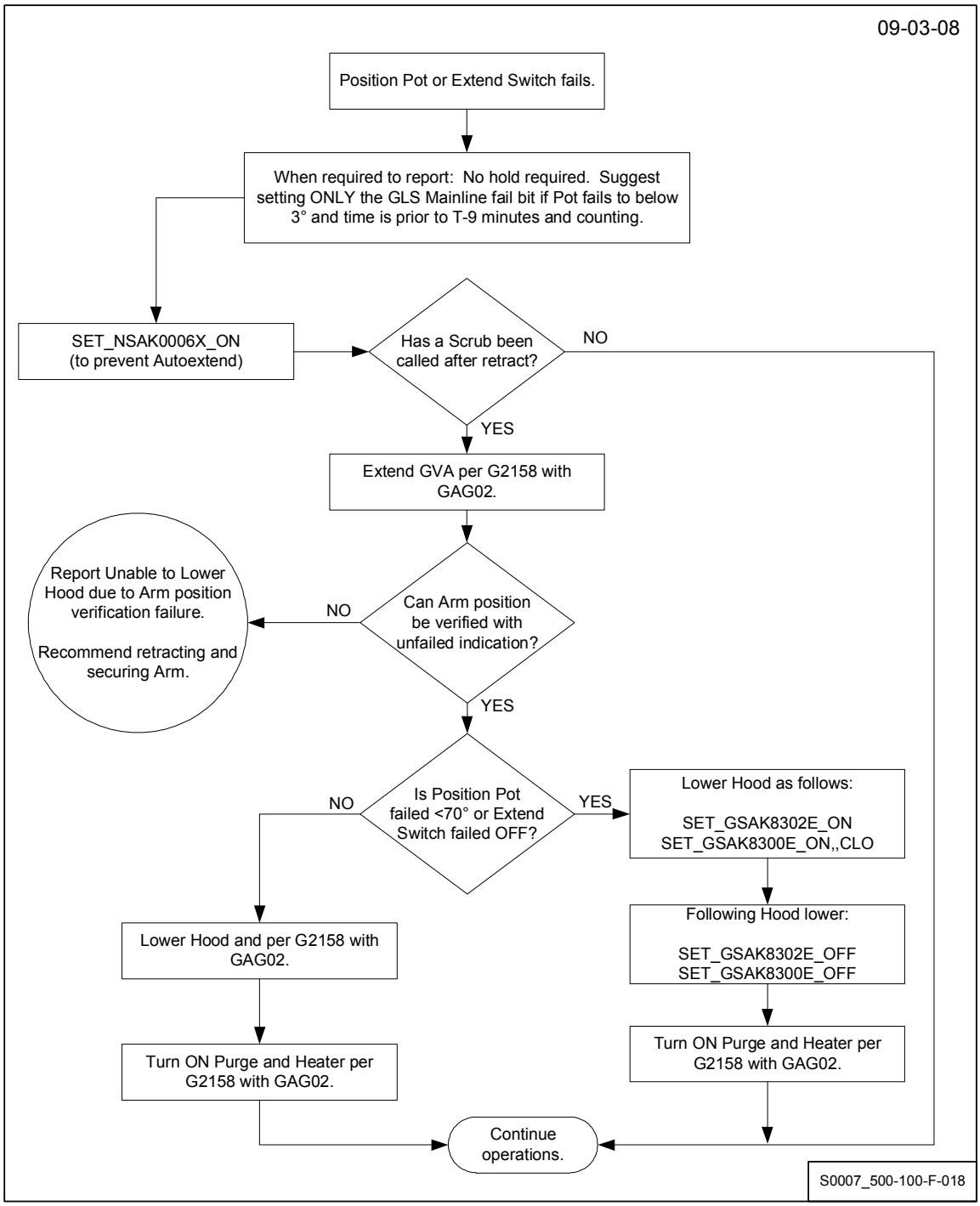
S0007_500-100-F-008

100-4

GVA Retract Anomaly (SSID GSE-13)

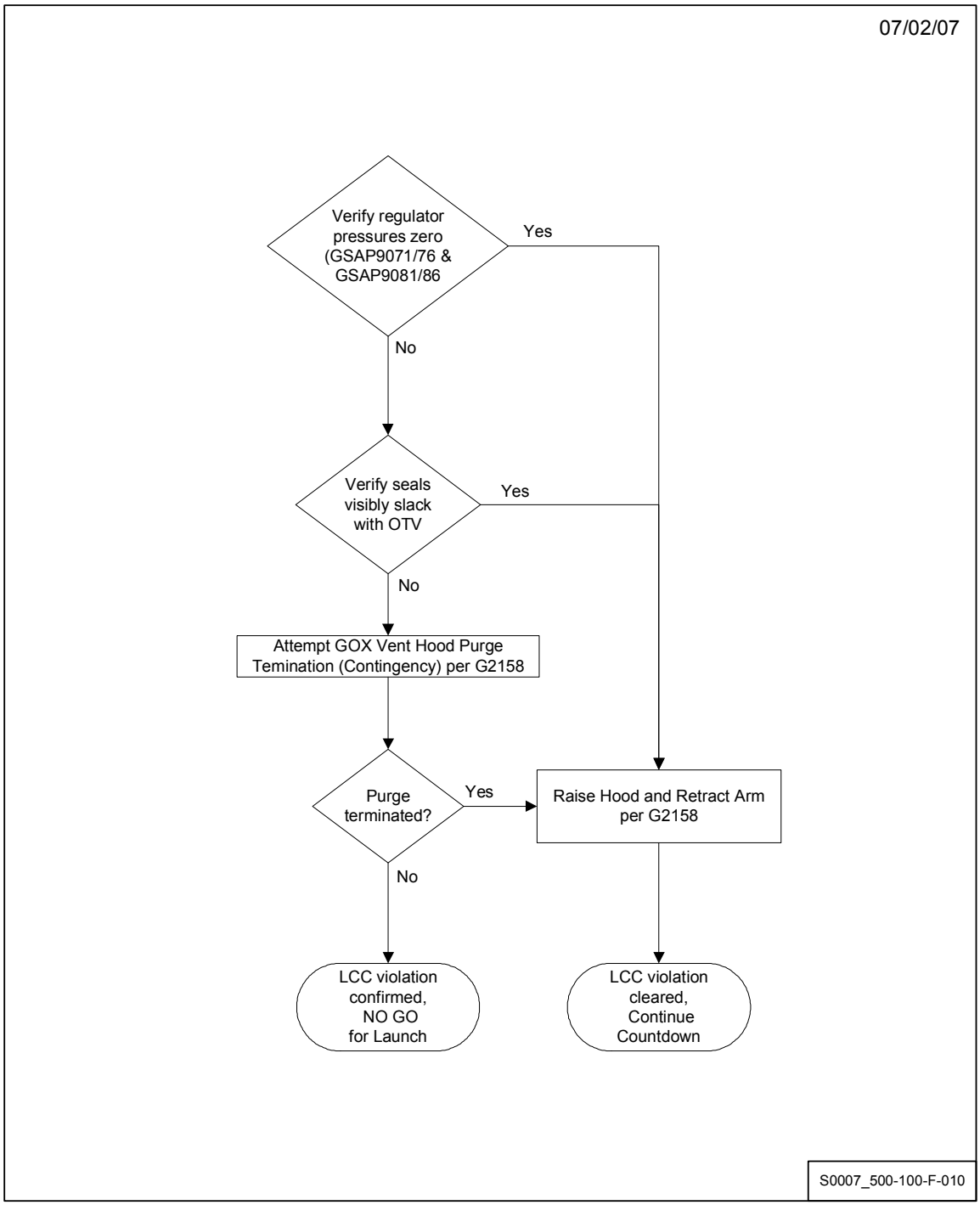


GVA Extend Indication Failure

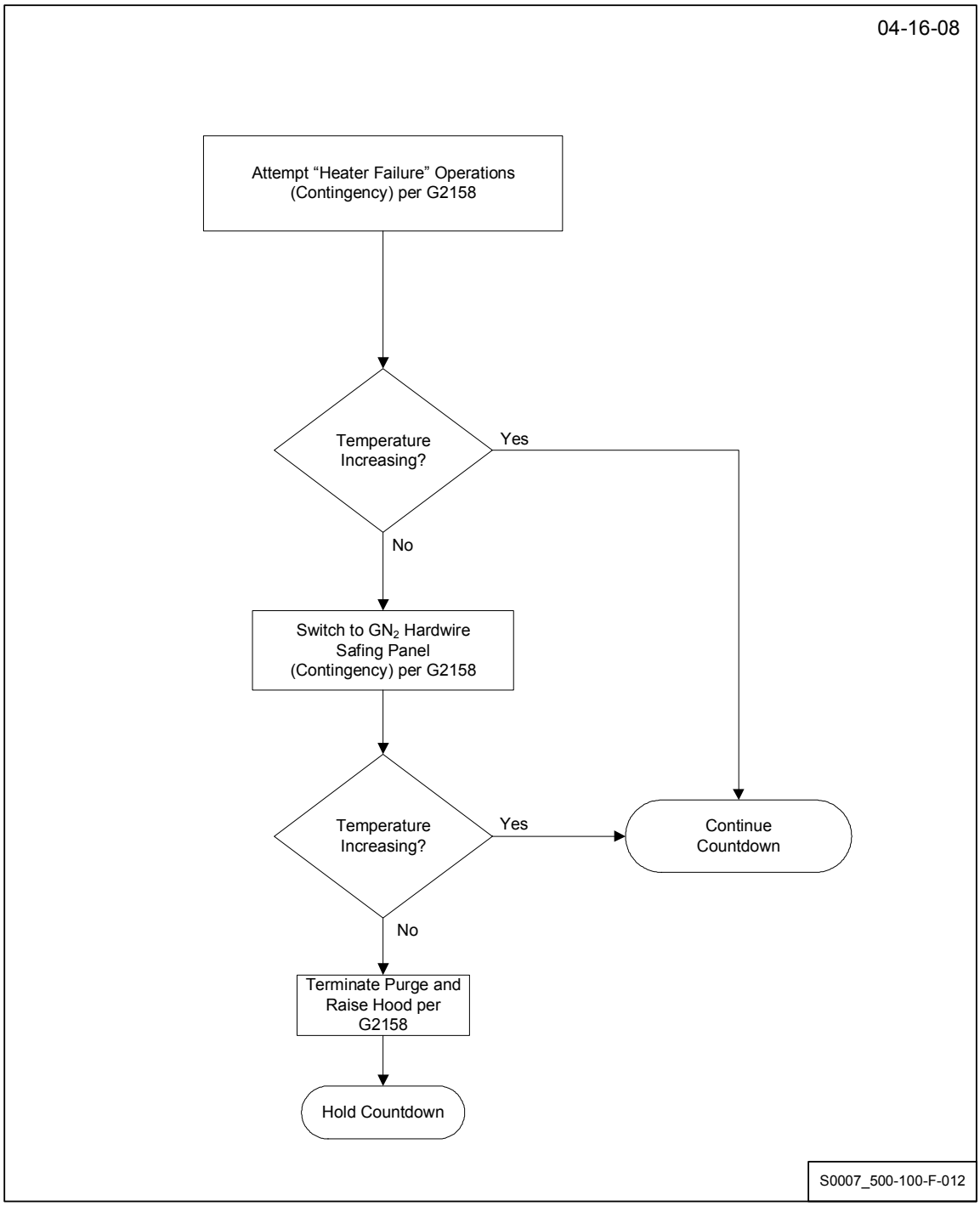


100-5

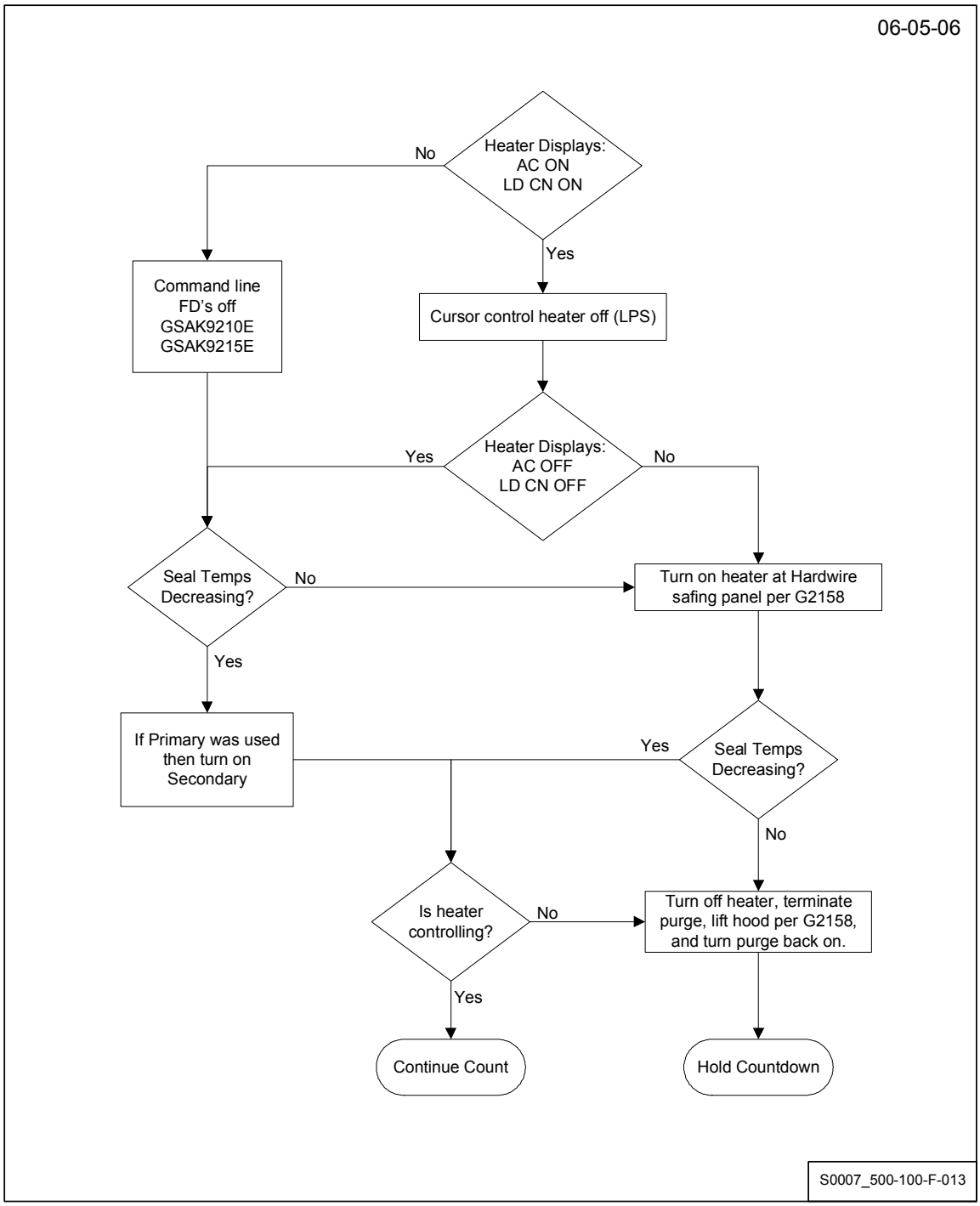
Purge Termination Failure by GLS (SSID GSE-27)



GN_2 Primary Heater Failed Off

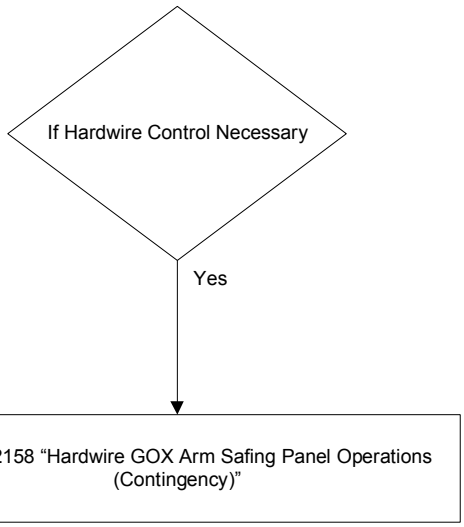


Runaway Heater



Loss of LPS-GVA Arm Safing Panel Operations

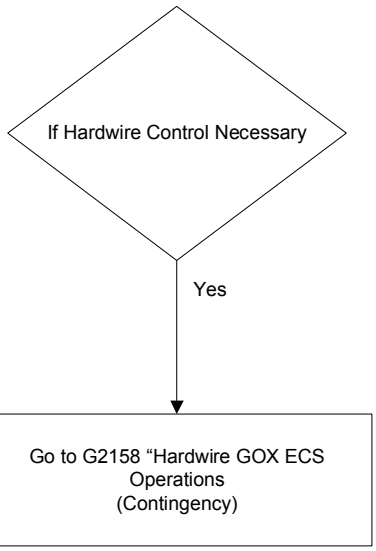
07/02/07



S0007_500-100-F-014

Loss of LPS-GN_2 Safing Panel Operations

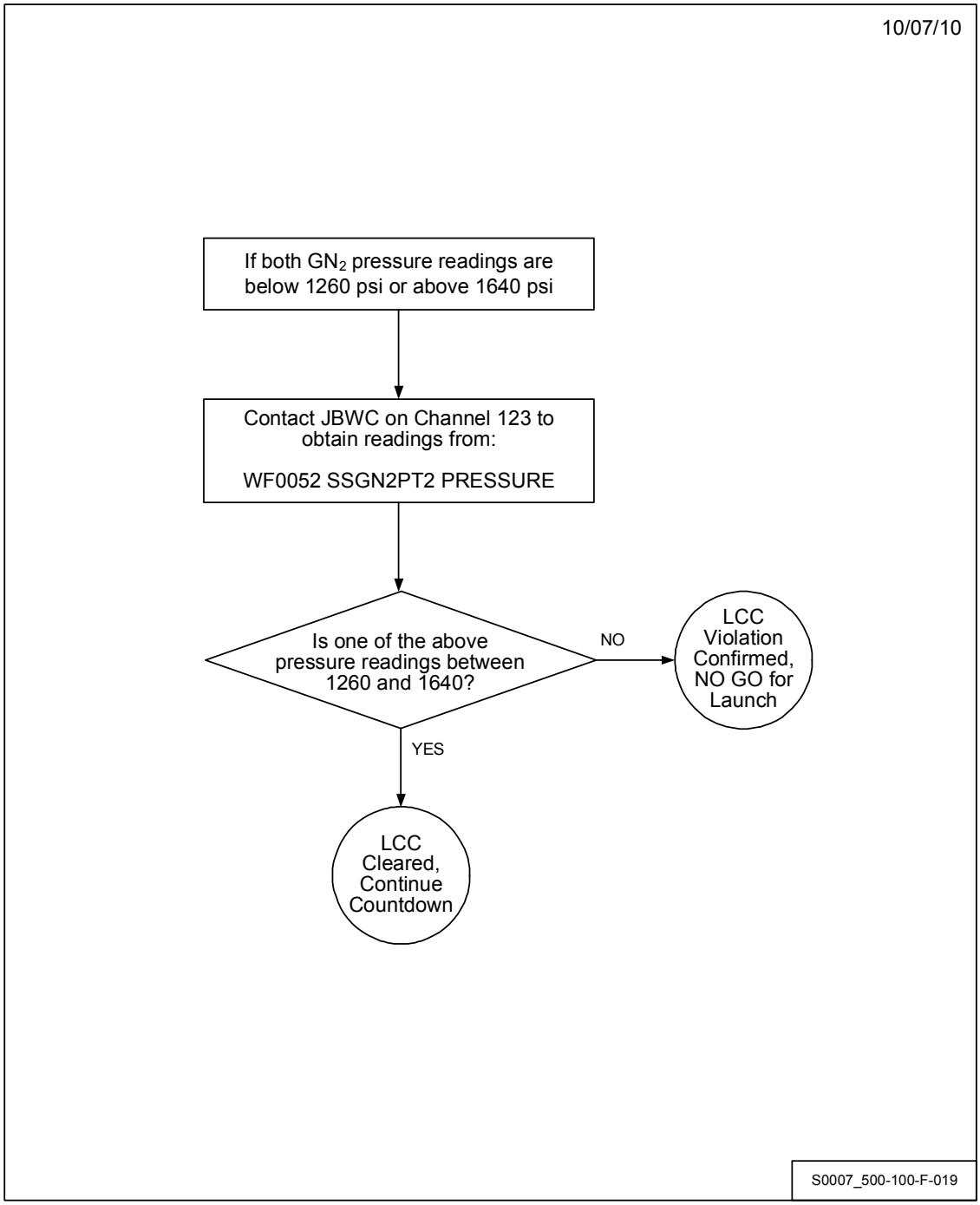
06-05-06



S0007_500-100-F-015

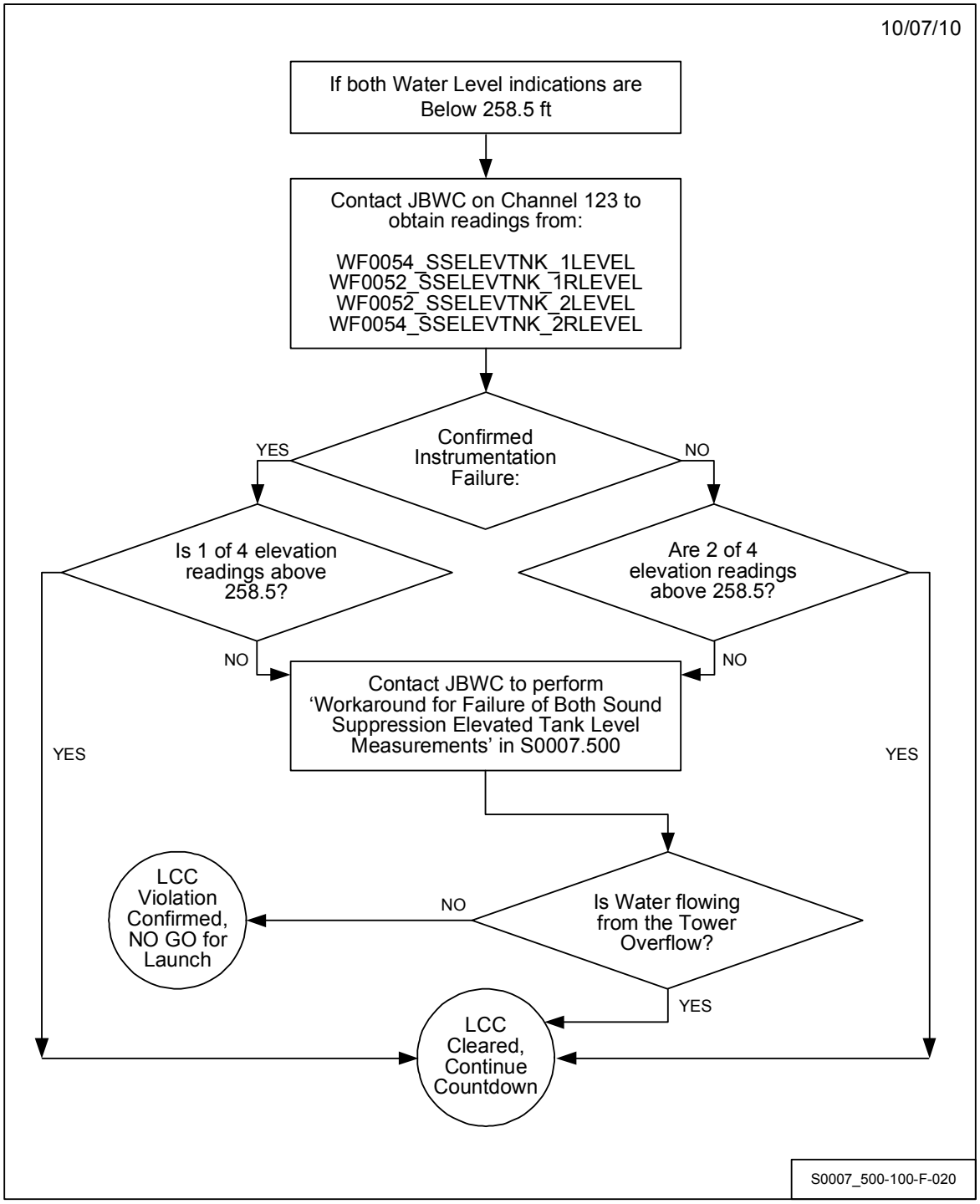
100-6

Sound Suppression Water Valve Actuation Pressure Anomaly (SSID GSE-14)



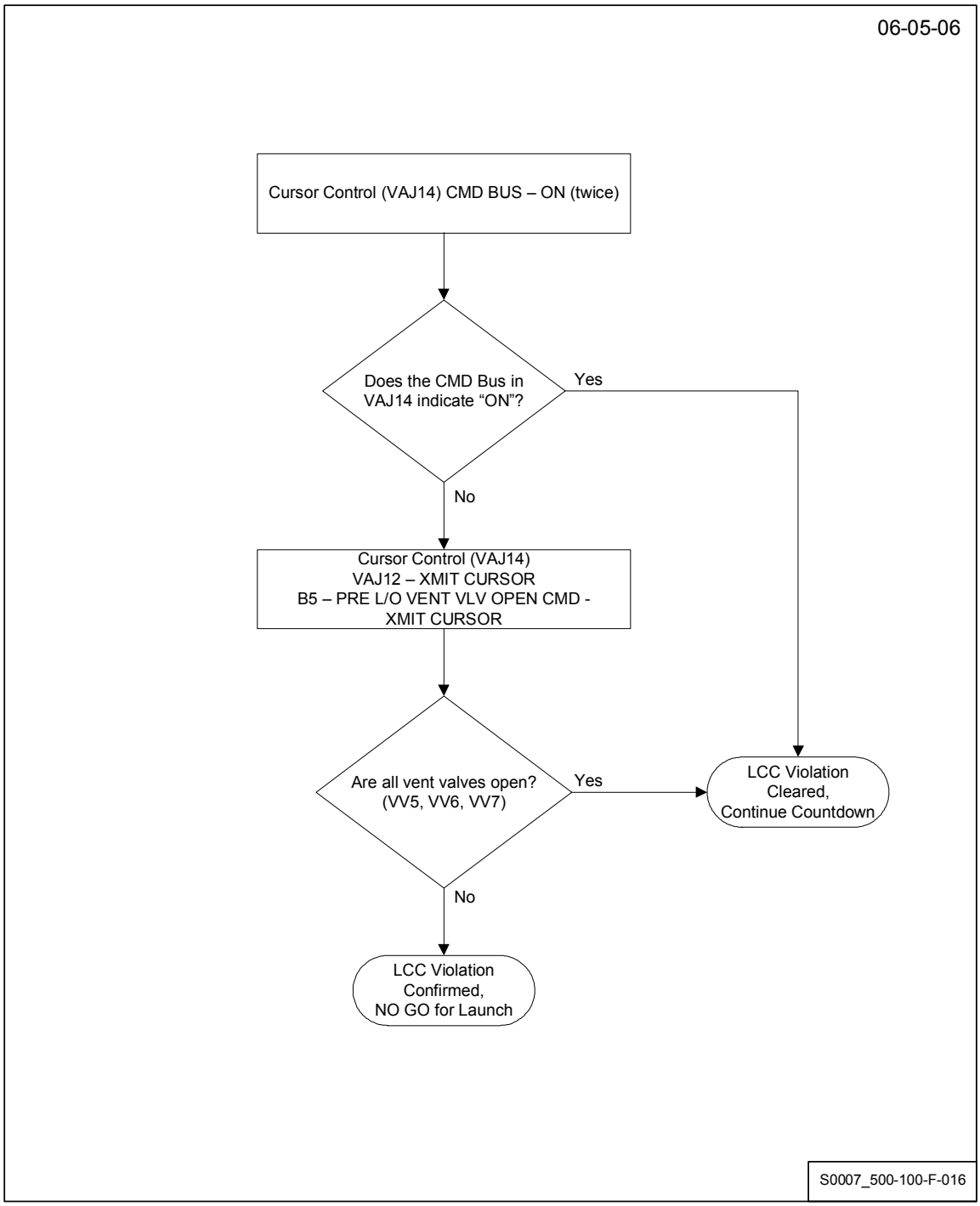
100-7

Sound Suppression Water Tank Level Anomaly (SSID GSE-15)



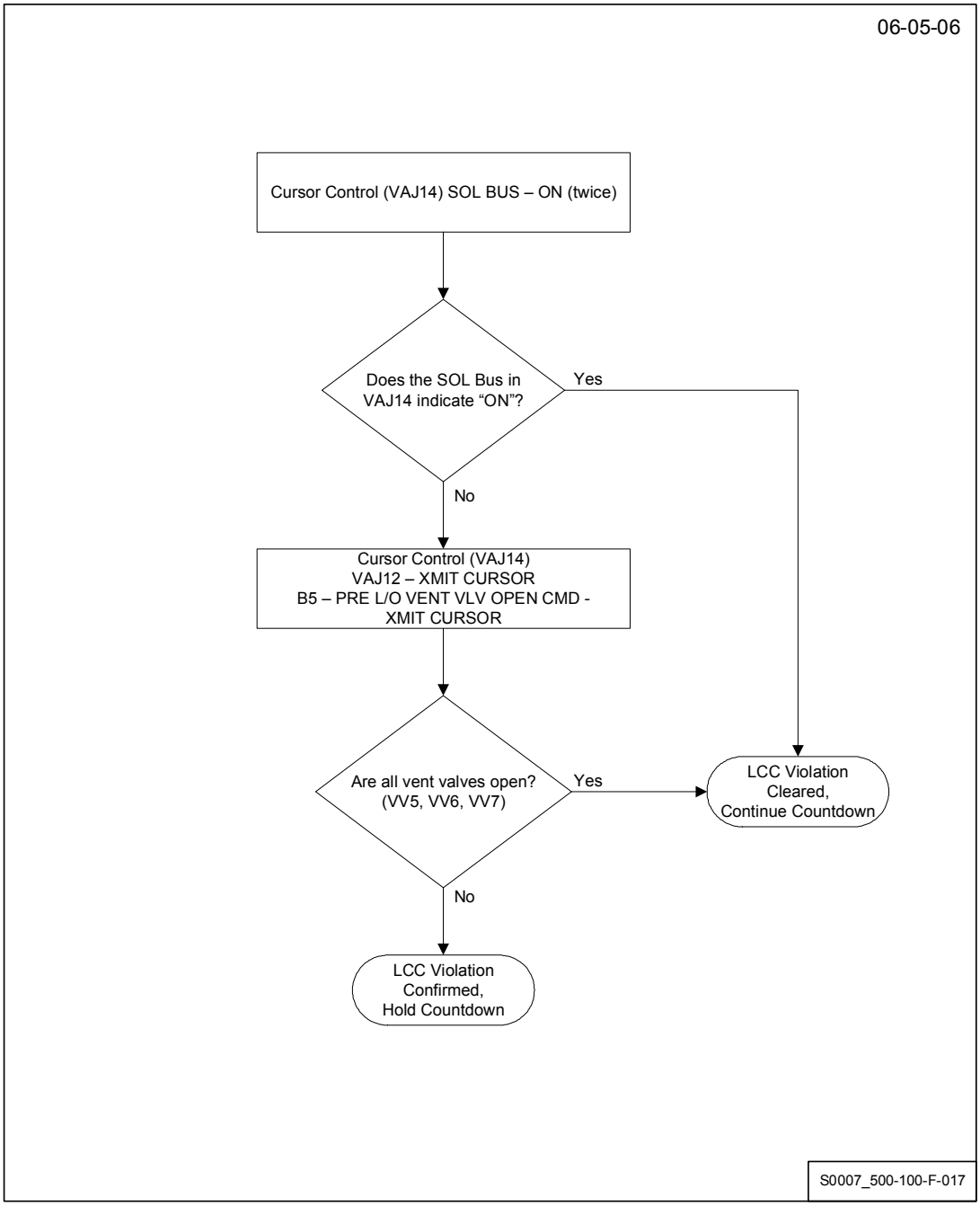
100-8

FR SS CMD Bus On Indicator Failure (SSID GSE-16)



100-9

SS SOL PWR Bus On Indicator Failure (SSID GSE-17)



*** End of Operation **100** ***

OPERATION 101 HGDS Operations - Contingency

Shop: **HWS**
Cntrl Rm Console: **C9**
OPR: **HWS**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.3**

Single Remote Control Workstation Failure

NOTE

Perform this option in the event that a single workstation fails due to internal power supply failure, hard drive failure, network card failure, and/or any failure associated with any functional loss of remote command and monitor functions directly attributed to the workstation. The first step of the troubleshooting plan is to connect using the laptop that was setup during S0007.200 for the failed workstation that has the preloaded HGDS 2000 software. If that does not work, HGDS Engineering will try to connect using a known working workstation. The final troubleshooting step will be to attempt a VME reset.

Single Remote Control Workstation Failure Not Performed:_____

101-1 **CHGD**

Verify the failed workstation is _____ (HGDSA or HGDSB).

101-2 **CHGD**

Verify HGDS applications are up and not disconnected.

101-3 **CHGD**

IF cannot connect,

THEN verify that the laptop which is connected to the same system that failed works.

Not Performed:_____

101-4 **CHGD**

IF the laptop does not work,

THEN try to connect to the correct system with a known working workstation in the active firing room or in an inactive firing room.

Not Performed:_____

101-5 **CHGD**

IF connection made with a known working workstation,

THEN problem located at LCC ATXS network and an IMCS trouble ticket needs to be taken.

Record Trouble Ticket Number_____

Not Performed:_____

101-6 **CHGD**

IF connection cannot be made with a known working workstation,

THEN perform a VME reset on the associated system.

Not Performed:_____

101-7 **CHGD**

IF VME test does not work,

THEN an IPR must be taken.

Not Performed:_____

***** End of Single Remote Control Workstation Failure *****

Dual Remote Control Workstation Failure

NOTE

Perform this option in the event that both workstations fail due to internal power supply failure, hard drive failure, network card failure, and/or any failure associated with any functional loss of remote command and monitor functions directly attributed to the workstations. The first step of the troubleshooting plan is to connect using the laptops that were setup during S0007.200 for the failed workstations that have the preloaded HGDS 2000 software. If that does not work, HGDS Engineering will try to connect using a known working workstation.

Dual Remote Control Workstation Failure Not Performed:_____

101-8 **CHGD**

Verify HGDS applications are up and not disconnected.

101-9 **CHGD**

IF cannot connect,

THEN verify that the laptops work.

Not Performed:_____

101-10 **CHGD**

IF the laptops do not work,

THEN try to connect each system with a known working workstation in the active firing room or in an inactive firing room.

Not Performed:_____

101-11 **CHGD**

IF connection made with a known working workstation,

THEN problem located at LCC ATXS network and an IMCS trouble ticket needs to be taken.

Record Trouble Ticket Number_____

Not Performed:_____

101-12 **CHGD**

IF connection cannot be made with a known working workstation,

THEN an IPR must be taken.

Not Performed:_____

***** End of Dual Remote Control Workstation Failure *****

101-13 **CHGD**

Verify the lights are blinking for the network connection located on the side of the laptop.

101-14 **CHGD**

Enable the "Controller" check box on the main page.

101-15 **CHGD**

Start recording file on the recording page.

File name _____

101-16 CHGD OTC 132

HGDS Remote Workstation R/R complete. LPS advisory data from system _____(HGDSA or HGDSB) is _____(Available/Unavailable).

***** End of Remote Control Workstation Failure *****

ETFC Failure

NOTE

If the HGDS 2000 LPS advisory is not working correctly, request that LPS Master Console move the CDL1 FEP to Source 2 for HGDS 2000 monitoring. IF this does not work, then any further troubleshooting will take place within LPS.

ETFC Failure Not Performed:_____

101-17 **CHGD OTC 132**
OTC LPS

IF ETFC data valid status is "Off" for either workstation,

THEN request assistance from LPS for a problem with the HGDS ETFC troubleshooting on Channel 177.

Not Performed:_____

NOTE

If the problem still exists after the above troubleshooting it will be necessary to move the CDL1 FEP to Source 2 for HGDS 2000 monitoring.

101-18 **CHGD LPS**

IP HGDS A and HGDS B to Inactive FR ETFC.

101-19 **CHGD LPS**

CDL1 FEP select Source 2.

101-20 **CHGD**

PGCOAL Display "HWSET"

Record ETFC Data Valid Status

HGDSA ETFC _____ (On or Off)

HGDSB ETFC _____ (On or Off)

101-21 **CHGD**

IF ETFC Data Valid Status is "On",

THEN troubleshooting ETFC complete.

LPS advisory data from system _____ (HGDSA or HGDSB) is available.

Not Performed:_____

***** End of ETFC Failure *****

EGRESS Confidence Off Indication - T/S

NOTE
This operation will perform evaluation for a failed EGRESS Fire Detector indication upon receiving an LPS indication of sensor Confidence OFF indication.

101-22 **CHGD** **OTC** **232**

EGRESS Fire Detector ____ Confidence indication changed from ON to OFF. Should be ON.
No LCCs affected. Notify CGSS that sensor is suspect.

101-23 **CHGD**

SAW01/HWW16
Observe power indications and state of surrounding EGRESS Fire and Temperature Detectors.

Record status:_____

_____

NOTE
The following steps will only be performed following problem notification and concurrence of OTC, NTD, SPE and CGSS to proceed.

101-24 **CHGD** **OTC** **232**

Request concurrence to perform a Self-Test on EGRESS Fire Detector ___

101-25 **OTC** **NTD**
CSPE
CGSS

CHGD will perform a Self-Test of EGRESS Fire Detector ___ momentarily. Ignore all alarm indications until testing complete.

101-26 **OTC** **CHGD**

You have concurrence to perform Self-Test on EGRESS Fire Detector ___. Upon completion, report results

101-27 **CHGD**

SAW01/HWW16
EGRESS Fire Detector ___
STC Cursor Control Key - Press (toggles to activate Self-Test)

Record Results:	PRI HIM:	ALRM	ON / OFF
		CONF	ON / OFF
		SELF	ON / OFF
	SEC HIM:	ALRM	ON / OFF
		CONF	ON / OFF
		SELF	ON / OFF

101-28

SAW01/HWW16
EGRESS Fire Detector ___
STC Cursor Control Key - Press (toggles to inhibit Self-Test)

Record Results:	PRI HIM:	ALRM	ON / OFF
		CONF	ON / OFF
		SELF	ON / OFF
	SEC HIM:	ALRM	ON / OFF
		CONF	ON / OFF
		SELF	ON / OFF

NOTE

HWS will evaluate ability of EGRESS Fire Detector tested to reliably report status of a fire based on the following guidelines:

Fire Detector will reliably detect and report a fire if it successfully indicated ALRM ON when Self-Test was activated regardless of state of CONF. If there is a successful response for only PRI HIM or SEC HIM, HWS will recommend CGSS use only HIM alarm data from the response HIM and ignore the response from the other one.

When the Fire Detector does NOT respond with ALRM ON to a Self-Test and there is no other indication such a redundant Fire Detector and/or Temperature Detector along with there being NO indication of an external cause, HWS will report that the sensor has failed, that the problem is confirmed instrumentation and indicate if this causes a violation for minimum sensor requirements required per Requirement S00FA0.820.

101-29 **CHGD** **OTC**

IF results of CHGD testing do not verify confirmed instrumentation failure or indicate that EGRESS Fire Detector's ability to reliably respond to fire has diminished,

THEN Request OTV coverage of EGRESS Fire Detector ___ surrounding areas. Report any indication of external cause of sensor failure such as damaged cabling, fire, etc.

Results:_____

_____

Not Performed:_____

101-30 CHGD OTC

Status of EGRESS Fire Detector ___ is as follows:

_____

_____

_____

_____

CHGD recommends:_____

_____

***** End of EGRESS Confidence Off Indication - T/S *****

RLDS Calibration Gas Check for Hydrogen Leakage

NOTE

The following steps perform a calibration gas verification when an RLDS hydrogen leak is close to redline limits.

This test is applicable to any time during the Countdown, including built-in holds and Terminal Count.

This test is generic for all RLDS and only one leak detector may be used in the redundant set to maintain a fresh sample to the cabinet.

RLDS Calibration Gas Check for Hydrogen Leak Not Performed:_____

101-31 CHGD NTD 212

Performing RLDS Calibration Gas Verification for Hydrogen Leakage.

101-32 CHGD

Remote Leak Detector System

1. **Record** System _____ (6145 or 6407)
2. **Record** Leak Detector _____ (23, 25, 28, 32, 56 or 57)
3. **Record** Sample line area Hydrogen _____ PPM
4. **Select** Zero Gas.
5. **Record** Zero Gas Hydrogen _____ PPM.
6. **Select** Span Gas.
7. **Record** Span Gas Hydrogen _____ PPM.
8. **Select** Sample line area.

9. **Record** Sample line area Hydrogen _____ PPM.

10. **Zero Gas Corrected Data**

Corrected Span Gas Hydrogen _____PPM

Corrected Sample line area Hydrogen _____ PPM

101-33 CHGD NTD 212

Corrected Sample line area Hydrogen is _____ PPM.

***** End of RLDS Calibration Gas Check for Hydrogen Leak *****

HGDS 2000 Transport Pump 1 Failure

NOTE

This option will be performed in the event that the HGDS 2000 Transport Pump 1 fails. As soon as the operator is aware of the failure, Transport Pump 2 will be selected and the sample flows and pressures will be verified as nominal. This option is applicable at any time during the Countdown, including built-in holds and Terminal Count.

HGDS 2000 Transport Pump 1 Failure Not Performed:_____

101-34 **CHGD**

HGDS 2000 System

Select Transport Pump 2.

101-35 **CHGD**

HGDS 2000 System

Verify that sample flows and pressures return to nominal.

101-36 **CHGD** **NTD** **212**

HGDS 2000 Transport Pump 1 failed. Switched to Transport Pump 2. All sample flows and pressures have been verified as nominal. HGD is Go for Launch.

***** End of HGDS 2000 Transport Pump 1 Failure *****

*** End of Operation **101** ***

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OPERATION 102 ET

Shop: **LO2/LH2**
Cntrl Rm Console: **C3, C4**
OPR: **LO2/LH2**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **1.0**

NOTE

CIF indicates a preplanned procedure for confirmation of instrumentation failure.

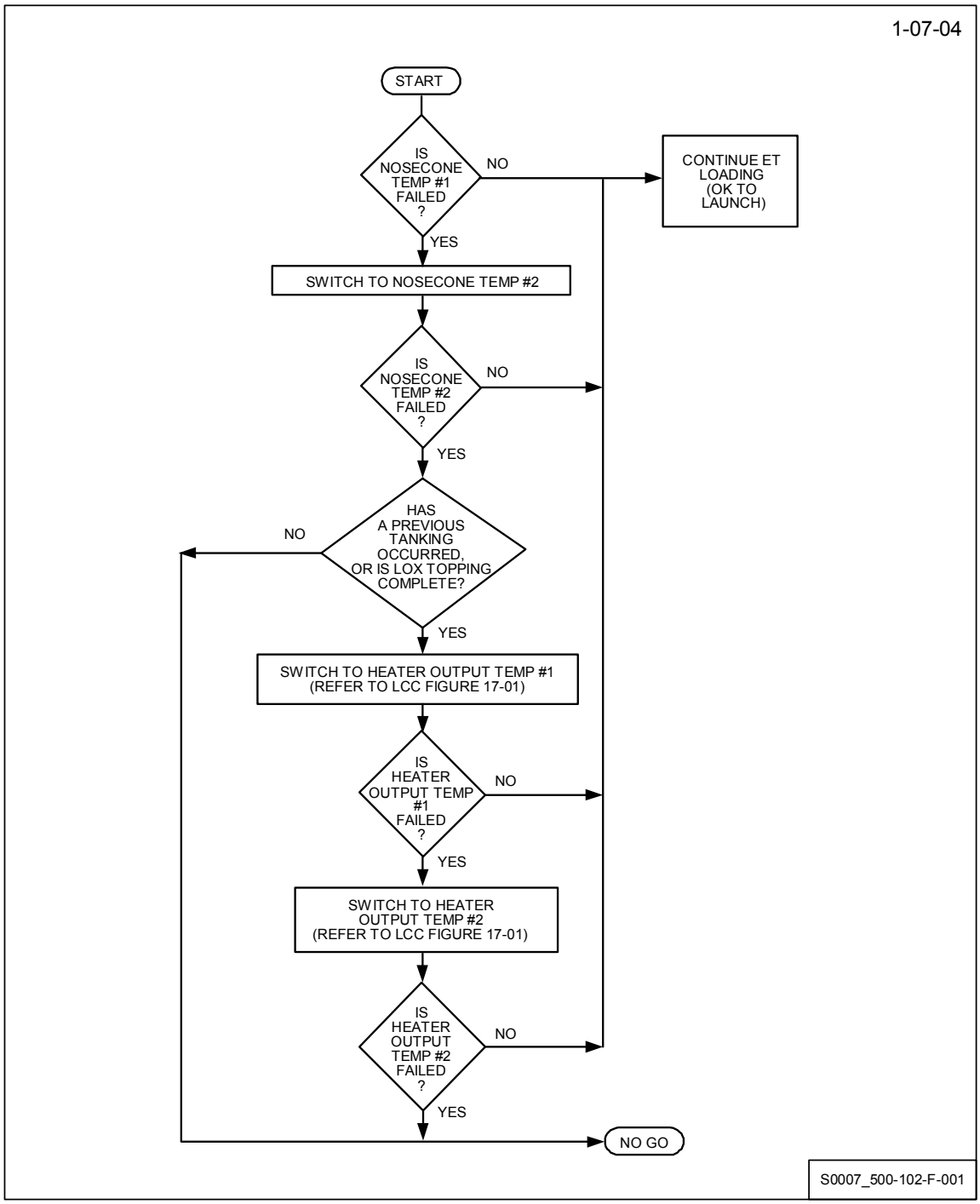
ET LO_2/LH_2

NOTE

This Operation contains logic flow diagrams for ET LO_2 and LH_2 preplanned procedures for apparent Launch Commit Criteria violations. Detailed work steps for these procedures, as well as non-LCC contingency procedures, are contained in S1003 and S1004.

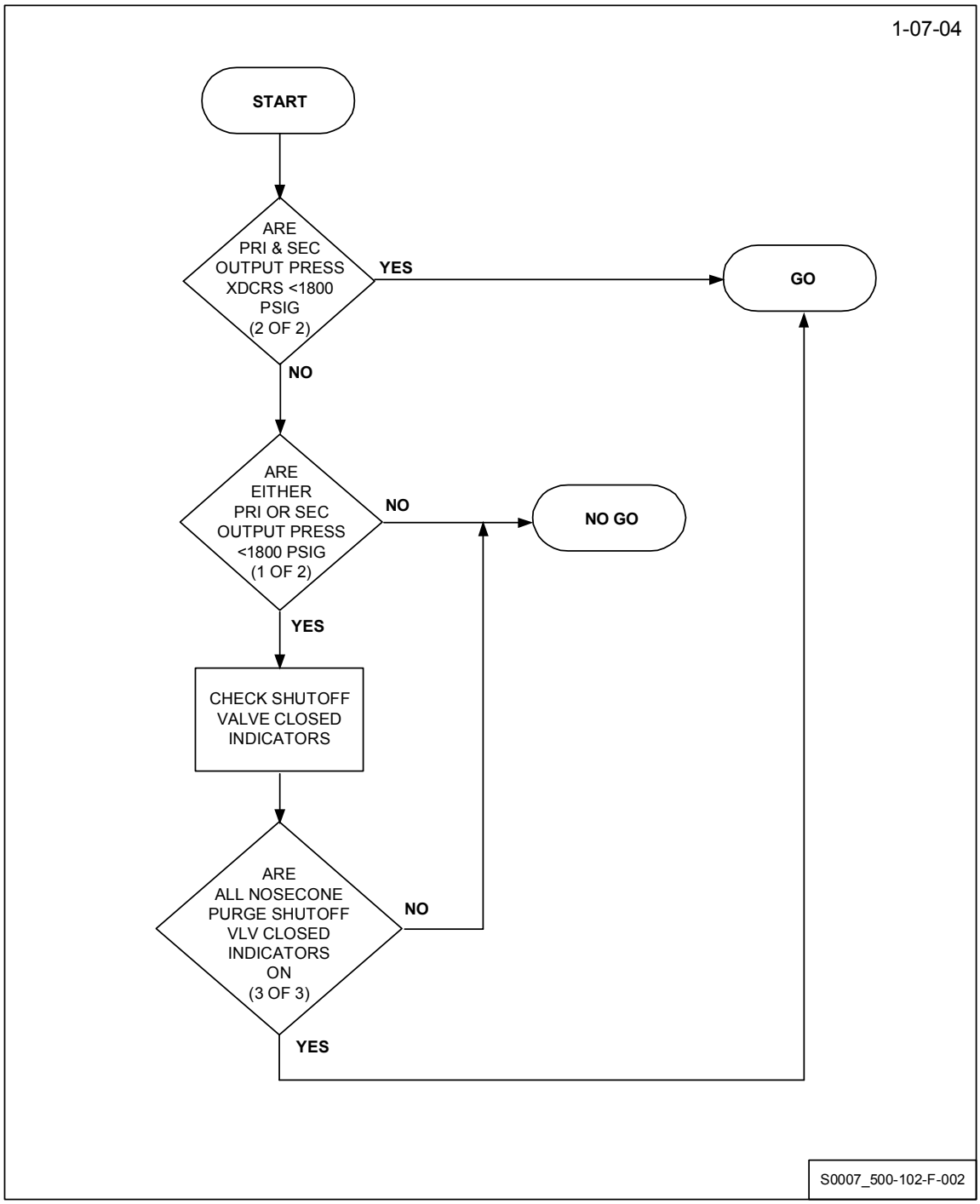
102-1

ET Nosecone Purge Temperature (Switch to Heater Output Control) (CIF) (SSID ET-01) (T-6 hrs thru T-1 min 15 sec)



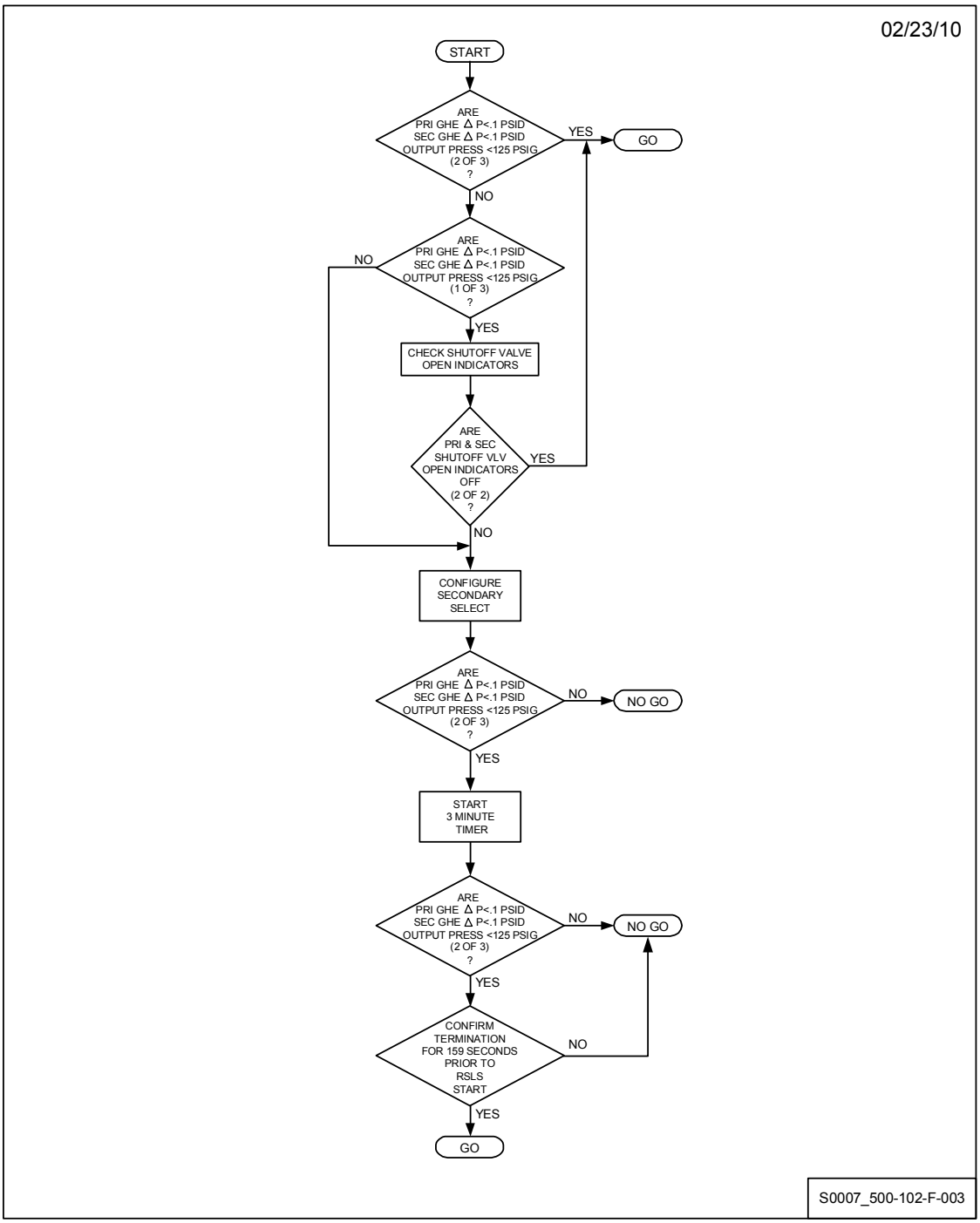
102-2

ET Nosecone Purge Termination (CIF) (SSID ET-02) (T-1 min15 sec)



102-3

ET LO_2 Helium Inject Termination (CIF) (SSID ET-03) (T-200 sec thru T-31 sec)



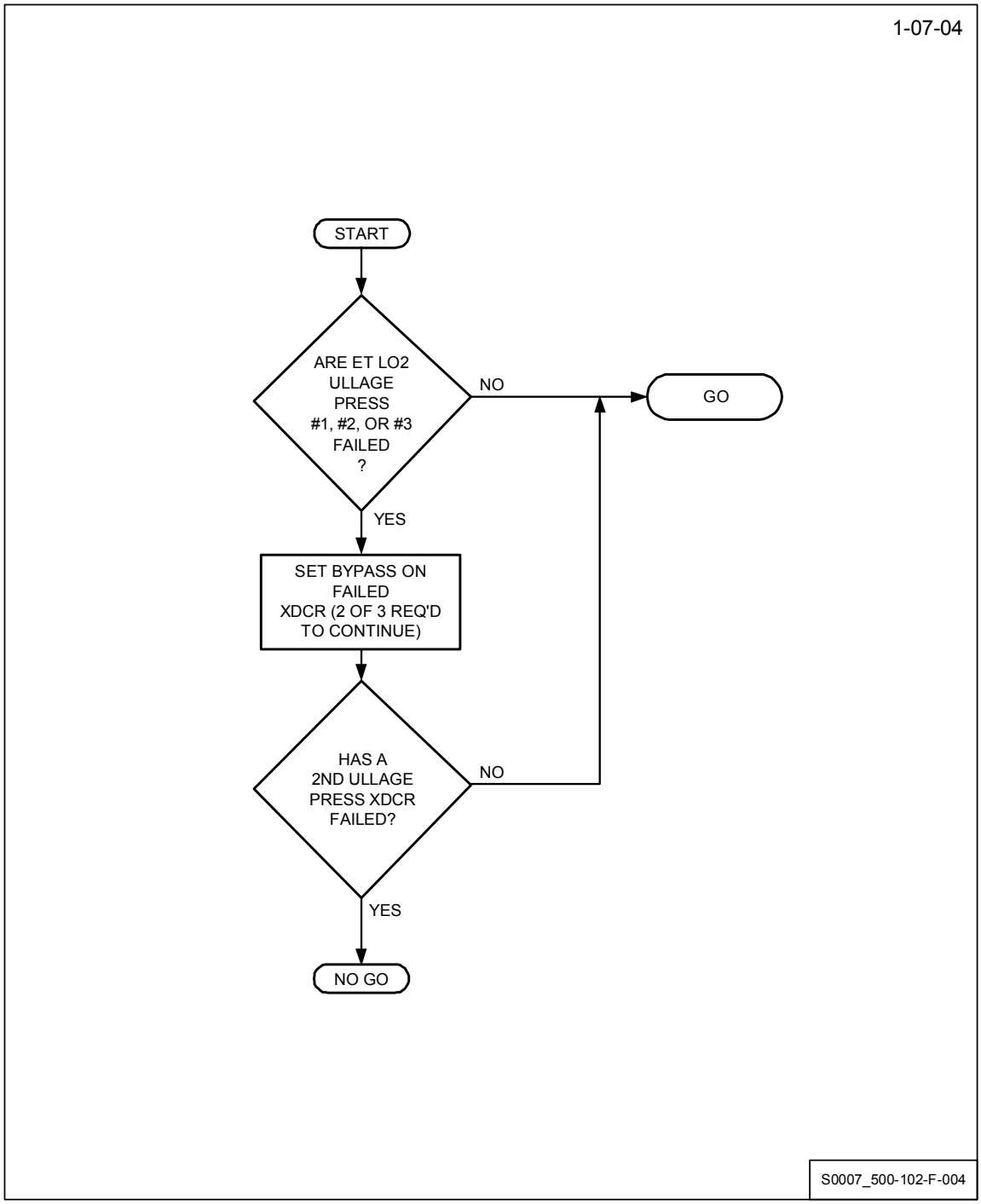
102-4

ET LH_2 Ullage Pressure Switchout (CIF) (SSID ET-05)

NOTE
S1004 contains preplanned procedure to switch in spare ullage pressure transducer to replace failed transducer (prior to Terminal count only).

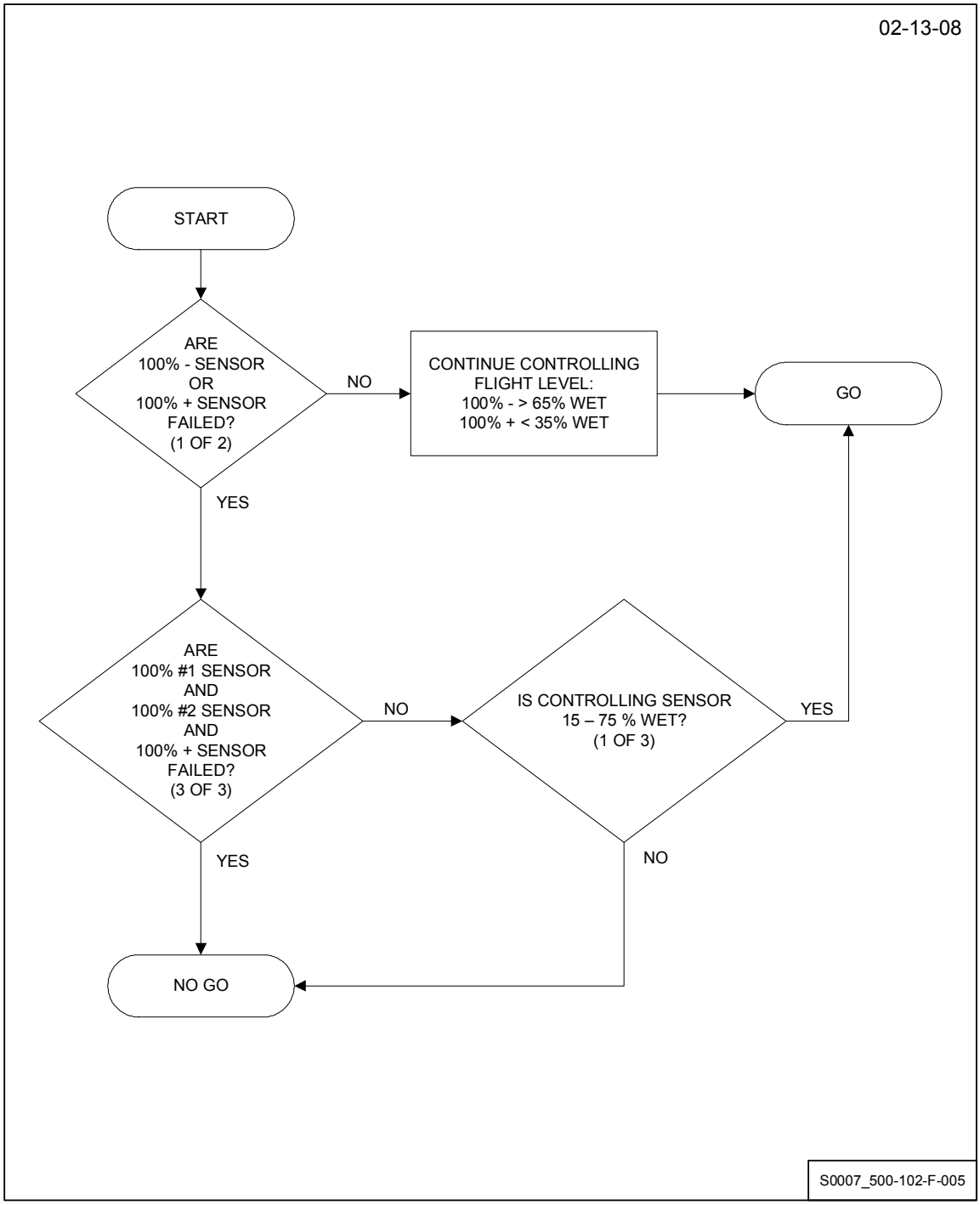
102-5

ET LO_2 Ullage Pressure Failure (CIF) (SSID ET-06)



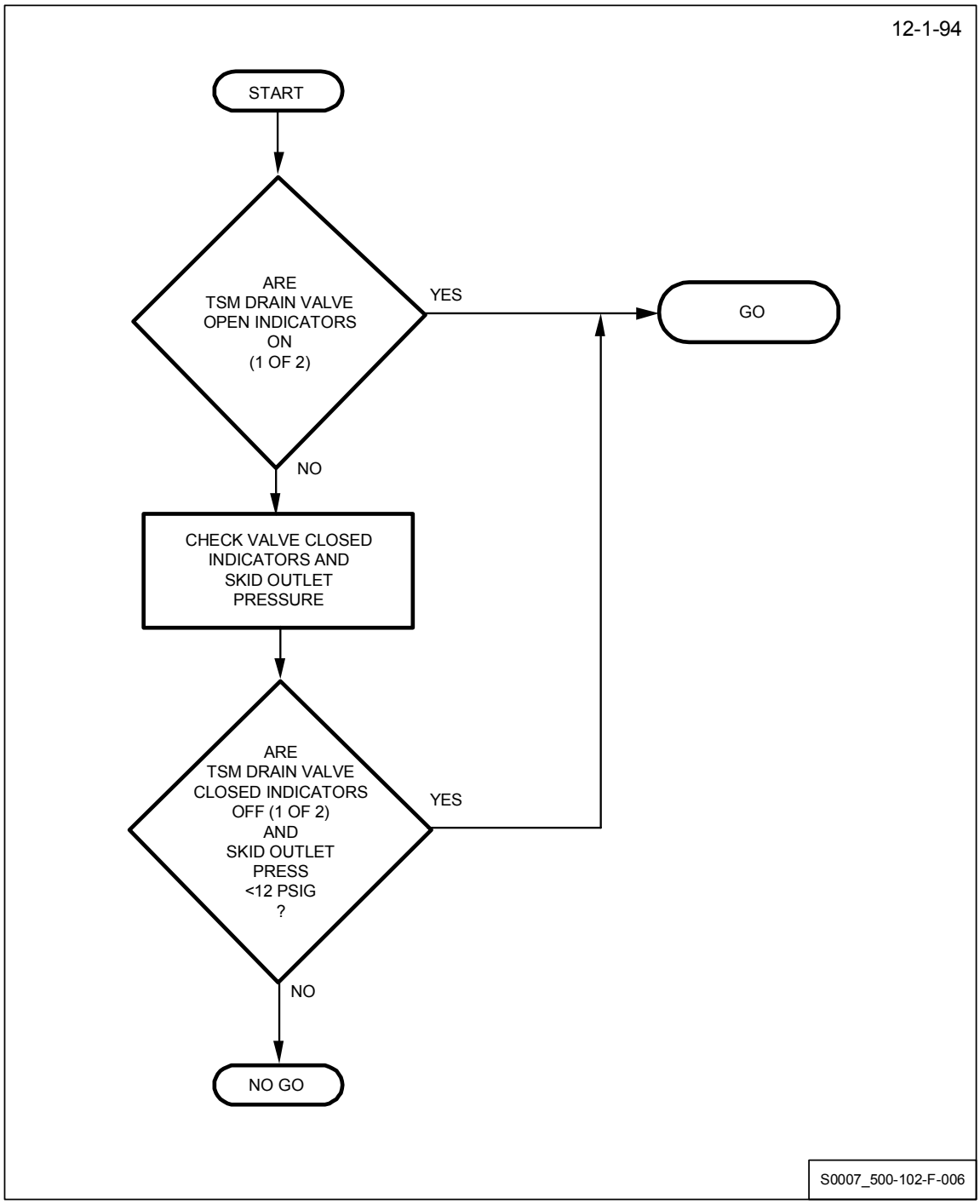
102-6

ET LO_2 Flight Level Monitor (CIF) (SSID ET-10) (T-5 min)



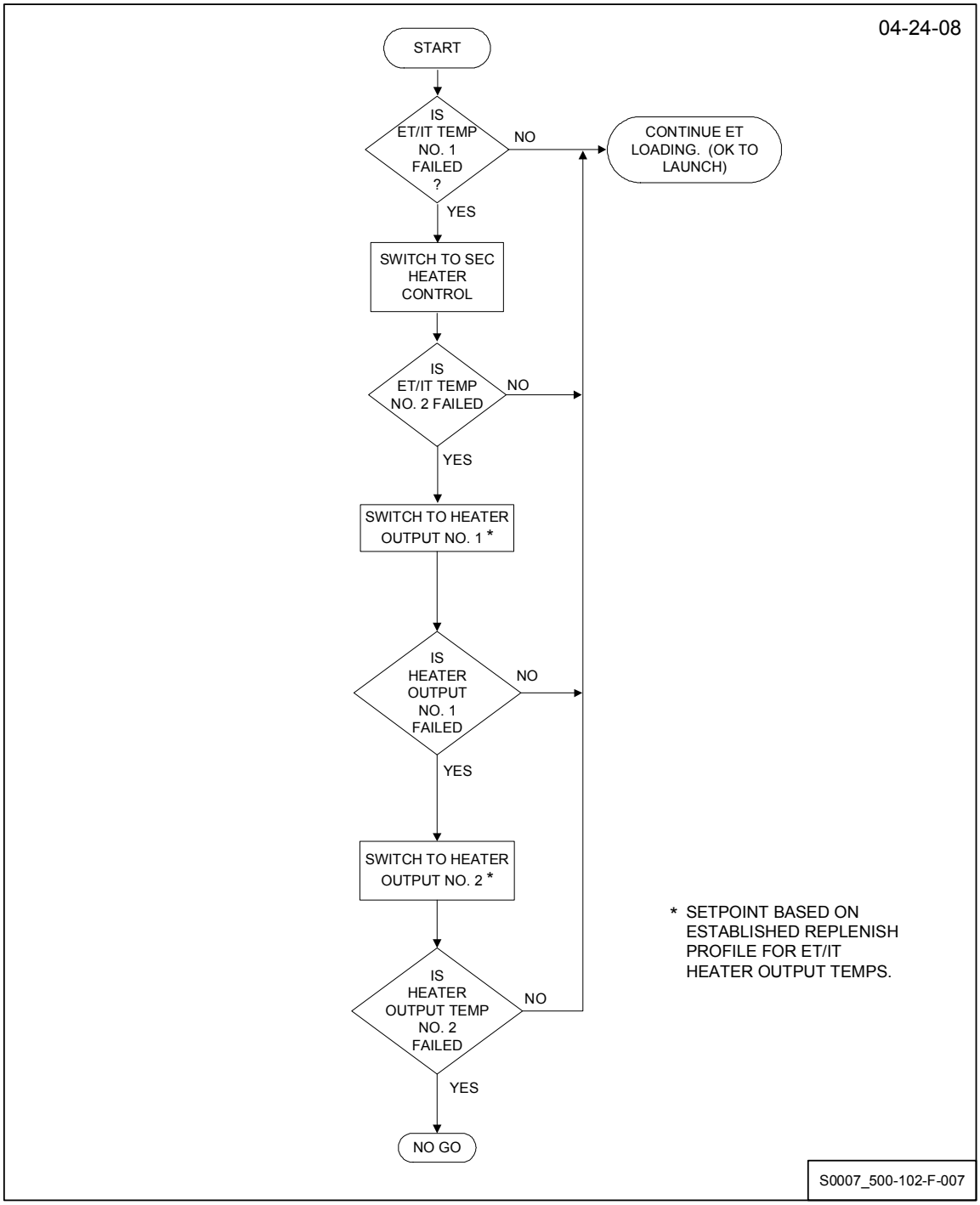
102-7

ET LO_2 Drainback (CIF) (SSID MPS-09) (T-4 min 55 sec to T-48 sec)



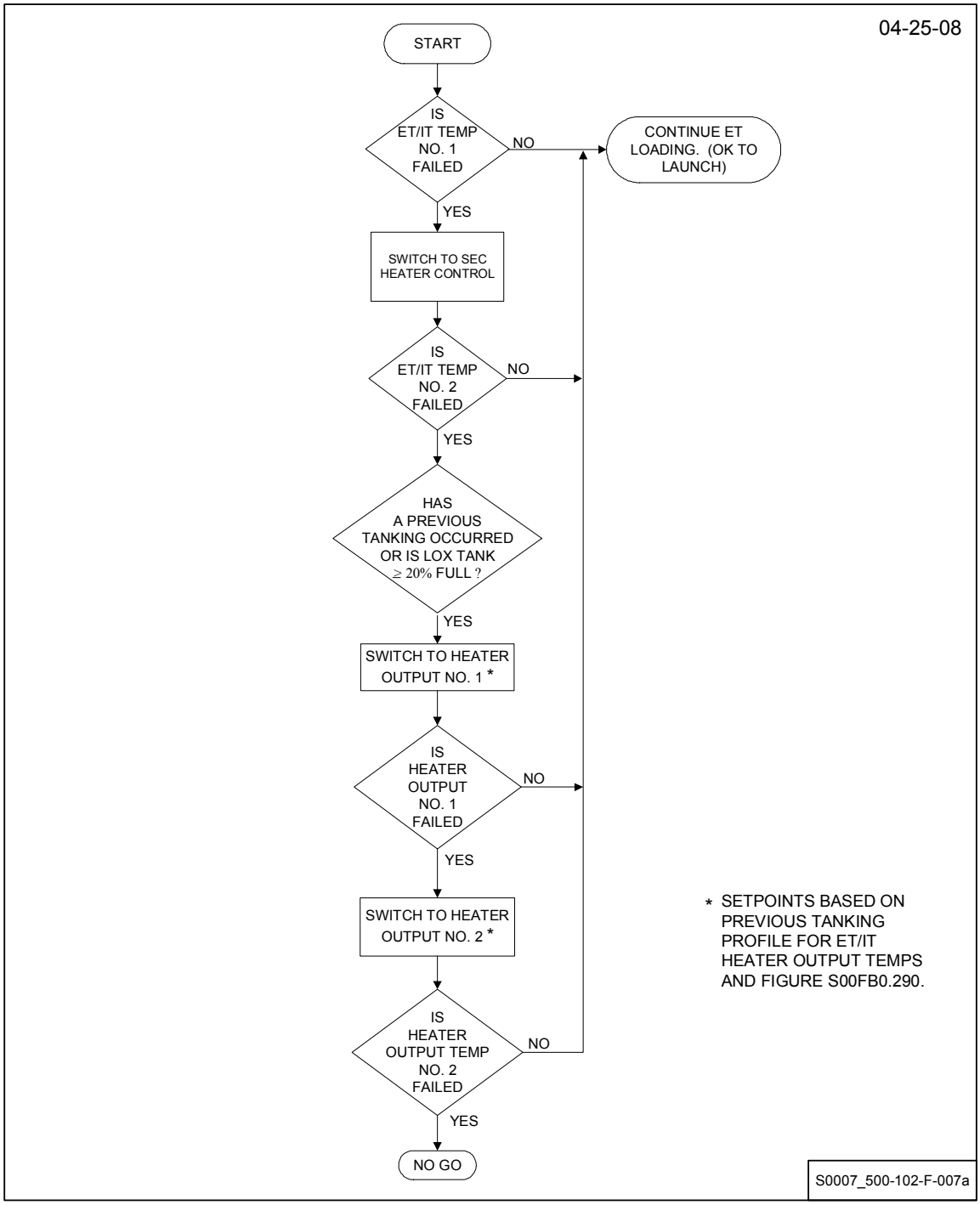
102-8

ET Intertank Temperature (T-1 hr to T-3 min) (SSID ET-07)



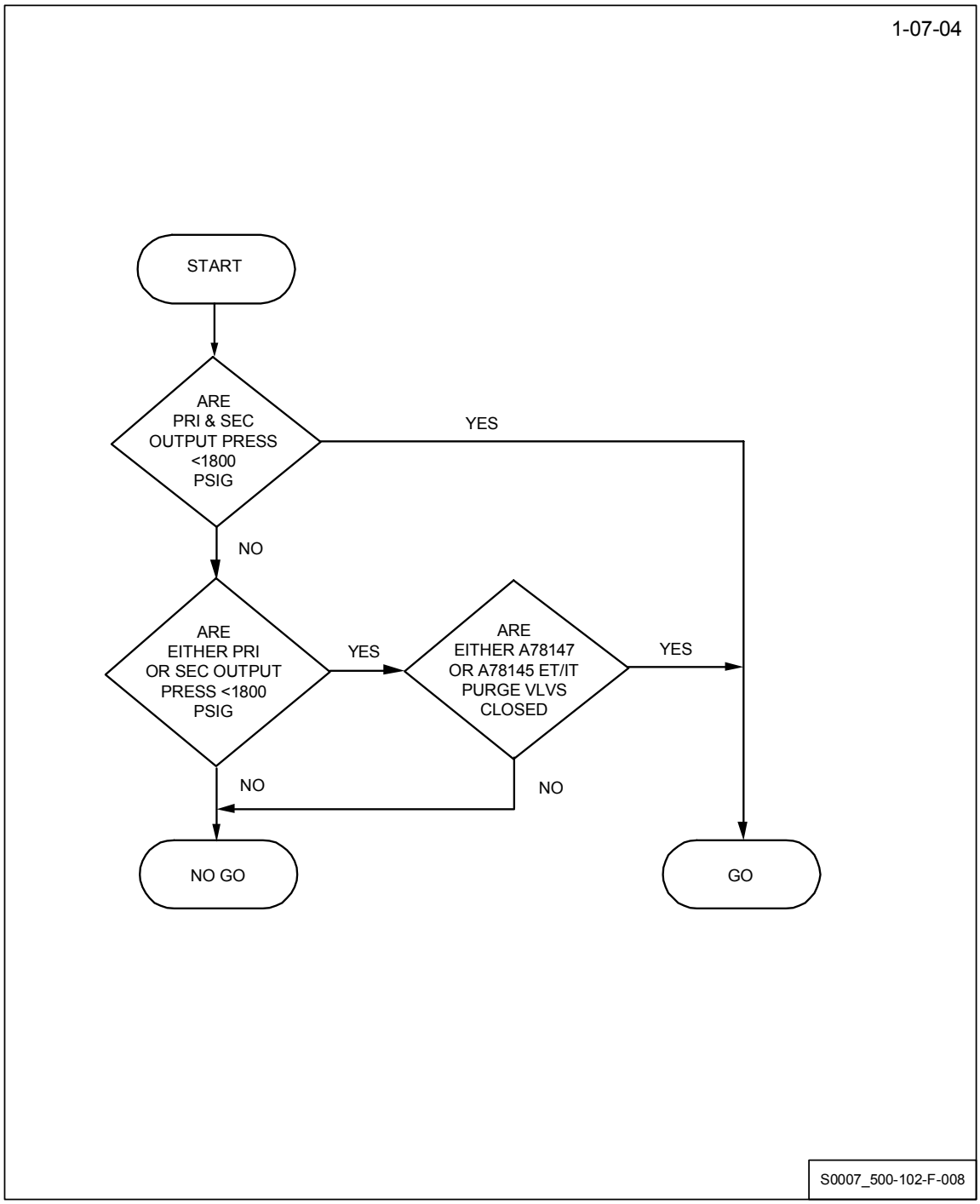
102-9

ET Intertank Temperature (T-6 Hr to T-1 Hr) (Reference S00FB0.290)



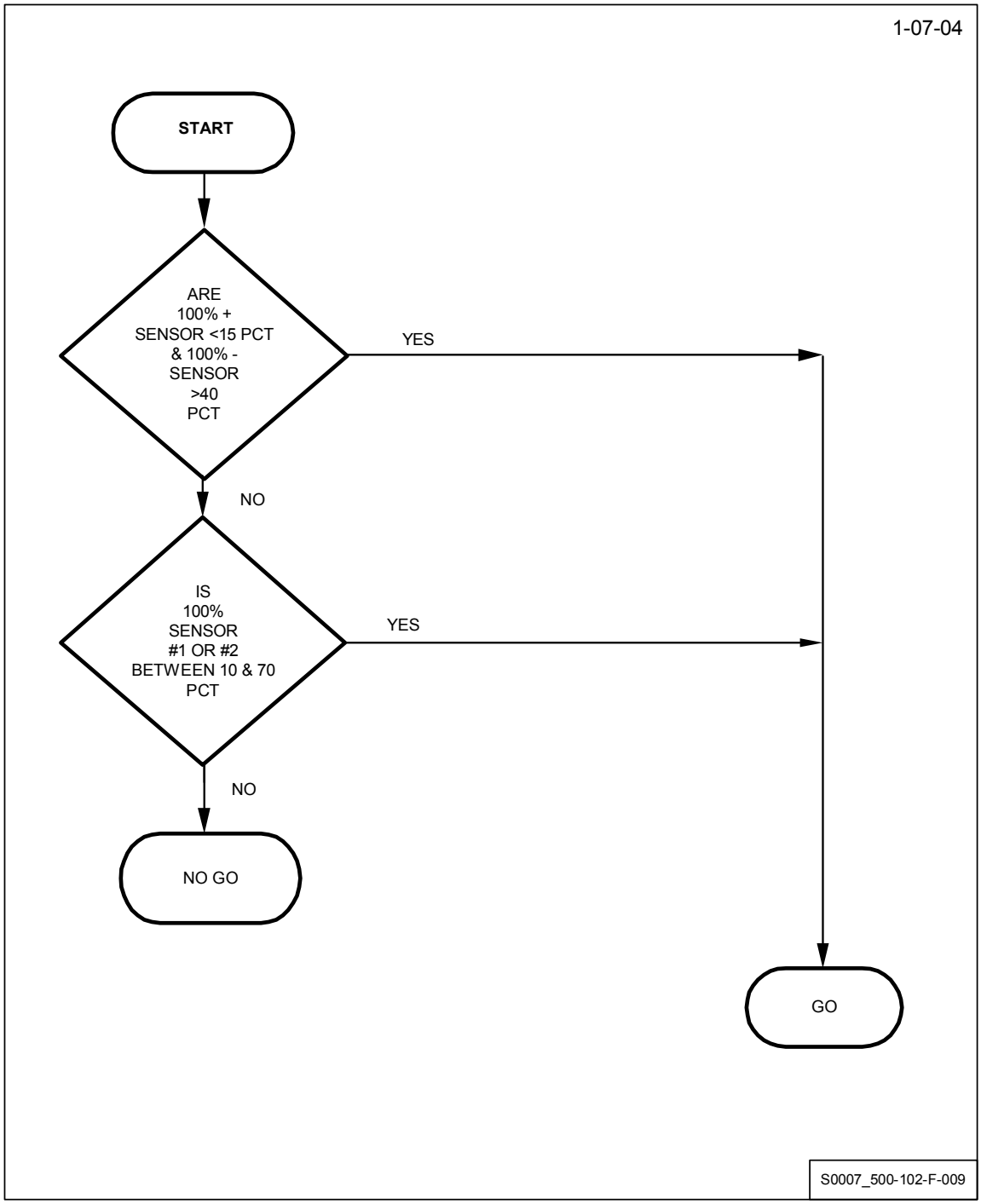
102-10

ET Intertank Purge Termination (T-1 min 15 sec) (SSID ET-08)



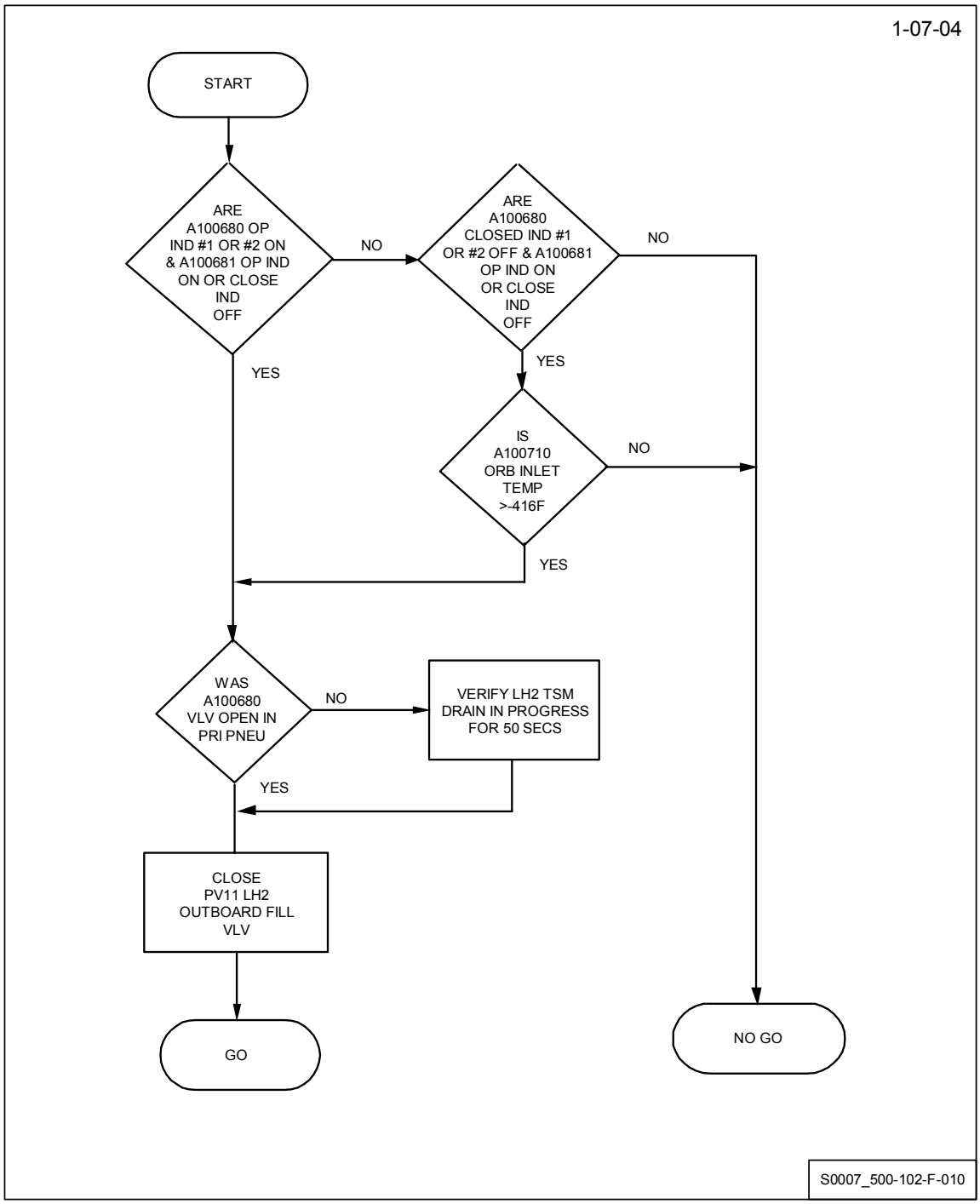
102-11

ET LH_2 Flight Level Monitor (T-1 min 57 sec) (SSID ET-09)



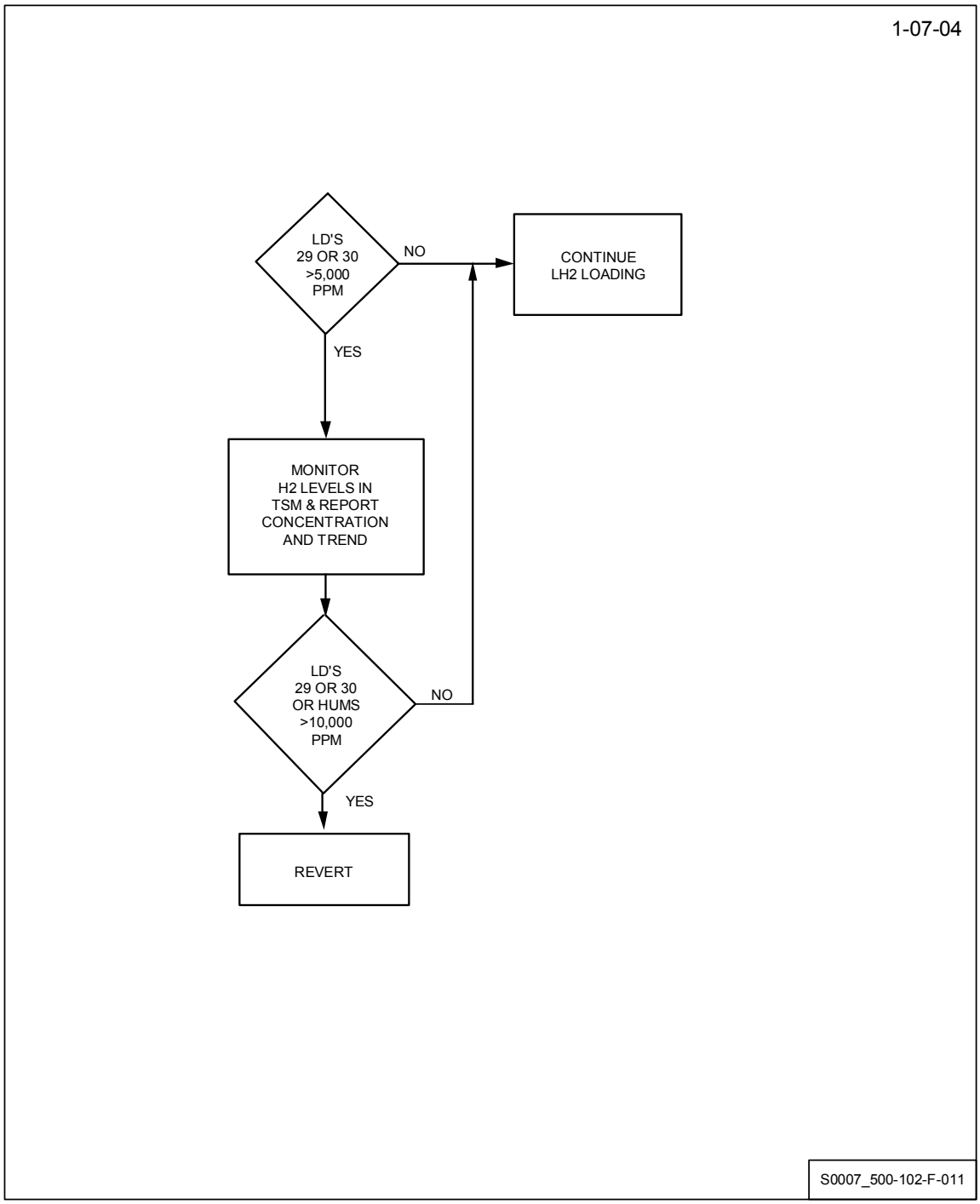
102-12

ET LH_2 Fill Line Drain (T-1 min 38 sec to T-48 sec) (SSID MPS-06)



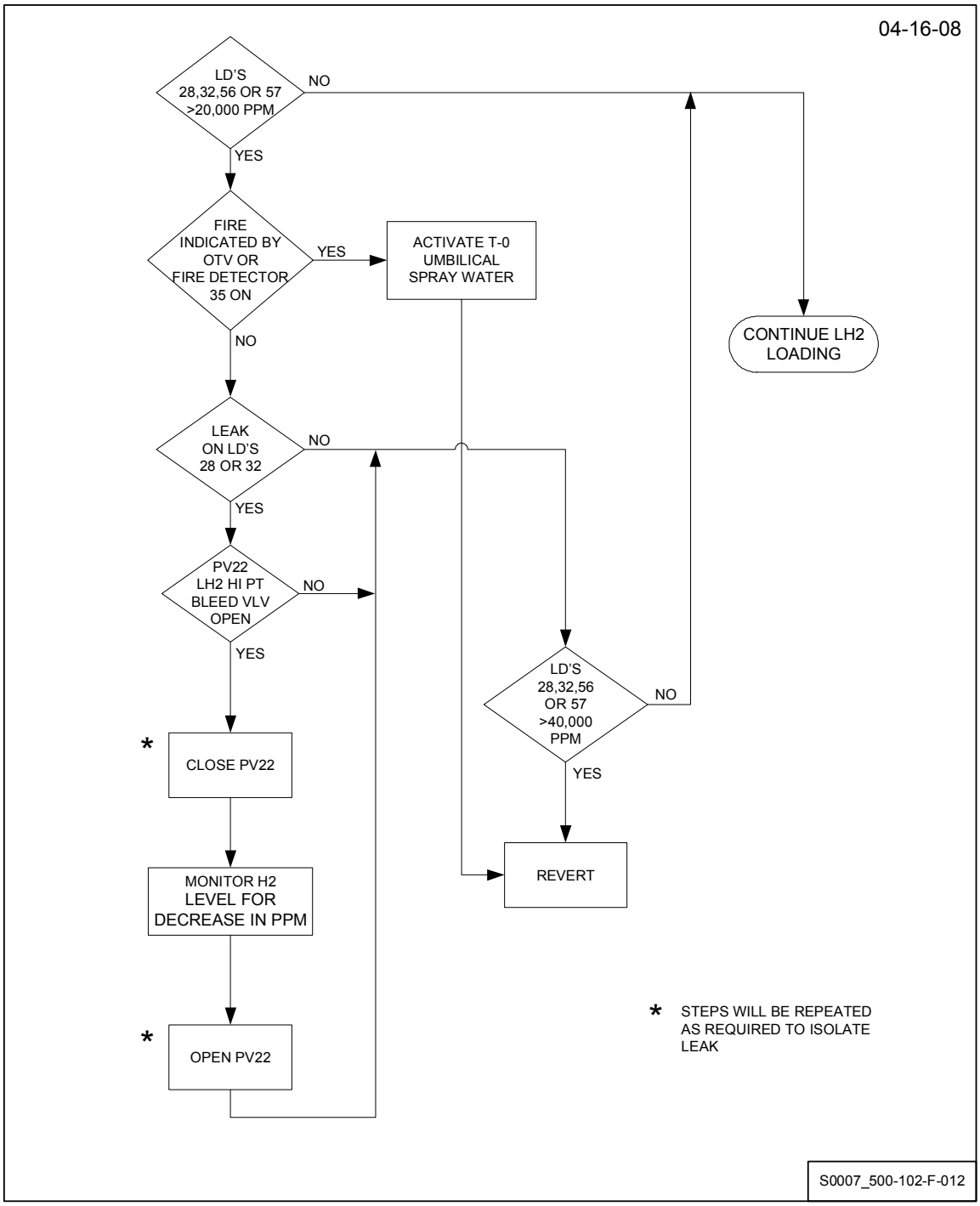
102-13

Excessive Hydrogen Concentration In LH_2 TSM (from Start of LH_2 Loading to T-31 sec) (SSID HAZ-13)



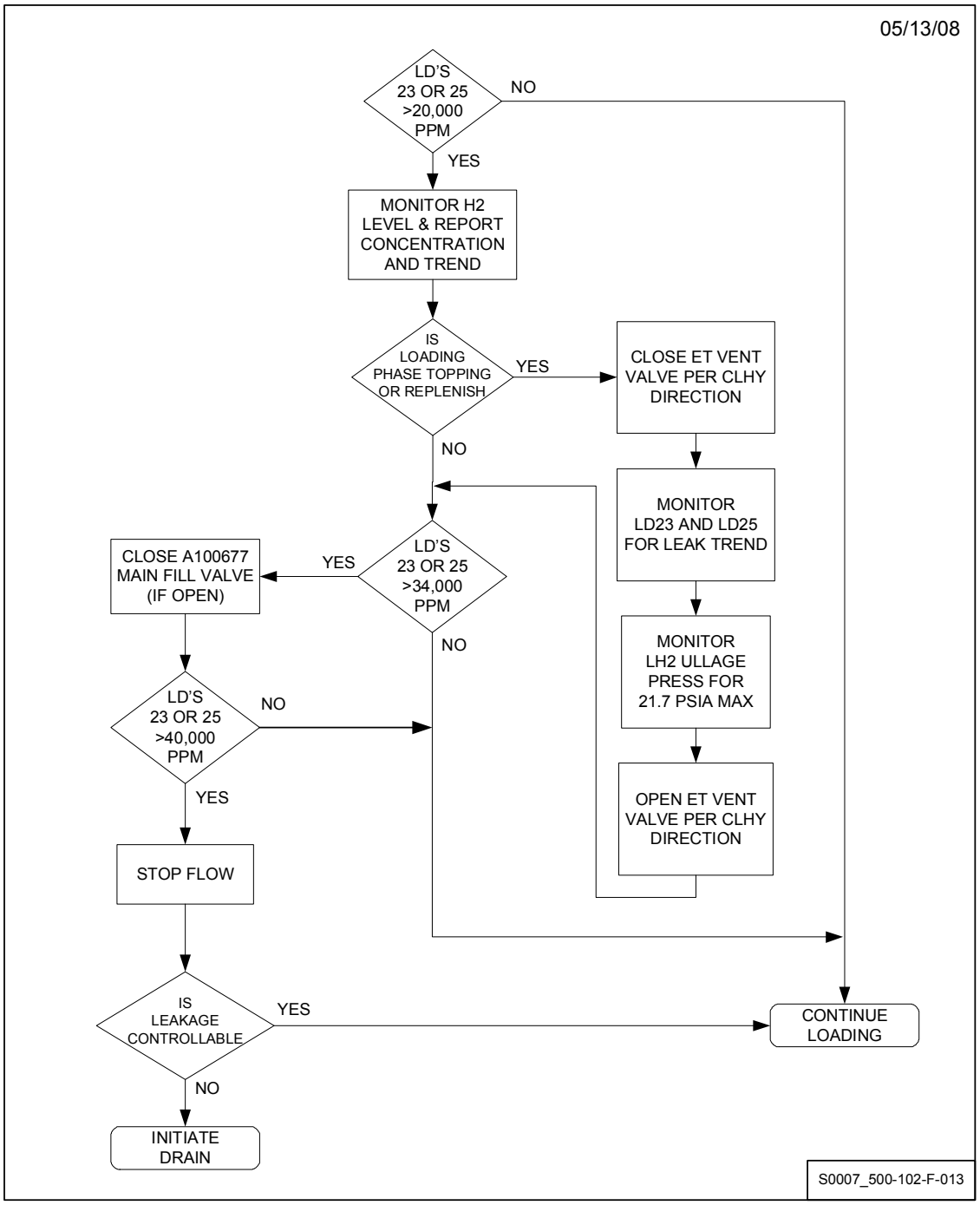
102-14

Excessive Hydrogen Concentration at T-0 Umbilical or 8 in. Feedline Torque Box (from Start of LH_2 Loading to T-31 Sec or T-1 min 57 sec) (SSID HAZ-10 and HAZ-11)



102-15

Excessive Hydrogen Concentration at ET Ground Umbilical Carrier Plate (from Start of LH_2 Loading to T-1 min 57 sec) (SSID HAZ-09)



Bipod Heaters to Secondary Power Source

Not Performed:_____

Option A - LH INBD Bipod Heaters to Secondary Power Source

Option A Not Performed:_____

102-16 **CPWR**

```
CURSOR CNTL (TD490)

LH INBD
SEC SEL ON/OFF
XMIT CURSOR KEY - PRESS
```

102-17 **CPWR**

```
CRT (TD490)

VERIFY
LH INBD
SEC SEL IND - ON (RED)
LH #2 SEC SEL RELAY - CLOSED
LH #1 SEC SEL RELAY - OPEN
```

***** End of Option A - LH INBD Bipod Heaters to Secondary Power Source *****

Option B - LH OTBD Bipod Heaters to Secondary Power Source

Option B Not Performed:_____

102-18 CPWR

```
CURSOR CNTL (TD490)

LH OTBD
SEC SEL ON/OFF
XMIT CURSOR KEY - PRESS
```

102-19 CPWR

```
CRT (TD490)

VERIFY
LH OTBD
SEC SEL IND - ON (RED)
LH #4 SEC SEL RELAY - CLOSED
LH #3 SEC SEL RELAY - OPEN
```

***** End of Option B - LH OTBD Bipod Heaters to Secondary Power Source *****

Option C - RH INBD Bipod Heaters to Secondary Power Source

Option C Not Performed:_____

102-20 CPWR

```
CURSOR CNTL (TD490)

RH INBD
SEC SEL ON/OFF
XMIT CURSOR KEY - PRESS
```

102-21 CPWR

```
CRT (TD490)

VERIFY
RH INBD
SEC SEL IND - ON (RED)
RH #2 SEC SEL RELAY - CLOSED
RH #1 SEC SEL RELAY - OPEN
```

***** End of Option C - RH INBD Bipod Heaters to Secondary Power Source *****

Option D - RH OTBD Bipod Heaters to Secondary Power Source

Option D Not Performed:_____

102-22 CPWR

```
CURSOR CNTL (TD490)

RH OTBD
SEC SEL ON/OFF
XMIT CURSOR KEY - PRESS
```

102-23 CPWR

```
CRT (TD490)

VERIFY
RH OTBD
SEC SEL IND - ON (RED)
RH #4 SEC SEL RELAY - CLOSED
RH #3 SEC SEL RELAY - OPEN
```

***** End of Option D - RH OTBD Bipod Heaters to Secondary Power Source *****

***** End of Bipod Heaters to Secondary Power Source *****

Invoking ET Bipod Heater Contingencies

Not Performed:_____

Option E - LH INBD Temp Sensor Failure

Not Performed:_____

NOTE
Noted requirement is satisfied by the following series of steps. OMRS S00E00.A15

NOTE
Upon completion of this option, active power supply voltage for LH INBD heaters will be automatically adjusted to maintain LH INBD power to 127% (+/-3%) of LH OTBD power level but not to exceed 300 watts.

102-24 **CPWR**

```
CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS
```

102-25 **CPWR**

VERIFY TD498 ACTIVATES

102-26 **CPWR**

CRT (TD498)

IF
SLOT/WEB TEMPS
LH INBD SLOT TEMP
SYS A - ACT (GREEN)

THEN
SLOT/WEB TEMPS
LH INBD SLOT TEMP
SYS A - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-27 **CPWR**

CRT (TD490)

VERIFY
SLOT/WEB TEMPS
LH INBD SLOT TEMP
SYS A - INH (INV YELLOW)

102-28 **CPWR**

CRT (TD498)

IF
SLOT/WEB TEMPS
LH INBD SLOT TEMP
SYS B - ACT (GREEN)

THEN
SLOT/WEB TEMPS
LH INBD SLOT TEMP
SYS B - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-29 **CPWR**

CRT (TD490)

VERIFY
SLOT/WEB TEMPS
LH INBD SLOT TEMP
SYS B - INH (INV YELLOW)

102-30 **CPWR**

CRT (TD498)

IF
CONTINGENCIES
LH TEMP SENSOR FAIL
INBD - INH (INV YELLOW)

THEN
CURSOR CNTL (TD498)

CONTINGENCIES
LH TEMP SENSOR FAIL
INBD - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-31 **CPWR**

CRT (TD498)

VERIFY
CONTINGENCIES
LH TEMP SENSOR FAIL
INBD - ACT (GREEN)

102-32 **CPWR**

```
CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS
```

102-33 **CPWR**

VERIFY TD490 ACTIVATES

102-34 Noted requirement is complete.

OMRSD S00E00.A15

***** End of Option E - LH INBD Temp Sensor Failure *****

Option F - LH OTBD Temp Sensor Failure

Not Performed:_____

NOTE

Noted requirement is satisfied by the following series of steps.

OMRS S00E00.A15

NOTE

Upon completion of this option, active power supply voltage for LH OTBD heaters will be automatically adjusted to maintain LH OTBD power to 79% (+/-3%) of LH INBD power level.

102-35 **CPWR**

```
CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS
```

102-36 **CPWR**

VERIFY TD498 ACTIVATES

102-37 **CPWR**

```
CRT (TD498)

IF
SLOT/WEB TEMPS
LH OTBD SLOT TEMP
SYS A - ACT (GREEN)

THEN
SLOT/WEB TEMPS
LH OTBD SLOT TEMP
SYS A - ACT/INH
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

102-38 **CPWR**

CRT (TD490)

VERIFY
SLOT/WEB TEMPS
LH OTBD SLOT TEMP
SYS A - INH (INV YELLOW)

102-39 **CPWR**

CRT (TD498)

IF
SLOT/WEB TEMPS
LH OTBD SLOT TEMP
SYS B - ACT (GREEN)

THEN
SLOT/WEB TEMPS
LH OTBD SLOT TEMP
SYS B - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-40 **CPWR**

CRT (TD490)

VERIFY
SLOT/WEB TEMPS
LH OTBD SLOT TEMP
SYS B - INH (INV YELLOW)

102-41 **CPWR**

CRT (TD498)

IF
CONTINGENCIES
LH TEMP SENSOR FAIL
OTBD - INH (INV YELLOW)

THEN
CURSOR CNTL (TD498)

CONTINGENCIES
LH TEMP SENSOR FAIL
OTBD - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-42 **CPWR**

CRT (TD498)

VERIFY
CONTINGENCIES
LH TEMP SENSOR FAIL
OTBD - ACT (GREEN)

102-43 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-44 **CPWR**

VERIFY TD490 ACTIVATES

102-45 Noted requirement is complete.

OMRSD S00E00.A15

***** End of Option F - LH OTBD Temp Sensor Failure *****

Option G - RH INBD Temp Sensor Failure

Not Performed:_____

NOTE

Noted requirement is satisfied by the following series of steps.

OMRS S00E00.A15

NOTE

Upon completion of this option, active power supply voltage for RH INBD heaters will be automatically adjusted to maintain RH INBD power to 127% (+/-3%) of RH OTBD power level but not to exceed 300 watts.

102-46 **CPWR**

```
CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS
```

102-47 **CPWR**

VERIFY TD498 ACTIVATES

102-48 **CPWR**

```
CRT (TD498)

IF
SLOT/WEB TEMPS
RH INBD SLOT TEMP
SYS A - ACT (GREEN)

THEN
SLOT/WEB TEMPS
RH INBD SLOT TEMP
SYS A - ACT/INH
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

102-49 **CPWR**

CRT (TD490)

VERIFY
SLOT/WEB TEMPS
RH INBD SLOT TEMP
SYS A - INH (INV YELLOW)

102-50 **CPWR**

CRT (TD498)

IF
SLOT/WEB TEMPS
RH INBD SLOT TEMP
SYS B - ACT (GREEN)

THEN
SLOT/WEB TEMPS
RH INBD SLOT TEMP
SYS B - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-51 **CPWR**

CRT (TD490)

VERIFY
SLOT/WEB TEMPS
RH INBD SLOT TEMP
SYS B - INH (INV YELLOW)

102-52 **CPWR**

CRT (TD498)

IF
CONTINGENCIES
RH TEMP SENSOR FAIL
INBD - INH (INV YELLOW)

THEN
CURSOR CNTL (TD498)

CONTINGENCIES
RH TEMP SENSOR FAIL
INBD - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-53 **CPWR**

CRT (TD498)

VERIFY
CONTINGENCIES
RH TEMP SENSOR FAIL
INBD - ACT (GREEN)

102-54 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-55 **CPWR**

VERIFY TD490 ACTIVATES

102-56 Noted requirement is complete.

OMRSD S00E00.A15

***** End of Option G - RH INBD Temp Sensor Failure *****

Option H - RH OTBD Temp Sensor Failure

Not Performed:_____

NOTE

Noted requirement is satisfied by the following series of steps.

OMRS S00E00.A15

NOTE

Upon completion of this option, active power supply voltage for RH OTBD heaters will be automatically adjusted to maintain RH OTBD power to 79% (+/-3%) of RH INBD power level.

102-57 **CPWR**

```
CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS
```

102-58 **CPWR**

VERIFY TD498 ACTIVATES

102-59 **CPWR**

```
CRT (TD498)

IF
SLOT/WEB TEMPS
RH OTBD SLOT TEMP
SYS A - ACT (GREEN)

THEN
SLOT/WEB TEMPS
RH OTBD SLOT TEMP
SYS A - ACT/INH
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

102-60 **CPWR**

CRT (TD490)

VERIFY
SLOT/WEB TEMPS
RH OTBD SLOT TEMP
SYS A - INH (INV YELLOW)

102-61 **CPWR**

CRT (TD498)

IF
SLOT/WEB TEMPS
RH OTBD SLOT TEMP
SYS B - ACT (GREEN)

THEN
SLOT/WEB TEMPS
RH OTBD SLOT TEMP
SYS B - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-62 **CPWR**

CRT (TD490)

VERIFY
SLOT/WEB TEMPS
RH OTBD SLOT TEMP
SYS B - INH (INV YELLOW)

102-63 **CPWR**

CRT (TD498)

IF
CONTINGENCIES
RH TEMP SENSOR FAIL
OTBD - INH (INV YELLOW)

THEN
CURSOR CNTL (TD498)

CONTINGENCIES
RH TEMP SENSOR FAIL
OTBD - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-64 **CPWR**

CRT (TD498)

VERIFY
CONTINGENCIES
RH TEMP SENSOR FAIL
OTBD - ACT (GREEN)

102-65 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-66 **CPWR**

VERIFY TD490 ACTIVATES

102-67 Noted requirement is complete.

OMRSD S00E00.A15

***** End of Option H - RH OTBD Temp Sensor Failure *****

Option I - LH INBD Heater to Manual Control with Primary Power Source

Not Performed:_____

NOTE
Upon completion of this option, voltage may be adjusted manually from the TD490 skeleton to maintain desired temperatures.

102-68 **CPWR**

```
CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS
```

102-69 **CPWR**

```
CRT
VERIFY TD498 ACTIVATES.
```

102-70 **CPWR**

```
CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

102-71 **CPWR**

CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH INBD/OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH INBD/OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-72 **CPWR**

CRT (TD498)

VERIFY
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - INH (INV YELLOW)
LH INBD/OTBD PWR BAL GL - INH (INV YELLOW)

102-73 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-74 **CPWR**

CRT
VERIFY TD490 ACTIVATES.

102-75 CPWR

```
CURSOR CNTL (TD490)

LH INBD
PID OVRD A
XMIT CURSOR KEY - PRESS

VERIFY
LH INBD
PID OVRD A - OFF (YELLOW)
```

102-76 CPWR

```
CURSOR CNTL (TD490)

LH INBD
PID OVRD A
EXEC CURSOR KEY - PRESS

VERIFY
LH INBD
PID OVRD A - ON (RED)
HTR PS LH #1 TARGETS - CYAN
```

102-77 CPWR

Adjust power supply voltage as needed.

***** End of Option I - LH INBD Heater to Manual Control with Primary Power Source *****

Option J - LH OTBD Heater to Manual Control with Primary Power Source

Not Performed:_____

NOTE
Upon completion of this option, voltage may be adjusted manually from the TD490 skeleton to maintain desired temperatures.

102-78 **CPWR**

```
CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS
```

102-79 **CPWR**

```
CRT
VERIFY TD498 ACTIVATES.
```

102-80 **CPWR**

```
CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

102-81 **CPWR**

CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH INBD/OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH INBD/OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-82 **CPWR**

CRT (TD498)

VERIFY
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - INH (INV YELLOW)
LH INBD/OTBD PWR BAL GL - INH (INV YELLOW)

102-83 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-84 **CPWR**

CRT
VERIFY TD490 ACTIVATES.

102-85 **CPWR**

```
CURSOR CNTL (TD490)

LH OTBD
PID OVRD A
XMIT CURSOR KEY - PRESS

VERIFY
LH OTBD
PID OVRD A - OFF (YELLOW)
```

102-86 **CPWR**

```
CURSOR CNTL (TD490)

LH OTBD
PID OVRD A
EXEC CURSOR KEY - PRESS

VERIFY
LH OTBD
PID OVRD A - ON (RED)
HTR PS LH #3 TARGETS - CYAN
```

102-87 **CPWR**

Adjust power supply voltage as needed.

***** End of Option J - LH OTBD Heater to Manual Control with Primary Power Source *****

Option K - RH INBD Heater to Manual Control with Primary Power Source

Not Performed:_____

NOTE
Upon completion of this option, voltage may be adjusted manually from the TD490 skeleton to maintain desired temperatures.

102-88 **CPWR**

```
CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS
```

102-89 **CPWR**

```
CRT
VERIFY TD498 ACTIVATES.
```

102-90 **CPWR**

```
CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

102-91 **CPWR**

CRT (TD498)

IF
PWR BALANCE GL LOGIC
RH INBD/OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
RH INBD/OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-92 **CPWR**

CRT (TD498)

VERIFY
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - INH (INV YELLOW)
RH INBD/OTBD PWR BAL GL - INH (INV YELLOW)

102-93 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-94 **CPWR**

CRT
VERIFY TD490 ACTIVATES.

102-95 **CPWR**

```
CURSOR CNTL (TD490)

RH INBD
PID OVRD A
XMIT CURSOR KEY - PRESS

VERIFY
RH INBD
PID OVRD A - OFF (YELLOW)
```

102-96 **CPWR**

```
CURSOR CNTL (TD490)

RH INBD
PID OVRD A
EXEC CURSOR KEY - PRESS

VERIFY
RH INBD
PID OVRD A - ON (RED)
HTR PS RH #1 TARGETS - CYAN
```

102-97 **CPWR**

Adjust power supply voltage as needed.

***** End of Option K - RH INBD Heater to Manual Control with Primary Power Source *****

Option L - RH OTBD Heater to Manual Control with Primary Power Source

Not Performed:_____

NOTE
Upon completion of this option, voltage may be adjusted manually from the TD490 skeleton to maintain desired temperatures.

102-98 **CPWR**

```
CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS
```

102-99 **CPWR**

```
CRT
VERIFY TD498 ACTIVATES.
```

102-100 **CPWR**

```
CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

102-101 **CPWR**

CRT (TD498)

IF
PWR BALANCE GL LOGIC
RH INBD/OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
RH INBD/OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-102 **CPWR**

CRT (TD498)

VERIFY
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - INH (INV YELLOW)
RH INBD/OTBD PWR BAL GL - INH (INV YELLOW)

102-103 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-104 **CPWR**

CRT
VERIFY TD490 ACTIVATES.

102-105 CPWR

```
CURSOR CNTL (TD490)

RH OTBD
PID OVRD A
XMIT CURSOR KEY - PRESS

VERIFY
RH OTBD
PID OVRD A - OFF (YELLOW)
```

102-106 CPWR

```
CURSOR CNTL (TD490)

RH OTBD
PID OVRD A
EXEC CURSOR KEY - PRESS

VERIFY
RH OTBD
PID OVRD A - ON (RED)
HTR PS RH #3 TARGETS - CYAN
```

102-107 CPWR

Adjust power supply voltage as needed.

***** End of Option L - RH OTBD Heater to Manual Control with Primary Power Source *****

Option M - LH INBD Heater to Manual Control with Secondary Power Source

Not Performed:_____

NOTE
Upon completion of this option, voltage may be adjusted manually from the TD490 skeleton to maintain desired temperatures.

102-108 **CPWR**

CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS

102-109 **CPWR**

CRT
VERIFY TD498 ACTIVATES.

102-110 **CPWR**

CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-111 **CPWR**

CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH INBD/OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH INBD/OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-112 **CPWR**

CRT (TD498)

VERIFY
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - INH (INV YELLOW)
LH INBD/OTBD PWR BAL GL - INH (INV YELLOW)

102-113 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-114 **CPWR**

CRT
VERIFY TD490 ACTIVATES.

102-115 CPWR

```
CURSOR CNTL (TD490)

LH INBD
PID OVRD B
XMIT CURSOR KEY - PRESS

VERIFY
LH INBD
PID OVRD B - OFF (YELLOW)
```

102-116 CPWR

```
CURSOR CNTL (TD490)

LH INBD
PID OVRD B
EXEC CURSOR KEY - PRESS

VERIFY
LH INBD
PID OVRD B - ON (RED)
HTR PS LH #2 TARGETS - CYAN
```

102-117 CPWR

Adjust power supply voltage as needed.

***** End of Option M - LH INBD Heater to Manual Control with Secondary Power Source *****

Option N - LH OTBD Heater to Manual Control with Secondary Power Source

Not Performed:_____

> **NOTE**
> Upon completion of this option, voltage may be adjusted manually from the TD490 skeleton to maintain desired temperatures.

102-118 **CPWR**

```
CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS
```

102-119 **CPWR**

```
CRT
VERIFY TD498 ACTIVATES.
```

102-120 **CPWR**

```
CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

102-121 **CPWR**

CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH INBD/OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH INBD/OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-122 **CPWR**

CRT (TD498)

VERIFY
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - INH (INV YELLOW)
LH INBD/OTBD PWR BAL GL - INH (INV YELLOW)

102-123 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-124 **CPWR**

CRT
VERIFY TD490 ACTIVATES.

102-125 **CPWR**

```
CURSOR CNTL (TD490)

LH OTBD
PID OVRD B
XMIT CURSOR KEY - PRESS

VERIFY
LH OTBD
PID OVRD B - OFF (YELLOW)
```

102-126 **CPWR**

```
CURSOR CNTL (TD490)

LH OTBD
PID OVRD B
EXEC CURSOR KEY - PRESS

VERIFY
LH OTBD
PID OVRD B - ON (RED)
HTR PS LH #4 TARGETS - CYAN
```

102-127 **CPWR**

Adjust power supply voltage as needed.

***** End of Option N - LH OTBD Heater to Manual Control with Secondary Power Source *****

Option O - RH INBD Heater to Manual Control with Secondary Power Source

Not Performed:_____

NOTE
Upon completion of this option, voltage may be adjusted manually from the TD490 skeleton to maintain desired temperatures.

102-128 **CPWR**

```
CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS
```

102-129 **CPWR**

```
CRT
VERIFY TD498 ACTIVATES.
```

102-130 **CPWR**

```
CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

102-131 **CPWR**

CRT (TD498)

IF
PWR BALANCE GL LOGIC
RH INBD/OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
RH INBD/OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-132 **CPWR**

CRT (TD498)

VERIFY
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - INH (INV YELLOW)
RH INBD/OTBD PWR BAL GL - INH (INV YELLOW)

102-133 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-134 **CPWR**

CRT
VERIFY TD490 ACTIVATES.

102-135 CPWR

```
CURSOR CNTL (TD490)

RH INBD
PID OVRD B
XMIT CURSOR KEY - PRESS

VERIFY
RH INBD
PID OVRD B - OFF (YELLOW)
```

102-136 CPWR

```
CURSOR CNTL (TD490)

RH INBD
PID OVRD B
EXEC CURSOR KEY - PRESS

VERIFY
RH INBD
PID OVRD B - ON (RED)
HTR PS RH #2 TARGETS - CYAN
```

102-137 CPWR

Adjust power supply voltage as needed.

***** End of Option O - RH INBD Heater to Manual Control with Secondary Power Source *****

Option P - RH OTBD Heater to Manual Control with Secondary Power Source

Not Performed:_____

NOTE
Upon completion of this option, voltage may be adjusted manually from the TD490 skeleton to maintain desired temperatures.

102-138 **CPWR**

CURSOR CNTL (TD490)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS

102-139 **CPWR**

CRT
VERIFY TD498 ACTIVATES.

102-140 **CPWR**

CRT (TD498)

IF
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
LH/RH OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-141 **CPWR**

CRT (TD498)

IF
PWR BALANCE GL LOGIC
RH INBD/OTBD PWR BAL GL - ACT (GREEN)

THEN
CURSOR CNTL (TD498)
PWR BALANCE GL LOGIC
RH INBD/OTBD PWR BAL GL - ACT/INH
XMIT CURSOR KEY - PRESS

Not Performed:_____

102-142 **CPWR**

CRT (TD498)

VERIFY
PWR BALANCE GL LOGIC
LH/RH INBD PWR BAL GL - INH (INV YELLOW)
RH INBD/OTBD PWR BAL GL - INH (INV YELLOW)

102-143 **CPWR**

CURSOR CNTL (TD498)

TERM
XMIT CURSOR KEY - PRESS

102-144 **CPWR**

CRT
VERIFY TD490 ACTIVATES.

102-145 CPWR

```
CURSOR CNTL (TD490)

RH OTBD
PID OVRD B
XMIT CURSOR KEY - PRESS

VERIFY
RH OTBD
PID OVRD B - OFF (YELLOW)
```

102-146 CPWR

```
CURSOR CNTL (TD490)

RH OTBD
PID OVRD B
EXEC CURSOR KEY - PRESS

VERIFY
RH OTBD
PID OVRD B - ON (RED)
HTR PS RH #4 TARGETS - CYAN
```

102-147 CPWR

Adjust power supply voltage as needed.

***** End of Option P - RH OTBD Heater to Manual Control with Secondary Power Source *****

Option Q - Manual Setpoint Adjustment for LH INBD BIPOD Heater

Not Performed:_____

102-148 **CPWR**

```
CURSOR CNTL (TW495)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS

VERIFY TW495 IS REPLACED BY TW499
```

102-149 **CPWR**

```
CURSOR CNTL (TW499)

SLOT SETPOINTS
INBD
   LH SLOT SETPOINT - ACT
XMIT CURSOR KEY - PRESS

CRT (TW499)
VERIFY

INBD
   LH SLOT SETPOINT - INH
```

102-150 **CPWR**

```
CURSOR CNTL (TW499)

TERM-
XMIT CURSOR KEY - PRESS

VERIFY TW499 IS REPLACED BY TW495
```

102-151 **CPWR**

IF PRIMARY SYSTEM, **Verify**

THEN ☐
APPLY G56K7053A XXX
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

XXX = DESIRED SETPOINT

ELSE (SECONDARY SYSTEM) ☐

APPLY G56K7153A XXX
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

XXX = DESIRED SETPOINT

102-152 **CPWR**

CRT (TW495)

VERIFY
LH INBD BIPOD HEATER SETPOINT IS XXX DEGF

XXX = DESIRED SETPOINT

***** End of Option Q - Manual Setpoint Adjustment for LH INBD BIPOD Heater *****

Option R - Manual Setpoint Adjustment for LH OTBD BIPOD Heater

Not Performed:_____

102-153 CPWR

```
CURSOR CNTL (TW495)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS

VERIFY TW495 IS REPLACED BY TW499
```

102-154 CPWR

```
CURSOR CNTL (TW499)

SLOT SETPOINTS
OTBD
   LH SLOT SETPOINT - ACT
XMIT CURSOR KEY - PRESS

CRT (TW499)
VERIFY

OTBD
   LH SLOT SETPOINT - INH
```

102-155 CPWR

```
CURSOR CNTL (TW499)

TERM-
XMIT CURSOR KEY - PRESS

VERIFY TW499 IS REPLACED BY TW495
```

102-156 **CPWR**

IF PRIMARY SYSTEM, **Verify**

THEN ☐
APPLY G56K7063A XXX
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

XXX = DESIRED SETPOINT

ELSE (SECONDARY SYSTEM) ☐

APPLY G56K7163A XXX
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

XXX = DESIRED SETPOINT

102-157 **CPWR**

CRT (TW495)

VERIFY
LH OTBD BIPOD HEATER SETPOINT IS XXX DEGF

XXX = DESIRED SETPOINT

***** End of Option R - Manual Setpoint Adjustment for LH OTBD BIPOD Heater *****

Option S - Manual Setpoint Adjustment for RH INBD BIPOD Heater

Not Performed:_____

102-158 **CPWR**

```
CURSOR CNTL (TW495)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS

VERIFY TW495 IS REPLACED BY TW499
```

102-159 **CPWR**

```
CURSOR CNTL (TW499)

SLOT SETPOINTS
INBD
   RH SLOT SETPOINT - ACT
XMIT CURSOR KEY - PRESS

CRT (TW499)
VERIFY

INBD
   RH SLOT SETPOINT - INH
```

102-160 **CPWR**

```
CURSOR CNTL (TW499)

TERM-
XMIT CURSOR KEY - PRESS

VERIFY TW499 IS REPLACED BY TW495
```

102-161 **CPWR**

IF PRIMARY SYSTEM, **Verify**

THEN ☐
APPLY G56K8053A XXX
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

XXX = DESIRED SETPOINT

ELSE (SECONDARY SYSTEM) ☐

APPLY G56K8153A XXX
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

XXX = DESIRED SETPOINT

102-162 **CPWR**

CRT (TW495)

VERIFY
RH INBD BIPOD HEATER SETPOINT IS XXX DEGF

XXX = DESIRED SETPOINT

***** End of Option S - Manual Setpoint Adjustment for RH INBD BIPOD Heater *****

Option T - Manual Setpoint Adjustment for RH OTBD BIPOD Heater

Not Performed:_____

102-163 CPWR

```
CURSOR CNTL (TW495)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS

VERIFY TW495 IS REPLACED BY TW499
```

102-164 CPWR

```
CURSOR CNTL (TW499)

SLOT SETPOINTS
OTBD
   RH SLOT SETPOINT - ACT
XMIT CURSOR KEY - PRESS

CRT (TW499)
VERIFY

OTBD
   RH SLOT SETPOINT - INH
```

102-165 CPWR

```
CURSOR CNTL (TW499)

TERM-
XMIT CURSOR KEY - PRESS

VERIFY TW499 IS REPLACED BY TW495
```

102-166 **CPWR**

IF PRIMARY SYSTEM, **Verify**

THEN ☐
APPLY G56K8063A XXX
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

XXX = DESIRED SETPOINT

ELSE (SECONDARY SYSTEM) ☐

APPLY G56K8163A XXX
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

XXX = DESIRED SETPOINT

102-167 **CPWR**

CRT (TW495)

VERIFY
RH OTBD BIPOD HEATER SETPOINT IS XXX DEGF

XXX = DESIRED SETPOINT

***** End of Option T - Manual Setpoint Adjustment for RH OTBD BIPOD Heater *****

Option U - Manual Setpoint Adjustment for Primary LH/RH INBD/OTBD BIPOD Heater

Not Performed:_____

102-168 CPWR

```
CURSOR CNTL (TW495)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS

VERIFY TW495 IS REPLACED BY TW499
```

102-169 CPWR

```
CURSOR CNTL (TW499)

SLOT SETPOINTS
INBD
  LH SLOT SETPOINT - ACT

XMIT CURSOR KEY - PRESS

REPEAT ABOVE ACTIONS FOR THE FOLLOWING SETPOINTS:

INBD
  RH SLOT SETPOINT - ACT
OTBD
  LH SLOT SETPOINT - ACT
  RH SLOT SETPOINT - ACT

CRT (TW499)
VERIFY

INBD
  LH SLOT SETPOINT - INH
  RH SLOT SETPOINT - INH
OTBD
  LH SLOT SETPOINT - INH
  RH SLOT SETPOINT - INH
```

102-170 **CPWR**

CURSOR CNTL (TW499)

TERM-
XMIT CURSOR KEY - PRESS

VERIFY TW499 IS REPLACED BY TW495

102-171 **CPWR**

THEN
APPLY G56K7053A XXX
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

REPEAT ABOVE ACTIONS FOR THE FOLLOWING FDs:
G56K7063A
G56K8053A
G56K8063A

XXX = DESIRED SETPOINT

102-172 **CPWR**

CRT (TW495)

VERIFY
LH OTBD BIPOD HEATER SETPOINT IS XXX DEGF
LH INBD BIPOD HEATER SETPOINT IS XXX DEGF
RH INBD BIPOD HEATER SETPOINT IS XXX DEGF
RH OTBD BIPOD HEATER SETPOINT IS XXX DEGF

XXX = DESIRED SETPOINT

***** End of Option U - Manual Setpoint Adjustment for Primary LH/RH INBD/OTBD BIPOD Heater *****

Option V - Manual Setpoint Adjustment for Secondary LH/RH INBD/OTBD BIPOD Heater

Not Performed:_____

102-173 CPWR

```
CURSOR CNTL (TW495)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS

VERIFY TW495 IS REPLACED BY TW499
```

102-174 CPWR

```
CURSOR CNTL (TW499)

SLOT SETPOINTS
INBD
  LH SLOT SETPOINT - ACT

XMIT CURSOR KEY - PRESS

REPEAT ABOVE ACTIONS FOR THE FOLLOWING SETPOINTS:

INBD
  RH SLOT SETPOINT - ACT
OTBD
  LH SLOT SETPOINT - ACT
  RH SLOT SETPOINT - ACT

CRT (TW499)
VERIFY

INBD
  LH SLOT SETPOINT - INH
  RH SLOT SETPOINT - INH
OTBD
  LH SLOT SETPOINT - INH
  RH SLOT SETPOINT - INH
```

102-175 **CPWR**

CURSOR CNTL (TW499)

TERM-
XMIT CURSOR KEY - PRESS

VERIFY TW499 IS REPLACED BY TW495

102-176 **CPWR**

THEN
APPLY G56K7153A XXX
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

REPEAT ABOVE ACTIONS FOR THE FOLLOWING FDs:
G56K7163A
G56K8153A
G56K8163A

XXX = DESIRED SETPOINT

102-177 **CPWR**

CRT (TW495)

VERIFY
LH OTBD BIPOD HEATER SETPOINT IS XXX DEGF
LH INBD BIPOD HEATER SETPOINT IS XXX DEGF
RH INBD BIPOD HEATER SETPOINT IS XXX DEGF
RH OTBD BIPOD HEATER SETPOINT IS XXX DEGF

XXX = DESIRED SETPOINT

***** End of Option V - Manual Setpoint Adjustment for Secondary LH/RH INBD/OTBD BIPOD Heater *****

Option W - Bipod Heater Safing After Inadvertent ET GUCP Separation

102-178 **CPWR**

```
IF AFTER INADVERTENT ET GUCP SEPARATION,

THEN PERFORM FOLLOWING TO REMOVE AC POWER FROM
BIPOD HEATER POWER CABLES:

ET/SRB HEATER SAFING PANEL
ET BIPOD HEATERS
  PRI PWR - OFF
  SEC PWR - OFF
```

Not Performed:_____

***** End of Option W - Bipod Heater Safing After Inadvertent ET GUCP Separation *****

***** End of Invoking ET Bipod Heater Contingencies *****

ET Heater Overview (TW495) Recovery After Inadvertent Termination or Console Failure

NOTE
Perform this option if count has passed T-9 hrs.

Not Performed:_____

102-179 **CPWR**

CURSOR CNTL (SDC01)

ET OPTIONS
ET HTR OVIEW
XMIT CURSOR KEY - PRESS

VERIFY SWC01 IS REPLACED BY TW495

102-180 **CPWR**

IF THE TANKING STATE IS BLANK (TW495),

THEN
PFP (TW495)

PFPK 6
ACT AUTO ET OPS - PRESS

VERIFY
PFPK6
INH AUTO ET OPS

Not Performed:_____

102-181 **CPWR** **CPEL** **188**

RECORD

BIPOD HTR PRI SP RAMP OFF CMD - _____
BIPOD HTR SEC SP RAMP OFF CMD - _____

VERIFY THE ABOVE COMMAND REPONSES ARE CORRECT FOR THE PRESENT TANKING STATE.

***** End of ET Heater Overview (TW495) Recovery After Inadvertent Termination or Console Failure *****

ET Bipod Heater Deadfacing Anomaly

NOTE
Perform this option in the event that a Bipod heater deadfacing anomaly (LCC ET-12) occurs after GLS commands the heaters off at T-1 min 52 sec.

ET Bipod Heater Deadfacing Anomaly Not Performed:_____

NOTE
GLS checks deadfacing requirements at T-40 seconds.

102-182 **CPWR**

```
ET/SRB HTR SAFING PANEL
ET BIPOD HEATERS
  PRI PWR - OFF
  OFF LIGHT ON
  SEC PWR - OFF
  OFF LIGHT ON
```

102-183 **CPWR**

```
CRT (BWE08)

VERIFY DEADFACE REQUIREMENTS IN LCC ET-12
MEASUREMENT REQUIREMENT TABLE ARE SATISIFIED.
```

102-184 **CPWR** **NTD** **212**

IF GLS is in a hold for Bipod Heater Deadface Anomaly at T-31 seconds,

THEN ET Bipod heaters are deadfaced, CPWR is Go for picking up the count.

Not Performed:_____

***** End of ET Bipod Heater Deadfacing Anomaly *****

ET Camera System Deadfacing Anomaly

NOTE
Perform this option in the event that an ET camera system deadfacing anomaly (LCC ET-15) occurs after GLS issues the deadface commands at T-2 min 30 sec.

ET Camera System Deadfacing Anomaly Not Performed:_____

NOTE
GLS checks deadfacing requirements at T-2 min. 20 sec.

102-185 CPWR

```
PFP (BDE08)

PFPK 4
ETCAM DEADFC - PRESS

PFPK 5
EXEC ETCAM DEADFC - PRESS
```

102-186 CPWR

```
CRT (BWE08, PG-B)

VERIFY THE FOLLOWING MESSAGE AT THE BOTTOM OF THE
PAGE (YELLOW):

<JTOY> ET CAMERA SYSTEM DEADFACED
```

102-187 CPWR NTD 212

IF GLS is in Hold for ET Camera System Deadface Anomaly at T-31 seconds,

THEN ET cameras are deadfaced, CPWR is Go for picking up the count.

Not Performed:_____

***** End of ET Cameras System Deadfacing Anomaly *****

Contingency - ET Camera on Secondary with Deadface Verification

NOTE
Perform this option if directed by the Test Team to try and activate ET Camera on Secondary Mode.

Contingency - ET Camera on Secondary with Deadface Verification
Not Performed:_____

102-188 **CPWR**

```
PFP (BDE08)

PFPK 2
ETCAM ONSEC - PRESS

PFPK 5
EXEC ETCAM ONSEC - PRESS
```

102-189 **CPWR**

```
CRT (BWE08, PG-B)

VERIFY THE FOLLOWING MESSAGE AT THE BOTTOM OF THE
PAGE (YELLOW):

<JTOY> ET CAMERA SYSTEM DEADFACED
```

102-190 **CPWR**

```
CRT (TD496)

VERIFY
ET CAMERA ON
```

***** End of Contingency - ET Camera on Secondary with Deadface Verification *****

ET Bellows Heater Manual Deactivation

Not Performed:_____

NOTE
Noted requirement is satisfied by the following series of steps. OMRS S00E00.992

102-191 **CPWR**

```
CURSOR CNTL (TW495)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS

VERIFY TW495 IS REPLACED BY TW499
```

NOTE

The following step is Not Performed if the AUTO MODE OVERRIDE is already ACTIVE. If AUTO MODE OVERRIDE is INHIBITED, the ET Bellows Heaters will be powered up by GOAL software if the LO2 Calculated Head Pressure is greater than 52 psi.

102-192 CPWR

```
IF
CRT (TW499)

ET BELLOWS HTRS
AUTO MODE OVERRIDE - INH (INV YELLOW)

THEN
CURSOR CNTL (TW499)

ET BELLOWS HTRS
AUTO MODE OVERRIDE
XMIT CURSOR KEY - PRESS

VERIFY
ET BELLOWS HTRS
AUTO MODE OVERRIDE - ACT (GREEN)
```

Not Performed:_____

102-193 CPWR

```
CURSOR CNTL (BWE08)

INT
XMIT CURSOR KEY - PRESS

VERIFY
INT - GREEN
```

102-194 **CPWR**

```
PFP (BWE08)

PFP KEY 3 (ET BELLOWS OFF) - PRESS
PFP KEY 5 (EXEC ET BELLOW OFF) - PRESS

VERIFY
BELLOWS HEATERS
CURRA <0.03
CURRB <0.03
```

102-195 **CPWR**

```
CURSOR CNTL (TW499)

PFK15 KEY - PRESS

VERIFY TW499 IS REPLACED BY TW495
```

102-196 Noted requirement is complete.

OMRSD S00E00.992

102-197 **CPWR**

```
CURSOR CNTL (BWE08)

SRB OPTIONS
LCC -
XMIT CURSOR KEY - PRESS

CRT
VERIFY LCC GREEN
```

***** End of ET Bellows Heater Manual Deactivation *****

ET Bellows Heater Manual Activation

Not Performed:_____

NOTE
Noted requirement is satisfied by the following series of steps.
OMRS S00E00.993

102-198 **CPWR**

```
CURSOR CNTL (BWE08)

INT
XMIT CURSOR KEY - PRESS

VERIFY
INT - GREEN
```

102-199 **CPWR**

```
PFP (BWE08)

PFP KEY 1 (ET BELLOWS ON) - PRESS
PFP KEY 5 (EXEC ET BELLOW ON) - PRESS

VERIFY
BELLOWS HEATERS
CURRA = 2.2 - 2.6
CURRB = 2.2 - 2.6
```

102-200 Noted requirement is complete.

OMRSD S00E00.993

NOTE
Perform the following three steps to activate ET Bellows Automated Control.

102-201 **CPWR**

```
CURSOR CNTL (TW495)

LOGIC ACT/INH
XMIT CURSOR KEY - PRESS

VERIFY TW495 IS REPLACED BY TW499
```

Not Performed:_____

102-202 **CPWR**

```
CURSOR CNTL (TW499)

ET BELLOWS HTRS
AUTO MODE OVERRIDE
XMIT CURSOR KEY - PRESS

VERIFY
ET BELLOWS HTRS
AUTO MODE OVERRIDE - INH (YELLOW)
```

Not Performed:_____

102-203 **CPWR**

```
CURSOR CNTL (TW499)

PFK15 KEY - PRESS

VERIFY TW499 IS REPLACED BY TW495
```

Not Performed:_____

102-204 CPWR

```
CURSOR CNTL (BWE08)

SRB OPTIONS
LCC -
XMIT CURSOR KEY - PRESS

CRT
VERIFY LCC GREEN
```

***** End of ET Bellows Heater Manual Activation *****

*** End of Operation **102** ***

OPERATION 103 SRB

Shop: **DPS**
Cntrl Rm Console: **C10**
OPR: **DPS**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **1.0**

SRB MDM PROM Bypass Recovery (SSID BEI-04)

NOTE
Perform this option if SRB PROM bypass occurs.

SRB MDM PROM Bypass Recovery (SSID BEI-04) Not Performed:_____

103-1 **TBC** **CBDP** **136**

Clear SRB MDM PROM bypass failure.

103-2 **CBDP**

```
CURSOR CNTL (SAS01 PG-B)
DPS
XMIT CURSOR KEY - PRESS

CURSOR CNTL (SAS01 PG-B)
SRB MANUAL TEST SEL
XMIT CURSOR KEY - PRESS
PFK 2 KEY - PRESS
```

103-3 **CBDP**

```
CURSOR CNTL (SAS25 PG-B)
PROM BYPASS RESET
XMIT CURSOR KEY - PRESS
```

103-4 **CBDP**

```
CRT (BSM06 PG-B)

SYSTEM STAUS PAGE DISPLAYED
PROM BYPASS RESET CURSOR LABEL - INVERT GREEN
(PASS) OR INVERT RED (FAIL)
```

RECORD PASS/FAIL RESULTS:_____

103-5 CBDP TBC 136

IF all of the following conditions are TRUE: **Verify**

PROM BYPASS RESET TEST PASSED
ALL SRB PROM BYPASSES ARE CLEAR (CYAN)
SRB POLLING ACTIVE
ALL P/S SEP SWITCHES ARE ON

THEN SRB MDM PROM Bypass Recovery complete. ☐
DPS is Go for Launch.

ELSE SRB MDM PROM Recovery unsuccessful. ☐
DPS is No Go for Launch.

103-6 CBDP

```
PFP (BSM06)
PFPK 1 (TERMINATE) - PRESS
```

***** End of SRB MDM PROM Bypass Recovery (SSID BEI-04) *****

SRB MDM P/S Sep Sensor Anomaly Recovery (SSID BEI-06/BEI-07)

NOTE
Perform this option if FWD (LCC BEI-07) or AFT (LCC BEI-06) SRB MDM P/S Sep Sensor voltage is out of limits.

SRB MDM P/S Sep Sensor Anomaly Recovery (SSID BEI-06/BEI-07)
Not Performed:_____

103-7 **TBC** **CDPS**

Perform MDM___ P/S Sep SW recovery.

103-8 **CDPS**

```
CURSOR CNTL (SAS01 PG B)
DPS
XMIT CURSOR KEY - PRESS

CURSOR CNTL (SAS01 PG B)
SRB MANUAL TEST SEL
XMIT CURSOR KEY - PRESS

PFK-2 KEY - PRESS
```

103-9 **CDPS**

```
CURSOR CNTL (BSM06 PG B)
P/S SEP SW RECOVERY
XMIT CURSOR KEY - PRESS
CRT (BSM06 PG B)

"...P/S SEP SW RECOVERY
__________(SUCCESSFUL/FAILED)
MOST PROBABLE CAUSE:____________________"
```

103-10 **CDPS**

```
PFP (BSM06)
CONTINUE KEY - PRESS
TERMINATE KEY - PRESS
```

103-11 **CDPS** **TBC**

IF recovery sequence indicates test success, **Verify**

THEN MDM___ P/S Sep SW recovery complete. CDPS ready to resume count. ☐

ELSE hold count. ☐

***** End of SRB MDM P/S Sep Sensor Anomaly Recovery (SSID BEI-06/BEI-07) *****

LH SRB Primary Igniter Heater Failure Contingency

Not Performed:_____

103-12 TBC CPWR

Perform LH SRB Primary Igniter Heater Failure Contingency.

103-13 CPWR

```
CURSOR CNTL (BDE11)
LH IGN AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

LH IGN AUTO SEQ INH
LH IGN HTR PWR OFF
```

103-14 CPWR

```
CURSOR CNTL (BDE11)
LH IGN SEC SEL
XMIT CURSOR KEY - PRESS

CRT

VERIFY LH IGN SEC SEL SEC
```

103-15 CPWR

```
CURSOR CNTL (BDE11)
LH IGN AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

LH IGN AUTO SEQ ACT
LH IGN HTR PWR ON
```

103-16 CPWR TBC

LH SRB Primary Igniter Heater Contingency complete.
LH SRB Secondary Igniter Heater Power On and cycling
at this time.

***** End of LH SRB Primary Igniter Heater Failure Contingency *****

RH SRB Primary Igniter Heater Failure Contingency

Not Performed:_____

103-17 TBC CPWR

Perform RH SRB Primary Igniter Heater Failure contingency.

103-18 CPWR

```
CURSOR CNTL (BDE11)
RH IGN AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

RH IGN AUTO SEQ INH
RH IGN HTR PWR OFF
```

103-19 CPWR

```
CURSOR CNTL (BDE11)
RH IGN SEC SEL
XMIT CURSOR KEY - PRESS

CRT

VERIFY RH IGN SEC SEL SEC
```

103-20 CPWR

```
CURSOR CNTL (BDE11)
RH IGN AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

RH IGN AUTO SEQ ACT
RH IGN HTR PWR ON
```

103-21 CPWR TBC

RH SRB Primary Igniter Heater Contingency complete.
RH SRB Secondary Igniter Heater Power On and cycling
at this time.

***** End of RH SRB Primary Igniter Heater Failure Contingency *****

Contingency for C10 Console Crash Prior to L-10 Min Igniter Heater Power Removal

Not Performed:_____

103-22 TBC CPWR

Perform SRB Igniter Heater Power Removal.

103-23 CPWR

IF the EPDC SHUTTLE OVERVIEW (SWC02) program is active at the Backup Console,

THEN perform the following:

```
CURSOR CNTL (SDC02)
IGN HTR PWR OFF
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

NOTE

Perform the next two steps if the command processor is being used to power down the SRB Igniter Heaters.

NOTE

If Primary Igniter Heaters are being used, replace the X in the FD with a 0.
If Secondary Igniter Heaters are being used, replace the X in the FD with a 1.

103-24 **CPWR**

```
CONSOLE KYBD
APPLY _B06K7X45A_0
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
REPEAT FOR B06K8X45A
```

Not Performed:_____

103-25 **CPWR**

```
CONSOLE KYBD
SET _B06K7X80E_OFF
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
REPEAT FOR B06K8X80E
```

Not Performed:_____

103-26 CPWR

```
CRT (BEE11)
VERIFY

LH/RH IGN HTR SETPOINTS 0 DEG F
LH/RH IGN HTR PWR - OFF
LH/RH IGN HTR CURRENT <0.5 AMP AC

OMRSD S00FA0.980
```

103-27 CPWR TBC

Igniter Heater Power Removal complete.

***** End of Contingency for C10 Console Crash Prior to L-10 Min Igniter Heater Power Removal *****

Contingency for C10 Console Crash and Extended Hold at T-5 Min Igniter Heater Activation

NOTE

Perform this option if determined by CPWR, NTD, and Launch Director to maintain igniter heater control settings at 100 deg F (99-101) for start of T-5 minute count.

Not Performed:_____

CAUTION

RSRM igniter temperature shall not exceed 125 deg F and current shall not exceed 4.9 amp AC or proper seal capabilities of all ignition system seals may not occur.

NOTE

If Primary Igniter Heaters are being used, replace the X in the FD with a 0.

If Secondary Igniter Heaters are being used, replace the X in the FD with a 1.

103-28 **CPWR**

```
CONSOLE KYBD
APPLY _B06K7X45A_0
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
REPEAT FOR B06K8X45A
```

103-29 **CPWR**

```
CONSOLE KYBD
SET _B06K7X80E_ ON
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
REPEAT FOR B06K8X80E
```

103-30 CPWR

```
CONSOLE KYBD
APPLY _B06K7X45A_100
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
REPEAT FOR B06K8X45A
```

103-31 CPWR

```
CRT (BEE11)
VERIFY

LH/RH IGN HTR SETPOINT 100 DEG F
LH/RH IGN HTR PWR - ON

OMRSD S00E00.742
OMRSD S00FA0.620-1R
```

103-32 CPWR TBC

Igniter Heater Activation complete.

***** End of Contingency for C10 Console Crash and Extended Hold at T-5 Min Igniter Heater Activation *****

Contingency for C10 Console Crash and Extended Hold at T-5 Min Igniter Heater Deactivation

NOTE
Heaters must be deactivated prior to resuming Countdown at T-5 min. Do not perform next five steps if heaters already deactivated.

Not Performed:_____

103-33 **CPWR**

IF the EPDC SHUTTLE OVERVIEW (SWC02) program is active at the Backup Console,

THEN perform the following:

```
CURSOR CNTL (SDC02)
IGN HTR PWR OFF
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

NOTE

Perform the next two steps if the command processor is being used to power down the SRB Igniter Heaters.

NOTE

If Primary Igniter Heaters are being used, replace the X in the FD with a 0.
If Secondary Igniter Heaters are being used, replace the X in the FD with a 1.

103-34 TBC CPWR

```
CONSOLE KYBD
APPLY _B06K7X45A_0
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
REPEAT FOR B06K8X45A
```

Not Performed:_____

103-35 CPWR

```
CONSOLE KYBD
SET _B06K7X80E_ OFF
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
REPEAT FOR B06K8X80E
```

Not Performed:_____

103-36 CPWR

```
CRT (BEE11)
VERIFY

LH/RH IGN HTR SETPOINT 0 DEG F
LH/RH IGN HTR PWR - OFF

OMRSD S00FA0.980
```

103-37 CPWR TBC

Igniter Heater Deactivation complete.

***** End of Contingency for C10 Console Crash and Extended Hold at T-5 Min Igniter Heater Deactivation *****

Contingency for Manual SRB Field/Igniter Joint Heater Operations

NOTE

Perform the following option if a temperature sensor for the SRB field/igniter joint heater is nearing the LCC limits, due to realtime thermal conditions.

(Igniter: 74-125 deg F, Field: 86-123 deg F)

Contingency for Manual SRB Field/Igniter Joint Heater Operations
Not Performed:_____

NOTE

In the following option, the control temperature sensor noted in the next step will be selected by the operator as required.

103-38 CPWR TBC 136

Request concurrence to take joint heater _____ to manual control to maintain temperatures within LCC limits.

103-39 TBC CPWR

Proceed with joint heater manual control as required.

103-40 CPWR

```
CURSOR CNTL (BDE11)
(JOINT HEATER) AUTO SEQ
XMIT CURSOR KEY - PRESS

VERIFY (JOINT HEATER) VAC AND AMPAC - LL
```

NOTE
Perform next step as necessary to cycle heater power On and Off.

103-41 **CPWR**

```
CURSOR CNTL (BDE11)
(JOINT HEATER) HTR PWR
XMIT CURSOR KEY - PRESS
```

103-42 **CPWR** **TBC**

(Joint Heater) is in manual mode with power on and manual cycling.

103-43 **CPWR**

IF MANUAL CONTROL NO LONGER REQUIRED,

THEN RETURN HEATER TO AUTO CONTROL AS FOLLOWS:

```
CURSOR CNTL (BDE11)
(JOINT HEATER) AUTO SEQ
XMIT CURSOR KEY - PRESS
```

VERIFY AUTO SEQ ACTIVE

Not Performed:_____

***** End of Contingency for Manual SRB Field/Igniter Joint Heater Operations *****

Contingency for Inhibiting SRB Field/Igniter Joint Temp Sensor

NOTE
Perform the following option if due to instrumentation failure or if real time thermal condition warrants.

Contingency for Inhibiting SRB Field/Igniter Joint Temp Sensor
Not Performed:_____

103-44 CPWR TBC 136

Request concurrence to inhibit Joint Heater Temp Sensor.

_____ (joint heater)

_____ (temp sensor)

103-45 TBC CPWR

Proceed with Joint Heater Temp Sensor inhibit.

103-46 CPWR

```
CURSOR CNTL (BDE11)
SENSOR ACT/INH
XMIT CURSOR KEY - PRESS
```

103-47 CPWR

```
CURSOR CNTL (BKE22)
SEN SEL (TEMP SENSOR)
XMIT CURSOR KEY - PRESS
```

VERIFY (JOINT HEATER) (TEMP SENSOR) INHIBITED

103-48 CPWR

```
CONSOLE KYBD (BKE22)
PFK15 - PRESS

VERIFY BWE11 ACTIVE
```

103-49 CPWR` TBC

(Joint Heater) (Temp Sensor) is inhibited.

***** End of Contingency for Inhibiting SRB Field/Igniter Joint Temp Sensor *****

LH SRB Primary FWD Field Joint Heater Failure Contingency

Not Performed:_____

103-50 TBC CPWR

Perform LH SRB Primary FWD Field Joint Heater Failure Contingency.

103-51 CPWR

```
CURSOR CNTL (BDE11)
LH FWD AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

LH FWD AUTO SEQ INH
LH FWD HTR PWR OFF
```

103-52 CPWR

```
CURSOR CNTL (BDE11)
LH FWD SEC SEL
XMIT CURSOR KEY - PRESS

CRT

VERIFY LH FWD SEC SEL SEC
```

103-53 CPWR

```
CURSOR CNTL (BDE11)
LH FWD AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

LH FWD AUTO SEQ ACT
LH FWD HTR PWR ON
```

103-54 CPWR TBC

LH SRB Primary FWD Field Joint Heater Contingency complete.
LH SRB Secondary FWD Field Joint Heater Power On and cycling at this time.

***** End of LH SRB Primary FWD Field Joint Heater Failure Contingency *****

RH SRB Primary FWD Field Joint Heater Failure Contingency

Not Performed:_____

103-55 TBC CPWR

Perform RH SRB Primary FWD Field Joint Heater Failure Contingency.

103-56 CPWR

```
CURSOR CNTL (BDE11)
RH FWD AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

RH FWD AUTO SEQ INH
RH FWD HTR PWR OFF
```

103-57 CPWR

```
CURSOR CNTL (BDE11)
RH FWD SEC SEL
XMIT CURSOR KEY - PRESS

CRT

VERIFY RH FWD SEC SEL SEC
```

103-58 CPWR

```
CURSOR CNTL (BDE11)
RH FWD AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

RH FWD AUTO SEQ ACT
RH FWD HTR PWR ON
```

103-59 CPWR TBC

RH SRB Primary FWD Field Joint Heater Contingency complete.
RH SRB Secondary FWD Field Joint Heater Power On and cycling at this time.

***** End of RH SRB Primary FWD Field Joint Heater Failure Contingency *****

LH SRB Primary MID Field Joint Heater Failure Contingency

Not Performed:_____

103-60 TBC CPWR

Perform LH SRB Primary MID Field Joint Heater Failure Contingency.

103-61 CPWR

```
CURSOR CNTL (BDE11)
LH MID AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

LH MID AUTO SEQ INH
LH MID HTR PWR OFF
```

103-62 CPWR

```
CURSOR CNTL (BDE11)
LH MID SEC SEL
XMIT CURSOR KEY - PRESS

CRT

VERIFY LH MID SEC SEL SEC
```

103-63 CPWR

```
CURSOR CNTL (BDE11)
LH MID AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

LH MID AUTO SEQ ACT
LH MID HTR PWR ON
```

103-64 CPWR TBC

LH SRB Primary MID Field Joint Heater Contingency complete.
LH SRB Secondary MID Field Joint Heater Power On and cycling at this time.

***** End of LH SRB Primary MID Field Joint Heater Failure Contingency *****

RH SRB Primary MID Field Joint Heater Failure Contingency

Not Performed:_____

103-65 TBC CPWR

Perform RH SRB Primary MID Field Joint Heater Failure Contingency.

103-66 CPWR

```
CURSOR CNTL (BDE11)
RH MID AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

RH MID AUTO SEQ INH
RH MID HTR PWR OFF
```

103-67 CPWR

```
CURSOR CNTL (BDE11)
RH MID SEC SEL
XMIT CURSOR KEY - PRESS

CRT

VERIFY RH MID SEC SEL SEC
```

103-68 CPWR

```
CURSOR CNTL (BDE11)
RH MID AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

RH MID AUTO SEQ ACT
RH MID HTR PWR ON
```

103-69 CPWR TBC

RH SRB Primary MID Field Joint Heater Contingency complete.
RH SRB Secondary MID Field Joint Heater Power On and cycling at this time.

***** End of RH SRB Primary MID Field Joint Heater Failure Contingency *****

LH SRB Primary AFT Field Joint Heater Failure Contingency

Not Performed:_____

103-70 TBC CPWR

Perform LH SRB Primary AFT Field Joint Heater Failure Contingency.

103-71 CPWR

```
CURSOR CNTL (BDE11)
LH AFT AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

LH AFT AUTO SEQ INH
LH AFT HTR PWR OFF
```

103-72 CPWR

```
CURSOR CNTL (BDE11)
LH AFT SEC SEL
XMIT CURSOR KEY - PRESS

CRT

VERIFY LH AFT SEC SEL SEC
```

103-73 CPWR

```
CURSOR CNTL (BDE11)
LH AFT AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

LH AFT AUTO SEQ ACT
LH AFT HTR PWR ON
```

103-74 CPWR TBC

LH SRB Primary AFT Field Joint Heater Contingency complete.
LH SRB Secondary AFT Field Joint Heater Power On and cycling
at this time.

***** End of LH SRB Primary AFT Field Joint Heater Failure Contingency *****

RH SRB Primary AFT Field Joint Heater Failure Contingency

Not Performed:_____

103-75 TBC CPWR

Perform RH SRB Primary AFT Field Joint Heater Failure Contingency.

103-76 CPWR

```
CURSOR CNTL (BDE11)
RH AFT AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

RH AFT AUTO SEQ INH
RH AFT HTR PWR OFF
```

103-77 CPWR

```
CURSOR CNTL (BDE11)
RH AFT SEC SEL
XMIT CURSOR KEY - PRESS

CRT

VERIFY RH AFT SEC SEL SEC
```

103-78 CPWR

```
CURSOR CNTL (BDE11)
RH AFT AUTO SEQ
XMIT CURSOR KEY - PRESS

CRT
VERIFY

RH AFT AUTO SEQ ACT
RH AFT HTR PWR ON
```

103-79 CPWR TBC

RH SRB Primary AFT Field Joint Heater Contingency complete.
RH SRB Secondary AFT Field Joint Heater Power On and cycling at this time.

***** End of RH SRB Primary AFT Field Joint Heater Failure Contingency *****

SRB Joint Heater Primary AC Power Failure Contingency

NOTE
Perform this option to switch all of the SRB Joint heaters to secondary power in the event of a primary AC power failure.

SRB Joint Heater Primary AC Power Failure Contingency Not Performed:_____

103-80 TBC CPWR

Perform SRB Joint Heater Primary AC Power Failure Contingency.

103-81 CPWR

```
CURSOR CNTL (BDE11)
AUTO SEQ - ALL
XMIT CURSOR KEY - PRESS

CRT
VERIFY
HTR PWR OFF FOR ALL JOINT HEATERS
```

103-82 CPWR

```
CURSOR CNTL (BDE11)
LH IGN SEC SEL
XMIT CURSOR KEY - PRESS

CRT
VERIFY
LH IGN SEC SEL SEC

REPEAT FOR:

RH IGN SEC SEL,
LH FWD SEC SEL,
RH FWD SEC SEL,
LH MID SEC SEL,
RH MID SEC SEL,
LH AFT SEC SEL,
RH AFT SEC SEL.
```

103-83 CPWR

```
CURSOR CNTL (BDE11)
AUTO SEQ - ALL
XMIT CURSOR KEY - PRESS

CRT
VERIFY
ALL HTR PWR ON
ALL AUTO SEQ ACT
```

103-84 CPWR TBC

SRB Joint Heater Primary AC Power Failure Contingency complete.
All of the Secondary SRB Joint Heaters are powered on and cycling at this time.

***** End of SRB Joint Heater Primary AC Power Failure Contingency *****

Prerequisite For Igniter/Field Joint Heater GFI Breaker Reset

NOTE
Perform next step prior to any Primary Igniter or Field Joint Heater GFI Breaker reset.

103-85 **CPWR** **QPDS**

MLP Compartment 9B
Rack 6662 - Open door

Not Performed:_____

T:_____

LH PRI Igniter Heater GFI Breaker Reset

103-86 **CPWR** **QPDS**

IF LH Igniter Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A1
GFI A1A23 - RESET

Not Performed:_____

T:_____

LH FWD PRI Joint Heater GFI Breaker Reset

103-87 **CPWR** **QPDS**

IF LH FWD Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A1
GFI A1A20 - RESET

Not Performed:_____

T:_____

LH MID PRI Joint Heater GFI Breaker Reset

103-88 **CPWR** **QPDS**

IF LH MID Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A1
GFI A1A21 - RESET

Not Performed:_____

T:_____

LH AFT PRI Joint Heater GFI Breaker Reset

103-89 **CPWR** **QPDS**

IF LH AFT Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A1
GFI A1A22 - RESET

Not Performed:_____

T:_____

RH PRI Igniter Heater GFI Breaker Reset

103-90 **CPWR** **QPDS**

IF RH Igniter Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A1
GFI A1A24 - RESET

Not Performed:_____

T:_____

RH FWD PRI Joint Heater GFI Breaker Reset

103-91 **CPWR** **QPDS**

IF RH FWD Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A1
GFI A1A17 - RESET

Not Performed:_____

T:_____

RH MID PRI Joint Heater GFI Breaker Reset

103-92 **CPWR** **QPDS**

IF RH MID Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A1
GFI A1A18 - RESET

Not Performed:_____

T:_____

RH AFT PRI Joint Heater GFI Breaker Reset

103-93 **CPWR** **QPDS**

IF RH AFT Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A1
GFI A1A19 - RESET

Not Performed:_____

T:_____

Post Igniter/Field Joint Heater GFI Breaker Reset Contingency

NOTE

Perform next step after any Primary Igniter or Field Joint Heater GFI Breaker reset.

103-94 **CPWR** **QPDS**

MLP Compartment 9B
Rack 6662 - Close door

Not Performed:_____

T:_____

Prerequisite For Secondary Igniter/Field Joint Heater GFI Breaker Reset

NOTE

Perform next step prior to any Secondary Igniter or Field Joint Heater GFI Breaker reset.

103-95 **CPWR** **QPDS**

MLP Compartment 9B
Rack 6662 - Open door

Not Performed:_____

T:_____

LH Sec Igniter Heater GFI Breaker Reset

103-96 **CPWR** **QPDS**

IF LH Igniter Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A2
GFI A2A23 - RESET

Not Performed:_____

T:_____

LH FWD Sec Joint Heater GFI Breaker Reset

103-97 **CPWR** **QPDS**

IF LH FWD Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A2
GFI A2A20 - RESET

Not Performed:_____

T:_____

LH MID Sec Joint Heater GFI Breaker Reset

103-98 **CPWR** **QPDS**

IF LH MID Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A2
GFI A2A21 - RESET

Not Performed:_____

T:_____

LH AFT Sec Joint Heater GFI Breaker Reset

103-99 **CPWR** **QPDS**

IF LH AFT Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A2
GFI A2A22 - RESET

Not Performed:_____

T:_____

RH Sec Igniter Heater GFI Breaker Reset

103-100 **CPWR** **QPDS**

IF RH Igniter Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A2
GFI A2A24 - RESET

Not Performed:_____

T:_____

RH FWD Sec Joint Heater GFI Breaker Reset

103-101 **CPWR** **QPDS**

IF RH FWD Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A2
GFI A2A17 - RESET

Not Performed:_____

T:_____

RH MID Sec Joint Heater GFI Breaker Reset

103-102 CPWR QPDS

IF RH MID Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A2
GFI A2A18 - RESET

Not Performed:_____

T:_____

RH AFT Sec Joint Heater GFI Breaker Reset

103-103 CPWR QPDS

IF RH AFT Joint Heater GFI Breaker tripped indicated On,

THEN

MLP Compartment 9B
Rack 6662A2
GFI A2A19 - RESET

Not Performed:_____

T:_____

Post Igniter/Field Joint Heater GFI Breaker Reset Contingency

NOTE

Perform next step after any Secondary Igniter or Field Joint Heater GFI Breaker reset.

103-104 CPWR QPDS

MLP Compartment 9B
Rack 6662 - Close door

Not Performed:_____

T:_____

***** End of Post Igniter/Field Joint Heater GFI Breaker Reset Contingency *****

SRB Separation PIC Cap Voltage Anomaly (SSID BSEP-01)

NOTE

Perform this option when an SRB Separation PIC Cap voltage is greater than 1.5 VDC (T-6 Hours to T-31 Seconds).

SRB Separation PIC Cap Voltage Anomaly (SSID BSEP-01) Not Performed:_____

103-105 CPWR

```
CURSOR CNTL (BWE08)
SRB OPTIONS
  CONTINGENCY
XMIT CURSOR KEY - PRESS
```

103-106 CPWR

```
CURSOR CNTL (BSE08)
SRB SEPARATION PIC CAP VOLTAGE ANOMALY
XMIT CURSOR KEY - PRESS

CRT (BSE08)

VERIFY SRB SEP SYSTEM PIC CAP VOLTAGE CHECK
COMPLETE.

PFP (BSE08)
PFPK5 KEY - PRESS (TERMINATE BSE08)

CRT

VERIFY BSE08 TERMINATES AND IS REPLACED BY BWE08.
```

***** End of SRB Separation PIC Cap Voltage Anomaly (SSID BSEP-01) *****

SRB Recovery System PIC Cap Voltage Anomaly (SSID BREC-02)

NOTE

Perform this option when an SRB Recovery System PIC Cap voltage is greater than 1.5 VDC (T-6 Hours to T-31 Seconds).

SRB Recovery System PIC Cap Voltage Anomaly (SSID BREC-02)
Not Performed:_____

103-107 CPWR

```
CURSOR CNTL (BWE08)
SRB OPTIONS
  CONTINGENCY
XMIT CURSOR KEY - PRESS
```

103-108 CPWR

```
CURSOR CNTL (BSE08)
SRB RECOVERY SYSTEM PIC CAP VOLTAGE ANOMALY
XMIT CURSOR KEY - PRESS
```

103-109 CPWR

```
CONSOLE KYBD (BSE08)

FOLLOW PROMPTS AS THEY OCCUR

PFP (BSE08)
PFPK5 KEY - PRESS

CRT

VERIFY BSE08 TERMINATES AND IS REPLACED BY BWE08.
```

***** End of SRB Recovery System PIC Cap Voltage Anomaly (SSID BREC-02) *****

SRB Ignition S&A Contingency Procedure (SRB Power on till T-5 min)

NOTE
Perform this option when an SRB Ignition S&A position is incorrect.

SRB Ignition S&A Contingency Procedure Not Performed:_____

NOTE
Following steps will have CPWR issue Ignition S&A safe commands. Design agency has authorized S&A to be safed after erroneous S &A status.

103-110 NTD CPWR

Perform Ignition S&A Safing.

103-111 CPWR

```
CURSOR CNTL (SDC01)
SRB OPTION IGN SAF/ARM
XMIT CURSOR KEY - PRESS

CRT

VERIFY SWC01 TERMINATED AND BDE07 IS DISPLAYED.
```

103-112 CPWR

```
CURSOR CNTL (BDE07)
SAFE LEFT AND RIGHT
XMIT CURSOR KEY - PRESS

CRT

VERIFY BSE06 GPC FORMAT OR VALIDITY FREQ ERROR
```

103-113 CPWR

```
PFP (BSE06)
CONTINUE - PRESS
```

103-114 CPWR

```
CONSOLE KYBD (BWE07)
PFK15 - PRESS

CRT

VERIFY BWE07 TERMINATES AND SDC01 IS DISPLAYED.
```

103-115 CPWR NTD

Ignition S&A Safing complete.

Power Down Range Safety System

NOTE
Perform this section if Range Safety systems are powered On.

Power Down Range Safety System Not Performed:_____

103-116 NTD CBRS

Perform Range Safety Power Down.

NOTE
Following step must be performed in the order that it is written otherwise it will impact the results of the MEC Preflight Byte.

103-117 CBRS

```
CURSOR CNTL (SWRB2)
LH A PWR OFF - OFF
LH B PWR OFF - OFF
RH A PWR OFF - OFF
RH B PWR OFF - OFF
LH INST ON & TRAN OFF
XMIT CURSOR KEY - PRESS
RH INST ON & TRAN OFF
XMIT CURSOR KEY - PRESS
LH INST OFF & TRAN OFF
XMIT CURSOR KEY - PRESS
RH INST OFF & TRAN OFF
XMIT CURSOR KEY - PRESS
```

103-118 CBRS NTD

SRB Range Safety Systems powered down.

***** End of Power Down Range Safety System *****

NOTE
Following step will remove SRB power and secure MEC 1 & 2.

103-119 NTD MS1

```
PANEL O17
ROW D
  MEC
    1 SW - OFF
    2 SW - OFF
```

103-120 NTD CPWR

Verify SRB power removed.

***** End of SRB Ignition S&A Contingency Procedure (SRB Power on till T-5 min) *****

SRB Ignition S&A Contingency Procedure
(T-4 min 58 sec till post GLS cutoff)

NOTE
Perform this section when an SRB Ignition S&A position is incorrect.

SRB Ignition S&A Contingency Procedure Not Performed:_____

NOTE
Next step will have GLS issue Ignition S&A safe commands during safing.

103-121 NTD CGLS 212

IF prior to T-31 sec and counting,

THEN perform GLS cutoff.

Not Performed:_____

Ignition S&A Safing

NOTE
Do not perform this section if Ignition S&A is in a Safe condition after GLS cutoff.

Ignition S&A Safing Not Performed:_____

NOTE
Following steps will have CPWR issue Ignition S&A safe commands.

103-122 NTD CPWR

Perform Ignition S&A Safing.

103-123 CPWR

```
CURSOR CNTL (SDC01)
SRB OPTION IGN SAF/ARM
XMIT CURSOR KEY - PRESS

CRT
```

VERIFY SWC01 TERMINATED AND BDE07 IS DISPLAYED.

103-124 CPWR

```
CURSOR CNTL (BDE07)
SAFE LEFT AND RIGHT
XMIT CURSOR KEY - PRESS

CRT
```

VERIFY BSE06 GPC FORMAT OR VALIDITY FREQ ERROR.

103-125 CPWR

```
PFP (BSE06)
CONTINUE - PRESS
```

103-126 CPWR

```
CONSOLE KYBD (BWE07)
PFK15 - PRESS

CRT
```

VERIFY BWE07 TERMINATES AND SDC01 IS DISPLAYED.

103-127 CPWR NTD

Ignition S&A Safing complete.

***** End of Ignition S&A Safing *****

SRB RSS S&A Safing

NOTE
Perform this section after transition to G9 and Post Cutoff Safety Check List is complete.

SRB RSS S&A Safing Not Performed:_____

103-128 NTD CGLS 212

Perform SRB RSS S&A Safing. (post G9 recycle/GLS)

103-129 NTD CBRS 212

Perform SRB Range Safety Power Down.

NOTE
Following step must be performed in the order that it is written otherwise it will impact the results of the MEC Preflight Byte.

103-130 CBRS

```
CURSOR CNTL (SWRB2)

LH A PWR OFF - OFF
LH B PWR OFF - OFF
RH A PWR OFF - OFF
RH B PWR OFF - OFF
LH INST ON & TRAN OFF
XMIT CURSOR KEY - PRESS
RH INST ON & TRAN OFF
XMIT CURSOR KEY - PRESS
LH INST OFF & TRAN OFF
XMIT CURSOR KEY - PRESS
RH INST OFF & TRAN OFF
XMIT CURSOR KEY - PRESS
```

103-131 CBRS NTD 212

SRB Range Safety Systems powered down and RSS S&A's in Safe position.

NOTE
Following step will remove SRB power and secure MEC 1 & 2. This step will be performed immediately after Range Safety power down.

103-132 NTD MS1 212

```
PANEL 017
ROW D
  MEC
  1 SW - OFF
  2 SW - OFF
```

103-133 NTD CPWR 212

Verify SRB power removed.

***** End of SRB RSS S&A Safing *****

***** SRB Ignition S&A Contingency Procedure (T-4 min 58 sec till post GLS cutoff) Complete *****

103-134

SRB Ignition S&A Contingency Securing complete.

*** End of Operation **103** ***

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OPERATION 104 MPS

Shop: **MPS**
Cntrl Rm Console: **C3, C4**
OPR: **MPS**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **1.0**

NOTE

Following LCD preplanned procedures are contained in S0007 subtask OMIs:

Title	S1003 OP No.	LCC Ref
PV10 CL Ind Failed Off	600	MPS-07
PV10 Pwr Fail at Term Repl	605	MPS-07
PV10 Pwr Fail Before Term Repl	607	MPS-50
PV9 CL Ind Failed Off	610	MPS-08
PV9 Pwr Fail Before T-48 sec	612	MPS-49
PV20/21 OP Ind Failed On	615	MPS-34
PV1/2/3 OP/CL Pwr Fail	620	MPS-35/36/37
PV19 CL Ind's Failed On	625	MPS-47

Title	S1004 OP No.	LCC Ref
PV12 CL Ind Failed Off	600	MPS-04
PV12 OP/CL Pwr Fail After RFF	605	MPS-04
PV12 OP/CL Pwr Fail Before RFF	607	MPS-52
PV11 CL Ind Failed Off	610	MPS-05
PV12 OP/CL Pwr Fail Before T-48 sec	615	MPS-51
PV13 CL Ind Failed Off	620	MPS-10
LH_2 17 In. Disc Temp Sens Fail	625	MPS-11
PV22 CL Ind Failed On	630	MPS-12/34
ET PT Sens C/O During Repl	635	MPS-23
LH_2/LO_2 ECO Snsr Failure	637	
LH_2 ECO Snsr Voltage Failure	638	MPS-53
Recirc Reinit From Pwr Loss	640	MPS-33
PV11 CL Ind Failed On	645	MPS-34
PV13 CL Ind Failed On	650	MPS-10/34
LV10 OP Pwr Failed On	655	MPS-39
LV59/61/63 OP Pwr Failed On	660	MPS-40
LV60/62/64 OP Pwr Failed On	665	MPS-40
LV26/27 OP Pwr Failed On	670	MPS-41
LV42/43 OP Pwr Failed On	675	MPS-42

NOTE (cont)

Title	S1004 OP No.	LCC Ref
MPS REG Out Press Anomaly	680	MPS-46
MPS He Temp Anomaly	685	MPS-02
MPS He Sup Press Anomaly	690	MPS-01
Orb/ET Umb LH2 Plate Gap Eval	692	
Recovery From PV22 Closure	700	
Restart of Cavitating Recirc Pumps	705	
MPS GHe Fill Decay Test	710	MPS-46

AFT Hydrogen Concentration Evaluation Contingency (HAZ-03)

NOTE

Perform this option if in violation of LCC HAZ-03. CHGD stopwatch will always be started at T-31 sec, regardless of hold initiation, per S0007 terminal count sequence in the event that a violation may occur. The HAZ-03 curve goes into effect at T-31 sec.

AFT Hydrogen Concentration Evaluation Contingency Not Performed:_____

104-1 **CHGD** **NTD**

Request hold, LCC violation HAZ-03. The AFT hydrogen concentration has exceeded the T-31 sec gate at _____ PPM.

NOTE
The hold at T-31 sec will be 30 seconds minimum.

104-2 CHGD NTD

AFT hydrogen leak evaluation initiated at _____ GMT.

NOTE
Evaluate the AFT hydrogen concentration for the duration of the hold every 30 secs and verify the hydrogen concentration remains below the HAZ-03 maximum. AFT hydrogen concentration will be reported in 1 minute intervals after hold + 4 minutes. Record concentration in the following table.

Completion of the table is not required to continue count; all remaining data may be marked "N/A" after the count resumes.

T-31 sec hold time Completed	AFT hydrogen PPM	HAZ-03 maximum PPM	Trend PPM/min
+00M30S		340	
+01M00S		420	
+01M30S		470	
+02M00S		510	
+02M30S		530	
+03M00S		550	
+03M30S		570	
+04M00S		580	
+05M00S		590	
+06M00S		590	
+06M42S		600	

104-3 **CHGD** **NTD**

IF AFT hydrogen concentration violates Flight Safety acceptability per LCC HAZ-03,

THEN AFT hydrogen concentration is not acceptable for flight per LCC HAZ-03.

Recommend scrub.

Not Performed:_____

104-4 **CHGD** **NTD**

IF AFT hydrogen concentration does not violate Flight Safety acceptability per LCC HAZ-03,

THEN AFT hydrogen concentration is acceptable for flight per LCC HAZ-03.

Recommend continue.

Not Performed:_____

***** End of AFT Hydrogen Concentration Evaluation Contingency (HAZ-03) *****

Loss of Orbiter FIREX FR Power Bus Indication

NOTE
Perform this option upon loss of the Orbiter FIREX FR Power Bus indication, GWDXPT13E.

Loss of Orbiter FIREX FR Power Bus Indication Not Performed:_____

104-5 **CMPL** **NTD** **232**
JBFX

Notify NTD and JBFX of the loss of the Orbiter FIREX FR Power Bus indication.

104-6 **JBFX**

IF FX FR-ON/CCC-OFF indicates OFF on Screen P2A/P2B, **Verify**

THEN issue a TRANSFER FIREX TO FR command. ☐

ELSE assume responsibility of the Orbiter FIREX and notify Water Systems Engineering. ☐

***** End of Loss of Orbiter FIREX FR Power Bus Indication *****

Failure of Orbiter FIREX Operation from C3 Console Contingency

NOTE

Perform this contingency option in the event of a failure of Orbiter FIREX operation from the C3 Console and Safing Panel.

Failure of Orbiter FIREX Operation from C3 Console Contingency
Not Performed:_____

104-7 **CMPL** **JBFX** **232**

Contact JBFX on the Net or by phone at 7-2676 and notify them of the need for Orbiter FIREX.

104-8 **JBFX**

Activate the Pad A FIREX Backup Panel by performing the following:

1. **Press** COMMAND POWER [K1].
2. **Press** Command Power On [F11].
3. **Verify** COMMAND POWER indicates ON.

104-9 **JBFX**

IF operation of the LOX-LH_2 Umbilical Spray is required,

THEN perform the following:

1. **Press** ORB UMB [F6].
2. **Press** Open V333/V334 (Orbiter Umbilical) [F11].
3. **Verify** V333/V334 indicates OPEN.
4. **Press** EXIT [F20].

Not Performed:_____

104-10 **JBFX**

IF operation of the Aft Heatshield Spray is required,

THEN perform the following:

1. **Press** ORB SHIELD [F7].
2. **Press** Open V336/V337 (Orbiter Shieldl) [F11].
3. **Verify** V336/V337 indicates OPEN.
4. **Press** EXIT [F20].

Not Performed:_____

104-11 **JBFX**

IF operation of the Orbiter Skin Spray is required,

THEN perform the following:

1. **Press** ORB SKIN [F8].
2. **Press** Open V339/V340 (Orbiter Skin) [F11].
3. **Verify** V339/V340 indicates OPEN.
4. **Press** EXIT [F20].

Not Performed:_____

104-12 **STM** **JBFX** **232**

Verify Orbiter FIREX is no longer needed.

104-13 **JBFX**

IF operation of the LOX-LH_2 Umbilical Spray was activated,

THEN perform the following:

1. **Press** ORB UMB [F6].
2. **Press** Close V333/V334 (Orbiter Umbilical) [F12].
3. **Verify** V333/V334 indicates CLOSED.
4. **Press** EXIT [F20].

Not Performed:_____

104-14 **JBFX**

IF operation of the Aft Heatshield Spray was activated,

THEN perform the following:

1. **Press** ORB SHIELD [F7].
2. **Press** Close V336/V337 (Orbiter Shieldl) [F12].
3. **Verify** V336/V337 indicates CLOSED.
4. **Press** EXIT [F20].

Not Performed:_____

104-15 **JBFX**

IF operation of the Orbiter Skin Spray was activated,

THEN perform the following:

1. **Press** ORB SKIN [F8].
2. **Press** Close V339/V340 (Orbiter Skin) [F12].
3. **Verify** V339/V340 indicates CLOSED.
4. **Press** EXIT [F20].

Not Performed:_____

104-16 JBFX

Deactivate the Pad A FIREX Backup Panel by performing the following:

1. **Press** COMMAND POWER [K1].
2. **Press** Command Power Off [F12].
3. **Verify** COMMAND POWER indicates OFF.

***** End of Failure of Orbiter FIREX Operation from C3 Console Contingency *****

*** End of Operation **104** ***

OPERATION 105 SSME

Shop: **SSME**
Cntrl Rm Console: **C3**
OPR: **SSME**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **1.0**

ME FEP Recovery Option

NOTE

For loss of ME FEP(s), perform the next option for affected engine(s), after FEP is restored.

ME FEP Recovery Option Not Performed:_____

105-1 CCME

```
CURSOR CNTL (VAE90A)
FMT 147 INH
```

105-2 CCME

```
SWITCH TO PAGE 2
PFPK5 KEY - PRESS (VWE01A)
INH/CHG/ACT FEP PROCESSING
PFPK4 KEY - PRESS (VWE01A)
SWITCH TO PAGE 1
PFPK5 KEY - PRESS (VWE01A)
```

105-3 CSME

```
CONSOLE C3
VKE26A,,INHIB <PERF PGRM>
```

105-4 CSME

```
CONSOLE C3, CONSOLE KYBD

A GX E41J1091D3 NE O
A GX E41J2091D3 NE O
A GX E41J3091D3 NE O
```

***** End of ME FEP Recovery Option *****

SSME HPOTP IMSL Purge Anomaly Contingency (LCC SSME-10)

NOTE

Perform this contingency procedure if HPOTP/AT IMSL pressure indicates greater than 160 psia or rise rate is greater than 12 psi per hour.

The use of the engine helium intermediate seal purge to affect a change in the steady state IMSL GN_2 purge pressure is preferred to minimize the effect on engine thermal conditioning (Z=1/2/3 = affected engine).

This procedure sends commands up the LDB. Do not perform during a format change.

SSME HPOTP IMSL Purge Anomaly Contingency Not Performed:_____

105-5 **CSME**

```
CURSOR CNTL (VAE38A)
FOR AFFECTED ENGINE:
E-Z OISP - ISSUE
E-Z NOOP - ISSUE

VERIFY SSME-Z INTERMEDIATE SEAL PURGE ACTIVATED
FOR 2 MINUTES
```

***** End of SSME HPOTP IMSL Purge Anomaly Contingency (Ref LCC SSME-10) *****

SSME Fuel Flow Rate Channel Qualification Anomaly Preplan (Ref SSME-29)

NOTE

Perform this Contingency Preplan if a Flowmeter FID is annunciated (FID111/011 Delimiter 103-106) as a result of Flowmeter motion caused by Tanking or MPS Troubleshooting Procedures.

If 3 or less Flowmeter Channels violate the LCC, FIDs will be posted and the SSME will remain in PSN3.

If 4 Flowmeter Channels violate the LCC, the SSME will transition thru Pneumatic Shutdown to Post Shutdown Standby with FSP Terminated, in this case the actions CTRS/Delay 10 sec/PSN3 must be executed quickly to limit the FSP interruption to 30 seconds or less.

The Controller Reset will reinitialize all Flowmeter sensor channels, cause SSME Bleed Valves to close and Terminate Hi Flow Continuous Fuel System Purge. The following constraints will be adhered to:

LCC SSME-09 SSME Fuel System Purge - allows a 30 second dropout prior to SSME GN_2 Purge Termination at T-2m55s when followed by a reinstatement of at least 5 minutes prior to SSME Start Enable.

LCC MPS-33 MPS Recirculation - allows a 1 minute interruption in recirc prior to LH_2 Pressurization when followed by a reinstatement period of 3.5 minutes prior to T-1m57s.

LCC MPS-24 MPS LO_2 Engine Inlet Temp - LO_2 Bleed Interruptions of 30 seconds maximum are allowable after initial (90 minute) thermal conditioning, a minimum of 9 minutes of continuous bleed flow through the SSMEs is prior to SSME Start.

SSME Fuel Flow Rate Channel Qualification Anomaly Preplan (Ref SSME-29)
Not Performed:_____

105-6 **CSME**
CCME

Indicate Affected SSME(s) _____.

105-7 CSME CLOX 156

The controller reset/purge sequence 3 command issue will cause the SSME bleed valves to close (for less than 30 sec), causing short circuit of LO_2 bleed between the SSME HPOTP and the LO_2 bleed valve. LO_2 bleed will remain active for the LO_2 manifold/feedline via the recirculation isolation valve (opens when the bleed valves close) and the oxidizer seal drain.

105-8 CCME

```
CURSOR CNTL (VWE01A)
ISSUE CTRS COMMAND
VERIFY CHECKOUT/STANDBY
  NO UNEXPECTED FIDS
  BLEED VALVES CLOSED
```

NOTE

Delay 10 seconds from the issuance of the CTRS Command before issuing PSN3 (use TRW as a timer).

105-9 CSME

```
CURSOR CNTL (VAE38A)
ISSUE PSN3 COMMAND

VERIFY START PREP / PSN3
  BLEED VALVES OPEN

RECORD TIME OF PSN3 INITATION _____GMT
```

NOTE

In the following step expected Fuel Flowmeter FIDs are FID111/011 Delimiter 103-106.

105-10 CCME

Perform EEPROM FID Buffer Dump of affected engine(s) via VSE02A. **Verify** expected FIDs.

105-11 CSME CSPE 212
CGLS

IF CTRS/PSN3 issue was worked following GLS activation and LCC SSME-07 violation was annotated by GLS on the SSME Mode,

THEN request GLS to reinitiate monitoring for the SSME Mode.

Not Performed:_____

***** End of SSME Fuel Flow Rate Channel Qualification Anomaly Preplan (Ref SSME-29) *****

*** End of Operation **105** ***

OPERATION 106 PRSD/Fuel Cell

Shop: **FCP, PRSD**
Cntrl Rm Console: **C6**
OPR: **FCP, PRSD**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **1.0**

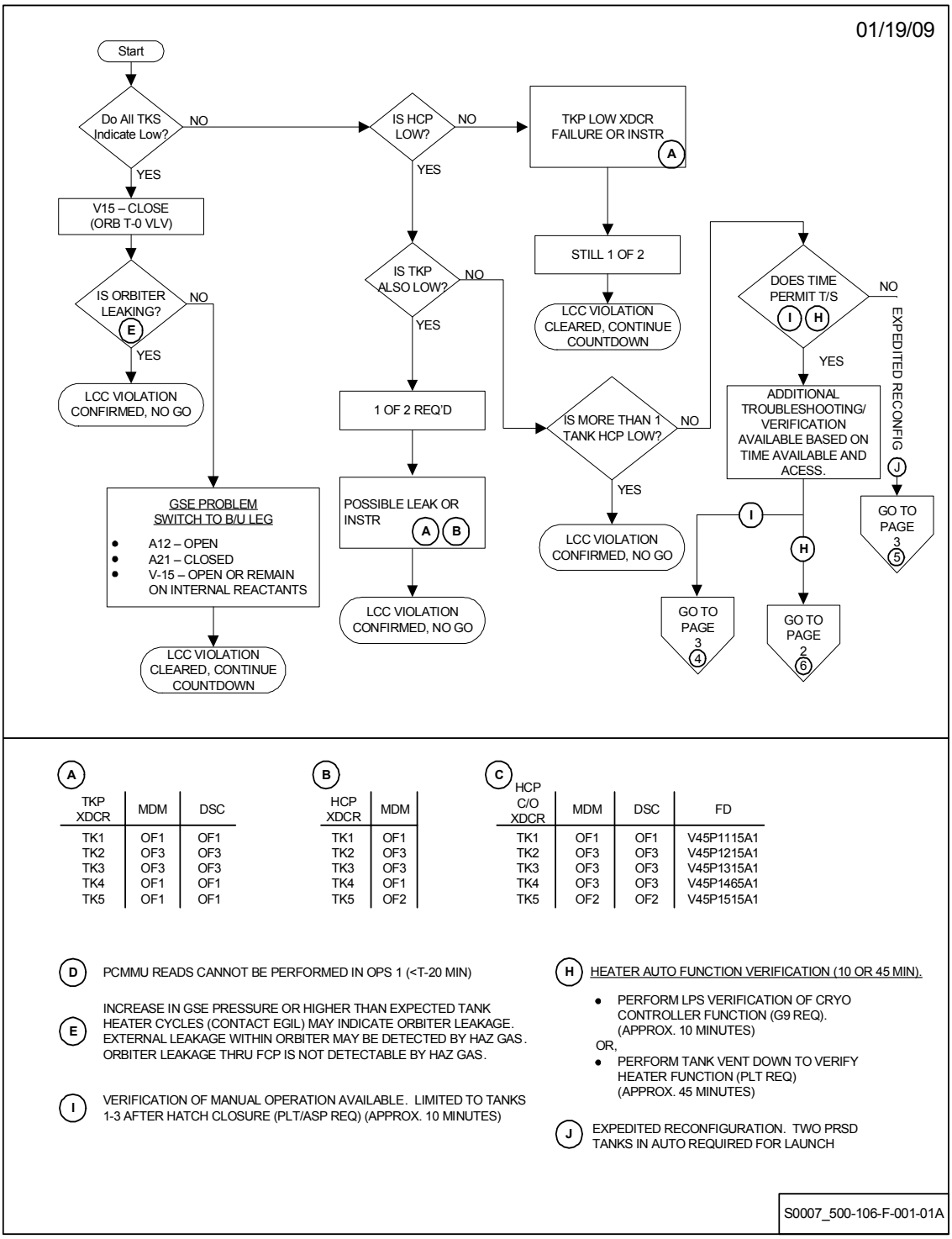
NOTE

This Operation contains logic flow diagrams for LCD preplanned contingency procedures.

This Operation represents preplanned illustrated procedures for use in event of an apparent Launch Commit Criteria and Background Document (NSTS 16007) violation. All work performed will be documented on an IPR.

106-1

O_2 Tank Pressure or Heater Control Pressure Low (SSID PRSD-01) (1 of 3)



A

TKP XDCR	MDM	DSC
TK1	OF1	OF1
TK2	OF3	OF3
TK3	OF3	OF3
TK4	OF1	OF1
TK5	OF1	OF1

B

HCP XDCR	MDM
TK1	OF1
TK2	OF3
TK3	OF3
TK4	OF1
TK5	OF2

C

HCP C/O XDCR	MDM	DSC	FD
TK1	OF1	OF1	V45P1115A1
TK2	OF3	OF3	V45P1215A1
TK3	OF3	OF3	V45P1315A1
TK4	OF3	OF3	V45P1465A1
TK5	OF2	OF2	V45P1515A1

D PCMMU READS CANNOT BE PERFORMED IN OPS 1 (<T-20 MIN)

E INCREASE IN GSE PRESSURE OR HIGHER THAN EXPECTED TANK HEATER CYCLES (CONTACT EGIL) MAY INDICATE ORBITER LEAKAGE. EXTERNAL LEAKAGE WITHIN ORBITER MAY BE DETECTED BY HAZ GAS. ORBITER LEAKAGE THRU FCP IS NOT DETECTABLE BY HAZ GAS.

I VERIFICATION OF MANUAL OPERATION AVAILABLE. LIMITED TO TANKS 1-3 AFTER HATCH CLOSURE (PLT/ASP REQ) (APPROX. 10 MINUTES)

H HEATER AUTO FUNCTION VERIFICATION (10 OR 45 MIN).

- PERFORM LPS VERIFICATION OF CRYO CONTROLLER FUNCTION (G9 REQ). (APPROX. 10 MINUTES)

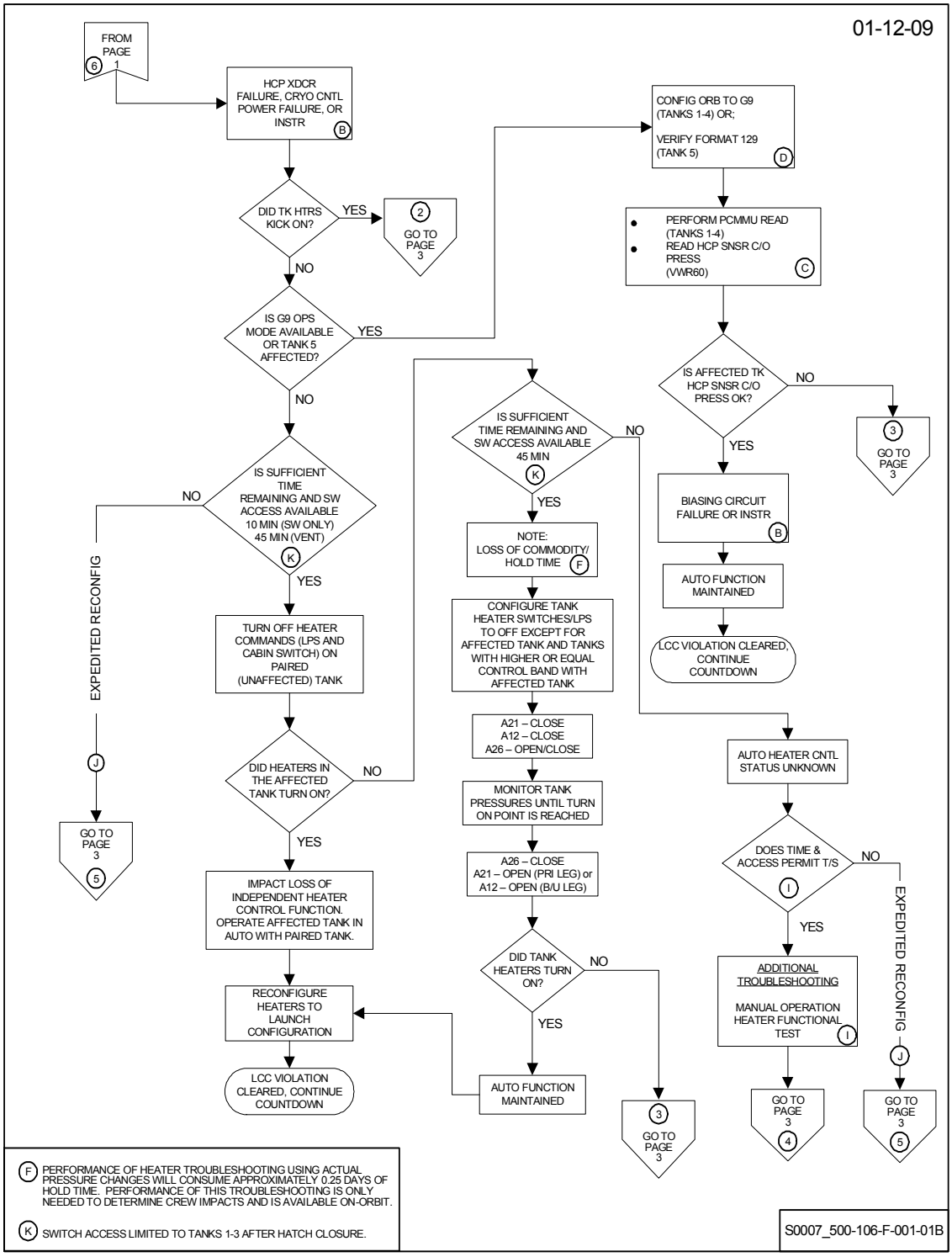
OR,

- PERFORM TANK VENT DOWN TO VERIFY HEATER FUNCTION (PLT REQ) (APPROX. 45 MINUTES)

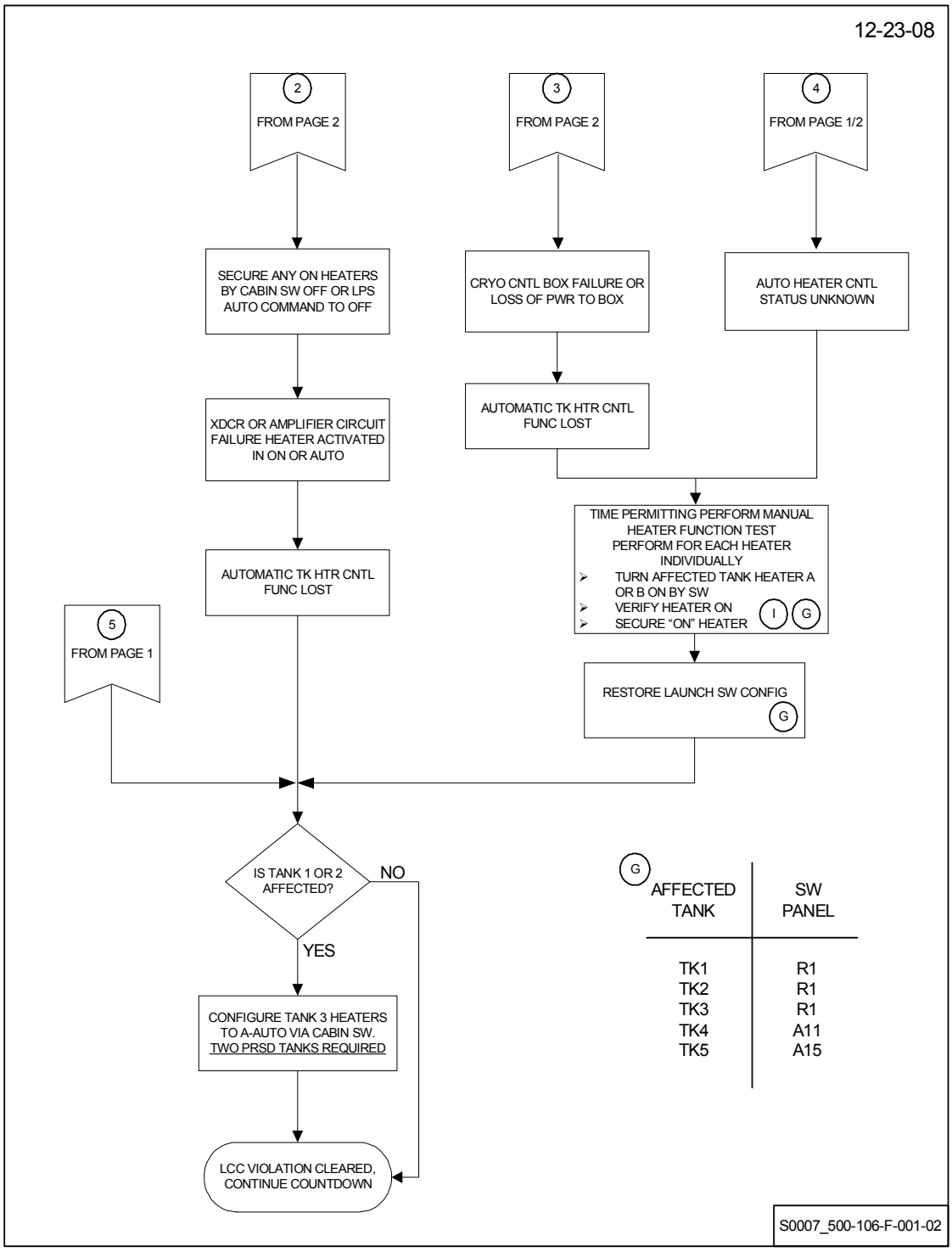
J EXPEDITED RECONFIGURATION. TWO PRSD TANKS IN AUTO REQUIRED FOR LAUNCH

S0007_500-106-F-001-01A

O_2 Tank Pressure or Heater Control Pressure Low (SSID PRSD-01) (2 of 3)

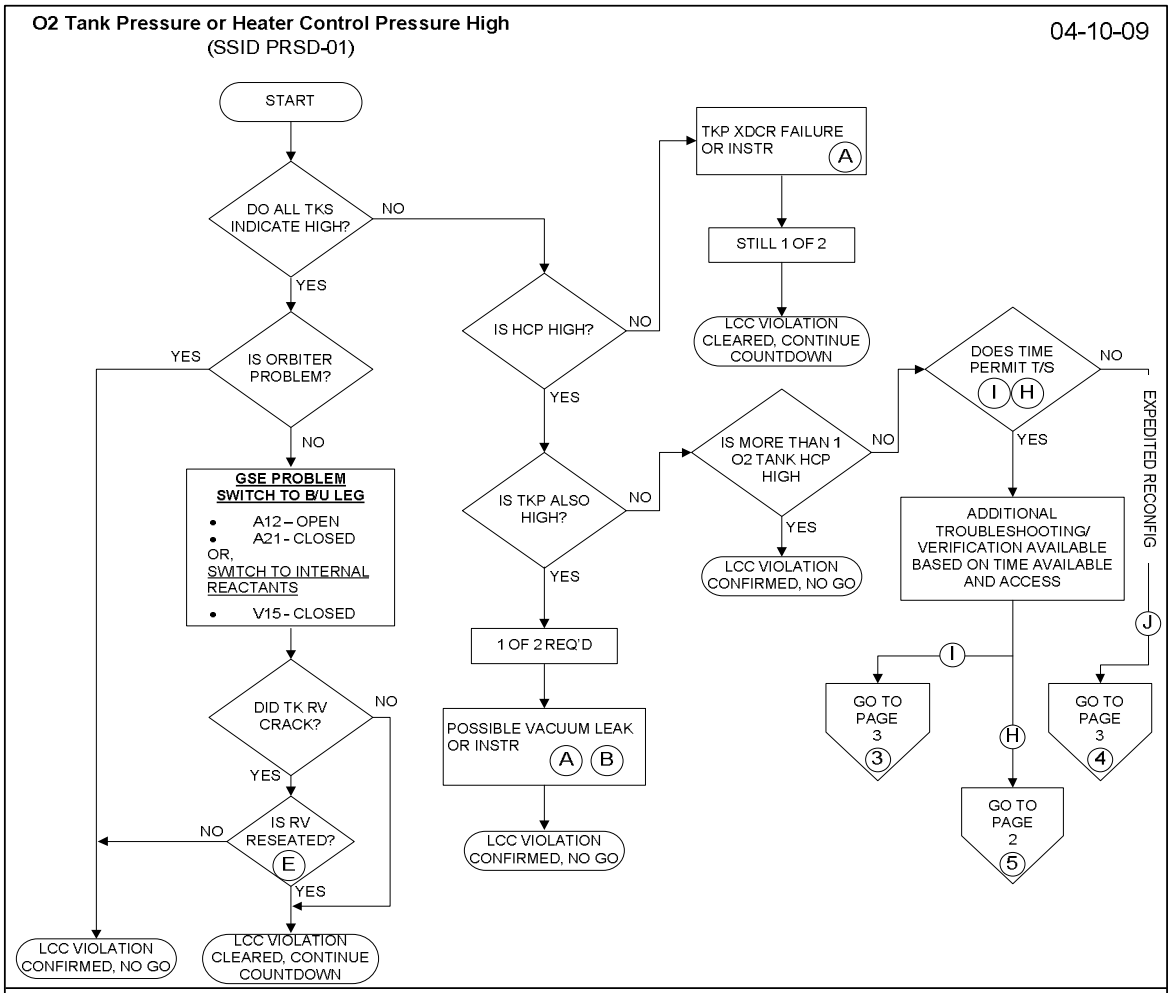


O_2 Tank Pressure or Heater Control Pressure Low (SSID PRSD-01) (3 of 3)



106-2

O_2 Tank Pressure or Heater Control Pressure High (SSID PRSD-01) (1 of 3)



A TKP XDCR	MDM	DSC
TK1	OF1	OF1
TK2	OF3	OF3
TK3	OF3	OF3
TK4	OF1	OF1
TK5	OF1	OF1

B HCP XDCR	MDM
TK1	OF1
TK2	OF3
TK3	OF3
TK4	OF1
TK5	OF2

C HCP C/O XDCR	MDM	DSC	FD
TK1	OF1	OF1	V45P1115A1
TK2	OF3	OF3	V45P1215A1
TK3	OF3	OF3	V45P1315A1
TK4	OF3	OF3	V45P1465A1
TK5	OF2	OF2	V45P1515A1

D PCMMU READS CANNOT BE PERFORMED IN OPS 1 (<T-20 MIN)

E RESEAT IS INDICATED BY STABLE TANK PRESSURE. OMRS SEAT LEAKAGE CANNOT BE VERIFIED (OMRS WAIVER REQUIRED)

I VERIFICATION OF MANUAL OPERATION ONLY. LIMITED TO TANKS 1-3 AFTER HATCH CLOSURE (PLT/ASP REQ) (APPROX 10 MINUTES)

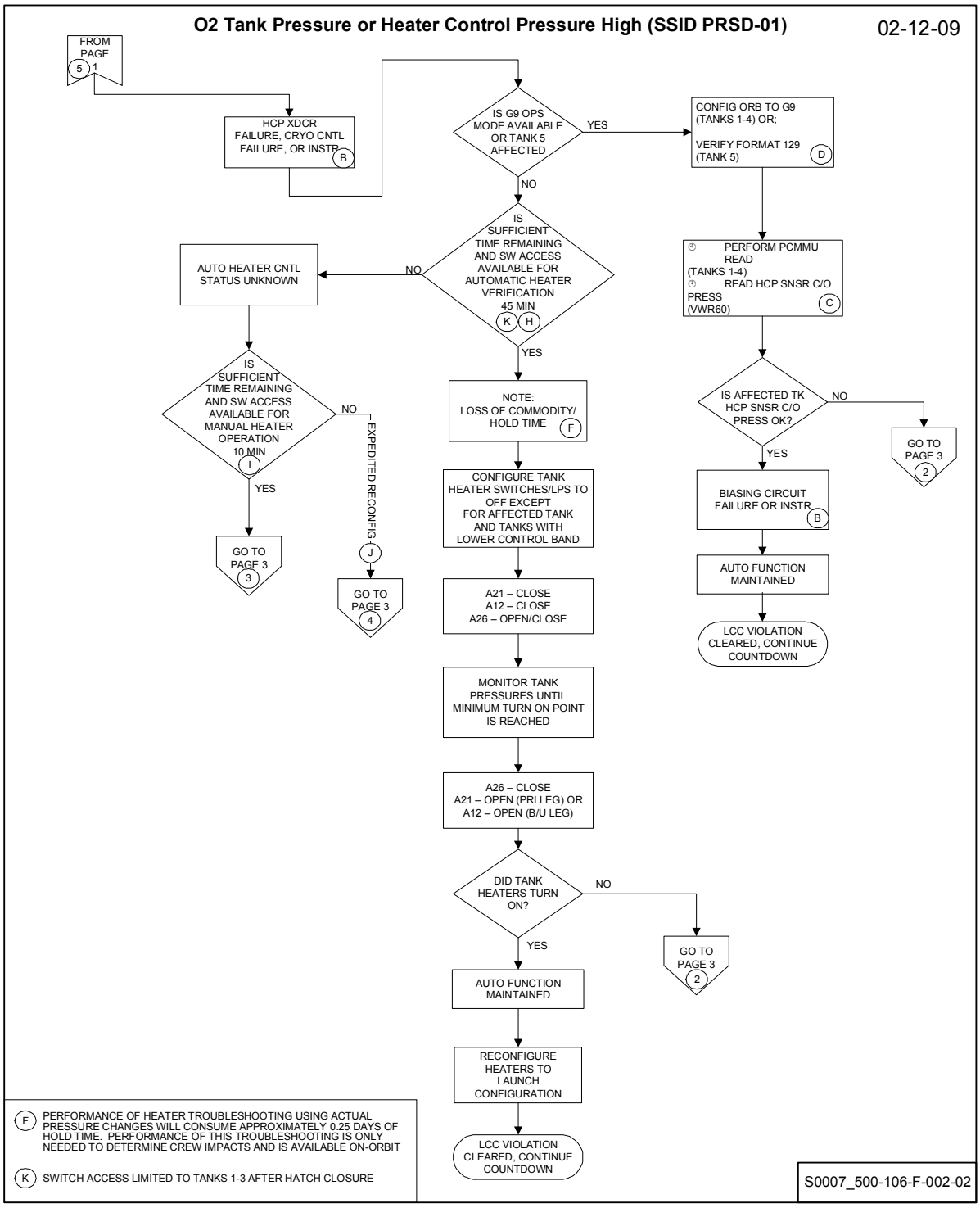
H HEATER AUTO FUNCTION VERIFICATION (10 OR 45 MIN).
- PERFORM LPS VERIFICATION OF CRYO CONTROLLER FUNCTION (G9 REQ.) (APPROX 10 MINUTES)

OR,
- PERFORM TANK VENT DOWN TO VERIFY HEATER FUNCTION (PLT REQ) (APPROX 45 MINUTES)

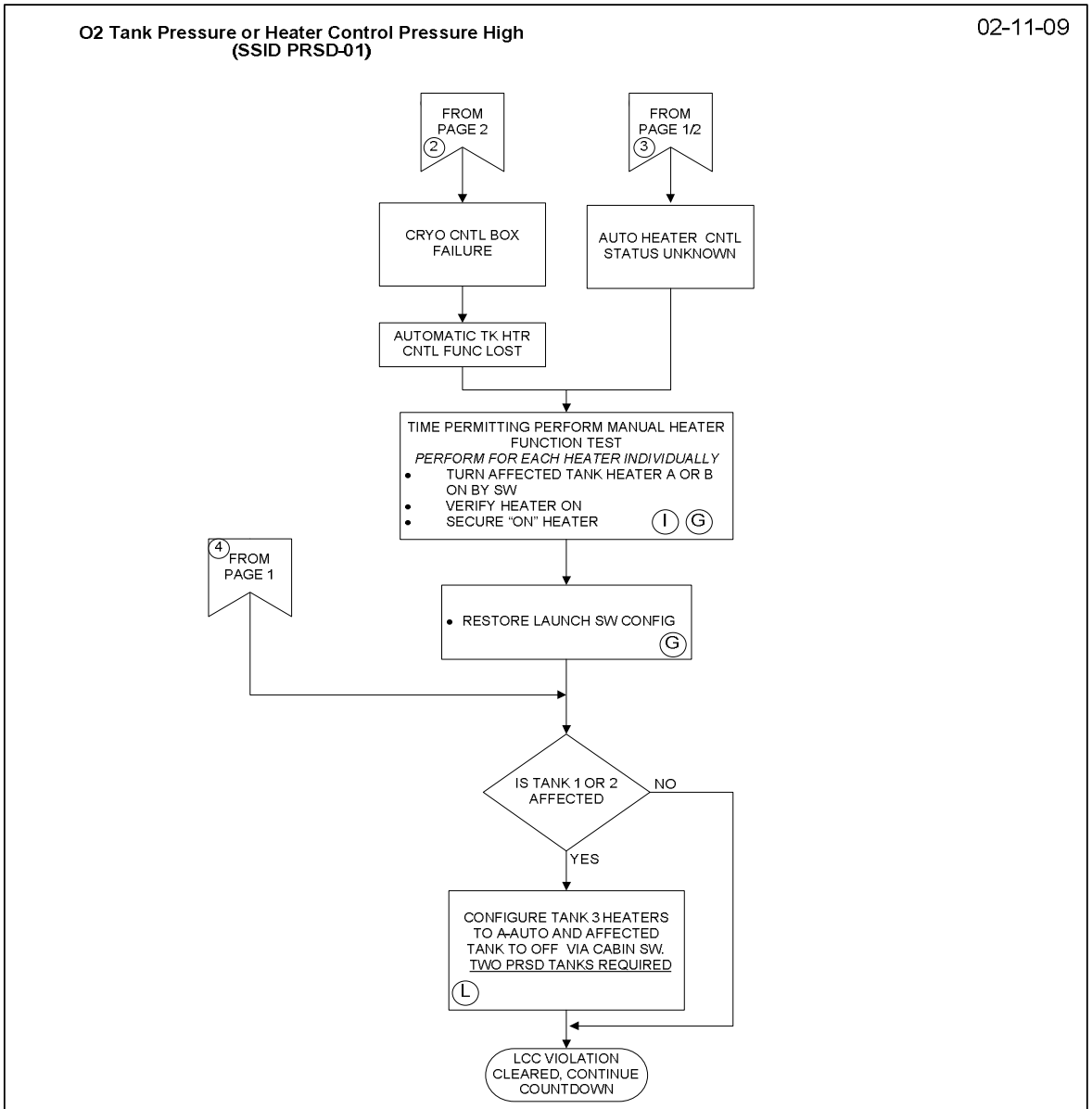
J EXPEDITED RECONFIGURATION. TWO PRSD TANKS IN AUTO REQUIRED FOR LAUNCH

S0007_500-106-F-002-01

O_2 Tank Pressure or Heater Control Pressure High (SSID PRSD-01) (2 of 3)



O_2 Tank Pressure or Heater Control Pressure High (SSID PRSD-01) (3 of 3)



G

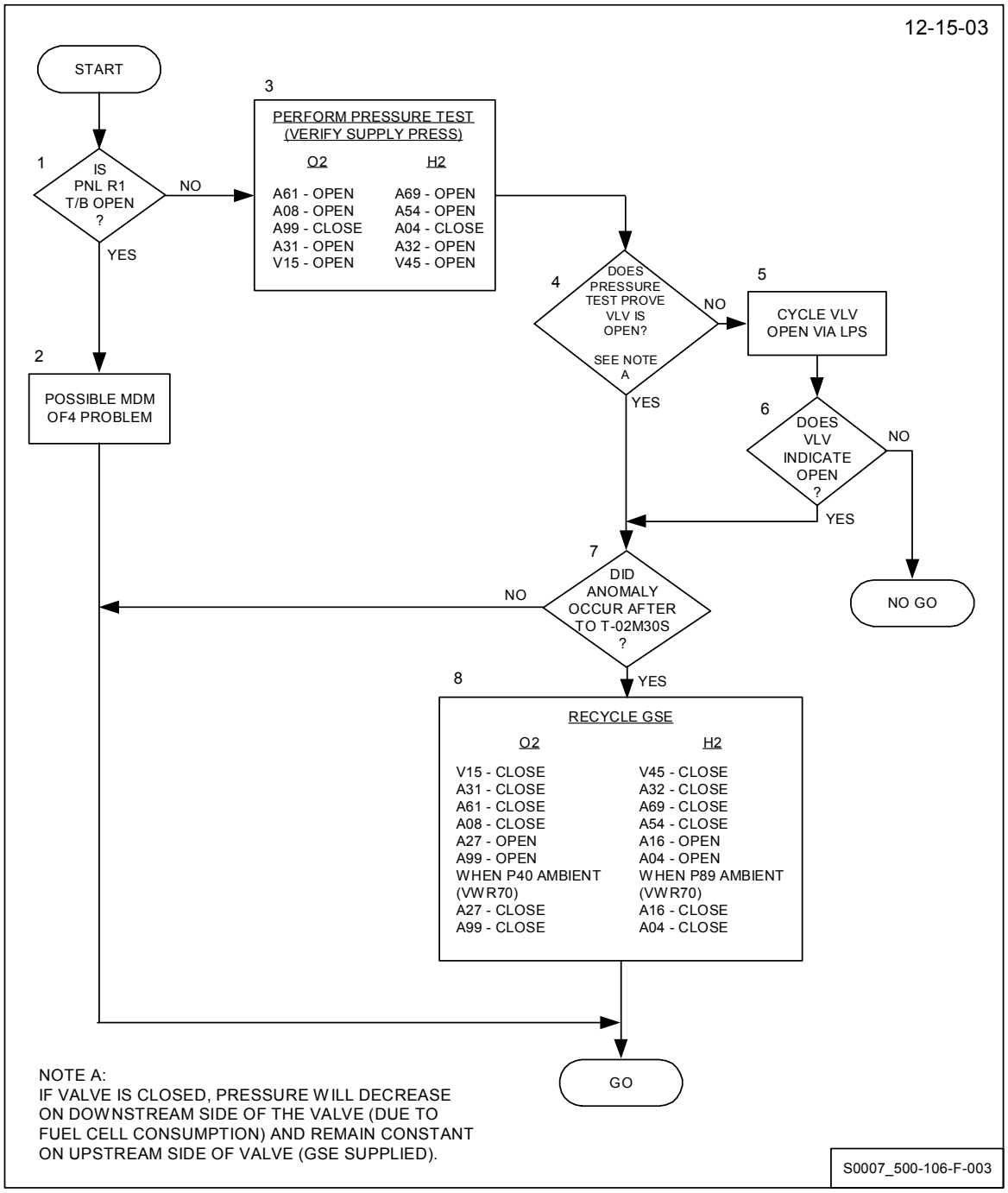
AFFECTED TANK	SW PANEL
TK1	R1
TK2	R1
TK3	R1
TK4	A11
TK5	A15

L TANK HCP FAILED HIGH ON A PAIRED TANK INHIBITS OPERATION OF COMPANION TANK HEATERS

S0007_500-106-002-03

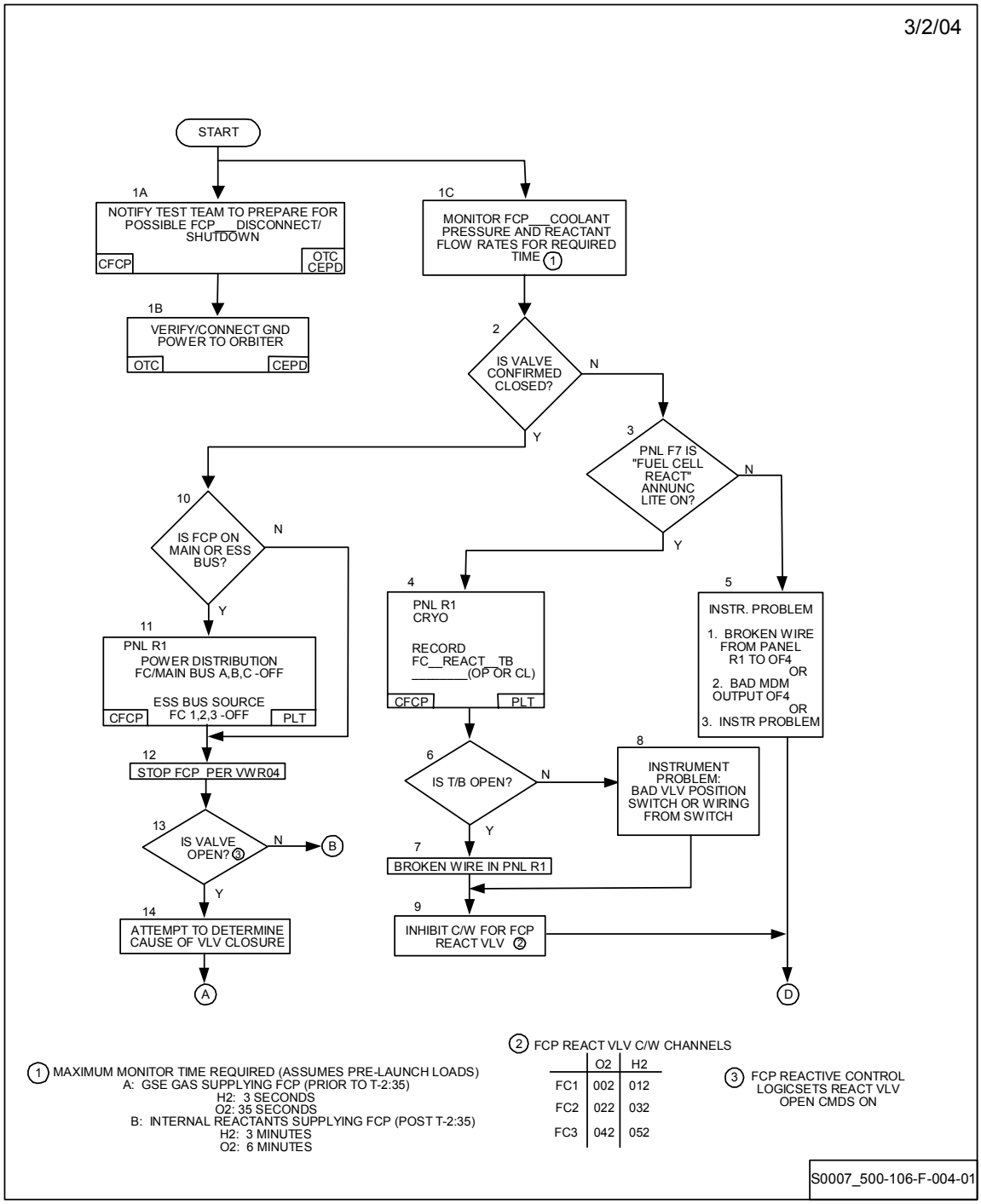
106-3

O_2 or H_2 Manifold Isolation Valve Indicates Closed (SSID PRSD-02)

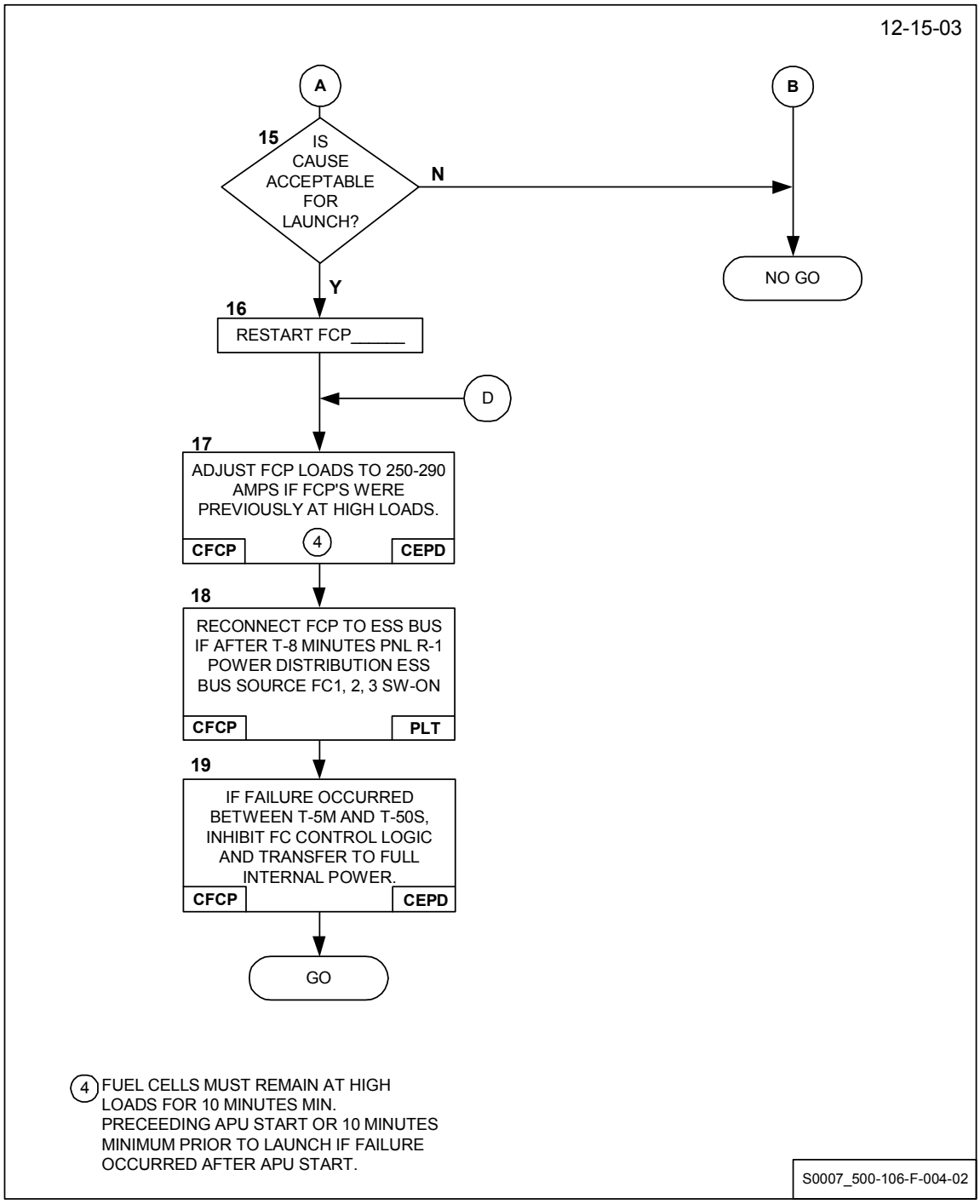


106-4

FCP Reactant Valve Indicates Closed (SSID PRSD-03) (1 of 2)

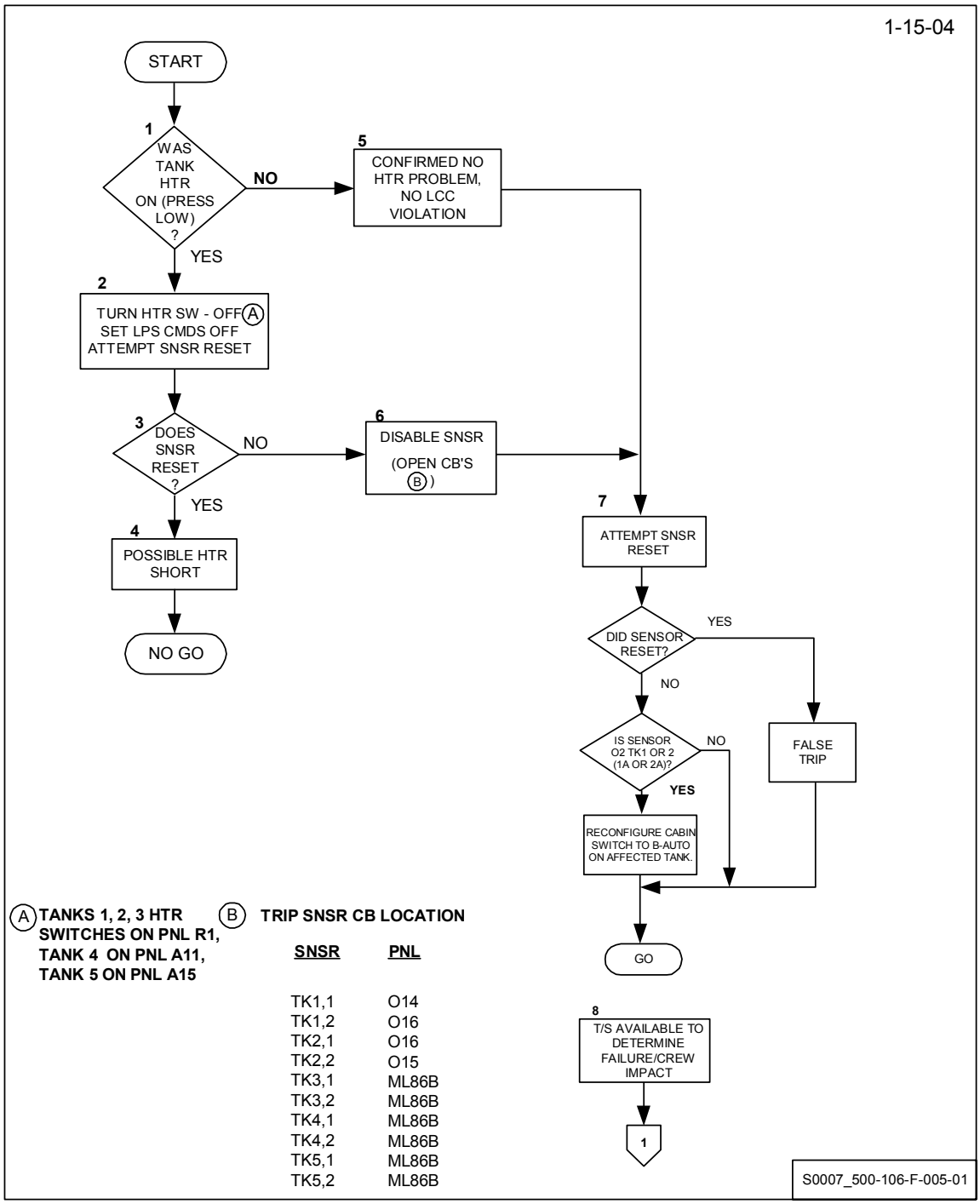


FCP Reactant Valve Indicates Closed (SSID PRSD-03) (2 of 2)

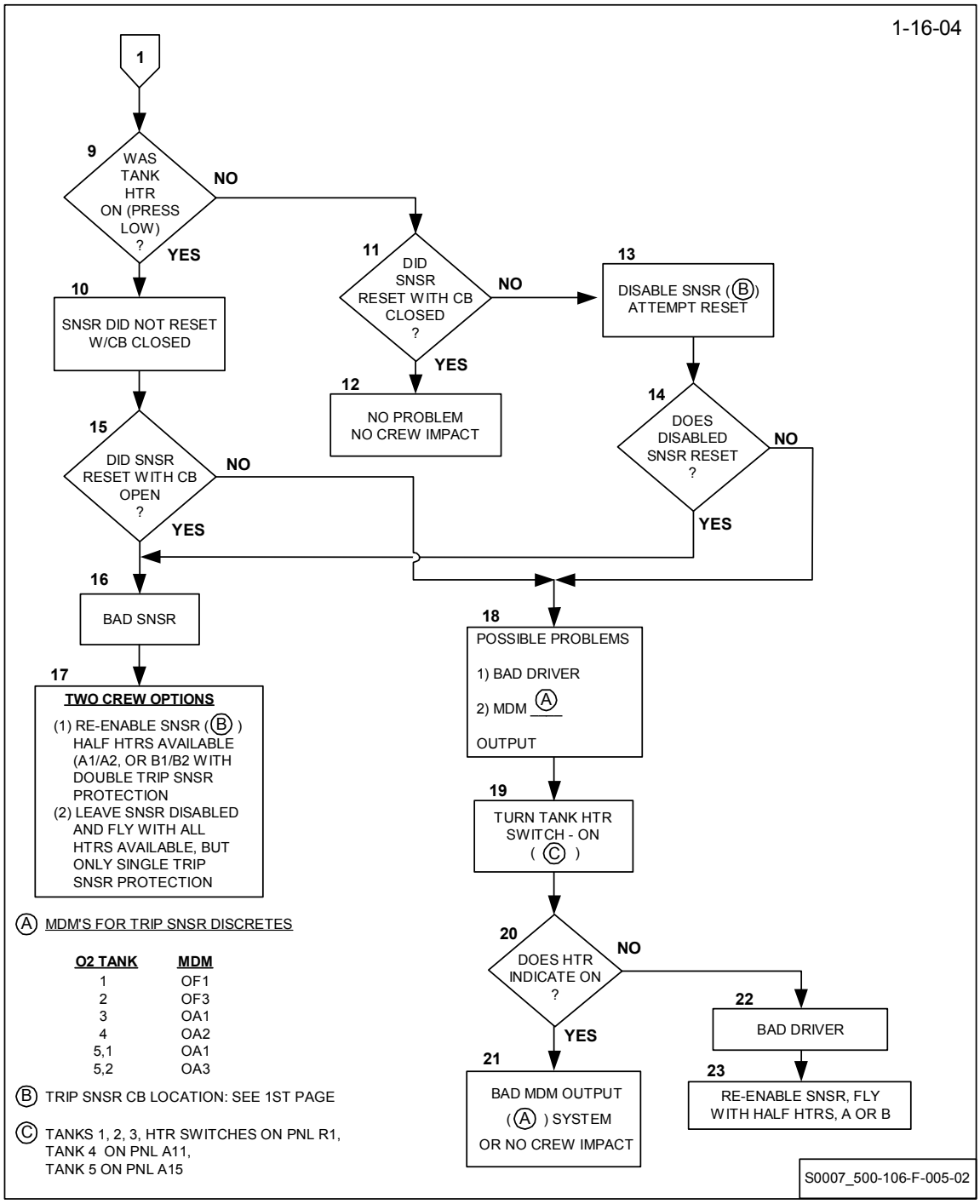


106-5

One O_2 Heater Current Trip Sensor On (SSID PRSD-04) (1 of 2)

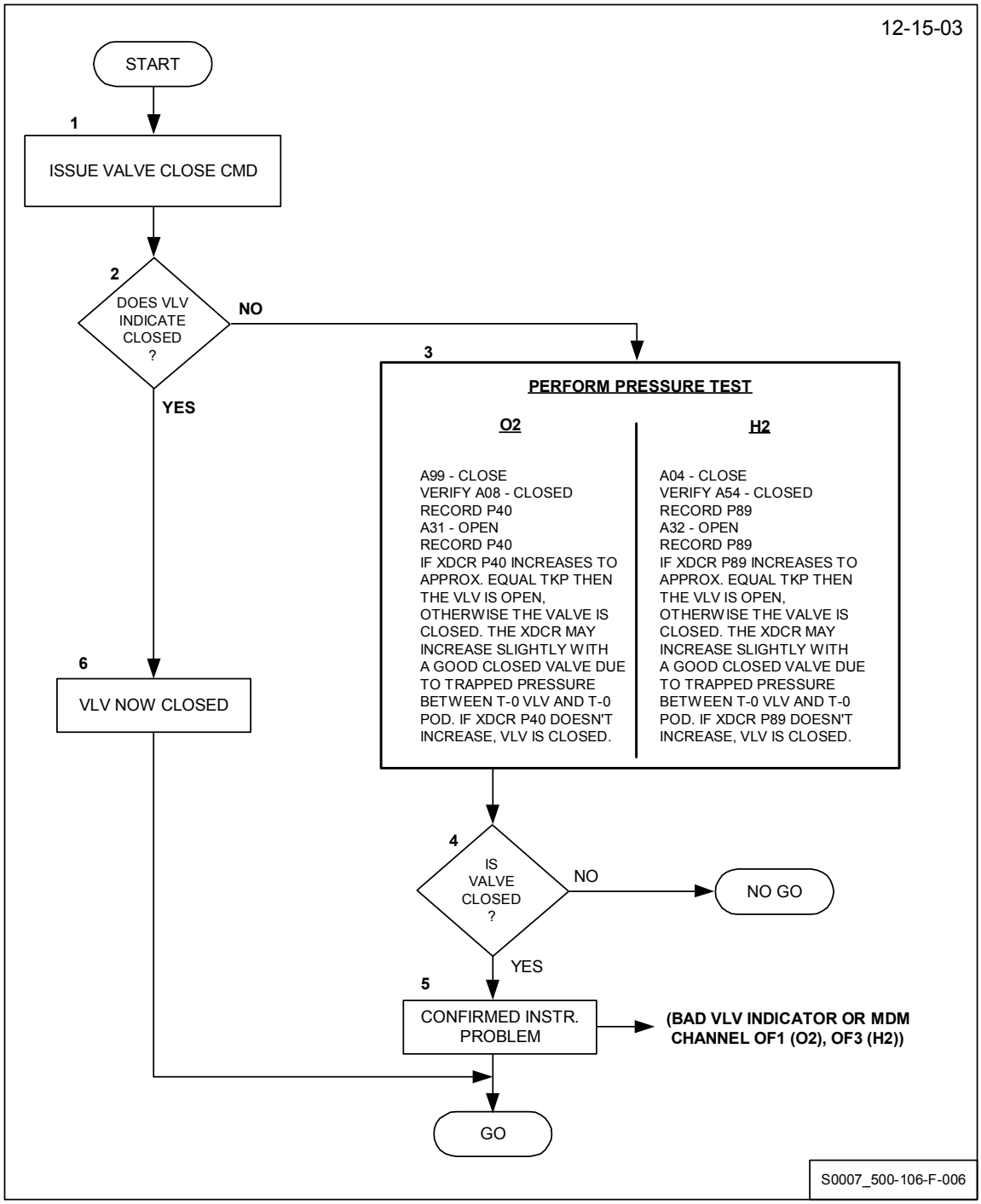


One O_2 Heater Current Trip Sensor on (SSID PRSD-04) (2 of 2)



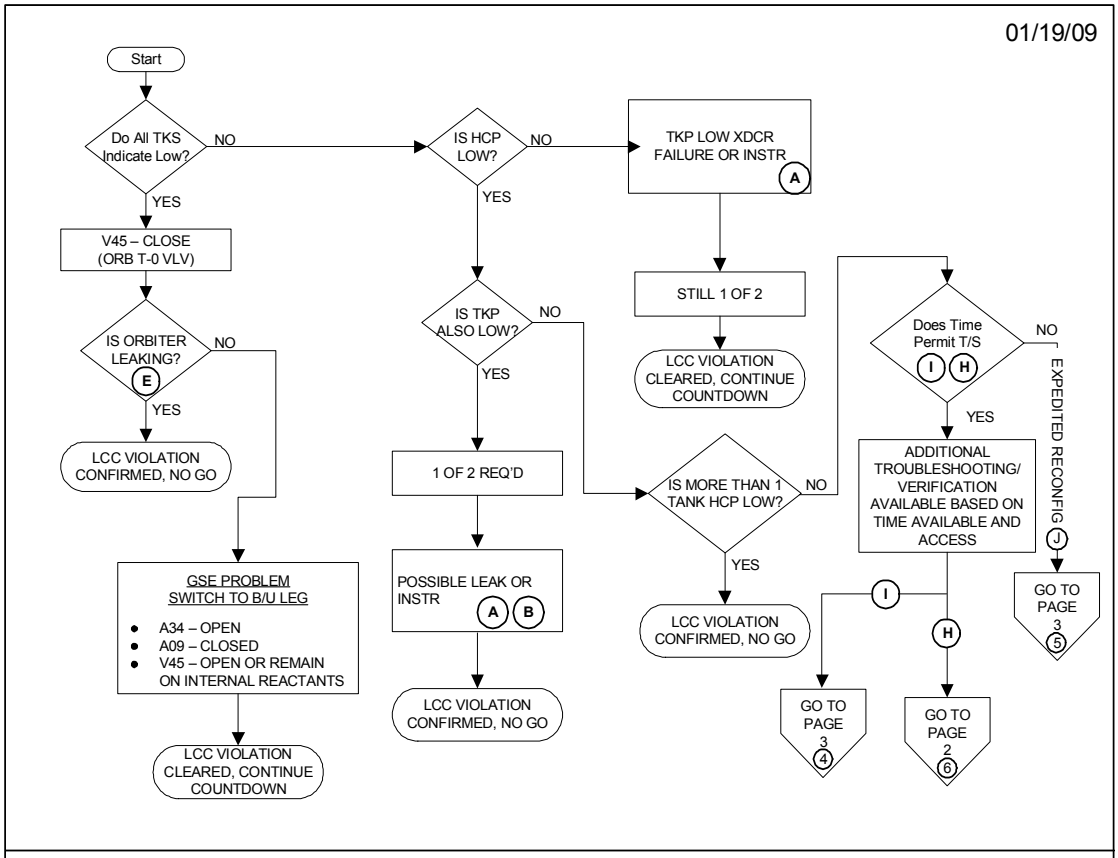
106-6

T-0 Valve Indicates Open (SSID PRSD-05)



106-7

H_2 Tank Pressure or Heater Control Pressure Low (SSID PRSD-06) (1 of 3)



A

TKP XDCR	MDM	DSC
TK1	OF1	OF1
TK2	OF3	OF3
TK3	OF1	OF1
TK4	OF3	OF3
TK5	OF1	OF1

B

HCP XDCR	MDM
TK1	OF2
TK2	OF3
TK3	OF1
TK4	OF2
TK5	OF1

C

HCP C/O XDCR	MDM	DSC	FD
TK1	OF2	OF2	V45P2115A1
TK2	OF3	OF3	V45P2215A1
TK3	OF3	OF3	V45P2315A1
TK4	OF3	OF3	V45P2465A1
TK5	OF1	OF1	V45P2515A1

D PCMMU READS CANNOT BE PERFORMED IN OPS 1 (<T-20 MIN)

E INCREASE IN GSE PRESSURE OR HIGHER THAN EXPECTED TANK HEATER CYCLES (CONTACT EGIL) MAY INDICATE ORBITER LEAKAGE. EXTERNAL LEAKAGE WITHIN ORBITER MAY BE DETECTED BY HAZ GAS. ORBITER LEAKAGE THRU FCP IS NOT DETECTABLE BY HAZ GAS.

I VERIFICATION OF MANUAL OPERATION AVAILABLE. LIMITED TO TANKS 1-3 AFTER HATCH CLOSURE (PLT/ASP REQ) (APPROX. 10 MINUTES)

H HEATER AUTO FUNCTION VERIFICATION (10 OR 45 MIN).

- PERFORM LPS VERIFICATION OF CRYO CONTROLLER FUNCTION (G9 REQ). (APPROX. 10 MINUTES)

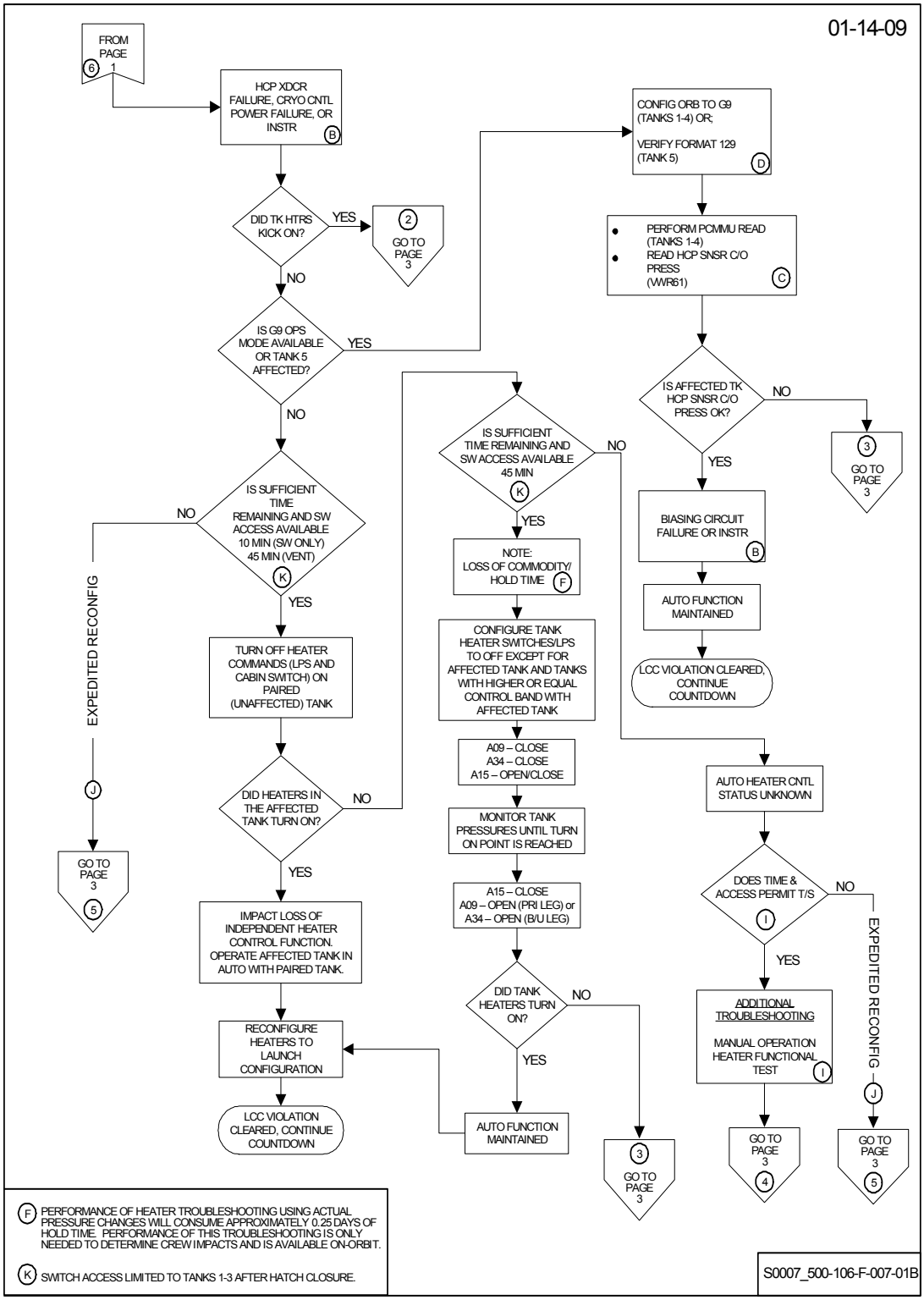
OR,

- PERFORM TANK VENT DOWN TO VERIFY HEATER FUNCTION (PLT REQ) (APPROX. 45 MINUTES)

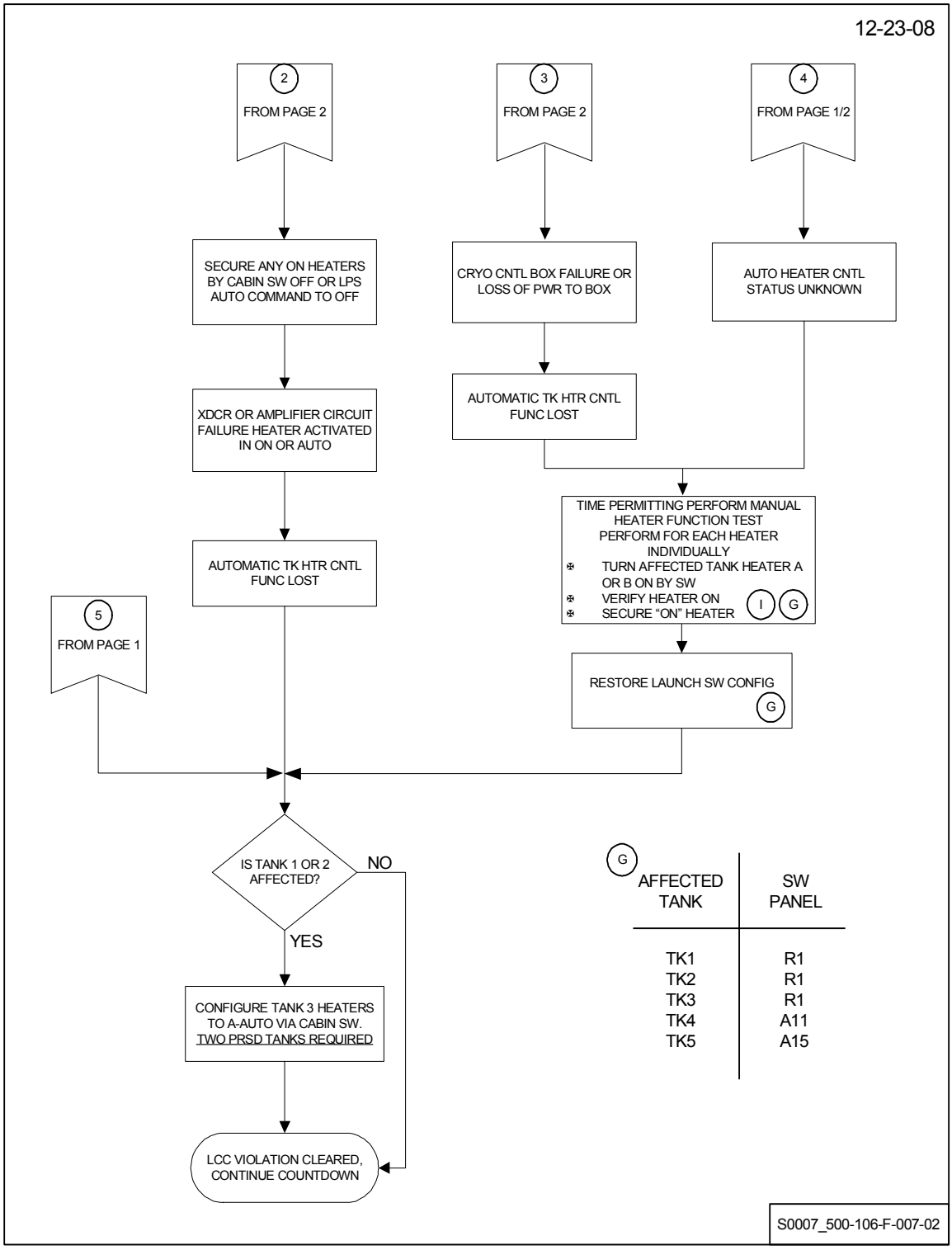
J EXPEDITED RECONFIGURATION. TWO PRSD TANKS IN AUTO REQUIRED FOR LAUNCH

S0007_500-106-F-007-01A

H_2 Tank Pressure or Heater Control Pressure Low (SSID PRSD-06) (2 of 3)



H_2 Tank Pressure or Heater Control Pressure Low (SSID PRSD-06) (3 of 3)

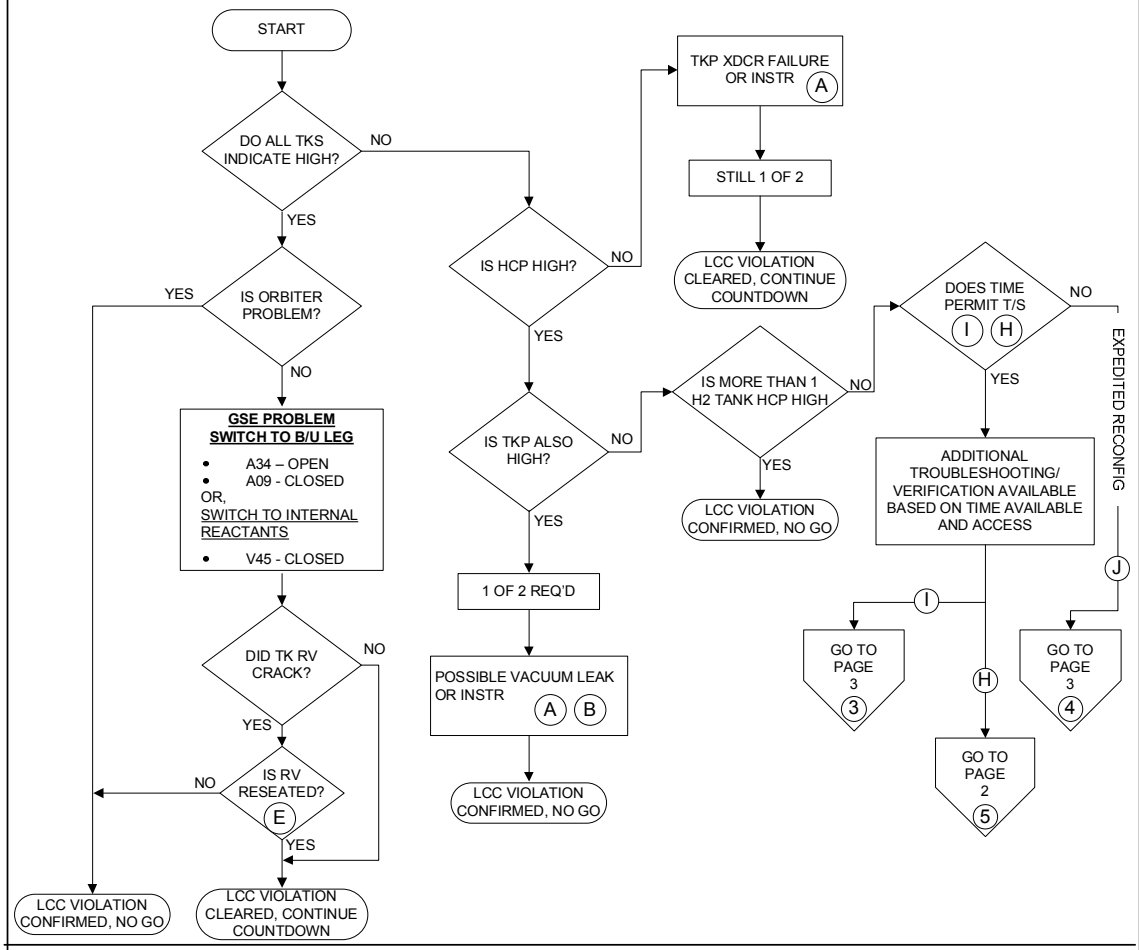


106-8

H_2 Tank Pressure or Heater Control Pressure High (SSID PRSD-06) (1 of 3)

H2 Tank Pressure or Heater Control Pressure High
(SSID PRSD-06)

04-10-09



A TKP XDCR	MDM	DSC
TK1	OF1	OF1
TK2	OF3	OF3
TK3	OF1	OF1
TK4	OF3	OF3
TK5	OF1	OF1

B HCP XDCR	MDM
TK1	OF2
TK2	OF3
TK3	OF1
TK4	OF2
TK5	OF1

C HCP C/O XDCR	MDM	DSC	FD
TK1	OF2	OF2	V45P2115A1
TK2	OF3	OF3	V45P2215A1
TK3	OF3	OF3	V45P2315A1
TK4	OF3	OF3	V45P2465A1
TK5	OF1	OF1	V45P2515A1

D PCMMU READS CANNOT BE PERFORMED IN OPS 1 (<T-20 MIN)

E RESEAT IS INDICATED BY STABLE TANK PRESSURE. OMRS SEAT LEAKAGE CANNOT BE VERIFIED (OMRS WAIVER REQUIRED)

I VERIFICATION OF MANUAL OPERATION ONLY. LIMITED TO TANKS 1-3 AFTER HATCH CLOSURE (PLT/ASP REQ) (APPROX 10 MINUTES)

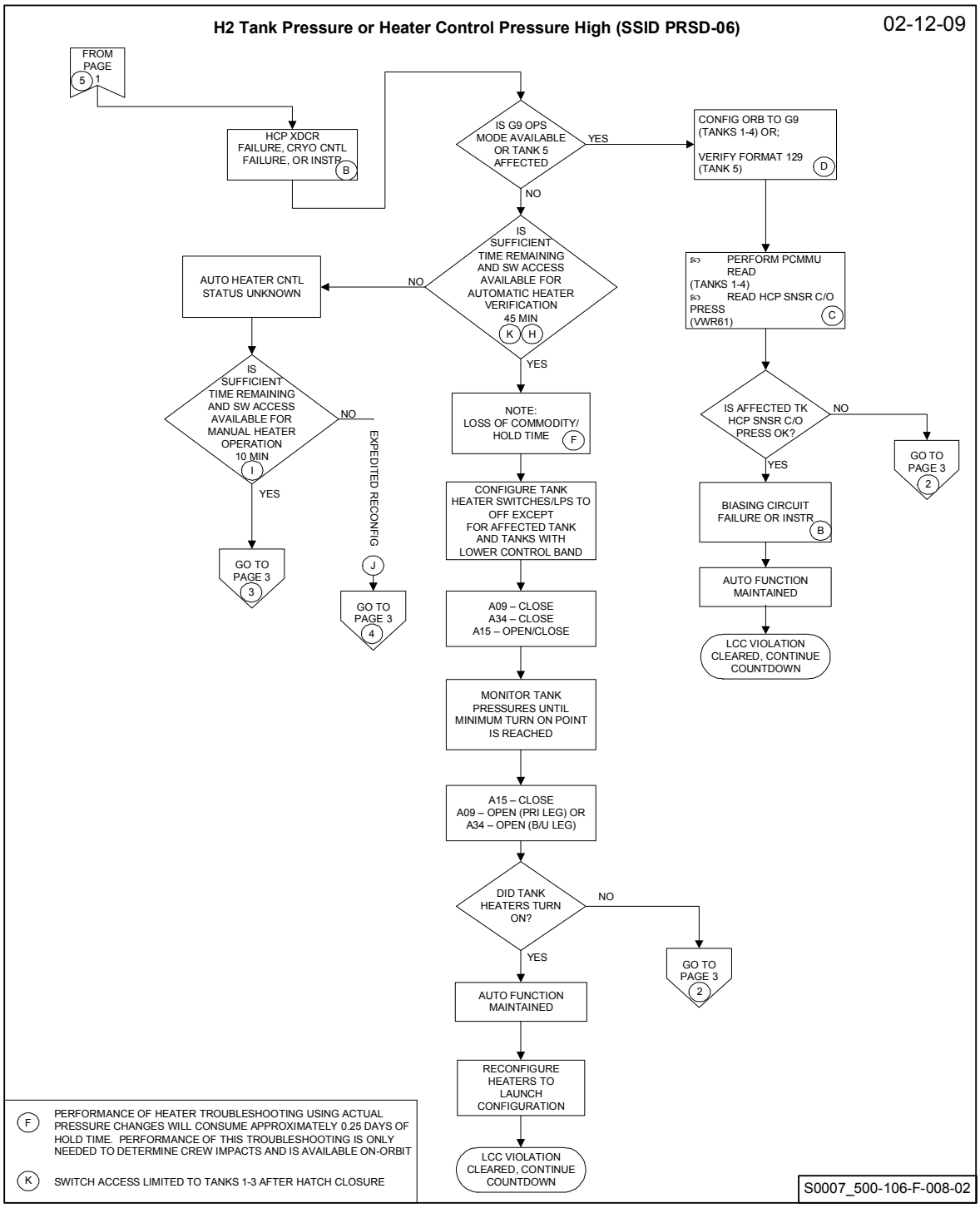
H HEATER AUTO FUNCTION VERIFICATION (10 OR 45 MIN).
- PERFORM LPS VERIFICATION OF CRYO CONTROLLER FUNCTION (G9 REQ.) (APPROX 10 MINUTES)

OR,
- PERFORM TANK VENT DOWN TO VERIFY HEATER FUNCTION (PLT REQ) (APPROX 45 MINUTES)

J EXPEDITED RECONFIGURATION. TWO PRSD TANKS IN AUTO REQUIRED FOR LAUNCH

S0007_500-106-F-008-01

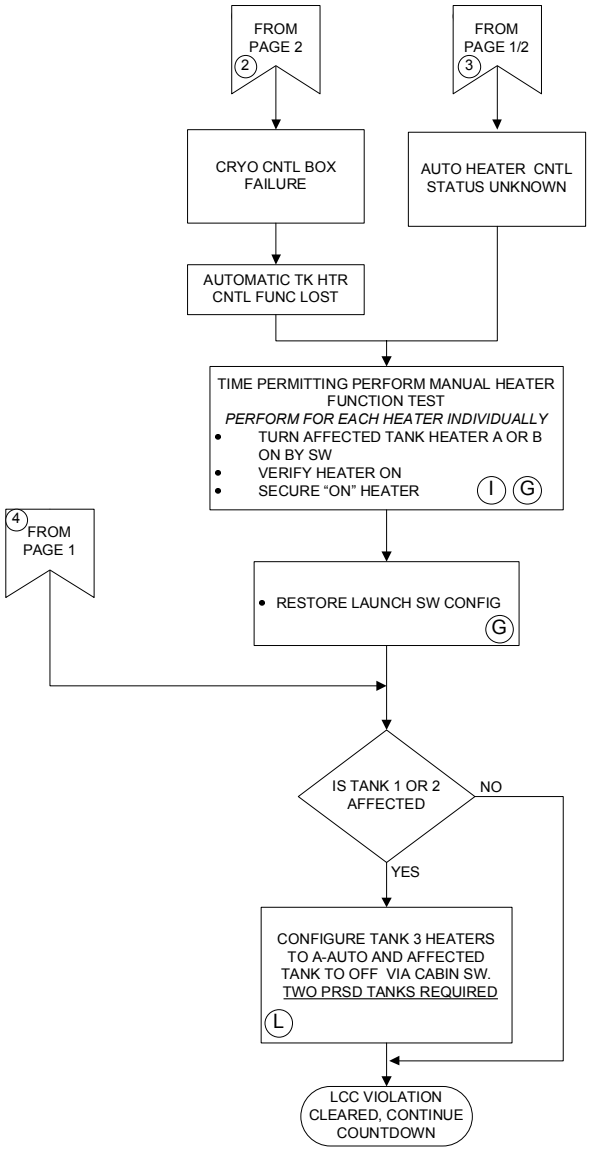
H_2 Tank Pressure or Heater Control Pressure High (SSID PRSD-06) (2 of 3)



H_2 Tank Pressure or Heater Control Pressure High (SSID PRSD-06) (3 of 3)

H2 Tank Pressure or Heater Control Pressure High (SSID PRSD-06)

02-11-09



G

AFFECTED TANK	SW PANEL
TK1	R1
TK2	R1
TK3	R1
TK4	A11
TK5	A15

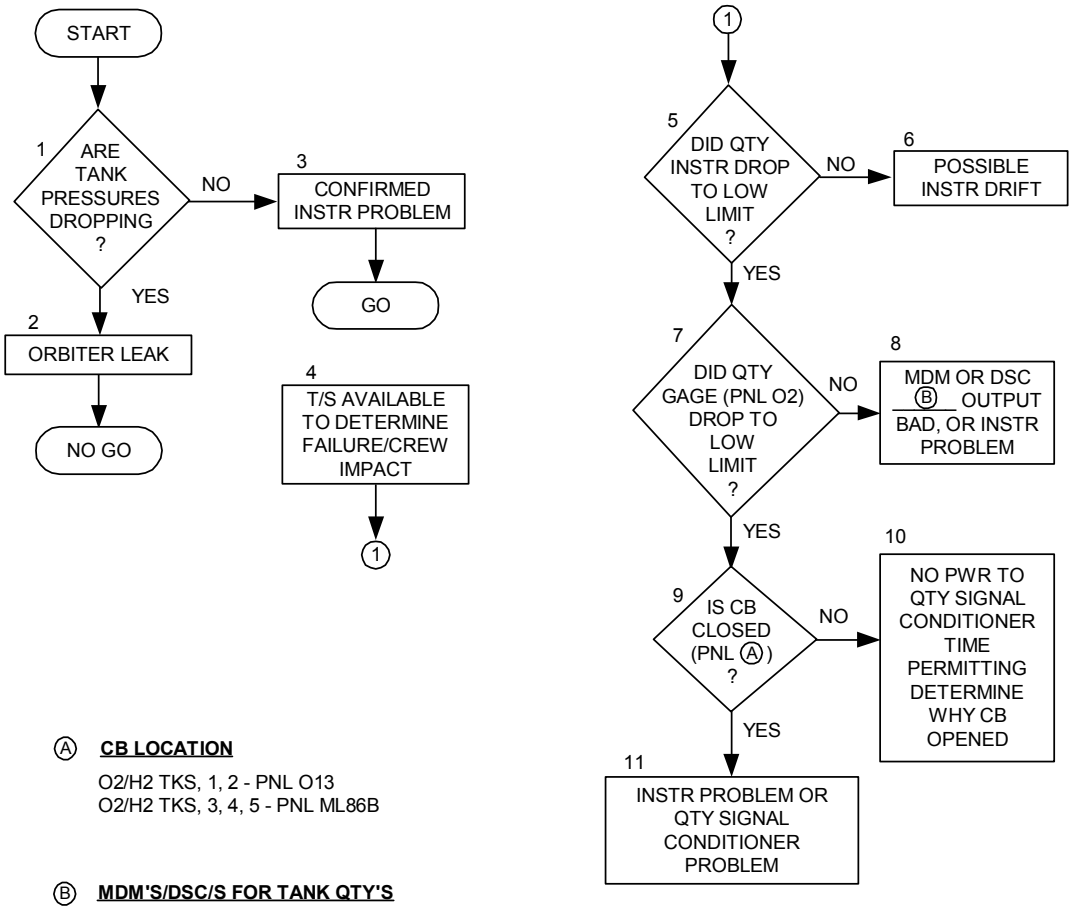
L TANK HCP FAILED HIGH ON A PAIRED TANK INHIBITS OPERATION OF COMPANION TANK HEATERS

S0007_500-106-008-03

106-9

O_2 Tank Quantity Low, H_2 Tank Quantity Low (SSID PRSD-07/08)

3/2/04



Ⓐ **CB LOCATION**

O2/H2 TKS, 1, 2 - PNL O13
O2/H2 TKS, 3, 4, 5 - PNL ML86B

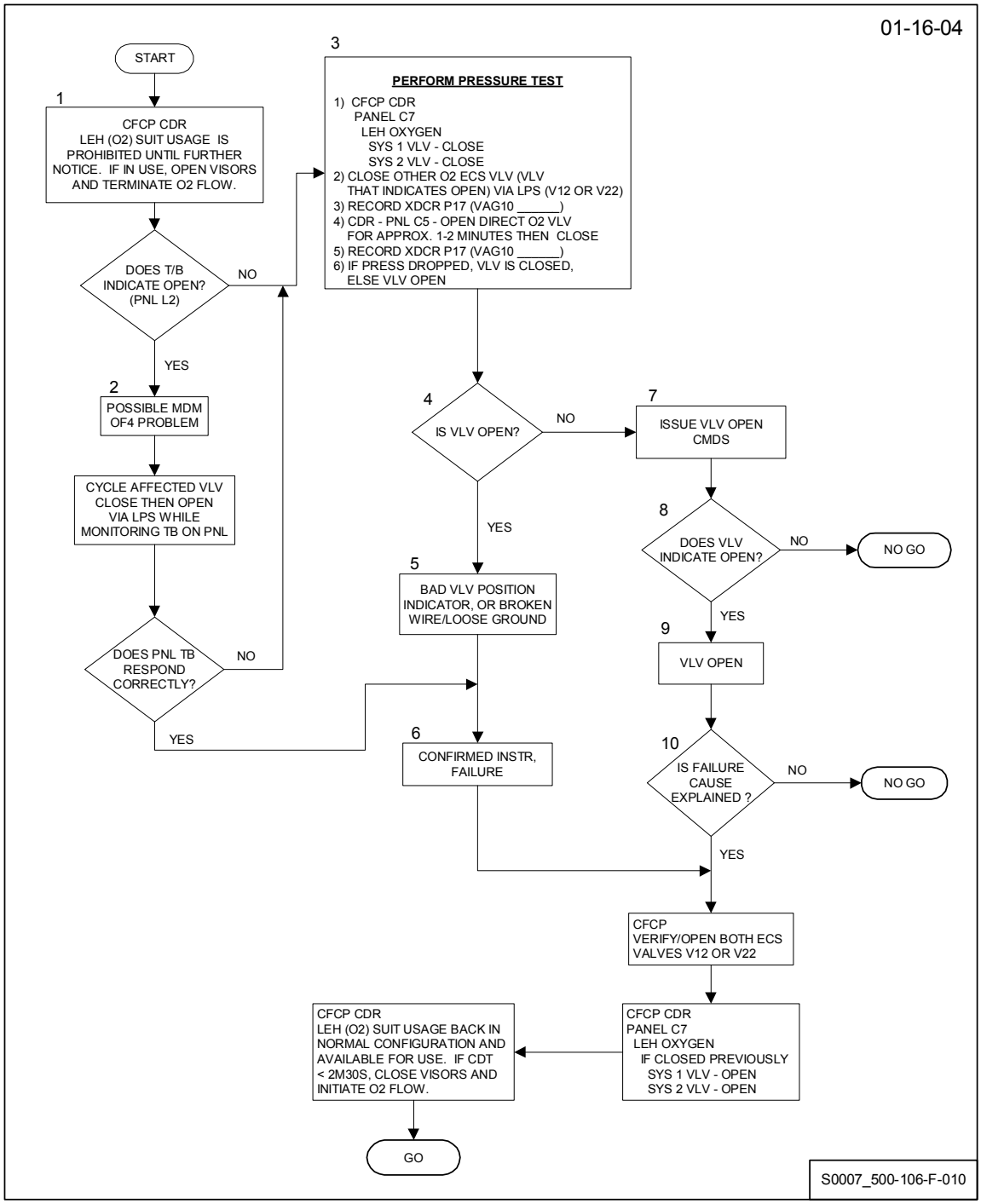
Ⓑ **MDM'S/DSC/S FOR TANK QTY'S**

TANK QTY	MDM	DSC
O2 1	OF1	OF1
O2 2	OF2	OF2
O2 3	OF3	OF3
O2 4	OF3	OF3
O2 5	OF2	OF2
H2 1	OF3	OF3
H2 2	OF1	OF1
H2 3	OF3	OF3
H2 4	OF3	OF3
H2 5	OF3	OF3

S0007_500-106-F-009

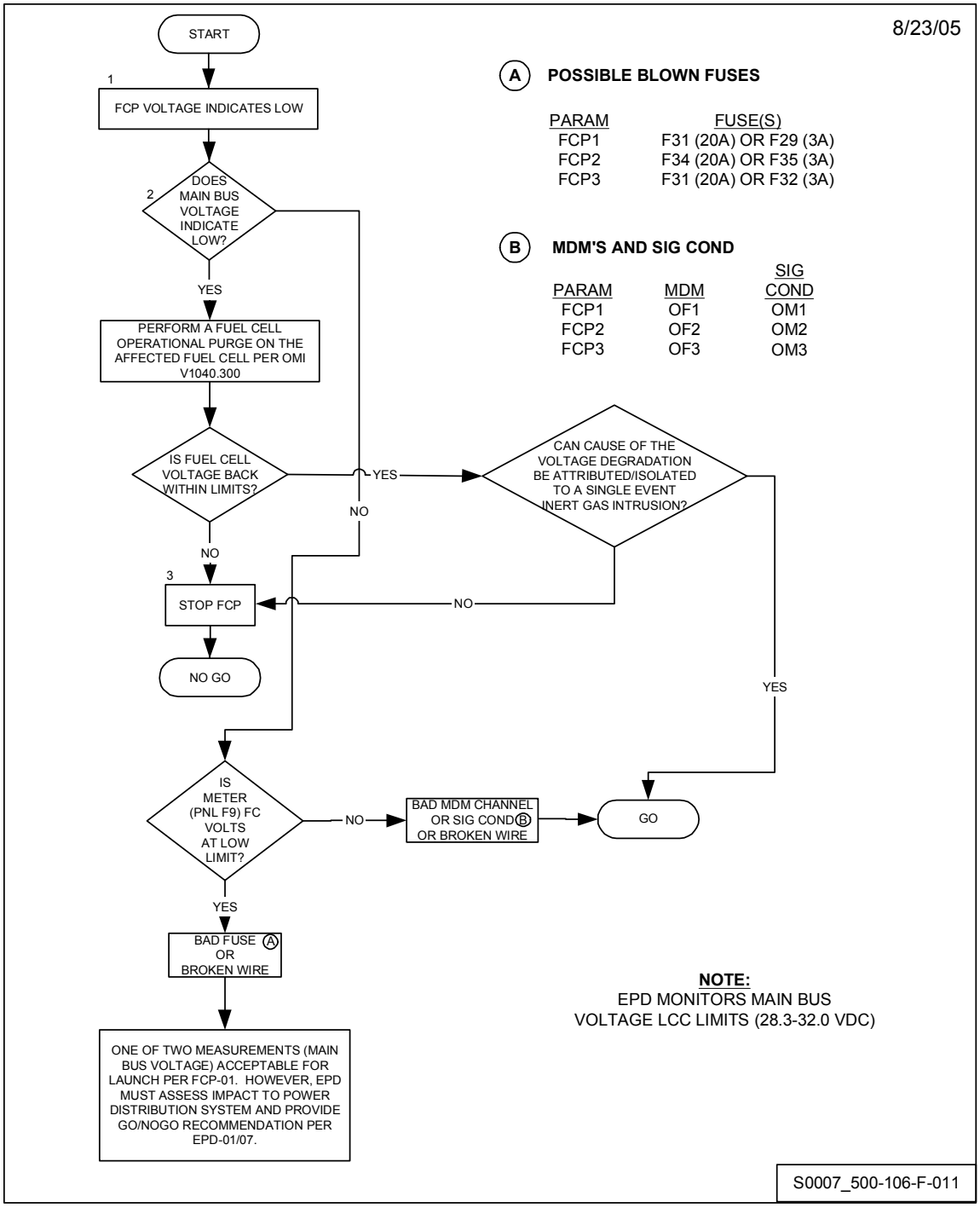
106-10

O_2 ECS Valve Indicates Closed (SSID PRSD-09)



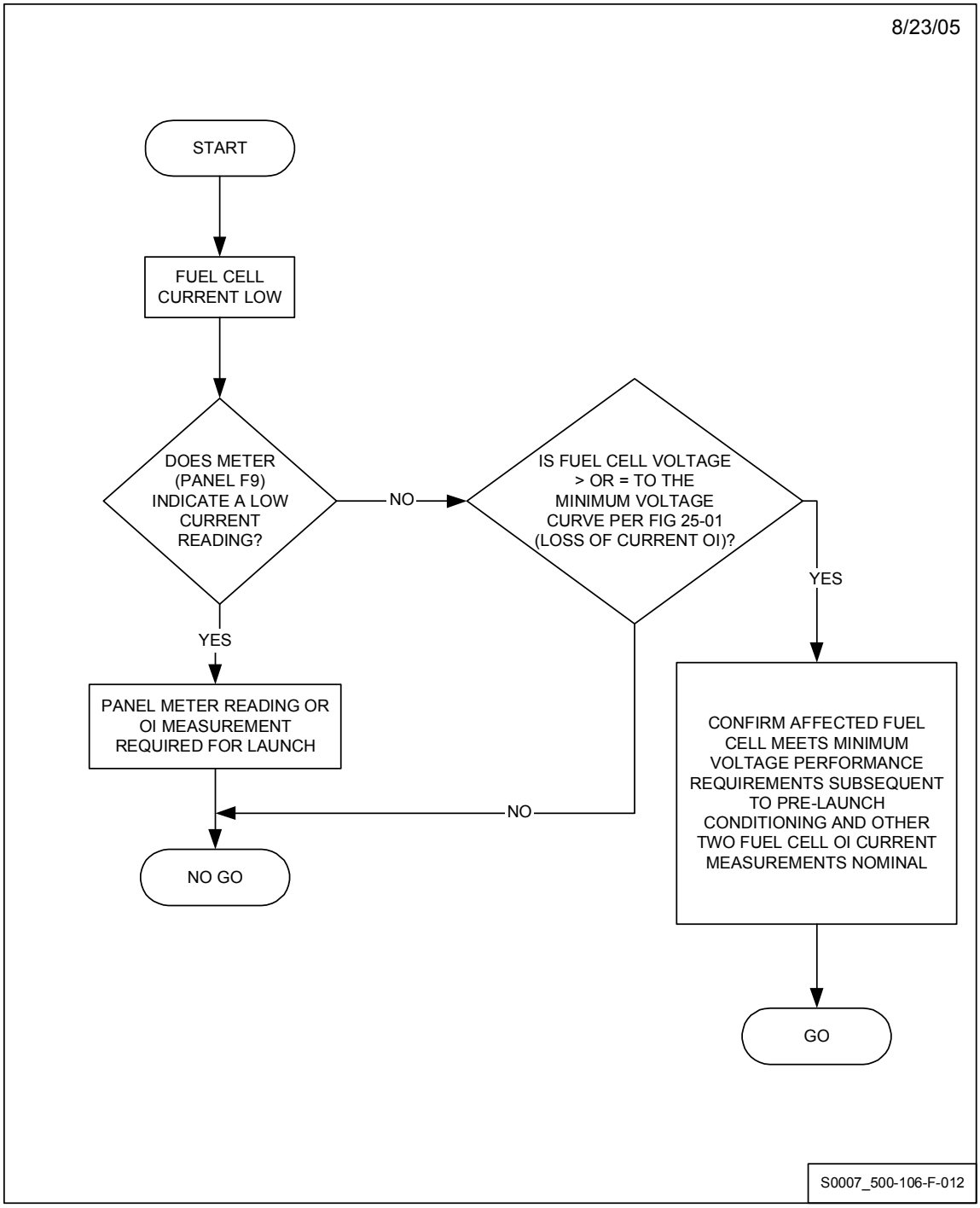
106-11

FCP Volts Low (SSID FCP-01)



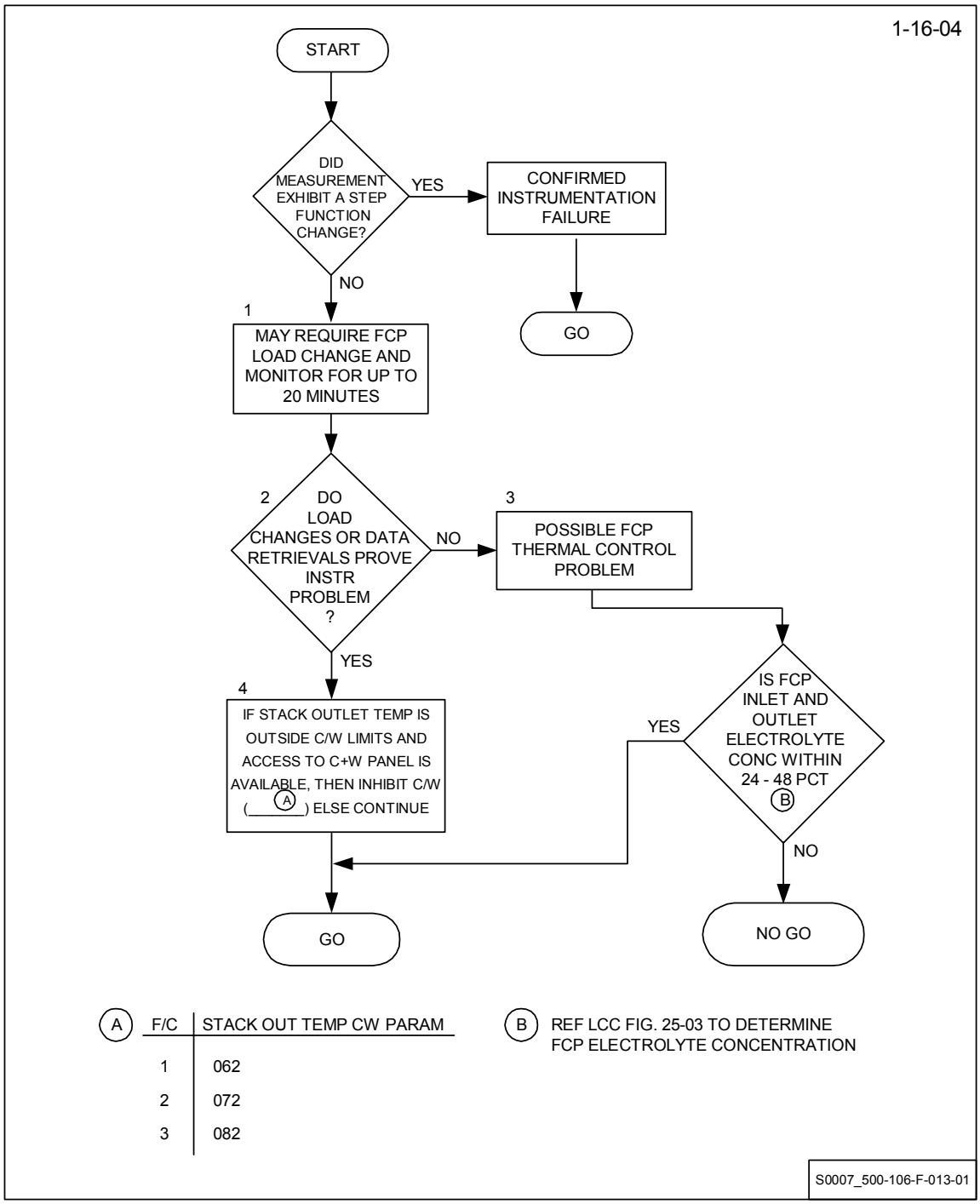
106-12

FCP Current Low (SSID FCP-01)

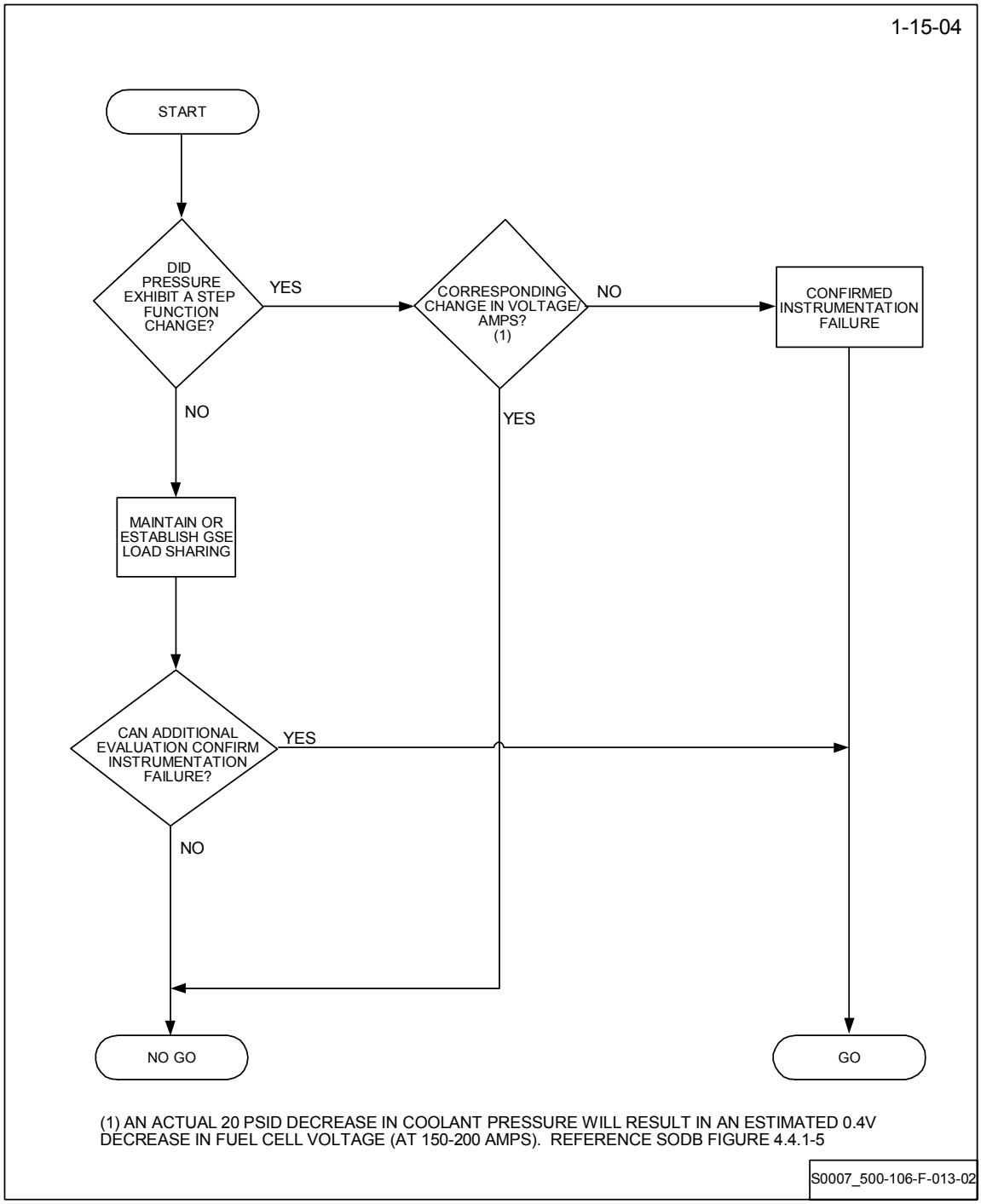


106-13

FCP Temps (Stack In, Stack Out, Condenser Exit) High or Low (SSID FCP-02)

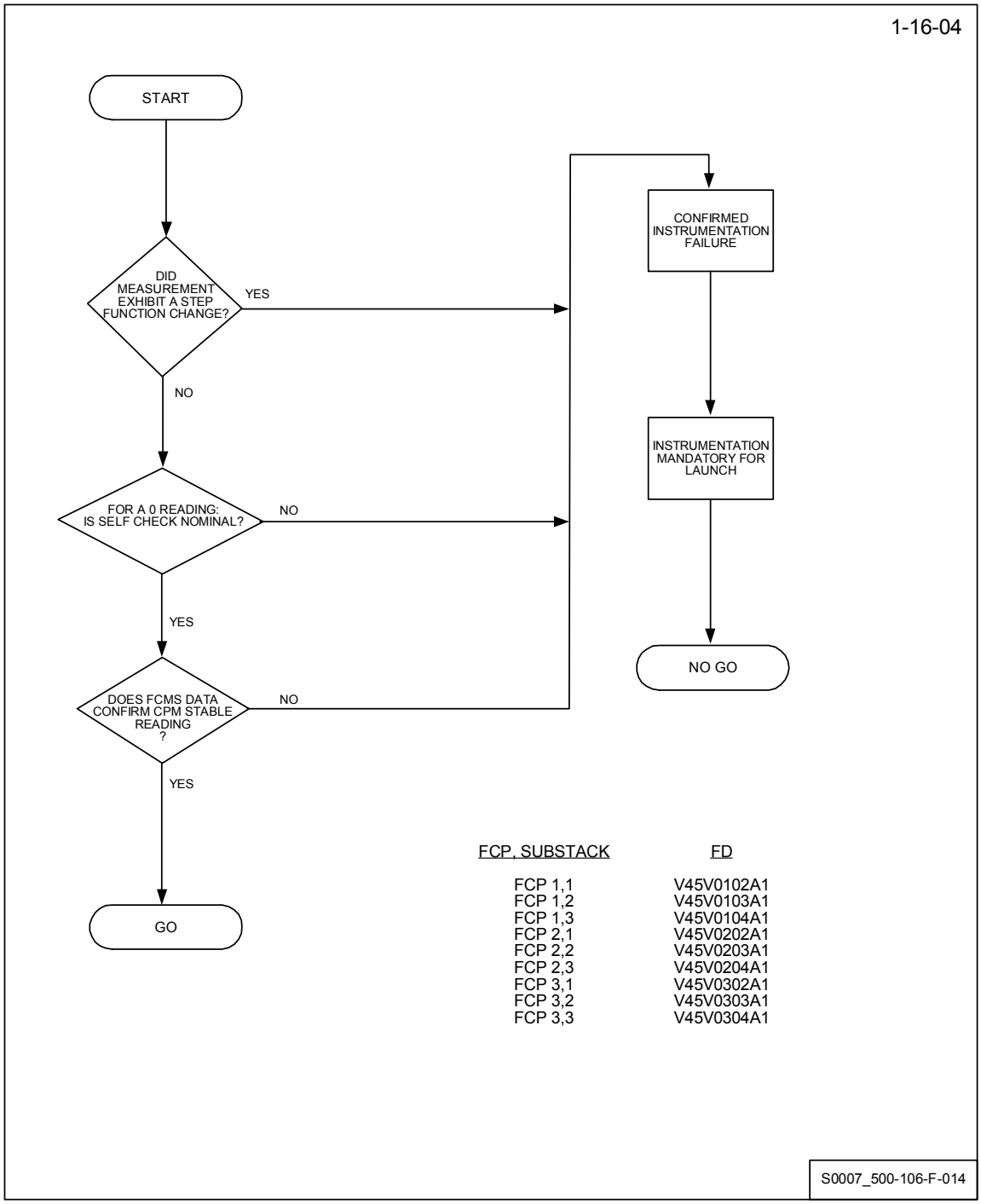


FCP Coolant Pressure High or Low (SSID FCP-02)



106-14

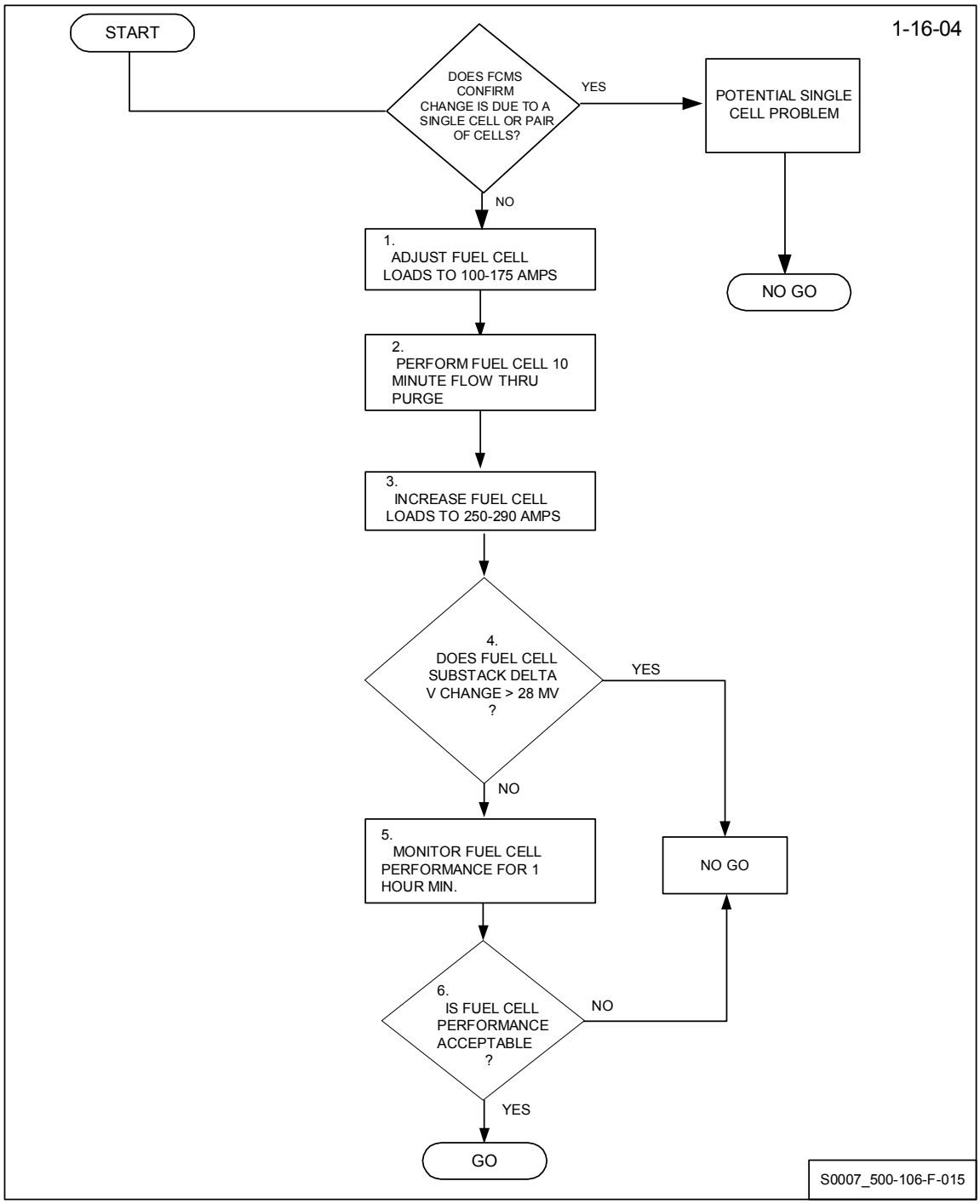
Substack Delta V Near 50 mV or Near 0 mV (SSID FCP-03)



FCP, SUBSTACK	FD
FCP 1,1	V45V0102A1
FCP 1,2	V45V0103A1
FCP 1,3	V45V0104A1
FCP 2,1	V45V0202A1
FCP 2,2	V45V0203A1
FCP 2,3	V45V0204A1
FCP 3,1	V45V0302A1
FCP 3,2	V45V0303A1
FCP 3,3	V45V0304A1

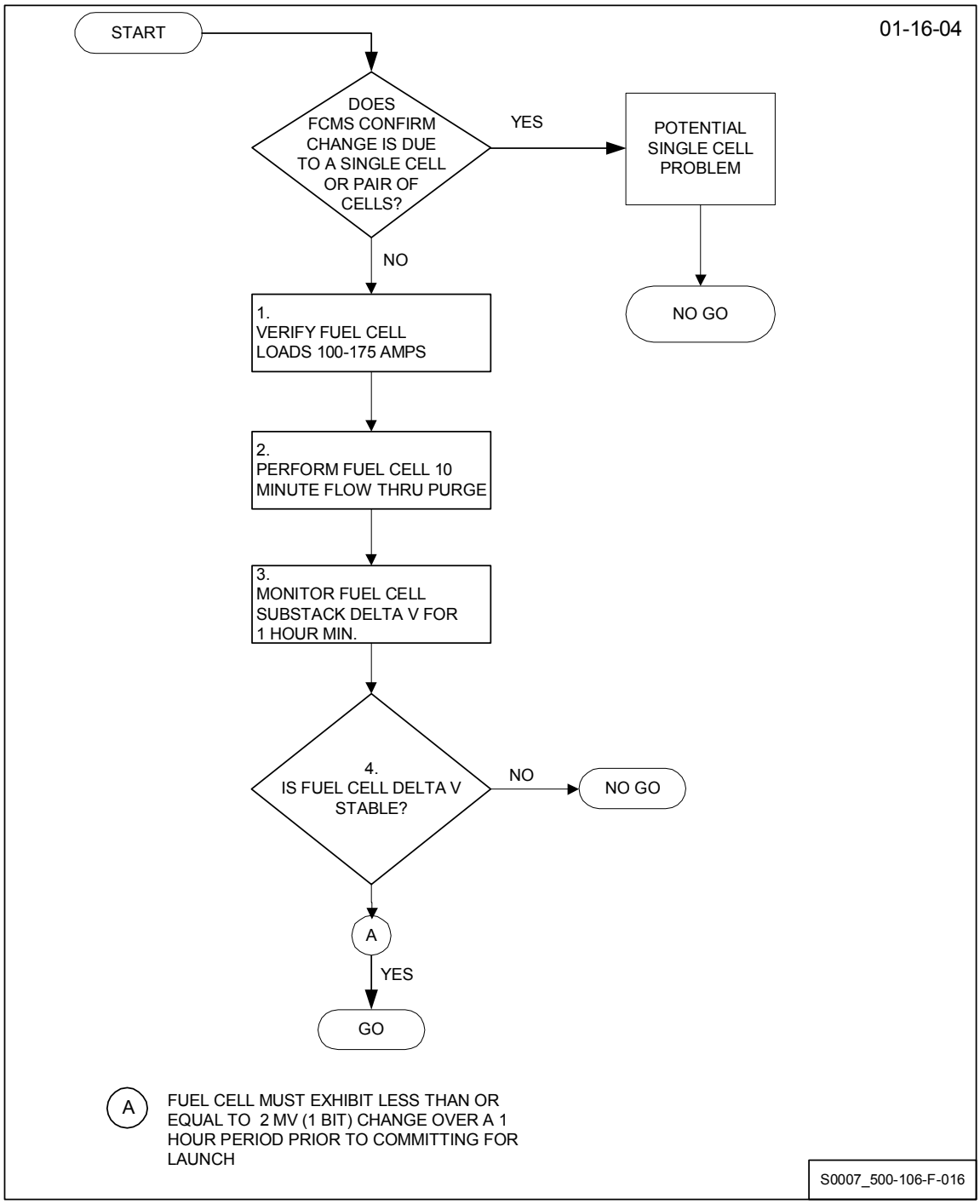
106-15

Substack Delta V > 28 mV Change During Load Adjust (SSID FCP-03)



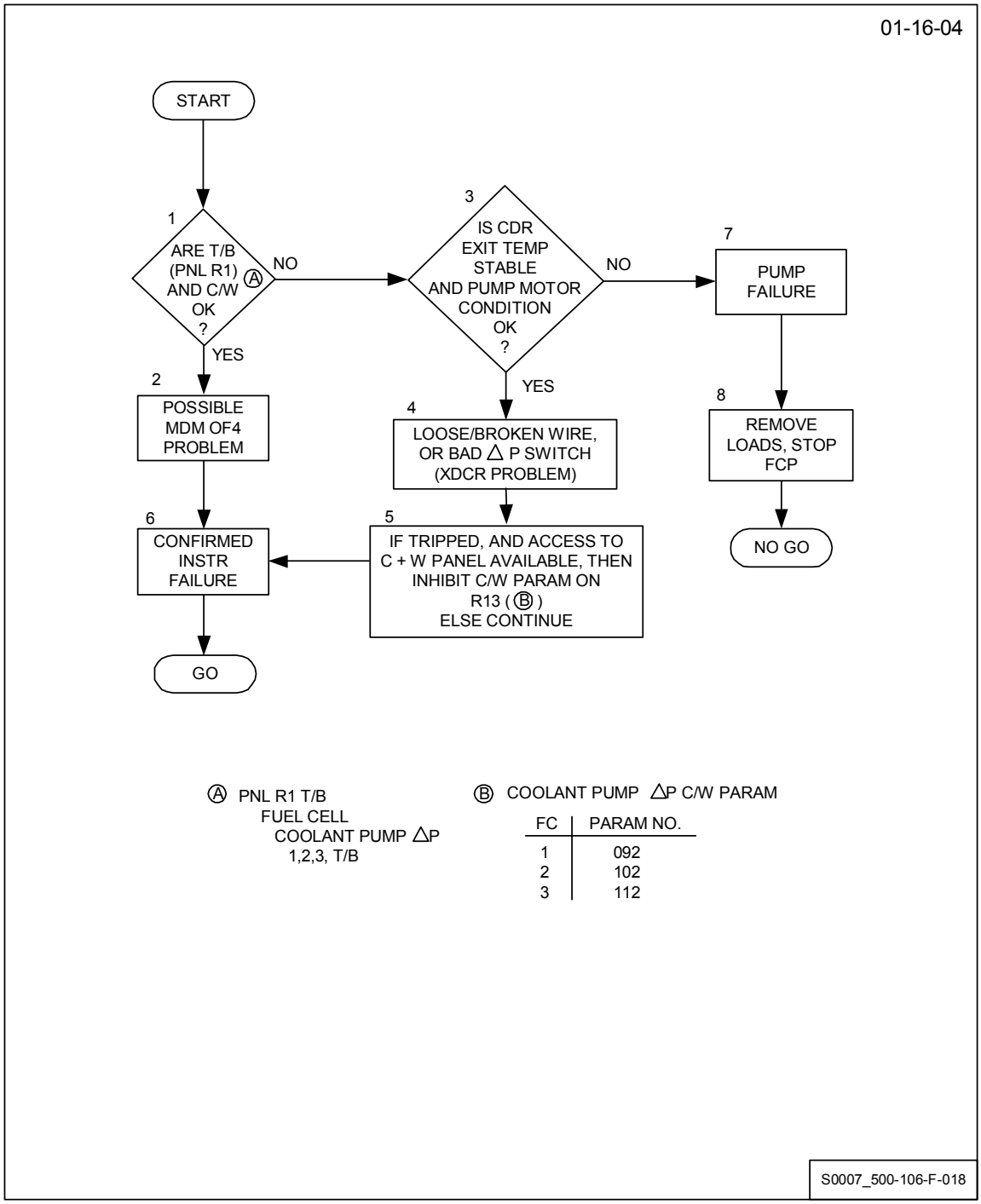
106-16

Substack Delta V > 18 mV Change at Steady State Loads (SSID FCP-03)



106-17

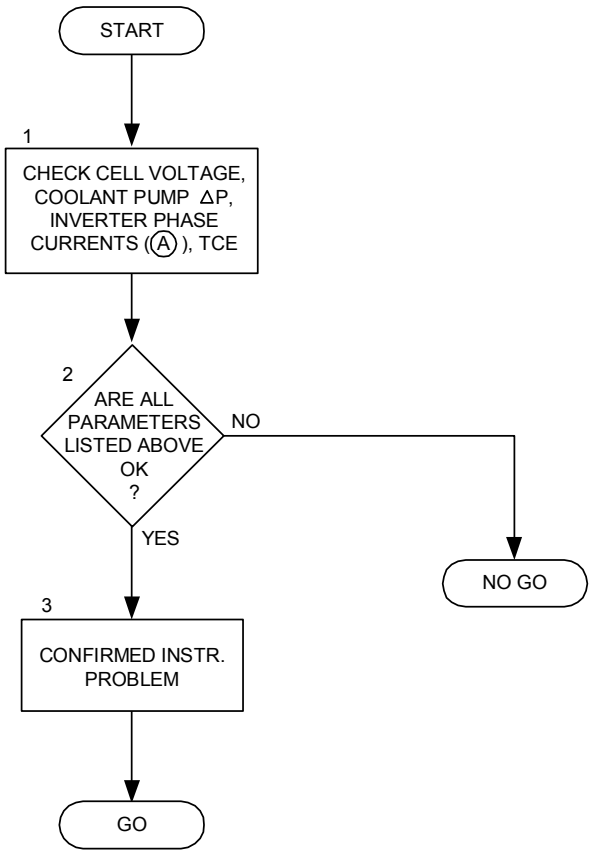
FCP Coolant Pump Indicates Off (SSID FCP-04)



106-18

H_2 Pump Motor Condition High or Low (SSID FCP-04)

01-16-04



Ⓐ INVERTER PHASE CURRENTS

	FC1	FC2	FC3
PHASE A	V76C1540A1	V76C1640A1	V76C1740A1
PHASE B	V76C1541A1	V76C1641A1	V76C1741A1
PHASE C	V76C1542A1	V76C1642A1	V76C1742A1

S0007_500-106-F-019

106-19 **CFCP** **OTC** **132**
OTC **JRPS**

FCP Pump motor event has been reported on OV-_____ at

GMT: _____:_____ for Fuel Cell Powerplant (FCP) _____

UPLOAD FILE(S) THAT CONTAIN 30 seconds prior to and continue until 1 minute after FCP Pump motor event.

Upload FCP(x) (1, 2, 3) data files to the RPS web page.
Utilize the following naming convention for files.

STSXXX_FLT XX_MMDDYY_FCPX

106-20 **JRPS** **OTC** **132**
OTC **CEPD**
CFCP

UPLOAD of EPDC measurements FOR FCP PUMP EVENT is complete.

Data is available on the Record Playback Subsystem web page at the following link and can be accessed using the DEWESOFT viewer.

http://usaflweb01/usago/orgs/Ids30/Rps/Index.htm

Select "RPS Display Recorder Data"
Select Vehicle number
Select STS Number
Select "OMI"
Select "S0007"
Select "FCPX" data and download to desktop
View using DEWESOFT viewer

106-21 **OTC** **CEPD** **132**

Perform review and analysis of DEWETRON files for FCPX data.

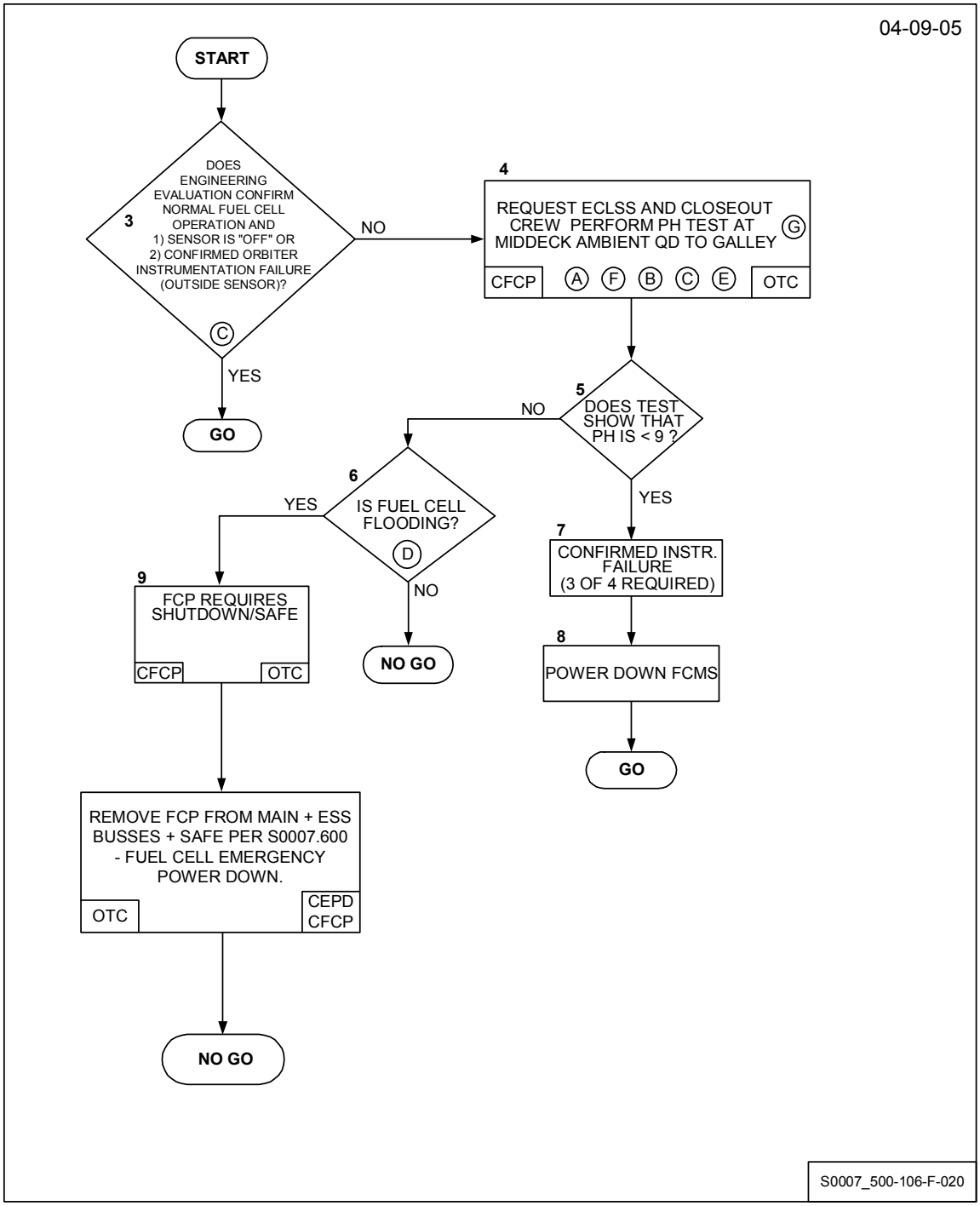
Results: _____

_____

_____

106-22

pH Sensor On > 5 Minutes (SSID FCP-05)



NOTE

For SSID FCP-05:

1. Closeout Crew should be sent for pH test kit upon first indication of pH problem. If a pH sensor comes on after T-9 min, request hold without waiting 5 minutes.

2. Establish ground power in parallel with remaining steps.

3. If Fuel Cell flooding occurs, expedite Fuel Cell shutdown.

4. FCP sustaining heater will provide load to consume Fuel Cell internal reactants and depress FCP.

   A. See following steps to perform pH test at galley.

   B. If both FC and common sensors are continuously "On" for > 1 hour, and a pH test at the galley has not been performed, proceed with FC shutdown/safing.

   C. Proceed with Fuel Cell shutdown and safing if confirming cues indicate flooding (confirming cues include: pump motor condition high, CPM high, voltage degradation, temps out of limits)

   D. Fuel cell flooding is suspect if pH > 9 after 1 hour of continuous sensor "On" indications.

   E. Additional evaluation required to confirm Fuel Cell health. Potable/supply water issues.

   F. FCMS Power up
      Panel ML86B
      Row D
        MN A
          PYRO JETT SYS A
            FC PCM CB - Closed

   G. Increased loads on affected Fuel Cell will reduce transport time and aid in evaluation of Fuel Cell health.

Fuel Cell Water pH Sensor Test at Galley

106-23 CFCP OMTO

Route following equipment to Orbiter Middeck at galley I/F.

(1) L070-000101-003 QD Flexhose Assy
(2) EA 8125012908864 bottle,screw cap,32oz,wide mouth
(1) EA 664000K040244 cylinder,graduated
(1) PG 8105010087056 bag,plastic
(1) RO 831500K316884 tape,black,re-2-1/2in,pres,sensi
(1) PG 6640013298806 litmus paper,asc

T:_____

106-24 CFCP ASP

```
PANEL ML26C
SUPPLY H2O GN2
   TK VENT VLV - PRESS (UP)
   TK SUPPLY VLV - OPEN (UP)
```

106-25 CFCP OMTO

Middeck Galley

1. **Disconnect** galley flexline (uninsulated) from "ambient" Orbiter I/F QD.

2. **Disconnect** galley flexline (insulated) from “chilled” Orbiter I/F QD.

3. **Temporarily bag** galley insulated and Orbiter chilled QDs.

4. **Connect** L070-000101-003 QD/flexhose assy to "ambient" Orbiter I/F QD. **Route** free end into drain bucket (Nalgene container).

5. F017 MV1 - Open

T:_____

106-26 CFCP ASP

```
PANEL ML86B
MNC
  SUPPLY H2O
    GALLEY SUPPLY CB - CLOSE
```

106-27 CFCP ASP

```
PANEL R12L
SUPPLY H2O
  GALLEY SUPPLY VLV SW - OPEN (10 SEC MAX)
  UNTIL GALLEY SUPPLY TB OP, THEN REL

  TKA INLET VLV SW - CLOSE (10 SEC MAX)
  UNTIL TKA INLET VLV TB CL, THEN REL
```

106-28 CFCP OMTO

White Room/Drain Hose Assembly

Verify water flow from F017 MV1.
Drain a minimum of 5 minutes prior to proceeding with sample.

T:_____

106-29 CFCP OMTO

Middeck Galley

1. **Drain** water from L070-000101-003 F/H assy into sample bottle. **Drain** enough to perform sample.

2. **Continue** to drain product water into waste bucket or Nalgene container until directed otherwise by CFCP.

T:_____

106-30 CFCP OMTO

Middeck

Perform product water sample of water in sample bottle using either litmus paper or Hach pH meter.

Record pH_____BD

Record method _____ litmus/meter

Cal No._____
(Meter only)

T:_____

NOTE

If product water pH is >9 and both the FCP and common pH sensors have been "On" continuously for >1 hour, FCP flooding is suspect and CFCP should proceed with Fuel Cell shutdown and safing per OMI S0007.600.

If product water pH is <9, additional Engineering evaluation of Fuel Cell performance is required prior to committing for flight.

Reconfigure for Launch

NOTE

If Engineering evaluation determines Fuel Cell performance is nominal and acceptable for flight, proceed with the following steps to reconfigure back to Launch Configuration.

Reconfigure for Launch Not Performed:_____

106-31 CFCP ASP

```
PANEL R12L
SUPPLY H2O
  TK A INLET SW - OPEN
  VERIFY TK A INLET TB OP
  TK A INLET SW - RELEASE
```

106-32 CFCP OMTO

OK To Install Qw:_____

Middeck

1. L070-000101-003 F/H assy F017MV1 - Close

2. **Disconnect** QD from "ambient" I/F QD

3. **Reconnect** galley flexline (uninsulated) to "ambient" Orbiter I/F QD.

4. **Reconnect** galley flexline (insulated) to "chilled" Orbiter IF QD.

T:_____ Qw:_____

NOTE
26.6 psia represents minimum acceptable leak check pressure.

106-33 **CECL**

CRT VAG12

VERIFY P0430 INDICATES 26.6 PSIA MINIMUM.

106-34 **CECL**

CRT VAG12

VERIFY LV1 POP ON (TK A INLET VLV)

106-35 **CFCP** **OMTO**

Galley

Perform visual leak check of "ambient" and “chilled” QDs at Orbiter Interfaces.
Verify no evidence of leakage in 15 minutes.

OMRSD V66AC0.143-H

T:_____ Qw:_____

106-36 **CFCP** **ASP**

PANEL R12L
SUPPLY H2O
  GALLEY SUPPLY VLV SW - CLOSE (10 SEC MAX)
  UNTIL GALLEY SUPPLY TB CL, THEN REL

106-37 **CFCP** **ASP**

```
PANEL ML86B
MNC
  SUPPLY H2O
    GALLEY SUPPLY CB - OPEN
```

106-38 **CECL** **OMTO**

IF TANK A WAS PREVIOUSLY VENTED FOR LAUNCH,

THEN

```
PANEL ML26C
SUPPLY H2O
  TK A SUPPLY VLV - CLOSE
  TK VENT VLV - VENT
```

Not Performed:_____

T:_____

106-39 **CFCP** **OMTO**

Route L070-000101-003 assembly, pH test equipment (beaker, Nalgene container, meter, litmus paper) to Closeout Crew for storage.

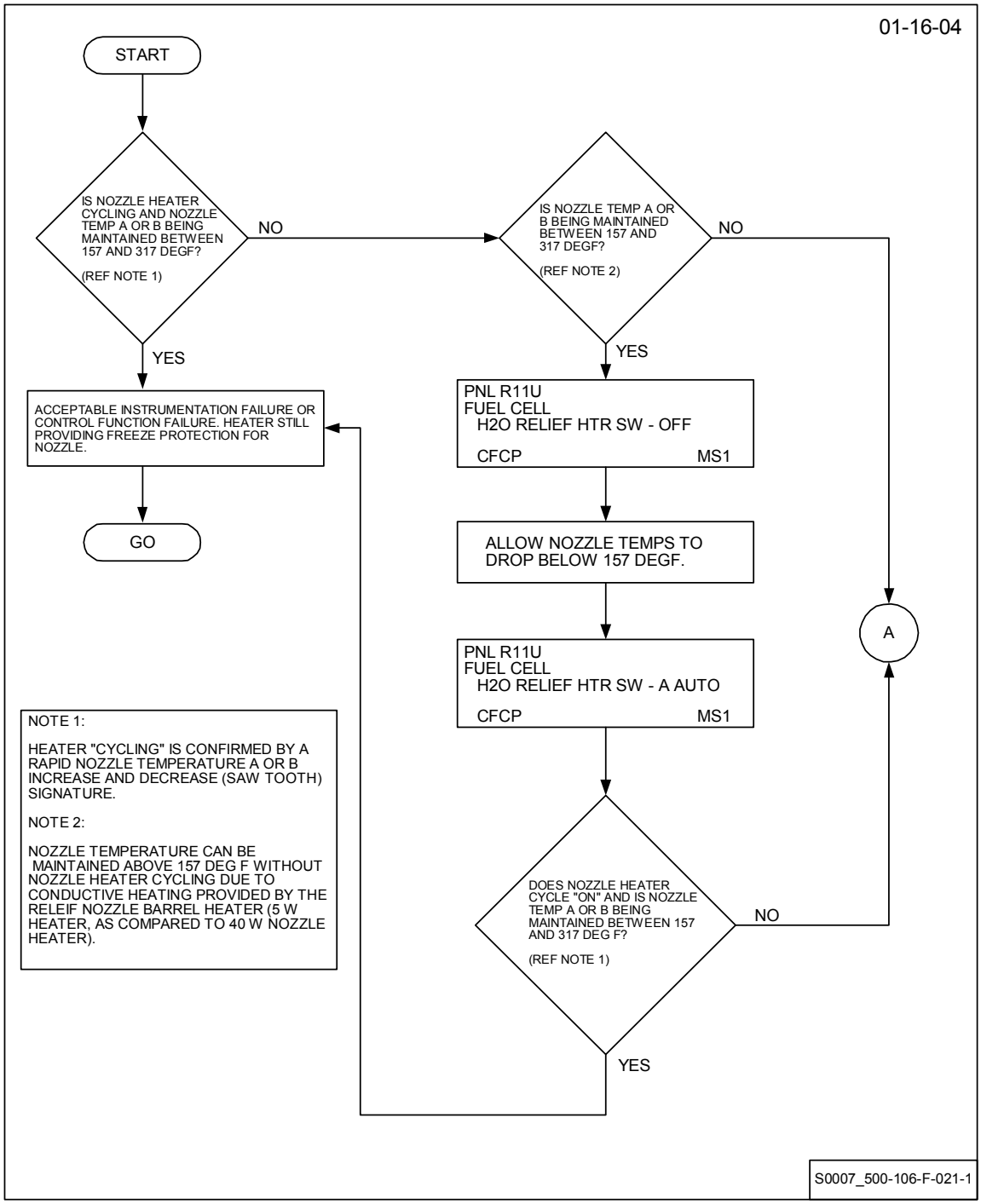
T:_____

***** End of Reconfigure for Launch *****

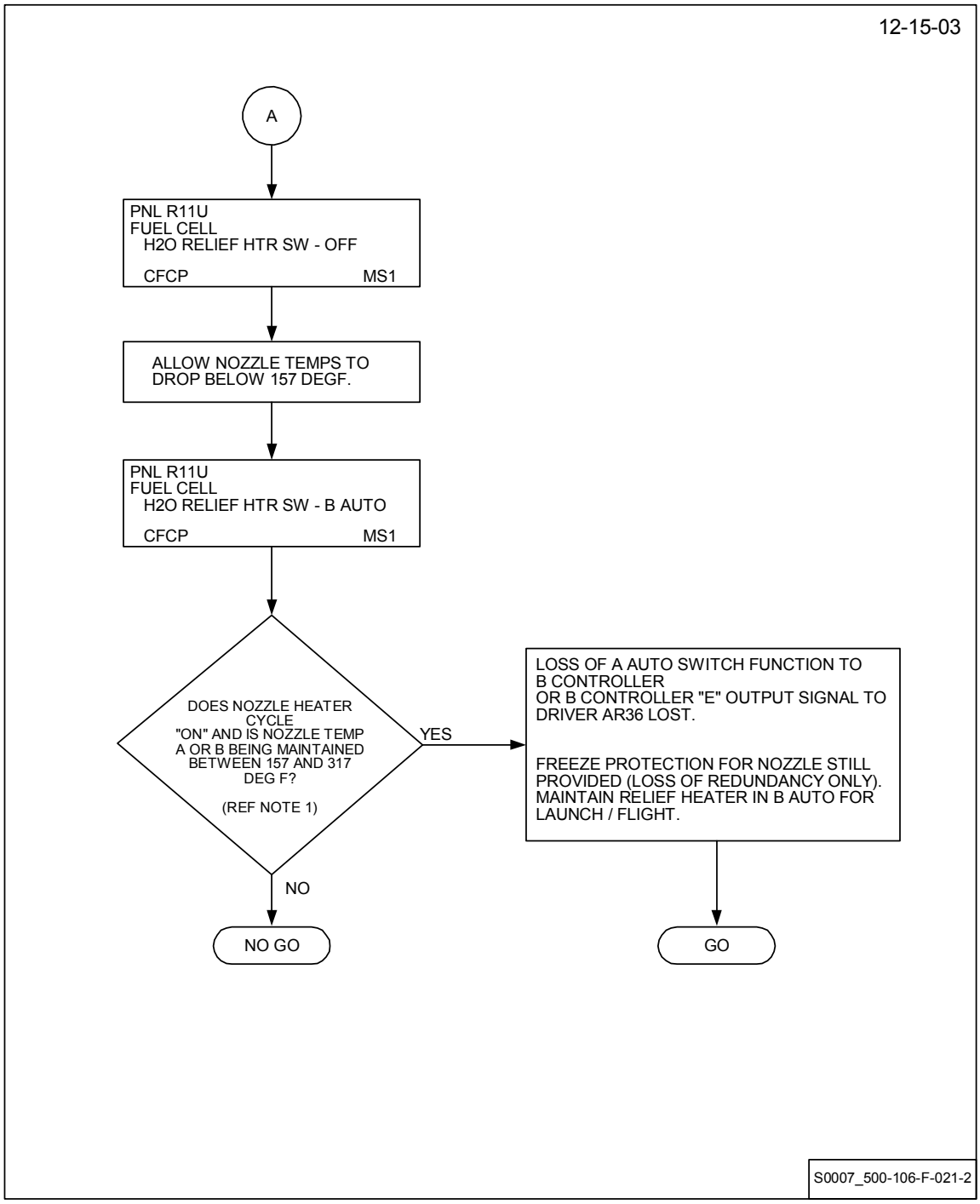
***** End of Fuel Cell Water pH Sensor Test at Galley *****

106-40

RLF Nozzle Temp High or Low (SSID FCP-06) (1 of 2)

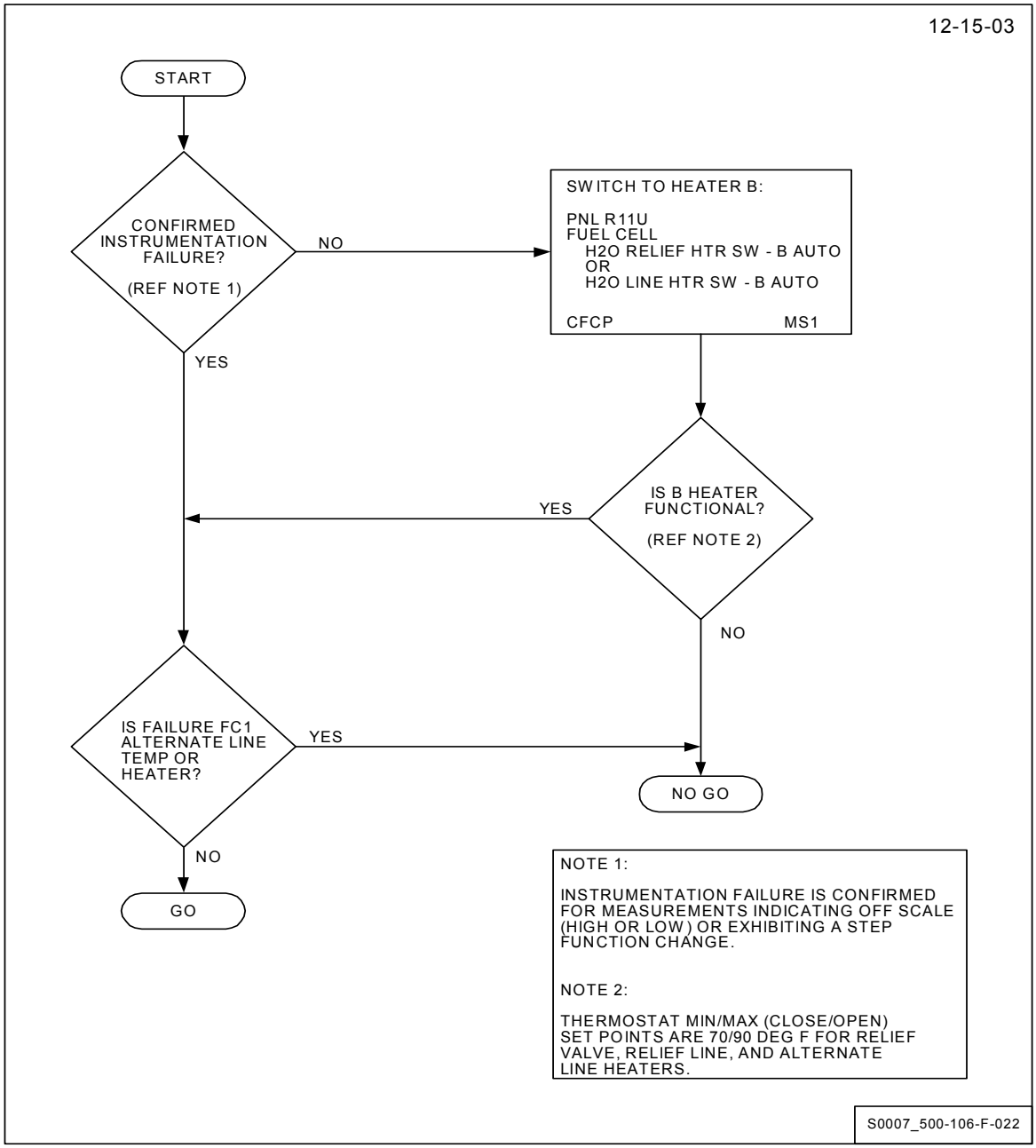


RLF Nozzle Temp High or Low (SSID FCP-06) (2 of 2)



106-41

RLF Valve Temps, RLF Line Temps, Alt Line Temps Low (SSID FCP-06)



Fuel Cell Low Load Test

NOTE

The following will reduce FCP current so that power plant thermal performance can be evaluated at as low a load as possible without exceeding FCP minimum amperage or EPD maximum bus voltage requirements. Fuel Cell Stack Outlet temperature should be maintained above recorded (following steps) sustaining heater turnoff temperature to preclude sustaining heater operation.

This operation may be performed on any FCP. In the following steps FCP X will refer to the target FCP.

106-42 **NTD** **OTC** **232**
OTC **CFCP** **132**
CEPD

Perform low load testing on Fuel Cell _____.

106-43 **CFCP**

Record FCP X Startup/Sustaining heater turn off point (obtain from FCP start data)

STACK OUT _____ Deg F BD

106-44 CFCP

CRT (VWR05, PG-B)
Record the following data for FCP X:

FCP VOLTAGE _____ VDC 28 TO 32

FC CURRENT _____ AMPS 70 TO 420

COOL PRESS _____ PSIA 55 TO 75

STACK OUT _____DEG F 180 TO 230

STACK IN _____ DEG F 176 TO 191

COND EXIT _____ DEG F 140 TO 160

COOL RTN _____ DEG F 40 TO 140

PUMP MTR COND _____ VDC 0.28 TO 1.00

O2 FLOW _____ LB/HR BD

H2 FLOW _____ LB/HR BD

pH SENSOR _____ ON/OFF OFF

KOH IN _____ 24-48% (PCG FCP_PERF)

KOH OUT _____ 24-48% (PCG FCP_PERF)

KOH AVG _____ 24-48% (PCG FCP_PERF)

CAUTION

In the following steps Fuel Cell loads should not drop below 70 amps. Orbiter Bus voltage should not exceed 32.0 VDC. Power Supply voltage should not exceed 40.0 VDC. Damage to flight hardware will occur.

NOTE

In the following step FCP load will be reduced to low levels. Inadvertent sustaining heater cycle may cause FCP load to drop below OMRS requirement minimum. Monitor FCP Stack out temp and maintain load as required to prevent sustaining heater cycling (~183.5 Deg F).

NOTE

The following steps will remain open until completion of testing to allow adjustment of loads per CFCP direction, to maintain FCP operational parameters and/or prevent sustaining heater cycles.

To allow adequate thermal adjustment and to prevent temperature undershoot, incremental loads adjustments only should be performed (initial 100 amps prior to additional changes).

106-45 CFCP CEPD 153

Lower FCP X loads to between 70 and 100 amps.
CEPD to monitor FCP Channel 153 for additional load adjusts as required.

Fuel Cell Load Adjust

106-46 CEPD 153

Perform Fuel Cell Load Sharing Adjust for FCP X per OMI S9001.104 , Operation 290, Option C.
Report completion.

***** End of Fuel Cell Load Adjust *****

106-47 CEPD CFCP 153

FCP X Loads Adjust complete.

106-48 CFCP

Record start of stabilization time.

Time _____ GMT

Date _____

NOTE

Monitor FCP temperatures until stabilized or per Engineering direction (FCP performance issues).

Monitor FCP Stack out temp and have CEPD adjust Fuel Cell loads to maintain FCP Stack out temperature above FCP sustaining heater turn off point (~187 deg F, obtained from FCP start data) to preclude heater operation.

106-49 CFCP

CRT (VWR05, PG-B)
Record the following data for FCP X AFTER temperature stabilization:

FCP VOLTAGE _____ VDC 28 TO 32

FC CURRENT _____ AMPS 70 TO 420

COOL PRESS _____ PSIA 55 TO 75

STACK OUT _____DEG F 180 TO 230

STACK IN _____ DEG F 176 TO 191

COND EXIT _____ DEG F 140 TO 160

COOL RTN _____ DEG F 40 TO 140

PUMP MTR COND _____ VDC 0.28 TO 1.00

O2 FLOW _____ LB/HR BD

H2 FLOW _____ LB/HR BD

pH SENSOR _____ ON/OFF OFF

KOH IN _____ 24-48% (PCG FCP_PERF)

KOH OUT _____ 24-48% (PCG FCP_PERF)

KOH AVG _____ 24-48% (PCG FCP_PERF)

106-50 CFCP CEPD 153

Adjust FCP X loads to 150 amps nominal and maintain.
CEPD to monitor FCP Channel 153 for additional load adjusts as required.

Fuel Cell Load Adjust

106-51 CEPD 153

Perform Fuel Cell Load Sharing Adjust for FCP X per OMI S9001.104 , Operation 290, Option C.
Report completion.

***** End of Fuel Cell Load Adjust *****

106-52 CEPD CFCP 153

FCP X Loads at 150 amps nominal.

106-53 CFCP

Record

Time _____ GMT

Date _____

106-54 **CFCP**

PCG2

Plot following parameters for duration of FCP Low Load Testing.
Attach results.

V45V0**X**00A1 FUEL CELL NO **X** VOLTAGE
V45C0**X**01A1 FUEL CELL NO **X** CURRENT
V45T0**X**20A1 FUEL CELL NO **X** STACK COOL OUT TEMP
V45T0**X**30A1 FUEL CELL NO **X** CONDENSER EXIT TEMP
NFKOH**X**001 FC**X** KOH INLET CONCENTRATION
NFKOH**X**002 FC**X** KOH OUTLET CONCENTRATION
NFKOH**X**003 FC**X** KOH AVG CONCENTRATION

Where **X** is 1,2,3 based on FCP number

106-55 **CFCP** **OTC** **132**
OTC **NTD** **232**

FCP X Low Load testing is complete.

***** End of Fuel Cell Low Load Test *****

*** End of Operation **106** ***

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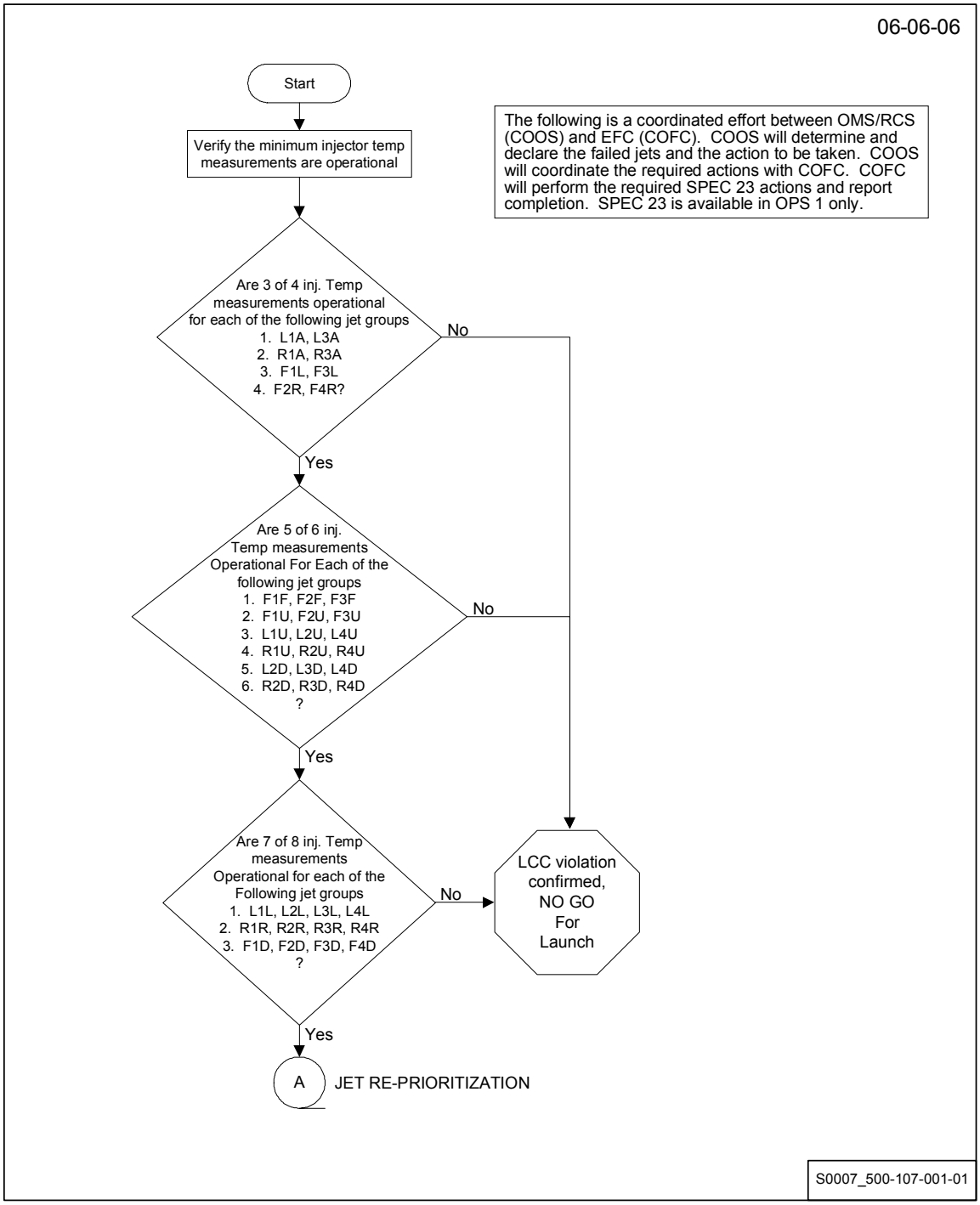
OPERATION 107 OMS/RCS

Shop: **ORP**
Cntrl Rm Console: **C7**
OPR: **ORP**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **1.0**

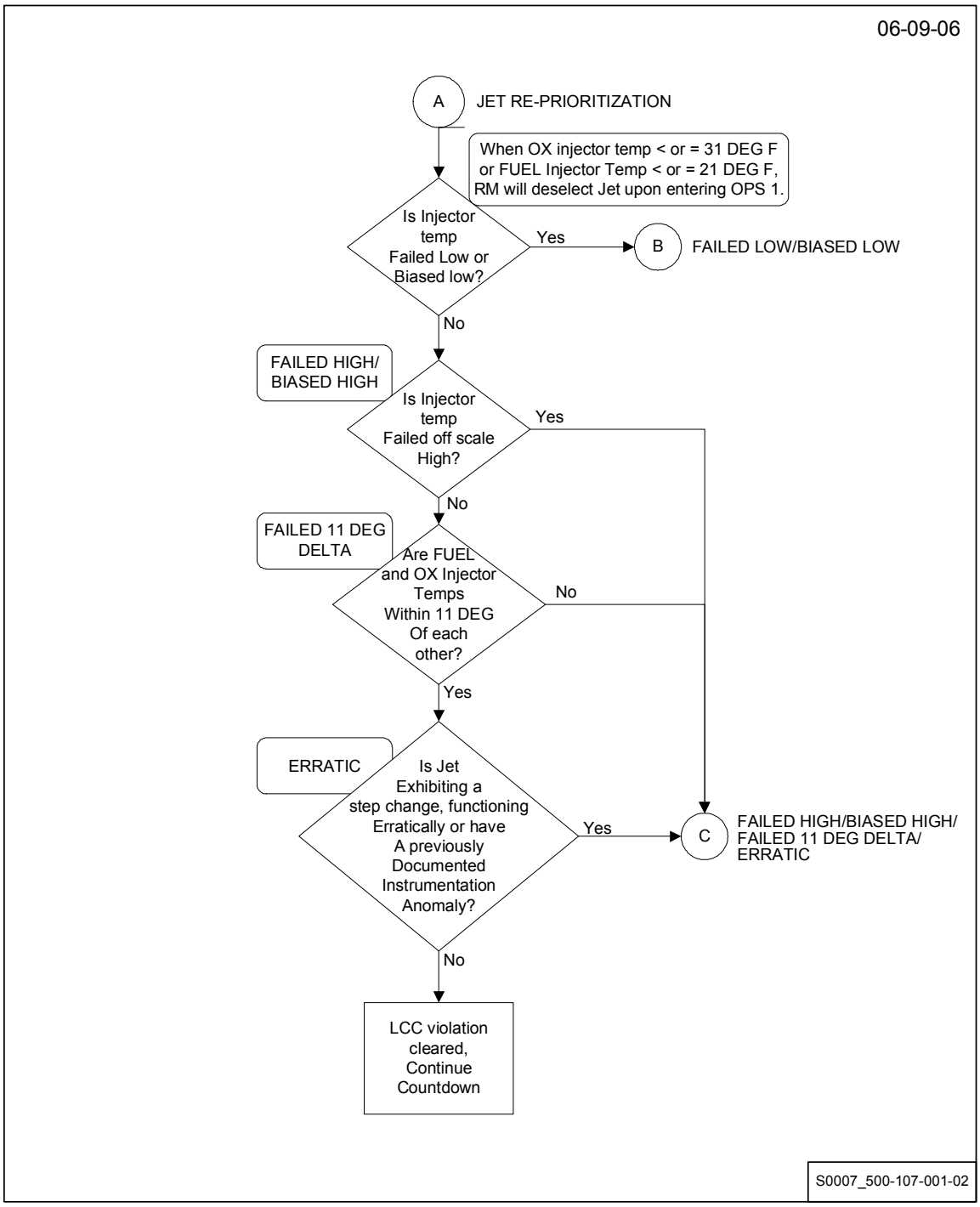
NOTE
Reference LCC for preplanned contingency procedures.

107-1

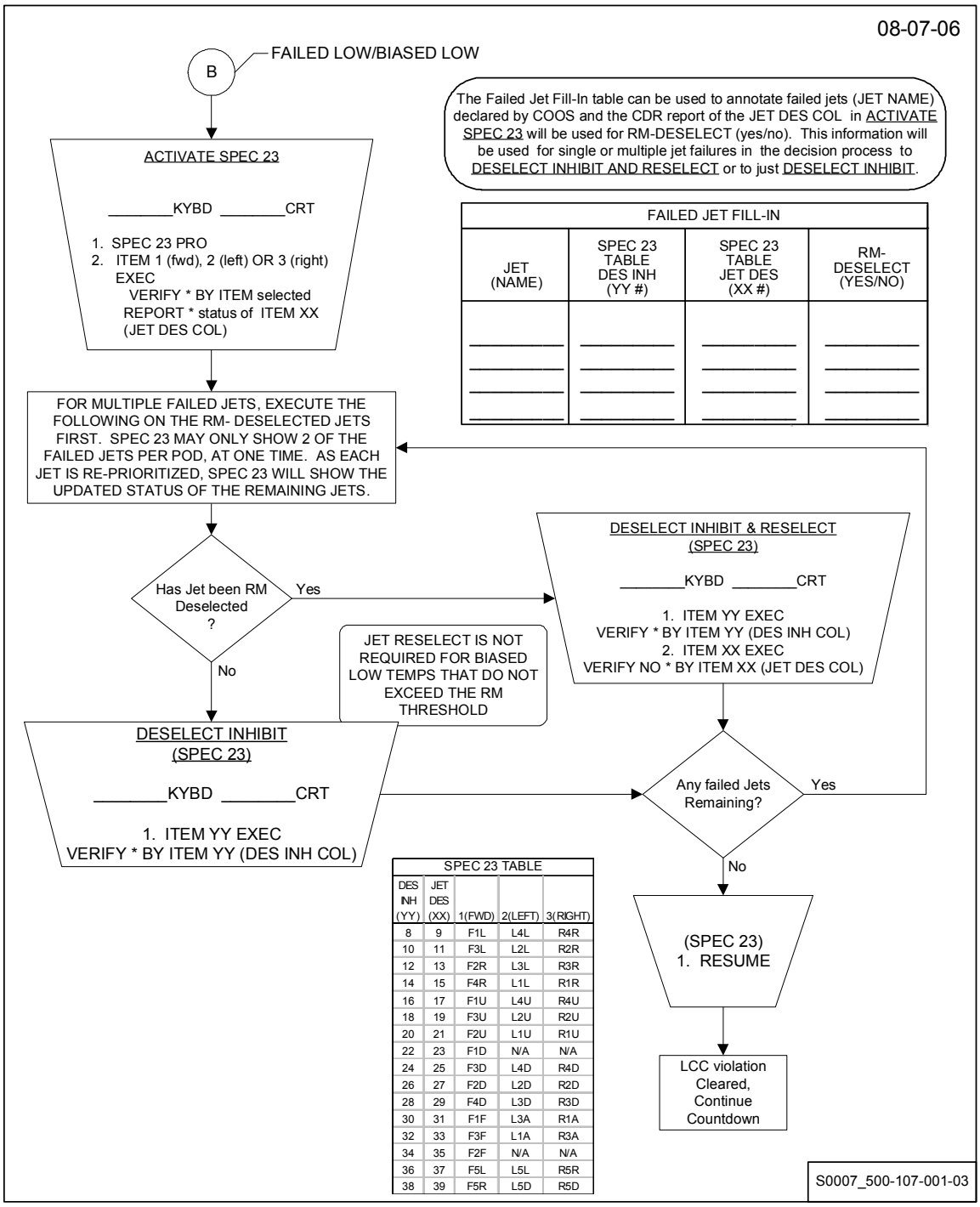
RCS Thruster Injector Temperature Anomaly (SSID RCS-06) (1 of 4)



RCS Thruster Injector Temperature Anomaly (SSID RCS-06) (2 of 4)

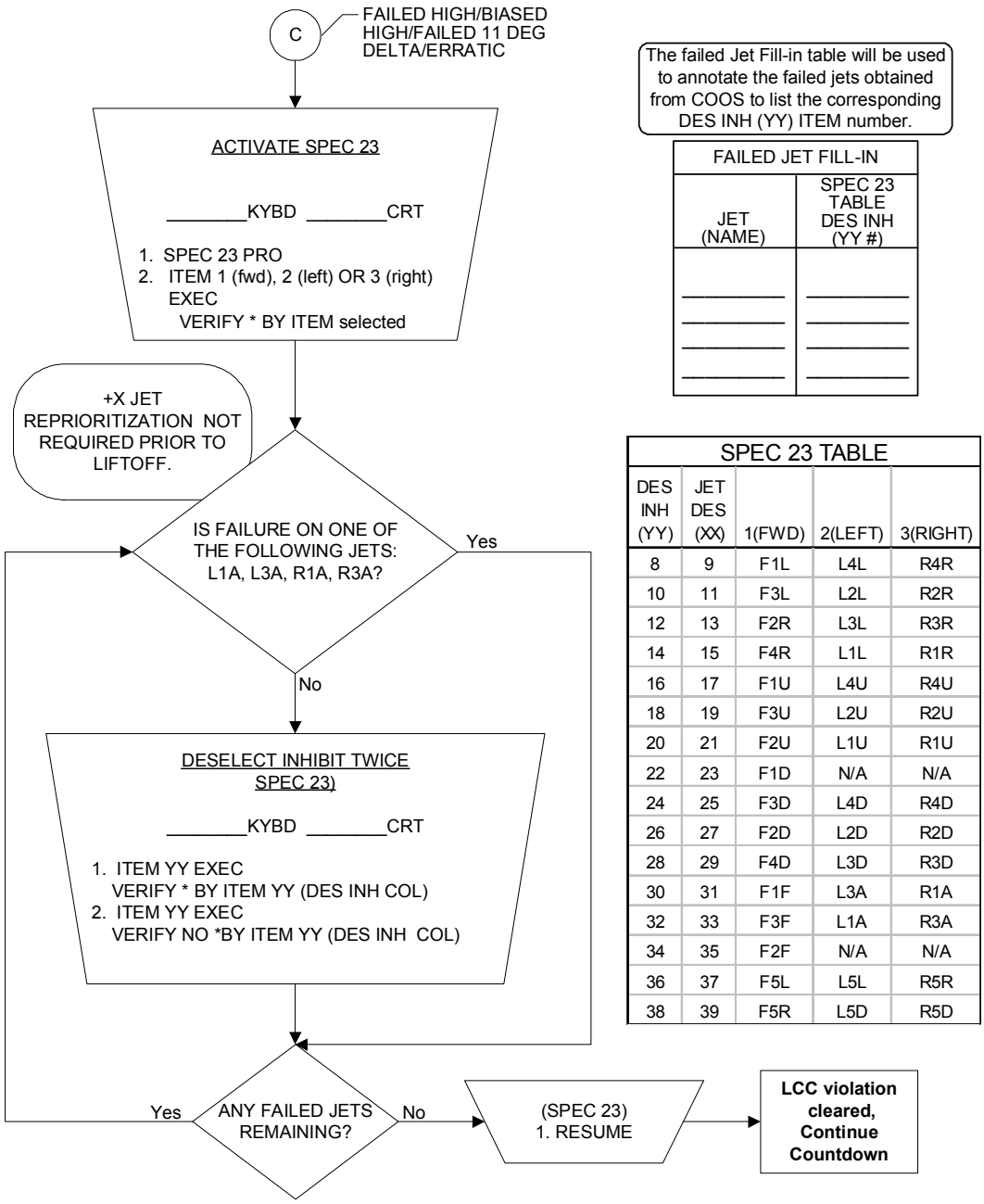


RCS Thruster Injector Temperature Anomaly (SSID RCS-06) (3 of 4)



RCS Thruster Injector Temperature Anomaly (SSID RCS-06) (4of 4)

06-06-06



The failed Jet Fill-in table will be used to annotate the failed jets obtained from COOS to list the corresponding DES INH (YY) ITEM number.

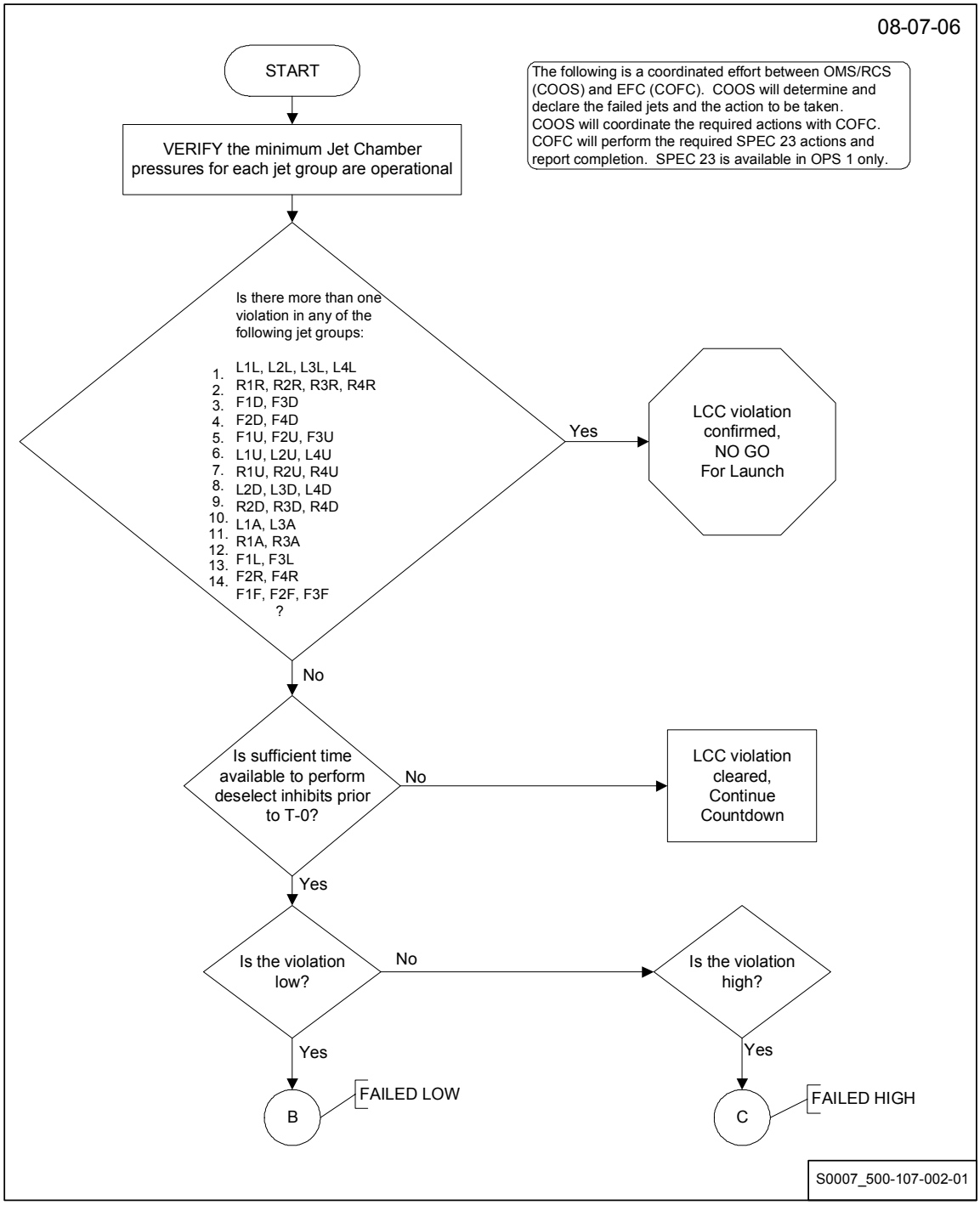
FAILED JET FILL-IN	
JET (NAME)	SPEC 23 TABLE DES INH (YY #)
_____	_____
_____	_____
_____	_____
_____	_____

SPEC 23 TABLE

DES INH (YY)	JET DES (XX)	1(FWD)	2(LEFT)	3(RIGHT)
8	9	F1L	L4L	R4R
10	11	F3L	L2L	R2R
12	13	F2R	L3L	R3R
14	15	F4R	L1L	R1R
16	17	F1U	L4U	R4U
18	19	F3U	L2U	R2U
20	21	F2U	L1U	R1U
22	23	F1D	N/A	N/A
24	25	F3D	L4D	R4D
26	27	F2D	L2D	R2D
28	29	F4D	L3D	R3D
30	31	F1F	L3A	R1A
32	33	F3F	L1A	R3A
34	35	F2F	N/A	N/A
36	37	F5L	L5L	R5R
38	39	F5R	L5D	R5D

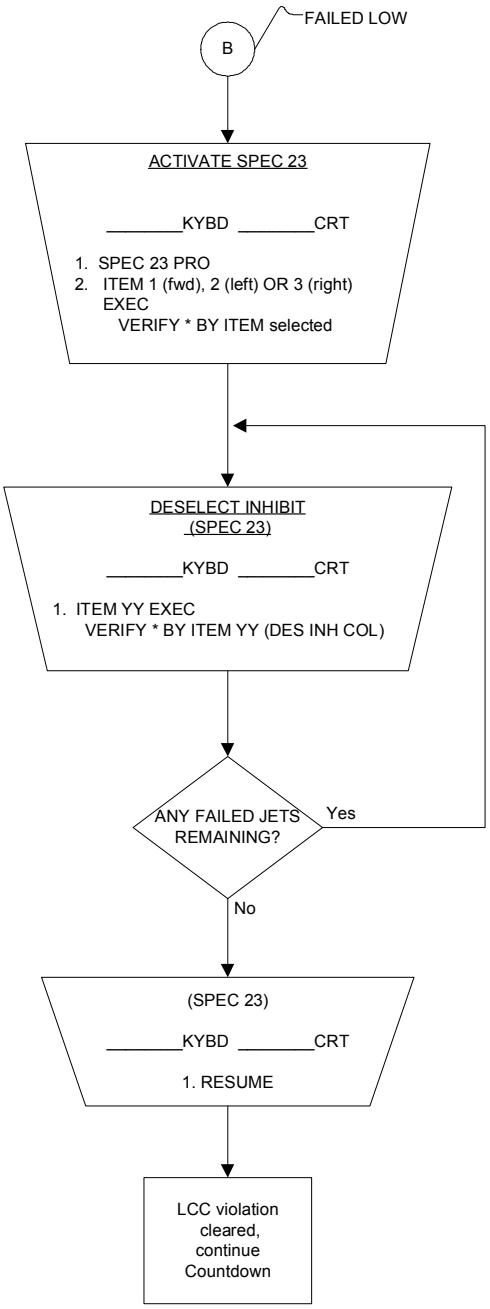
107-2

RCS Jet Chamber Pressure Indication Anomaly (SSID RCS-08) (Page 1 of 3)



RCS Jet Chamber Pressure Indication Anomaly (SSID RCS-08) (Page 2 of 3)

06-09-06



The Failed Jet Fill-In table will be used to annotate the failed jets obtained from COOS to list the corresponding DES INH (YY) ITEM number. The purpose of this information will be used for single or multiple jet failures.

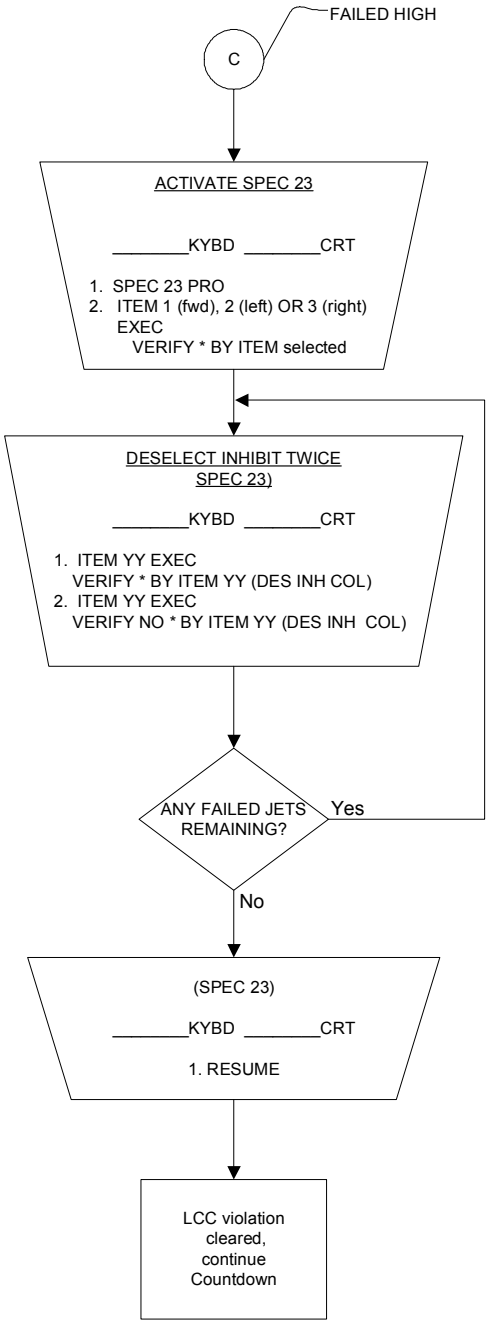
FAILED JET FILL-IN	
JET (NAME)	SPEC 23 TABLE DES INH (YY #)
_____	_____
_____	_____
_____	_____
_____	_____

SPEC 23 TABLE				
DES INH (YY)	JET DES (XX)	1(FWD)	2(LEFT)	3(RIGHT)
8	9	F1L	L4L	R4R
10	11	F3L	L2L	R2R
12	13	F2R	L3L	R3R
14	15	F4R	L1L	R1R
16	17	F1U	L4U	R4U
18	19	F3U	L2U	R2U
20	21	F2U	L1U	R1U
22	23	F1D	N/A	N/A
24	25	F3D	L4D	R4D
26	27	F2D	L2D	R2D
28	29	F4D	L3D	R3D
30	31	F1F	L3A	R1A
32	33	F3F	L1A	R3A
34	35	F2F	N/A	N/A
36	37	F5L	L5L	R5R
38	39	F5R	L5D	R5D

S0007_500-107-002-02

RCS Jet Chamber Pressure Indication Anomaly (SSID RCS-08) (Page 3 of 3)

06-09-06



The Failed Jet Fill-In table will be used to annotate the failed jets obtained from COOS to list the corresponding DES INH (YY) ITEM number. The purpose of this information will be used for single or multiple jet failures.

FAILED JET FILL-IN	
JET (NAME)	SPEC 23 TABLE DES INH (YY)
_____	_____
_____	_____
_____	_____
_____	_____

SPEC 23 TABLE				
DES INH (YY)	JET DES (XX)	1(FWD)	2(LEFT)	3(RIGHT)
8	9	F1L	L4L	R4R
10	11	F3L	L2L	R2R
12	13	F2R	L3L	R3R
14	15	F4R	L1L	R1R
16	17	F1U	L4U	R4U
18	19	F3U	L2U	R2U
20	21	F2U	L1U	R1U
22	23	F1D	N/A	N/A
24	25	F3D	L4D	R4D
26	27	F2D	L2D	R2D
28	29	F4D	L3D	R3D
30	31	F1F	L3A	R1A
32	33	F3F	L1A	R3A
34	35	F2F	N/A	N/A
36	37	F5L	L5L	R5R
38	39	F5R	L5D	R5D

S0007_500-107-002-03

Left OMS Crossfeed B Valve Anomaly (SSID OMS-07)

Left OMS Crossfeed B Oxid or Fuel Valve Presence of Open VPI Option

NOTE
Perform this option if "presence of Open" condition exists after T-3 hours.

Left OMS Crossfeed B Oxid or Fuel Valve Presence of Open VPI Option
Not Performed:_____

NOTE

LCC Requirement: Open VPI OFF except for confirmed instrumentation failure.

Troubleshooting Plan: Confirm instrumentation failure and valve operation by cycling the valve and monitoring MCA status and cockpit talkback. If valve operation is verified, the valve will be placed in Open position for Launch. Crossfeed line and feedline pressures during valve cycles may also give insight into valve operation.

Conclusion/Recommendation: If valve operation can be verified by monitoring MCA status and cockpit talkback, an instrumentation failure is confirmed.

The valve will be placed in the Open position and the switch returned to GPC. Per the LCC, OMS is Go for Launch. The instrumentation failure could be located in the valve or in MDM FA2.

MCA status must be verified via SDC data retrieval. MCA status is required only for valve (oxidizer or fuel) that did not function properly.

107-3 **COOS**

CRT

VERIFY CORRECT MCA STATUS DURING ATTEMPTED VALVE CYCLE (FROM ON TO MOMENTARY OFF AND BACK TO ON).

OXID VALVE CLOSE	V76X2261E1
	V76X2262E1
FUEL VALVE CLOSE	V76X2263E1
	V76X2264E1

107-4 **COOS** **CDR**

PANEL O8
LOMS CROSSFEED
B TB _____
B SW OPEN
B TB _____

107-5 **COOS**

CRT

VERIFY CORRECT MCA STATUS DURING PREVIOUS VALVE CYCLE (*IF MCA STATUS INDICATES "NO CHANGE" THEN THE INSTRUMENTATION PROBLEM IS LOCATED IN THE VALVE SWITCH, OTHERWISE PROBLEM IS LOCATED IN MDM FA2).

OXID VALVE OPEN	V76X2263E1
	*V76X2264E1
FUEL VALVE OPEN	V76X2261E1
	*V76X2262E1

107-6 **COOS** **CDR**

PANEL O8
LOMS CROSSFEED
B SW CLOSE
B TB _____

107-7 **COOS**

CRT

VERIFY CORRECT MCA STATUS DURING PREVIOUS VALVE CYCLE.

OXID VALVE CLOSE	V76X2261E1
	V76X2262E1
FUEL VALVE CLOSE	V76X2263E1
	V76X2264E1

107-8 **COOS CDR**

PANEL O8
LOMS CROSSFEED
B SW OPEN
B TB _____

107-9 **COOS**

CRT

VERIFY CORRECT MCA STATUS DURING PREVIOUS VALVE CYCLE (*IF MCA STATUS INDICATES "NO CHANGE" THEN THE INSTRUMENTATION PROBLEM IS LOCATED IN THE VALVE SWITCH, OTHERWISE PROBLEM IS LOCATED IN MDM FA2).

OXID VALVE OPEN V76X2263E1
*V76X2264E1

FUEL VALVE OPEN V76X2261E1
*V76X2262E1

107-10 **COOS CDR**

PANEL O8
LOMS CROSSFEED
B SW GPC
B TB _____

***** End of Left OMS Crossfeed B Oxid or Fuel Valve Presence of Open VPI Option *****

Left OMS Crossfeed B Oxid or Fuel Valve Lack of Closed VPI Option

NOTE
Perform this option if "lack of Closed" condition exists after T-3 hours.

Left OMS Crossfeed B Oxid or Fuel Valve Lack of Closed VPI Option
Not Performed:_____

NOTE
LCC Requirement: Close VPI ON except for confirmed instrumentation failure.

Troubleshooting Plan: Confirm instrumentation failure by placing cockpit switch in Close position and verifying cockpit talkback indicates Closed.
Valve has two VPI's, one to LPS and one to cockpit talkback.

Conclusion/Recommendation: If valve cockpit talkback indicates Closed with the switch in the Closed position, an instrumentation failure is confirmed. The switch will be returned to GPC. Per the LCC, OMS is Go for Launch. The instrumentation failure could be located in the valve or in MDM FA2.

107-11 COOS CDR

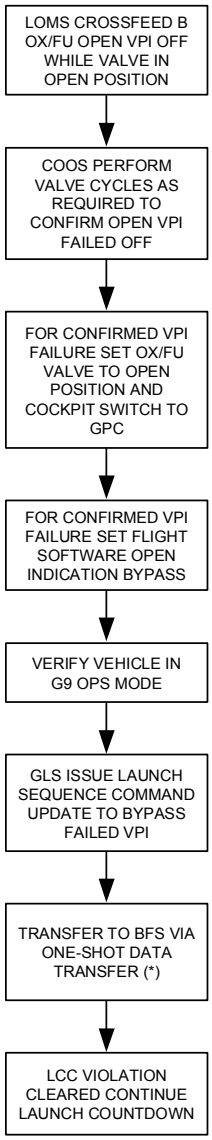
```
PANEL O8
LOMS CROSSFEED
B TB ________
B SW CLOSE
B TB ________
B SW GPC
B TB ________
```

***** End of Left OMS Crossfeed B Oxid or Fuel Valve Lack of Closed VPI Option *****

***** End of Left OMS Crossfeed B Valve Anomaly (SSID OMS-07) *****

Left OMS Crossfeed B Oxid or Fuel Valve Lack of Open VPI (SSID OMS-07)

09/26/07



* BFS One-Shot Data Transfer nominally occurs at T-22 Minutes.

S0007_500-107-F-003-01

107-12

OMS GN_2 ARM Valve Anomaly (SSID OMS-10)

NOTE

LCC Requirement: Open VPI ON after T-30 minutes except for confirmed instrumentation failure.

Troubleshooting Plan: Confirm instrumentation failure by verifying the regulator outlet pressure increased to normal regulator lockup pressure at activation.

Conclusion/Recommendation: If regulator outlet pressure increased to normal regulator lockup pressure at activation, instrumentation failure is confirmed. Per the LCC, OMS is Go for Launch. The instrumentation failure could be located in the valve or in MDM FA4 (ROME)/ FA3 (LOME).

107-13 **COOS**

CRT

VERIFY GN2 REGULATOR OUTLET PRESSURE FOR AFFECTED OME INCREASED TO 314-391 PSIA AT ACTIVATION.

REGULATOR OUTLET PRESSURE

LOME _____PSIA BD

ROME _____PSIA BD

***** End of OMS GN_2 ARM Valve Anomaly (SSID OMS-10) *****

*** End of Operation **107** ***

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OPERATION 108 APU

Shop: **CAPU**
Cntrl Rm Console: **C8**
OPR: **CAPU**
Zone: **300**
Hazard (Y/N): **Y**
Duration (Hrs): **4.0**

APU Fuel Tank Pressure Anomaly (SSID APU-01)

NOTE

Perform this option if required to confirm instrumentation failure of V46P0X00A1 or V46P0X05A1. Instrumentation failure of both measurements on any one system is LCC violation confirmed No-Go for Launch since this causes the loss of fuel tank quantity gauging and the ability to monitor for tank leakage.

APU Fuel Tank Pressure Anomaly (SSID APU-01) Not Performed:_____

108-1 **CAPU**

VWF57

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU___.

2. **RECORD** APU X FUEL TANK PRESS

   _____PSIA BD V46P0X00A1

3. **RECORD** APU X FUEL TANK OUT PRESS

   _____PSIA BD V46P0X05A1

4. **RECORD** APU X FUEL PUMP INLET PRESS

   _____PSIA BD V46P0X10A1

5. **USE** DATA RETRIEVAL TO DETERMINE IF THE FAILED MEASUREMENT EXHIBITED THE SYMPTOMS OF A CLASSIC INSTRUMENTATION FAILURE; I.E., A STEP FUNCTION TO GOAL LOWER LIMIT (0.0) OR GOAL UPPER LIMIT (500.0), OR ERRATIC BEHAVIOR, WHICH IS NOT PHYSICALLY POSSIBLE BASED ON OTHER AVAILABLE DATA.

SSID APU-01 Additional Data Required

NOTE

Perform this option if additional data is required to prove instrumentation failure. Repeat as required.

SSID APU-01 Additional Data Required Not Performed:_____

108-2 **CAPU**

VWF47

1. **VERIFY** GROUND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

2. FUEL ISLN VLV A PWR ON CMD
   XMIT CURSOR KEY - PRESS V46K0X21NL

3. FUEL ISLN VLVS PWR DRIVERS ON CMD
   XMIT CURSOR KEY - PRESS V46K0X77NL

4. FUEL ISLN VLV GND DRIVERS ON CMD
   XMIT CURSOR KEY - PRESS V46K0X78NL

108-3 **CAPU**

VWF57

1. **RECORD** APU X FUEL TANK PRESS

   _____PSIA BD V46P0X00A1

2. **RECORD** APU X FUEL TANK OUT PRESS

   _____PSIA BD V46P0X05A1

3. **RECORD** APU X FUEL PUMP INLET PRESS

   _____PSIA BD V46P0X10A1

4. **EVALUATE** PRESSURES TO DETERMINE IF INSTRUMENTATION FAILURE HAS OCCURRED.

108-4 **CAPU**

VWF47

1. **VERIFY** GROUND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

2. FUEL ISLN VLV A PWR OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X21NL

3. FUEL ISLN VLVS PWR DRIVERS OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X77NL

4. FUEL ISLN VLV GND DRIVERS OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X78NL

***** End of SSID APU-01 Additional Data Required *****

108-5 CAPU

Evaluate the results of the previous four steps of troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-01, APU Fuel Tank Pressure Anomaly.

***** End of APU Fuel Tank Pressure Anomaly (SSID APU-01) *****

APU Fuel Line Temperature Anomaly (SSID APU-02)

NOTE
Perform this option as required for an APU Fuel Line Temperature Anomaly.

APU Fuel Line Temperature Anomaly (SSID APU-02) Not Performed:_____

NOTE
Instrumentation failure of both measurements on any one system is a LCC violation (confirmed No-Go for Launch) since this causes loss of insight into heater function.

108-6 **CAPU**

IF REQUIRED TO CONFIRM INSTRUMENTATION FAILURE OF V46T0X04A1 OR V46T0X08A1,

THEN PERFORM VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X FUEL LINE TEMP 1

   _____DEG F V46T0X08A1

3. **RECORD** APU X FUEL LINE TEMP 2

   _____DEG F V46T0X04A1

4. **USE** DATA RETRIEVAL TO DETERMINE IF THE FAILED MEASUREMENT EXHIBITED THE SYMPTOMS OF A CLASSIC INSTRUMENTATION FAILURE, I.E. A STEP FUNCTION TO GOAL LOWER LIMIT (-0.8) OR GOAL UPPER LIMIT (248.1), OR ERRATIC BEHAVIOR WHICH IS NOT PHYSICALLY POSSIBLE BASED ON OTHER AVAILABLE DATA.

   Not Performed:_____

APU Fuel Line Temp Anomaly Troubleshooting

NOTE

For the case where both temp measurements are trending up or down exceeding high or low limit, apply Flowchart 108-1 "APU Fuel System Temperature Anomaly Logic Chart." Perform this option as required to perform troubleshooting.

APU Fuel Line Temp Anomaly Troubleshooting Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel A12. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a Scrub will be called.

108-7 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X04	_____	_____
T0X08	_____	_____

108-8 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. TANK AND LINE HTRS B AUTO OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X09NL

4. PFK11 KEY - PRESS

108-9 ASP

PANEL A12
APU HEATER
  TANK/FUEL LINE/H2O SYS
    _A SW - AUTO V46S0X06E1

108-10 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X04	_____	_____
T0X08	_____	_____

108-11 ASP

```
PANEL A12
APU HEATER
  TANK/FUEL LINE/H2O SYS
    _A SW - OFF                          V46S0X06E1
  TANK/FUEL LINE/H2O SYS
    _B SW - AUTO                         V46S0X09E1
```

108-12 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X04	_____	_____
T0X08	_____	_____

108-13 ASP

```
PANEL A12
APU HEATER
  TANK/FUEL LINE/H2O SYS
    _B SW - OFF                          V46S0X09E1
```

108-14 **CAPU**

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. TANK AND LINE HTRS A AUTO ON CMD
   XMIT CURSOR KEY - PRESS V46K0X06NL

4. PFK11 KEY - PRESS

108-15 **CAPU**

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH, LOW OR IN TOLERANCE.

FD	Temp	H/L/IT
T0X04	_____	_____
T0X08	_____	_____

NOTE

Perform next two steps if heaters are not functioning properly with ground command activation.

108-16 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. TANK AND LINE HTRS A AUTO OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X06NL

4. PFK11 KEY - PRESS

Not Performed:_____

108-17 ASP

```
PANEL A12
APU HEATER
  TANK/FUEL LINE/H2O SYS
    _A SW - AUTO                    V46S0X06E1
                    OR
  TANK/FUEL LINE/H2O SYS
    _B SW - AUTO                    V46S0X09E1
```

Not Performed:_____

***** End of APU Fuel Line Temp Anomaly Troubleshooting *****

108-18 **CAPU**

IF performed,

THEN evaluate the results of the previous 15 steps of troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-02 APU Fuel Line Temperature Anomaly.

Not Performed:_____

***** End of APU Fuel Line Temperature Anomaly SSID APU-02) *****

APU Gas Generator Chamber Pressure Anomaly (SSID APU-03)

NOTE

Perform this option as required to confirm acceptable APU GG chamber pressure transducer shift (low point between pressure pulses).

APU Gas Generator Chamber Pressure Anomaly (SSID APU-03) Not Performed:_____

108-19 **CAPU** **JAPU** **182**

Record APU_____ average low point chamber pressure _____ psia (V46P0X20A1) during normal speed operation.

108-20 **CAPU** **PLT** **212**

Perform the following:

```
PANEL R2
APU/HYD
  APU SPEED SELECT
    SW ______ - HIGH
```

108-21 **CAPU** **JAPU** **182**

Perform the following:

1. **Confirm** shift to high speed and monitor chamber pressure low point between pulses (10 seconds, minimum)

2. **Record** APU _____ average low point chamber pressure _____ psia (V46P0X20A1) during high speed operation.

3. **Record** the difference between the APU _____ high speed and normal speed average low point chamber pressure _____ psid.

108-22 **CAPU** **PLT** **212**

Perform the following:

```
PANEL R2
APU/HYD
  APU SPEED SELECT
    SW _______ - NORM
```

108-23 **CAPU**

Evaluate the results of APU Gas Generator Chamber Pressure Anomaly troubleshooting.

1. If maximum observed pressure between pulses returns to the APU operating transducer bias level (i.e., drops by >= 100 psi), unacceptable PCV outlet or SOV bypass leakage is indicated. LCC violation confirmed, APU is No-Go for Launch.

2. If bias shift is confirmed, (i.e., chamber pressure between pulses in high speed mode remains consistent with that observed in normal speed), then LCC violation cleared, APU is Go to continue Countdown.

Make recommendation to the OTC and NTD based on LCC page APU-03, APU Gas Generator Chamber Pressure Anomaly.

APU Gas Generator Chamber Pressure - RPS Failure

NOTE

Perform this option as required if APU 1, 2 or 3 Chamber Pressure data from the Record & Playback Subsystem (RPS) at KSC is unavailable.

APU Gas Generator Chamber Pressure - RPS Failure Not Performed:_____

108-24 CAPU NTD 212

JAPU can no longer confirm Gas Generator Chamber Pressure performance for one or more APUs per LCC APU-03. Per Note 5 of the LCC, **request** Houston Flight direct Mechanical Maintenance Arm & Crew Systems (MMACS) to confirm visibility of APU Gas Generator Chamber Pressures and assume responsibility for monitoring the chamber pressure performance for the remainder of the LCD.

108-25 NTD *FLT 212

JAPU can no longer confirm acceptable APU Gas Generator Chamber Pressure performance. Full monitoring responsibilities are transferred to MMACS for the remainder of the LCD. MMACS will contact CAPU on channel 182 for any anomalous condition.

108-26 *FLT NTD 212
NTD CAPU

MMACS is monitoring chamber pressure performance.

NOTE

KSC/APU will continue to monitor APU Gas Generator Chamber Pressures to support Houston Flight/MMACS utilizing PCGoal2 and High Speed Displays in FR2. Communication will be established utilizing the APU back-up channel, OIS-182.

***** End of APU Gas Generator Chamber - RPS Failure *****

***** End of APU Gas Generator Chamber Pressure Anomaly *****

APU Gas Generator Bed/Injector Tube Temperature Anomaly (SSID APU-04)

NOTE
Perform this option as required for an APU Gas Generator Bed/Injector Tube Temperature Anomaly (SSID APU-04).

APU Gas Generator Bed/Injector Tube Temperature Anomaly (SSID APU-04)
Not Performed:_____

108-27 CAPU

IF REQUIRED TO CONFIRM INSTRUMENTATION FAILURE OF V46T0X22A1 OR V46T0X74A1,

THEN PERFORM VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X GAS GENERATOR BED

   TEMP _____ DEG F V46T0X22A1

3. **RECORD** APU X INJECTOR TUBE TEMP

   _____ DEG F V46T0X74A1

4. **USE** DATA RETRIEVAL TO DETERMINE IF THE FAILED MEASUREMENT EXHIBITED THE SYMPTONS OF A CLASSIC INSTRUMENTATION FAILURE. I.E. A STEP FUNCTION TO GOAL LOWER LIMIT (0.0 V46T0X22A1/8.0 V46T0X74A1) OR GOAL UPPER LIMIT (510.0 V46T0X22A1/1519.0 V46T0X74A1), OR ERRATIC BEHAVIOR WHICH IS NOT PHYSICALLY POSSIBLE BASED ON OTHER AVAILABLE DATA.

Not Performed:_____

GG Bed Temperature Failed Below 190 deg F

NOTE

Perform this option if Gas Generator Bed Temperature has failed below 190 deg F in order to brief the Flight Crew on what to expect at APU pre-start.

GG Bed Temperature Failed Below 190 deg F Not Performed:_____

108-28 CAPU PLT

At APU pre-start the APU/HYD ____ READY TO START Talkback will indicate barber pole instead of the normal gray, due to a failure of the Gas Generator Bed Temperature measurement.

This indication may be ignored and APU start performed nominally. Injector Tube Temperature will be monitored to ensure LCC compliance.

***** End of GG Bed Temperature Failed Below 190 deg F *****

Temperature Measurements Trending Down

NOTE

Perform this option if both temperature measurements are trending down past the lower limit, or if one measurement has been previously determined to be failed, and the remaining measurement is trending down past the lower limit. A single measurement trending below the lower limit is acceptable, but should be brought forward to the Test Team.

Temperature Measurements Trending Down Not Performed:_____

108-29 **CAPU**

Perform following:

1. PVO V76V3091A1_____ VDC
   Heater 1A and 3B source

2. PVO V76V3092A1_____ VDC
   Heater 2A and 1B source

3. PVO V76V3093A1_____ VDC
   Heater 3A and 2B source

4. **Verify** with EPD that the above voltages are within normal tolerance. A lower than normal voltage can lead to below average heater performance. One volt lower can produce up to 30 degrees lower temperature.

108-30 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. GG/FUEL PUMP/FUEL LINE HTRS A AUTO OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X18NL

4. GG/FUEL PUMP/FUEL LINE HTRS B AUTO ON CMD
   XMIT CURSOR KEY - PRESS V46K0X19NL

108-31 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X GAS GENERATOR BED

   TEMP _____ DEG F V46T0X22A1

3. **RECORD** APU X INJECTOR TUBE TEMP

   _____ DEG F V46T0X74A1

4. **VERIFY** TEMPERATURE IS CONTROLLING IN THE CORRECT RANGE.

***** End of Temperature Measurements Trending Down *****

Temperature Measurements Trending Up

NOTE

Perform this option if both temperature measurements are trending up past the upper limit, or if one measurement has been previously determined to be failed, and the remaining measurement is trending up past the upper limit. A single measurement trending above the upper limit is acceptable, but should be brought forward to the Test Team.

Temperature Measurements Trending Up Not Performed:_____

108-32 **CAPU**

Perform following:

1. PVO V76V3091A1_____ VDC
   Heater 1A and 3B source

2. PVO V76V3092A1_____ VDC
   Heater 2A and 1B source

3. PVO V76V3093A1_____ VDC
   Heater 3A and 2B source

4. **Verify** with EPD that the above voltages are within normal tolerance. A higher than normal voltage can lead to above average heater performance. One volt above normal can produce up to 30 degrees above normal.

NOTE

Perform the next two steps to adjust ground power supply voltage for the Gas Generator Bed Heaters and prevent Gas Generator Bed Temperatures or Injector Tube Temperature from exceeding their LCC upper limit.

NOTE

Ensure that ground power supply voltage reduction has been coordinated with CFCP and CEPD prior to proceeding with the next two steps.

108-33 **CAPU** **CEPD**
CFCP

Perform the following:

1. **Decrease** MN Bus _____ AFT PCA volts by 0.1-0.5 VDC

(MN Bus A for heaters 1A or 3B)	V76V3091A1
(MN Bus B for heaters 2A or 1B)	V76V3092A1
(MN Bus C for heaters 3A or 2B)	V76V3093A1

2. **Record** voltage prior to adjustment:

_____ VDC 27.5-32.0

3. **Record** voltage after adjustment:

_____ VDC 27.5-32.0

Not Performed:_____

108-34 CAPU

VWF48

1. **MONITOR** GAS GEN BED TEMP AND INJ TUBE TEMP FOR SUSPECT APU. V46T0X22A1 V46T0X74A1

2. **REPORT** TREND: _____

_____

Not Performed:_____

NOTE
Perform the next four steps if heater performance continues to exceed expectations and APU cool down time needs to be calculated.

108-35 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. GG/FUEL PUMP/FUEL LINE HTRS A AUTO OFF CMD XMIT CURSOR KEY - PRESS V46K0X18NL

4. CONTROLLER POWER ON CMD XMIT CURSOR KEY - PRESS V46K0X24NL

5. PFK11 KEY - PRESS

Not Performed:_____

108-36 CAPU

VWF48/PCGOAL

1. **PLOT** GAS GENERATOR BED TEMP V46T0X22A1 AND INJECTOR TUBE TEMP V46T0X74A1 USING DATA RETRIEVAL.

2. **CALCULATE** COOLDOWN RATE, BASED ON ABOVE.

3. **ESTIMATE** TIME REQUIRED AFTER HEATER DEACTIVATION FOR APU GAS GENERATOR BED TEMP AND INJECTOR TUBE TEMP TO DECREASE TO SAFE LEVELS TO INITIATE APU START, BASED ON ABOVE.

Not Performed:_____

108-37 CAPU

VWF48

1. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

2. CONTROLLER POWER OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X24NL

NOTE
Perform either of the next two commands.

3. GG/FUEL PUMP/FUEL LINE HTRS A AUTO ON CMD
   XMIT CURSOR KEY - PRESS V46K0X18NL

Not Performed:_____
SS3

4. GG/FUEL PUMP/FUEL LINE HTRS B AUTO ON CMD
   XMIT CURSOR KEY - PRESS V46K0X19NL

Not Performed:_____
SS4

Entire Step Not Performed:_____

108-38 **CAPU**

AT THE PRE-DETERMINED T-TIME, PERFORM VWF48

NOTE
Perform either of the next two commands.

1. GG/FUEL PUMP/FUEL LINE HTRS A AUTO OFF CMD
XMIT CURSOR KEY - PRESS V46K0X18NL

Not Performed:_____
SS1

2. GG/FUEL PUMP/FUEL LINE HTRS B AUTO OFF CMD
XMIT CURSOR KEY - PRESS V46K0X19NL

Not Performed:_____
SS2

3. CONTROLLER POWER ON CMD
XMIT CURSOR KEY - PRESS V46K0X24NL

4. AT THE PRE-DETERMINED T-TIME,
CONTROLLER POWER OFF CMD
XMIT CURSOR KEY - PRESS V46K0X24NL

Entire Step Not Performed:_____

***** End of Temperature Measurements Trending Up *****

108-39 **CAPU**

Evaluate the results of previous 12 steps of troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-04, APU Gas Generator Bed/Injector Tube Temperature Anomaly.

***** End of APU Gas Generator Bed/Injector Tube Temperature Anomaly (SSID APU-04) *****

APU Fuel Line Temp #3/Supply Line Temperature Anomaly (SSID APU-05)

NOTE

Perform this option as required for an APU Fuel Line Temp #3 or Fuel Supply Line Temperature Anomaly.

APU Fuel Line Temp #3/Supply Line Temperature Anomaly (SSID APU-05)

Not Performed:_____

NOTE

Instrumentation failure of both measurements on any one system is a LCC violation (confirmed No-Go for Launch) since this causes loss of insight into heater function.

108-40 CAPU

IF REQUIRED TO CONFIRM INSTRUMENTATION FAILURE OF V46T0X28A1 OR V46T1X71A1,

THEN PERFORM VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X FUEL LINE TEMP 3

   _____DEG F V46T0X28A1

3. **RECORD** APU X FUEL SUPPLY LINE TEMP

   _____DEG F V46T1X71A1

4. **USE** DATA RETRIEVAL TO DETERMINE IF THE FAILED MEASUREMENT EXHIBITED THE SYMPTOMS OF A CLASSIC INSTRUMENTATION FAILURE, I.E. A STEP FUNCTION TO GOAL LOWER LIMIT (-2.0 V46T0X28A1/0.9 V46T1X71A1) OR GOAL UPPER LIMIT (396.4 V46T0X28A1/441.7 V46T1X71A1), OR ERRATIC BEHAVIOR WHICH IS NOT PHYSICALLY POSSIBLE BASED ON OTHER AVAILABLE DATA.

Not Performed:_____

APU Fuel Line Temp #3 Anomaly Troubleshooting

NOTE

For the case where both temp measurements are trending up or down exceeding high or low limit, apply Flowchart 108-1 "APU Fuel System Temperature Anomaly Logic Chart." Perform this option as required to perform troubleshooting.

APU Fuel Line Temp #3 Anomaly Troubleshooting Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel A12. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a Scrub will be called.

108-41 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X12	_____	_____
T0X28	_____	_____
T0X92	_____	_____
T0X71	_____	_____
T0X72	_____	_____

108-42 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. GG/FUEL PUMP/FUEL LINE HTRS A AUTO OFF CMD XMIT CURSOR KEY - PRESS V46K0X18NL

4. PFK11 KEY - PRESS

108-43 ASP

```
PANEL A12
APU HEATER
  GAS GEN/FUEL PUMP
    _SW - B AUTO                    V46S0X18E1
```

108-44 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X12	_____	_____
T0X28	_____	_____
T0X92	_____	_____
T0X71	_____	_____
T0X72	_____	_____

108-45 ASP

PANEL A12
APU HEATER
GAS GEN/FUEL PUMP
_SW - A AUTO V46S0X19E1

108-46 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X12	_____	_____
T0X28	_____	_____
T0X92	_____	_____
T0X71	_____	_____
T0X72	_____	_____

108-47 ASP

PANEL A12
APU HEATER
  GAS GEN/FUEL PUMP
    _SW - OFF V46S0X18/19E1

108-48 **CAPU**

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. GG/FUEL PUMP/FUEL LINE HTRS B AUTO ON CMD XMIT CURSOR KEY - PRESS V46K0X19NL

4. PFK11 KEY - PRESS

108-49 **CAPU**

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH, LOW OR IN TOLERANCE.

FD	Temp	H/L/IT
T0X12	_____	_____
T0X28	_____	_____
T0X92	_____	_____
T0X71	_____	_____
T0X72	_____	_____

NOTE

APU-05 perform next two steps if heaters are not functioning properly with ground command activation.

108-50 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. GG/FUEL PUMP/FUEL LINE HTRS B AUTO OFF CMD XMIT CURSOR KEY - PRESS V46K0X19NL

4. PFK11 KEY - PRESS

Not Performed:_____

108-51 ASP

PANEL A12
APU HEATER
GAS GEN/FUEL PUMP
_SW - A/B AUTO V46S0X18/19E1

Not Performed:_____

***** End of APU Fuel Line Temp #3 Anomaly Troubleshooting *****

108-52 **CAPU**

IF performed,

THEN evaluate the results of the previous 13 steps of troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-05 APU Fuel Line Temp #3/Supply Line Temperature Anomaly.

Not Performed:_____

***** End of APU Fuel Line Temp #3/Supply Line Temperature Anomaly (SSID APU-05) *****

Static APU Lube Oil Temperature Anomaly (SSID APU-09)

NOTE
Perform this option as required for a Static APU Lube Oil Temperature Anomaly.

Static APU Lube Oil Temperature Anomaly (SSID APU-09) Not Performed:_____

NOTE
Instrumentation failure of one measurement on any one system is acceptable.

108-53 CAPU

IF REQUIRED TO CONFIRM INSTRUMENTATION FAILURE OF V46T0X50A1 OR V46T0X54A1,

THEN PERFORM VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X LUBE OIL OUT TEMP

   _____ DEG F V46T0X54A1

3. **RECORD** APU X LUBE OIL RETURN TEMP

   _____ DEG F V46T0X50A1

4. **USE** DATA RETRIEVAL TO DETERMINE IF THE FAILED MEASUREMENT EXHIBITED THE SYMPTONS OF A CLASSIC INSTRUMENTATION FAILURE.
   I.E. A STEP FUNCTION TO GOAL LOWER LIMIT (-3.1 V46T0X50A1/-2.0 V46T0X54A1) OR GOAL UPPER LIMIT (496.8 V46T0X50A1/396.4 V46T0X54A1), OR ERRATIC BEHAVIOR WHICH IS NOT PHYSICALLY POSSIBLE BASED ON OTHER AVAILABLE DATA.

Not Performed:_____

APU Lube Oil Temperature Troubleshooting

NOTE

For the case where both of the temperature measurements are trending up or down exceeding past the high or low limit, or the case where one measurement has been previously determined to be failed, and the remaining measurement is trending up or down exceeding the high or low limit, apply Flowchart 108-2 "APU Lube Oil Temperature Logic Chart." Use the next nine steps as required to perform troubleshooting.

APU Lube Oil Temperature Troubleshooting Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel A12. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a Scrub will be called.

108-54 **CAPU**

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH, LOW OR IN TOLERANCE.

FD	Temp	H/L/IT
T0X50	_____	_____
T0X54	_____	_____

108-55 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. LUBE OIL HTRS A AUTO OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X16NL

4. LUBE OIL HTRS B AUTO ON CMD
   XMIT CURSOR KEY - PRESS V46K0X17NL

5. PFK11 KEY - PRESS

108-56 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH, LOW OR IN TOLERANCE.

FD	Temp	H/L/IT
T0X50	_____	_____
T0X54	_____	_____

108-57 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. LUBE OIL HTRS B AUTO OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X17NL

4. PFK11 KEY - PRESS

Not Performed:_____

108-58 ASP

PANEL A12
APU HEATER
  LUBE OIL LINE
    __ SW - A AUTO

Not Performed:_____

108-59 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **VERIFY** LUBE OIL HTRS A SW SC - ON V46S0X16E1

3. **RECORD** BELOW THE TEMPERATURE OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH, LOW OR IN TOLERANCE.

FD	Temp	H/L/IT
T0X50	_____	_____
T0X54	_____	_____

Not Performed:_____

108-60 ASP

PANEL A12
APU HEATER
  LUBE OIL LINE
    __ SW - B AUTO

Not Performed:_____

108-61 **CAPU**

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **VERIFY** LUBE OIL HTRS B SW SC - ON V46S0X17E1

3. **RECORD** BELOW THE TEMPERATURE OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH, LOW OR IN TOLERANCE.

FD	Temp	H/L/IT
T0X50	_____	_____
T0X54	_____	_____

Not Performed:_____

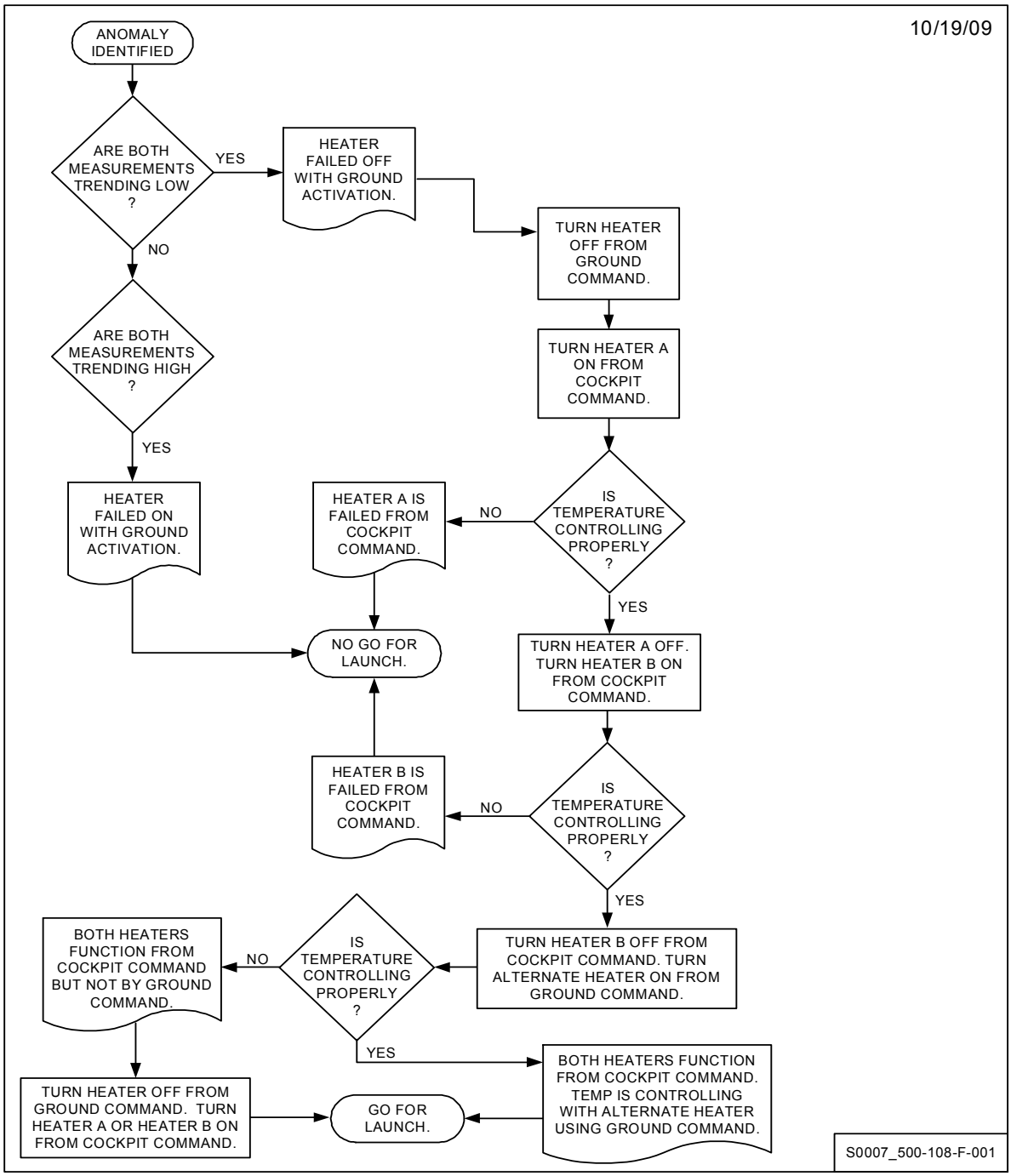
***** End of APU Lube Oil Temperature Troubleshooting *****

108-62 **CAPU**

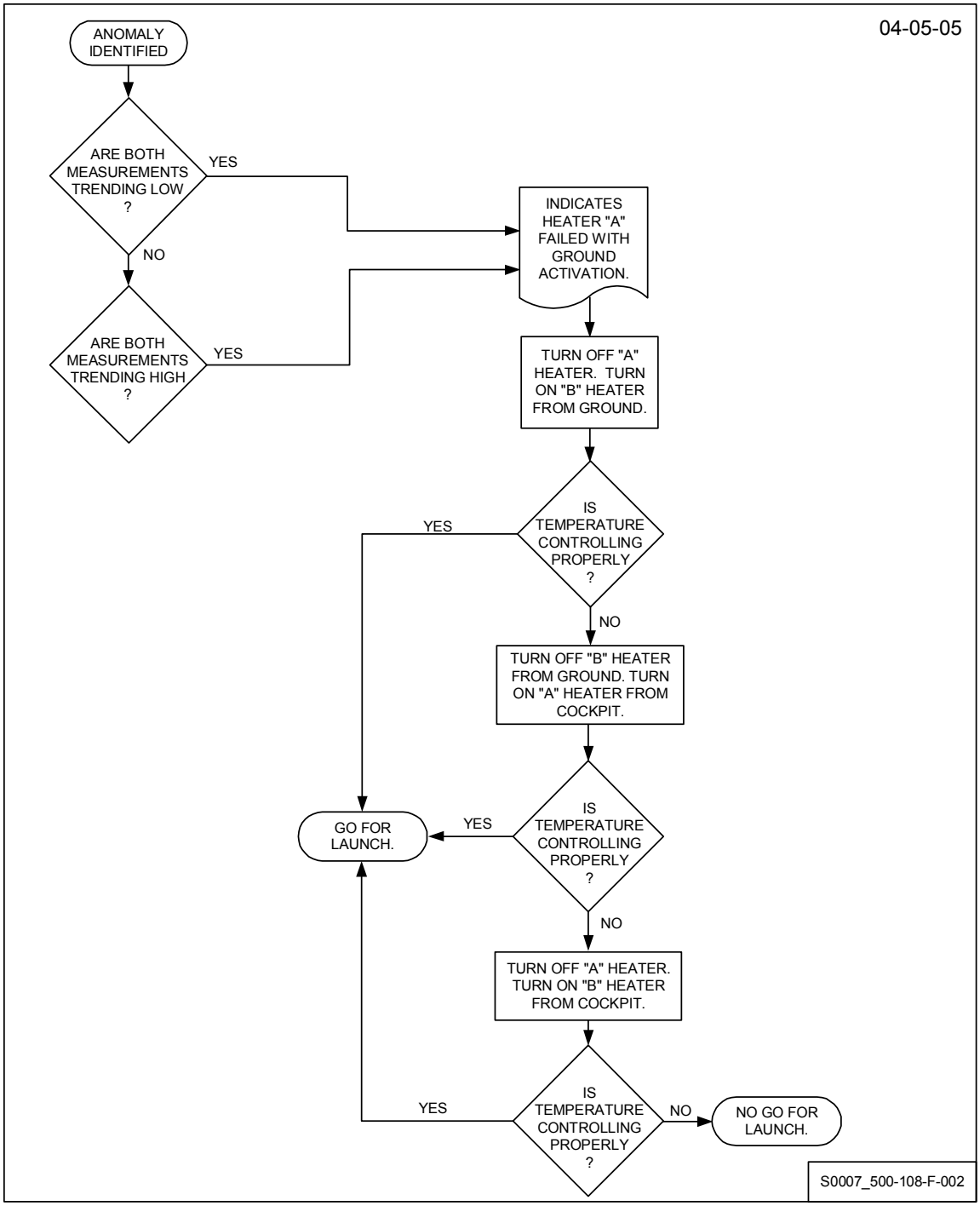
Evaluate the results of the previous nine steps of troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-09, APU Lube Oil Temperature Anomaly.

***** End of Static APU Lube Oil Temperature Anomaly (SSID APU-09) *****

Flowchart 108-1 - APU Fuel System Temperature Anomaly Logic Chart



Flowchart 108-2 - APU Lube Oil Temperature Logic Chart



APU Gearbox Pressure Measurement Anomaly (SSID APU-10)

NOTE

Perform this option as required for an APU Gearbox Pressure Measurement Anomaly.

APU Gearbox Pressure Measurement Anomaly (SSID APU-10)
Not Performed:_____

108-63 **CAPU**

IF REQUIRED TO CONFIRM INSTRUMENTATION FAILURE OF V46P0X51A1,

THEN PERFORM VWF57

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X GEARBOX GN2 PRESS

   _____ PSIA BD V46P0X51A1

3. **RECORD** APU X LUBE OIL OUT PRESS

   _____ PSIA BD V46P0X53A1

4. **USE** DATA RETRIEVAL TO DETERMINE IF THE FAILED MEASUREMENT EXHIBITED THE SYMPTONS OF A CLASSIC INSTRUMENTATION FAILURE. I.E. A STEP FUNCTION TO GOAL LOWER LIMIT (0.0) OR GOAL UPPER LIMIT (30.0), OR ERRATIC BEHAVIOR WHICH IS NOT PHYSICALLY POSSIBLE BASED ON OTHER AVAILABLE DATA.

Not Performed:_____

Confirmed Instrumentation Lower Limit Failure APU Pre-start Not Imminent

NOTE

Perform this option for a confirmed instrumentation failure to GOAL lower limit, if APU Pre-start is not imminent. Issuing the Start command will activate the Gearbox GN_2 Repress Valve if the controller is reading the instrumentation as failed low.

Confirmed Instrumentation Lower Limit Failure APU Pre-start Not Imminent
Not Performed:_____

108-64 **CAPU**

VWF57

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X GN2 BOTTLE PRESS

   _____ PSIA BD V46P0X52A1

3. **RECORD** APU X LUBE OIL OUT PRESS

   _____ PSIA BD V46P0X53A1

CAUTION

Fuel Isolation Valve Power must be verified Off prior to issuing the Start/Run command to prevent an unwanted APU start.

108-65 CAPU

VWF47

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. FUEL ISLN VLV A PWR - VERIFY OFF
   V46X0X15E1

3. FUEL ISLN VLV B PWR - VERIFY OFF
   V46X0X34E1

4. PFK10 KEY - PRESS

5. **VERIFY** GROUND COMMANDS ARE BEING ISSUED FOR THE CORRECT APU.

6. CONTROLLER POWER ON CMD
   XMIT CURSOR KEY - PRESS V46K0X24NL

7. START/RUN ON CMD
   XMIT CURSOR KEY - PRESS V46K0X26NL

108-66 CAPU

VWF57

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X GN2 BOTTLE PRESS

   _____ PSIA BD V46P0X52A1

3. **RECORD** APU X LUBE OIL PRESS

   _____ PSIA BD V46P0X53A1

4. **VERIFY** NO CHANGE FROM PREVIOUS RECORDING.

108-67 CAPU

VWF47

1. **VERIFY** GROUND COMMANDS ARE BEING ISSUED FOR THE CORRECT APU.

2. START/RUN OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X26NL

3. CONTROLLER POWER OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X24NL

4. PFK11 KEY - PRESS

***** End of Confirmed Instrumentation Lower Limit Failure APU Pre-start Not Imminent *****

108-68 **CAPU**

IF CONFIRMED INSTRUMENTATION FAILURE TO GOAL LOWER LIMIT AND APU START IS IMMINENT,

THEN PERFORM THE FOLLOWING:
VWF57

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X GN2 BOTTLE PRESS

   _____ PSIA BD V46P0X52A1

3. POST APU START RECORD APU X GN2 BOTTLE PRESS

   _____ PSIA BD V46P0X52A1

4. **VERIFY** NO DECREASE FROM PREVIOUS RECORDING.

Not Performed:_____

108-69 **CAPU**

IF performed,

THEN evaluate the results of the previous six steps of troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-10, APU Gearbox Pressure Measurement Anomaly.

Not Performed:_____

***** End of APU Gearbox Pressure Measurement Anomaly (SSID APU-10) *****

APU GN_2 Bottle Pressure Anomaly (SSID APU-13)

108-70 CAPU

IF REQUIRED TO CONFIRM INSTRUMENTATION FAILURE OF V46P0X52A1,

THEN PERFORM VWF57

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X GN2 BOTTLE PRESS

   _____ PSIA BD V46P0X52A1

3. **USE** DATA RETRIEVAL TO DETERMINE IF THE FAILED MEASUREMENT EXHIBITED THE SYMPTONS OF A CLASSIC INSTRUMENTATION FAILURE. I.E. A STEP FUNCTION TO GOAL LOWER LIMIT (0.0) OR GOAL UPPER LIMIT (300.0), OR ERRATIC BEHAVIOR WHICH IS NOT PHYSICALLY POSSIBLE BASED ON OTHER AVAILABLE DATA.

Not Performed:_____

NOTE

Perform the next step to evaluate a possible leak in the GN_2 Bottle. Reference supplemental LCC page "APU GN_2 Bottle Pressure Anomaly APU-13" for additional information for use in performing PVT calculations.

108-71 CAPU

VWF57

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X GN2 BOTTLE PRESS

   _____ PSIA BD V46P0X52A1

3. **RECORD** APU X GB BEARING TEMP 1

   _____ DEG F V46T0X61A1

4. **RECORD** APU X GB BEARING TEMP 2

   _____ DEG F V46T0X62A1

5. **RECORD** APU X GEARBOX GN2 PRESS

   _____ PSIA BD V46P0X51A1

6. **RECORD** APU X LUBE OIL OUT PRESS

   _____ PSIA BD V46P0X53A1

7. **USE** DATA RETRIEVAL TO PLOT THE ABOVE PARAMETERS AND DETERMINE IF THE NOTED CHANGE IN PRESSURE CAN BE ATTRIBUTED TO A CHANGE IN TEMPERATURE, OR IF THERE EXISTS A SATISFACTORY EXPLANATION FOR THE PRESSURE CHANGE. I.E. VALVE LEAKAGE INTO THE GEARBOX OF SUCH A MAGNITUDE AS TO NOT JEOPARDIZE MISSION OBJECTIVES.

Not Performed:_____

108-72 **CAPU**

IF performed,

THEN evaluate the results of the previous two steps of troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-13, APU GN_2 Bottle Pressure Anomaly.

Not Performed:_____

***** End of APU GN_2 Bottle Pressure Anomaly (SSID APU-13) *****

APU Fuel Test Line Temperature Anomaly (SSID APU-14)

NOTE
Perform this option as required for an APU Fuel Test Line Temperature Anomaly.

APU Fuel Test Line Temperature Anomaly (SSID APU-14) Not Performed:_____

NOTE
Instrumentation failure of both measurements on any one system is a LCC violation (confirmed No-Go for Launch) since this causes loss of insight into heater function.

108-73 CAPU

IF REQUIRED TO CONFIRM INSTRUMENTATION FAILURE OF V46T0X83A1 OR V46T0X84A1,

THEN PERFORM VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X FUEL TEST LINE

   TEMP _____DEG F V46T0X83A1

3. **RECORD** APU X FUEL TANK LINE

   TEMP _____DEG F V46T0X84A1

4. **USE** DATA RETRIEVAL TO DETERMINE IF THE FAILED MEASUREMENT EXHIBITED THE SYMPTOMS OF A CLASSIC INSTRUMENTATION FAILURE, I.E., A STEP FUNCTION TO GOAL LOWER LIMIT (-0.8) OR GOAL UPPER LIMIT (248.1), OR ERRATIC BEHAVIOR WHICH IS NOT PHYSICALLY POSSIBLE BASED ON OTHER AVAILABLE DATA.

   Not Performed:_____

APU Fuel Test Line Temp Anomaly Troubleshooting

NOTE

For the case where both temp measurements are trending up or down exceeding high or low limit, apply Flowchart 108-1 "APU Fuel System Temperature Anomaly Logic Chart." Perform this option as required to perform troubleshooting.

APU Fuel Test Line Temp Anomaly Troubleshooting Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel A12. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a Scrub will be called.

108-74 **CAPU**

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X83	_____	_____
T0X84	_____	_____

108-75 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. TANK AND LINE HTRS B AUTO OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X09NL

4. PFK11 KEY - PRESS

108-76 ASP

PANEL A12
APU HEATER
  TANK/FUEL LINE/H2O SYS
    _A SW - AUTO V46S0X06E1

108-77 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X83	_____	_____
T0X84	_____	_____

108-78 ASP

```
PANEL A12
APU HEATER
  TANK/FUEL LINE/H2O SYS
    _A SW - OFF                          V46S0X06E1
  TANK/FUEL LINE/H2O SYS
    _B SW - AUTO                         V46S0X09E1
```

108-79 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X83	_____	_____
T0X84	_____	_____

108-80 ASP

```
PANEL A12
APU HEATER
  TANK/FUEL LINE/H2O SYS
    _B SW - OFF                          V46S0X09E1
```

108-81 **CAPU**

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. TANK AND LINE HTRS A AUTO ON CMD
   XMIT CURSOR KEY - PRESS V46K0X06NL

4. PFK11 KEY - PRESS

108-82 **CAPU**

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH, LOW OR IN TOLERANCE.

FD	Temp	H/L/IT
T0X83	_____	_____
T0X84	_____	_____

NOTE

APU-14 perform next two steps if heaters are not functioning properly with ground command activation.

108-83 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. TANK AND LINE HTRS A AUTO OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X06NL

4. PFK11 KEY - PRESS

Not Performed:_____

108-84 ASP

PANEL A12
APU HEATER
TANK/FUEL LINE/H2O SYS
_A SW - AUTO V46S0X06E1
OR
TANK/FUEL LINE/H2O SYS
_B SW - AUTO V46S0X09E1

Not Performed:_____

***** End of APU Fuel Test Line Temp Anomaly Troubleshooting *****

108-85 **CAPU**

IF performed,

THEN evaluate the results of the previous 13 steps of troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-14 APU Fuel Test Line Temperature Anomaly.

Not Performed:_____

***** End of APU Fuel Test Line Temperature Anomaly (SSID APU-14) *****

APU Fuel Pump Drain Line Temperature Anomaly (SSID APU-15)

NOTE
Perform this option as required for an APU Fuel System Temperature Anomaly.

APU Fuel Pump Drain Line Temperature Anomaly (SSID APU-15)
Not Performed:_____

NOTE
Instrumentation failure of both measurements on any one system is LCC violation confirmed No-Go for Launch since this causes loss of insight into heater function.

108-86 CAPU

IF REQUIRED TO CONFIRM INSTRUMENTATION FAILURE OF V46T0X86A1 OR V46T0X70A1,

THEN PERFORM VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** APU X FP DRAIN LINE

   TEMP 1 _____DEG F V46T0X86A1

3. **RECORD** APU X FP DRAIN LINE

   TEMP 2 _____DEG F V46T0X70A1

4. **USE** DATA RETRIEVAL TO DETERMINE IF THE FAILED MEASUREMENT EXHIBITED THE SYMPTOMS OF A CLASSIC INSTRUMENTATION FAILURE, I.E. A STEP FUNCTION TO GOAL LOWER LIMIT (-0.8) OR GOAL UPPER LIMIT (248.1), OR ERRATIC BEHAVIOR WHICH IS NOT PHYSICALLY POSSIBLE BASED ON OTHER AVAILABLE DATA.

   Not Performed:_____

APU Fuel Pump Drain Line Temp Anomaly Troubleshooting

NOTE

For the case where both temp measurements are trending up or down exceeding high or low limit, apply Flowchart 108-1 "APU Fuel System Temperature Anomaly Logic Chart." Perform this option as required to perform troubleshooting.

APU Fuel Pump Drain Line Temp Anomaly Troubleshooting
Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel A12. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a Scrub will be called.

108-87 **CAPU**

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X86	_____	_____
T0X70	_____	_____

108-88 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. TANK AND LINE HTRS B AUTO OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X09NL

4. PFK11 KEY - PRESS

108-89 ASP

PANEL A12
APU HEATER
  TANK/FUEL LINE/H2O SYS
    _A SW - AUTO V46S0X06E1

108-90 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X86	_____	_____
T0X70	_____	_____

108-91 ASP

```
PANEL A12
APU HEATER
  TANK/FUEL LINE/H2O SYS
    _A SW - OFF                          V46S0X06E1
  TANK/FUEL LINE/H2O SYS
    _B SW - AUTO                         V46S0X09E1
```

108-92 CAPU

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH (H), LOW (L) OR IN TOLERANCE (IT).

FD	Temp	H/L/IT
T0X86	_____	_____
T0X70	_____	_____

108-93 ASP

```
PANEL A12
APU HEATER
  TANK/FUEL LINE/H2O SYS
    _B SW - OFF                          V46S0X09E1
```

108-94 **CAPU**

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. TANK AND LINE HTRS A AUTO ON CMD
   XMIT CURSOR KEY - PRESS V46K0X06NL

4. PFK11 KEY - PRESS

108-95 **CAPU**

VWF48

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION,

   APU_____.

2. **RECORD** BELOW THE TEMPERATURE READING OF THE LISTED FDS AND RECORD WHETHER THE READING IS HIGH, LOW OR IN TOLERANCE.

FD	Temp	H/L/IT
T0X86	_____	_____
T0X70	_____	_____

NOTE

Perform next two steps if heaters are not functioning properly with ground command activation.

108-96 CAPU

VWF48

1. PFK10 KEY - PRESS

2. **VERIFY** GND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

3. TANK AND LINE HTRS A AUTO OFF CMD
   XMIT CURSOR KEY - PRESS V46K0X06NL

4. PFK11 KEY - PRESS

Not Performed:_____

108-97 ASP

PANEL A12
APU HEATER
TANK/FUEL LINE/H2O SYS
_A SW - AUTO V46S0X06E1
OR
TANK/FUEL LINE/H2O SYS
_B SW - AUTO V46S0X09E1

Not Performed:_____

***** End of APU Fuel Pump Drain Line Temp Anomaly Troubleshooting *****

108-98 **CAPU**

IF performed,

THEN evaluate the results of the previous 12 steps of troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-15 APU Fuel Pump Drain Line Temperature Anomaly.

Not Performed:_____

***** End of APU Fuel Pump Drain Line Temperature Anomaly (SSID APU-15) *****

Injector Cooling System Pressure Anomaly (SSID APU-20)

108-99 **CAPU**

IF REQUIRED TO CONFIRM INSTRUMENTATION FAILURE OF V46P0504A1,

THEN PERFORM VWF57

1. **RECORD** INJECTOR H2O TANK PRESS

   _____ PSIA BD V46P0504A1

2. **USE** DATA RETRIEVAL TO DETERMINE IF THE FAILED MEASUREMENT EXHIBITED THE SYMPTONS OF A CLASSIC INSTRUMENTATION FAILURE. I.E. A STEP FUNCTION TO GOAL LOWER LIMIT (0.0) OR GOAL UPPER LIMIT (200.0), OR ERRATIC BEHAVIOR WHICH IS NOT PHYSICALLY POSSIBLE BASED ON OTHER AVAILABLE DATA.

Not Performed:_____

108-100 CAPU

VWF57

IF REQUIRED TO EVALUATE A POSSIBLE LEAK IN THE INJECTOR H2O COOLING TANK,

THEN PERFORM:

1. **RECORD** INJECTOR H2O TANK PRESS

   _____PSIA BD V46P0504A1

2. **RECORD** INJECTOR H2O TANK TEMP

   _____ DEG F V46T0500A1

3. **RECORD** INJECTOR H2O LINE TEMP 1

   _____ DEG F V46T0501A1

4. **RECORD** INJECTOR H2O LINE TEMP 2

   _____ DEG F V46T0502A1

5. **RECORD** INJECTOR H2O LINE TEMP 3

   _____ DEG F V46T0503A1

6. **USE** DATA RETRIEVAL TO PLOT THE ABOVE PARAMETERS AND DETERMINE IF THE NOTED CHANGE IN PRESSURE CAN BE ATTRIBUTED TO A CHANGE IN TEMPERATURE, OR IF THERE EXISTS A SATISFACTORY EXPLANATION FOR THE PRESSURE CHANGE.

Not Performed:_____

108-101 CAPU

IF performed,

THEN evaluate the results of the previous two steps of troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-20 Injector Cooling System Pressure Anomaly.

Not Performed:_____

***** End of Injector Cooling System Pressure Anomaly (SSID APU-20) *****

APU Fuel Tank Isolation Valve Anomaly (SSID APU-23)

NOTE

Perform this option as required to troubleshoot a Fuel Isolation Valve power indicator failure to indicate ON following Pre-start. Fuel Isolation Valve temperature may be used to build confidence that the isolation valve coil is energized. Fuel Isolation Valve temperature will increase approximately 1 degree for every minute it is open with no fuel flow.

APU Fuel Tank Isolation Valve Anomaly (SSID APU-23) Not Performed:_____

Anomaly Detected Prior to APU Start/T-5 Minutes

NOTE

Perform "Anomaly Detected Prior to APU Start/T-5 Minutes" if the anomaly occurred prior to T-5 minutes or APU Start. If the anomaly occurred after APU Start, then do not perform these steps and go directly to the "Anomaly Detected After APU Start" section.

Anomaly Detected Prior to APU Start/T-5 Minutes Not Performed:_____

108-102 CAPU

VWF57

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION.

   APU _____

2. **RECORD** FUEL ISLN VLV A PWR (ON/OFF) _____

   V46X0X15E1

3. **RECORD** FUEL ISLN VLV B PWR (ON/OFF) _____

   V46X0X34E1

4. **RECORD** FUEL ISO VLV A TEMP 1_____ DEG F

   V46T1X75A1

5. **RECORD** FUEL ISO VLV A TEMP 2 _____ DEG F

   V46T1X76A1

6. **RECORD** FUEL ISO VLV B TEMP 1 _____ DEG F

   V46T1X73A1

7. **RECORD** FUEL ISO VLV B TEMP 2 _____ DEG F

   V46T1X74A1

108-103 CAPU PLT 212

PANEL R2
APU/HYD
APU FUEL TK VLV
___ SW - CYCLE CLOSED/OPEN

108-104 CAPU

VWF57

1. **RECORD** WHICH APU HAS AN ANOMALOUS CONDITION.

   APU _____

2. **RECORD** FUEL ISLN VLV A PWR (ON/OFF) _____

   V46X0X15E1

3. **RECORD** FUEL ISLN VLV B PWR (ON/OFF) _____

   V46X0X34E1

4. **RECORD** FUEL ISO VLV A TEMP 1 _____ DEG F

   V46T1X75A1

5. **RECORD** FUEL ISO VLV A TEMP 2 _____ DEG F

   V46T1X76A1

6. **RECORD** FUEL ISO VLV B TEMP 1 _____ DEG F

   V46T1X73A1

7. **RECORD** FUEL ISO VLV B TEMP 2 _____ DEG F

   V46T1X74A1

NOTE
If the FIV power indicator(s) remains "OFF", perform the following step.

108-105 **CAPU** **NTD** **212**
NTD **PLT**
CGLS

Launch Team Troubleshooting Coordination

1. **Brief** the Test Team that post APU Start pre-planned troubleshooting will be required per steps 108-108 through 108-115.

2. **Request** a manual hold at T-4 minutes.

3. **Brief** PLT on Panel R2 APU ISO Valve Circuit Breaker cycling:

   A. CAPU will direct PLT to perform CB _____ cycling 15 seconds after T-5 minute APU Start.

   B. CAPU will monitor APU _____ startup and operation for 10 seconds.

   C. CAPU will instruct PLT to close CB _____.

Not Performed:_____

NOTE
The following step must be worked by CLGS before resuming the Count at T-5 minutes.

108-106 **CAPU** **NTD** **212**
NTD **CGLS**

Request GLS mask FD _____ (Select the appropriate Failed FDs)

V46X0_____15E1 APU _____ Fuel Isln Vlv A Open/Pwr On

V46X0_____34E1 APU _____ Fuel Isln Vlv B Open/Pwr On

***** End of Anomaly Detect Prior to APU Start/T-5 Minutes *****

Anomaly Detected After APU Start

NOTE

Perform "Anomaly Detected After APU Start" if the anomaly occurred after APU Start or if the previous troubleshooting did not clear an anomaly that occurred prior to APU Start. If the previous troubleshooting cleared the anomaly, then do not perform the remainder of the troubleshooting for this SSID.

Anomaly Detected After APU Start Not Performed:_____

NOTE

If the anomaly occurs prior to T-4 minutes, a manual T-4 minute GLS hold will be requested to facilitate not allowing the SSME's to transition from Purge Sequence 3 (pneumatics available for engine valve control) to Purge Sequence 4 (only hydraulics available for engine valve control). If the holds can not be inserted prior to T-4 minutes, then a manual GLS hold at T-31 seconds will be requested. In either hold, pending successful completion of this contingency troubleshooting, GLS can implement the required masks and clearing of the hold to allow countdown to continue.

108-107 **CAPU** **NTD** **212**
NTD **CGLS**

IF before the T-4 minute milestone, **Verify**

THEN insert a manual hold at T-4 minutes ☐

ELSE insert a manual hold at T-31 seconds ☐

108-108 **CAPU**

VWF57

Verify APU _____ is running and stable.

NOTE

Perform the following step if either APU ISO Valve A or B power indicator indicates OFF. Open circuit breaker for the good valve to determine state of the discrepant valve.

108-109 CAPU PLT 212

```
PANEL R2
APU/HYD
   APU FUEL TK VLV ENA
      _____ CB - OPEN
```

Not Performed:_____

NOTE

Perform the following step if both APU ISO valves A and B power indicators indicate OFF. This verifies function of each ISO valve individually.

108-110 CAPU PLT 212

Perform the following:

1. PANEL R2
   APU/HYD
     APU FUEL TK VLV ENA
       ____A CB - OPEN

2. WAIT 10 SECONDS

3. PANEL R2
   APU/HYD
     APU FUEL TK VLV ENA
       ___ A CB - CLOSE
       ___ B CB - OPEN

Not Performed:_____

108-111 **CAPU**

VWF57

Monitor APU operation for 10 seconds.

108-112 **CAPU** **PLT** **212**

```
PANEL R2
APU/HYD
  APU FUEL TK VLV ENA
     ____ CB - CLOSE
```

NOTE
If APU ____ shutdown occurred, then perform the following safing step.

108-113 **CAPU** **PLT** **212**

```
PANEL R2
APU/HYD
  APU _____ OPERATE - OFF
  APU _____ FU TK VLV - OFF
  APU _____ CNTLR PWR - OFF
```

Not Performed:_____

***** End of Anomaly Detected After APU Start *****

108-114 **CAPU**

IF performed,

THEN evaluate the results of the previous troubleshooting and make a recommendation to the NTD based on LCC page APU-23, APU Fuel Tank Isolation Valve Anomaly.

Not Performed:_____

***** End of APU Fuel Tank Isolation Valve Anomaly (SSID APU-23) *****

PCA APU Controller RPC Power On Anomaly (SSID APU-24)

NOTE

Perform PCA APU Controller RPC Power On Anomaly if a violation of LCC APU-24 has occurred..

PCA APU Controller RPC Power On Anomaly Not Performed:_____

APU Controller Side B Anomaly Prior to APU Start

NOTE

Perform APU Controller Side B Anomaly Prior to APU Start to confirm instrumentation failure of V76X4002E1, 4005E, or 4007E (APU Controller 1, 2, or 3 Side B RPC power indication) prior to APU start. The following steps will take approximately 3 minutes to execute, and will verify 28VDC power into the Controller Side B.

APU _____ Underspeed and Overspeed Master Alarms will occur if the BIT test is successful.

APU Controller Side B Anomaly Prior to APU Start Not Performed:_____

108-115 CAPU PLT 212

```
PANEL R2
APU/HYD
   APU FUEL TK VLV
      _______ SW - CLOSE
```

NOTE

The APU Controller Auto BIT Test in VWF57 takes approximately 30 seconds to complete once begun. A successful Auto BIT Test will result in the BIT GO for that APU indicating "ON" and APU Turbine Speed indicating approximately 108 percent. An unsuccessful Auto BIT Test will result in the BIT GO for that APU remaining "OFF" after 30 seconds has elapsed.

Removal of the BIT "ON" command after a successful BIT test will remove power from the Controller BIT board and any BIT GO "ON" indication will return to "OFF". APU Turbine Speed will return to zero percent.

108-116 CAPU

VWF57

1. **VERIFY** APU _____ FUEL ISLN VLV A PWR - OFF
   V46X0X15E1

   VERIFY APU _____ FUEL ISLN VLV B PWR - OFF
   V46X0X34E1

2. **RECORD** CONTROLLER PWR J1 RPC _____

   V76X400XE1
   (X=1, 4 OR 8)

3. **RECORD** CONTROLLER PWR J2 RPC _____

   V76X400XE1
   (X=2, 5 OR 7)

4. **VERIFY** GROUND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

5. BIT ON CMD
   XMIT CURSOR KEY - **PRESS** V46K0X57NL
   V46K0X29NL
   V46K0X49NL

6. **WAIT** 30 SECONDS MINIMUM

   RECORD BIT GO _____ (ON OR OFF) V46X0X58E1

   RECORD APU ____ TURBINE SPEED ____ PCT
   V46R0X35A1

108-117 **CAPU**

VWF57

1. **VERIFY** GROUND COMMANDS ARE BEING ISSUED FOR CORRECT APU.

2. BIT ON CMD (OFF)
   XMIT CURSOR KEY - **PRESS** V46K0X57NL
   V46K0X29NL
   V46K0X49NL

3. **VERIFY** BIT GO - OFF. V46X0X58E1

108-118 **CAPU** **PLT** **212**

PANEL R2
APU/HYD
APU FUEL TK VLV
____ SW - OPEN

108-119 **CAPU**

Evaluate the results of APU Controller APU Auto BIT Test Prior to APU Start troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-24, PCA APU Controller RPC Power On Anomaly.

***** End of APU Controller Side B Anomaly Prior to APU Start *****

Controller Side A PCA APU Controller RPC Indicating OFF

NOTE

Perform Controller Side A PCA APU Controller RPC Indicating OFF to confirm instrumentation failure of APU Controller Side A redundant power indication. This test may be performed **before or after** APU Start within the LCC time effectivity of APU-24 (~T-6 min to T-31 Sec). This test should take approximately 1 minute to perform.

This troubleshooting is valid before and after APU Start, as the loss of Controller Side A power input after APU Start will prevent the Start command from inhibiting the GG/Fuel Pump/Line A heater power feed into Power Supply C.

The following steps will send LDB commands and perform BITE 4 MDM reads.

Controller Side A PCA APU Controller RPC Indicating OFF
Not Performed:_____

108-120 **CAPU**

VWF57

1. PFK10 KEY - **PRESS**

2. PFPK1 BUTTON - **PRESS**

3. APU _____ GG/FUEL PUMP/FUEL LINE HTR A AUTO-OFF CMD

   PRESS - XMIT CURSOR KEY

   V46K0X18NL

4. **VERIFY** GG/FUEL PUMP/FUEL LINE HTR A AUTO - OFF

   V46K0X18NL

5. PFK11 KEY - **PRESS**

6. **RECORD** APU ____ GEARBOX GN2 PRESS: _____PSIA

V46P0X51A1

> **NOTE**
>
> If Gearbox GN_2 Press (V46P0x51A1) indicates zero psia, then loss of the PCA APU Controller RPC is confirmed, LCC APU-24 has been violated, APU is NO-GO.
>
> If Gearbox GN_2 Press indicates other than zero psia, then instrumentation failure is confirmed, and the APU-24 LCC violation is cleared, APU is GO.

108-121 CAPU

VWF57

1. PFK10 KEY - **PRESS**

2. PFPK1 BUTTON - **PRESS**

3. APU _____ GG/FUEL PUMP/FUEL LINE HTR A AUTO-ON CMD

   PRESS - XMIT CURSOR KEY

   V46K0X18NL

4. **VERIFY** GG/FUEL PUMP/FUEL LINE HTR A AUTO - ON

   V46K0X18NL

5. PFK11 KEY - **PRESS**

108-122 **CAPU**

VWF57

RECORD APU _____ GEARBOX GN2 PRESS: _____ PSIA

V46P0X51A1

108-123 **CAPU**

Evaluate the results of Controller Side A PCA APU Controller RPC Indicating Off troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-24, PCA APU Controller RPC Power On Anomaly.

***** End of Controller Side A PCA APU Controller RPC Indicating OFF *****

Controller Side B PCA APU Controller RPC Indicating OFF Post APU Start

NOTE

Perform Controller Side B PCA APU Controller RPC Indicating OFF Post APU Start to confirm instrumentation failure of APU Controller Side B redundant power indication. This test is to be performed at any time following APU Start within the LCC time effectivity of APU-24 (T-5 min to T-31 Sec).

Controller Side B PCA APU Controller RPC Indicating OFF Post APU Start
Not Performed:_____

108-124 **CAPU**

VWF57

1. **VERIFY** APU _____ IS RUNNING AND STABLE.

2. **RECORD** APU _____ TURBINE SPEED: _____ PCT

V46R0X35A1

NOTE

If APU Turbine Speed (V46R0x35A1) indicates zero percent, then loss of the PCA APU Controller RPC is confirmed, LCC APU-24 has been violated, APU is NO-GO.

If APU Turbine Speed indicates other than zero percent, then instrumentation failure is confirmed, and the APU-24 LCC violation is cleared, APU is GO.

108-125 **CAPU**

Evaluate the results of Controller Side B PCA APU Controller RPC Indicating Off troubleshooting and make a recommendation to the OTC and NTD based on LCC page APU-24, PCA APU Controller RPC Power On Anomaly.

***** End of Controller Side B PCA APU Controller RPC Indicating OFF Post APU Start*****

Controller Side A PCA APU Controller RPC Indicating OFF Using Backup/Integration Console

NOTE

The following 3 steps may only be performed at Backup/Integration Console.

NOTE

Perform Controller Side A PCA APU Controller RPC Indicating OFF Using Backup/Integration Console to confirm instrumentation failure of APU Controller Side A redundant power indication. This test may be performed **before or after** APU Start within the LCC time effectivity of APU-24 (~T-6 min to T-31 Sec). This test should take approximately 1 minute to perform.

This Troubleshooting is valid before and after APU Start, as the loss of Controller Side A power input after APU Start will prevent the Start command from inhibiting the GG/Fuel Pump/Line A heater power feed into Power Supply C.

Controller Side A PCA APU Controller RPC Indicating OFF Using Backup/Integration Console Not Performed:_____

NOTE

The following steps will send LDB commands and perform BITE 4 MDM reads.

108-126 CAPU

SEP03

1. **Type** "SET V46K0X18NL OFF"
   (X indicates 1, 2, or 3 for the APU with the anomaly)

2. **Press** XMIT CMD

3. **Verify** message "SET SUCCESSFUL - V46K0X18NL"

4. **RECORD** APU _____ GEARBOX GN2 PRESS: _____PSIA

V46P0X51A1

NOTE

If Gearbox GN_2 Press (V46P0X51A1) indicates zero psia, then loss of the PCA APU Controller RPC is confirmed, LCC APU-24 has been violated, APU is NO-GO.

If Gearbox GN_2 Press indicates other than zero psia, then instrumentation failure is confirmed, and the APU-24 LCC violation is cleared, APU is GO.

108-127 **CAPU**

SEP03

1. **Type** "SET V46K0X18NL ON"
   (X indicates 1, 2, or 3 for the APU with the anomaly)

2. **Press** XMIT CMD

3. **Verify** message "SET SUCCESSFUL - V46K0X18NL"

4. **RECORD** APU _____ GEARBOX GN2 PRESS: _____PSIA

V46P0X51A1

108-128 **CAPU**

Evaluate the results of Controller Side A PCA APU Controller RPC Indicating Off Troubleshooting and make a recommendation to the OTC and NTD based on LCC Page APU-24, PCA APU Controller RPC Power On Anomaly.

***** End of Controller Side A PCA APU Controller RPC Indicating OFF Using Backup/Integration Console *****

***** End of PCA APU Controller RPC Power On Anomaly (SSID APU-24) *****

*** End of Operation **108** ***

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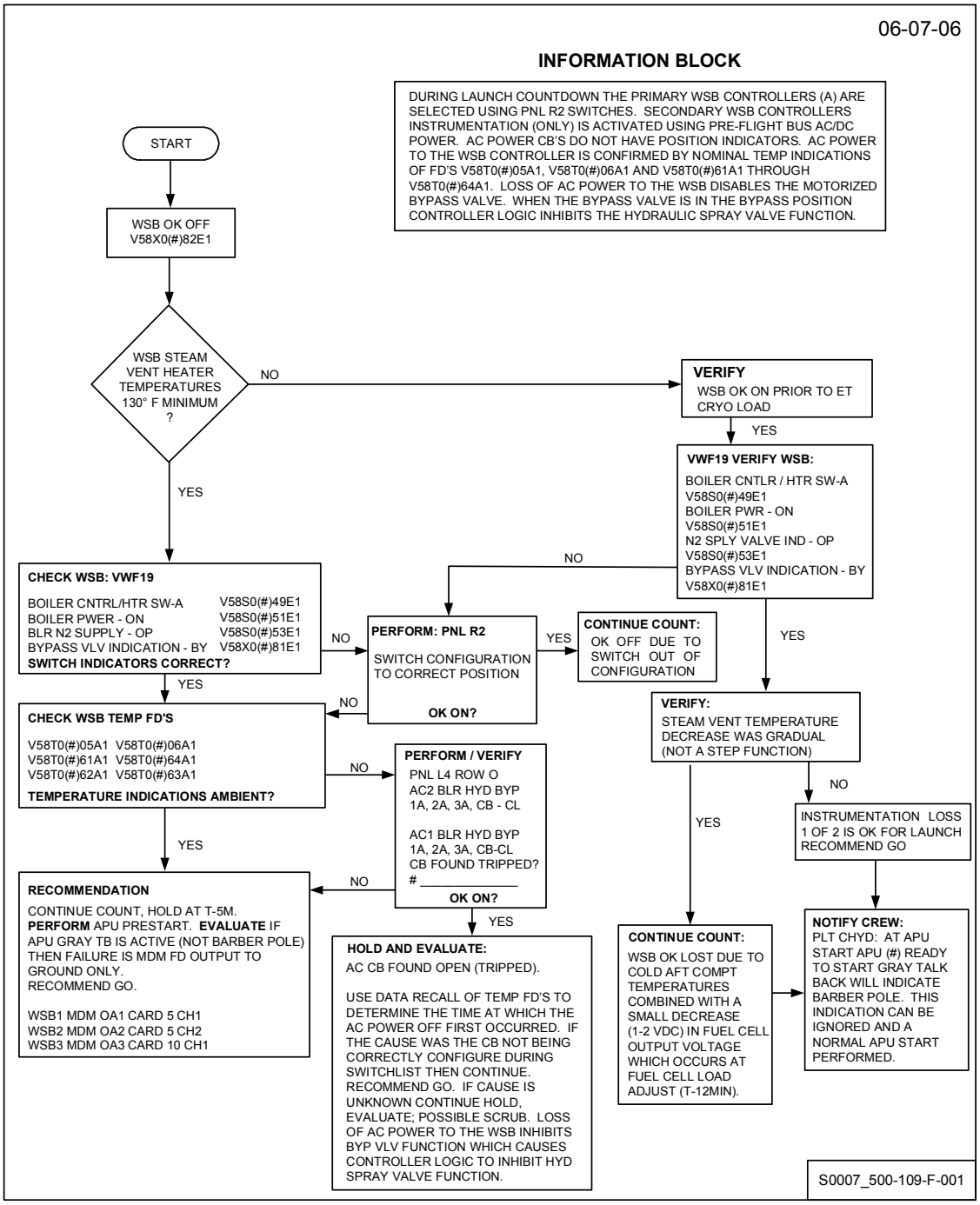
OPERATION 109 HYD

Shop: **HYD**
Cntrl Rm Console: **C8**
OPR: **HYD**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **1.0**

WSB OK Anomaly (SSID HYD-10)

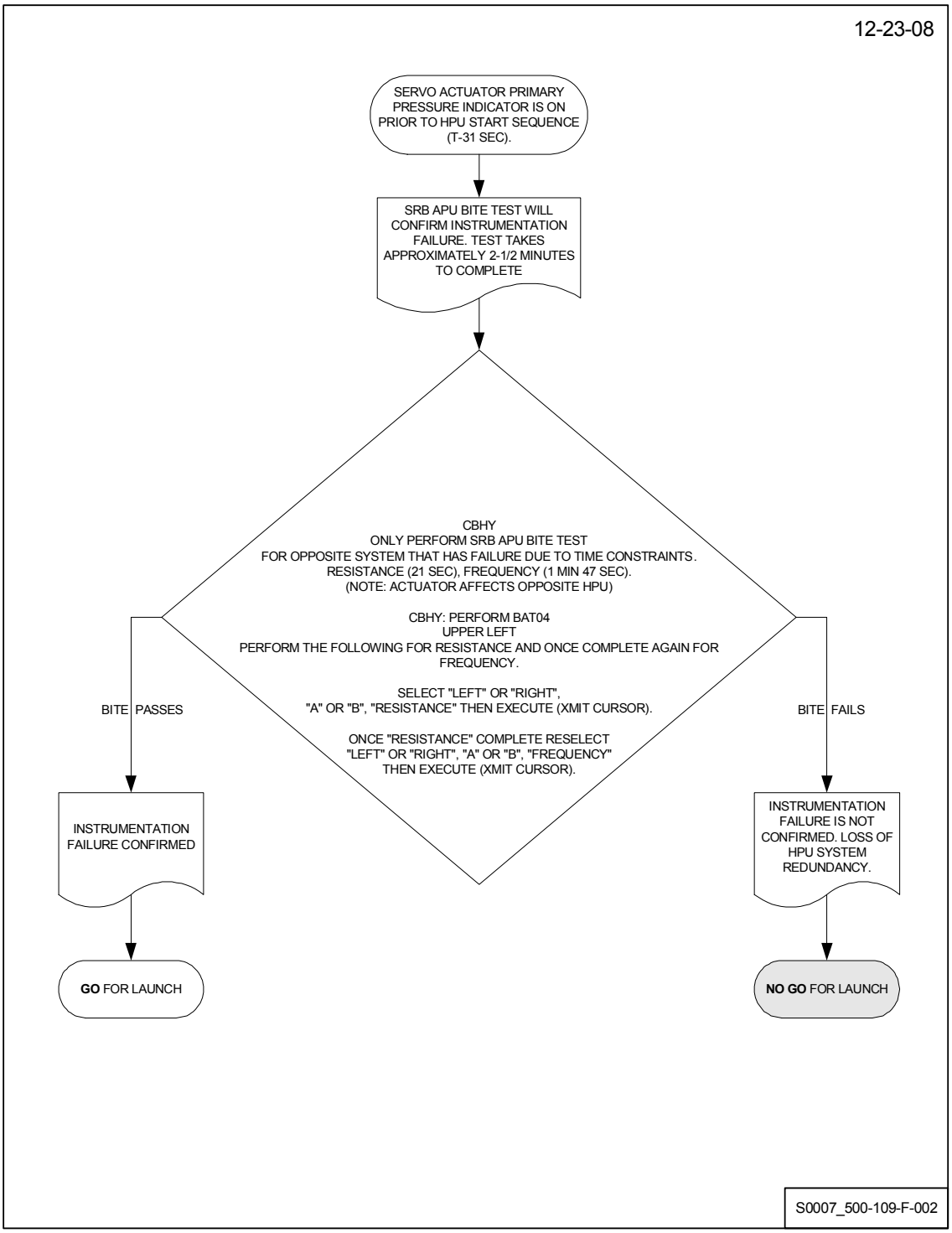
109-1

WSB "OK" After T-30 min N2 Valve Activation

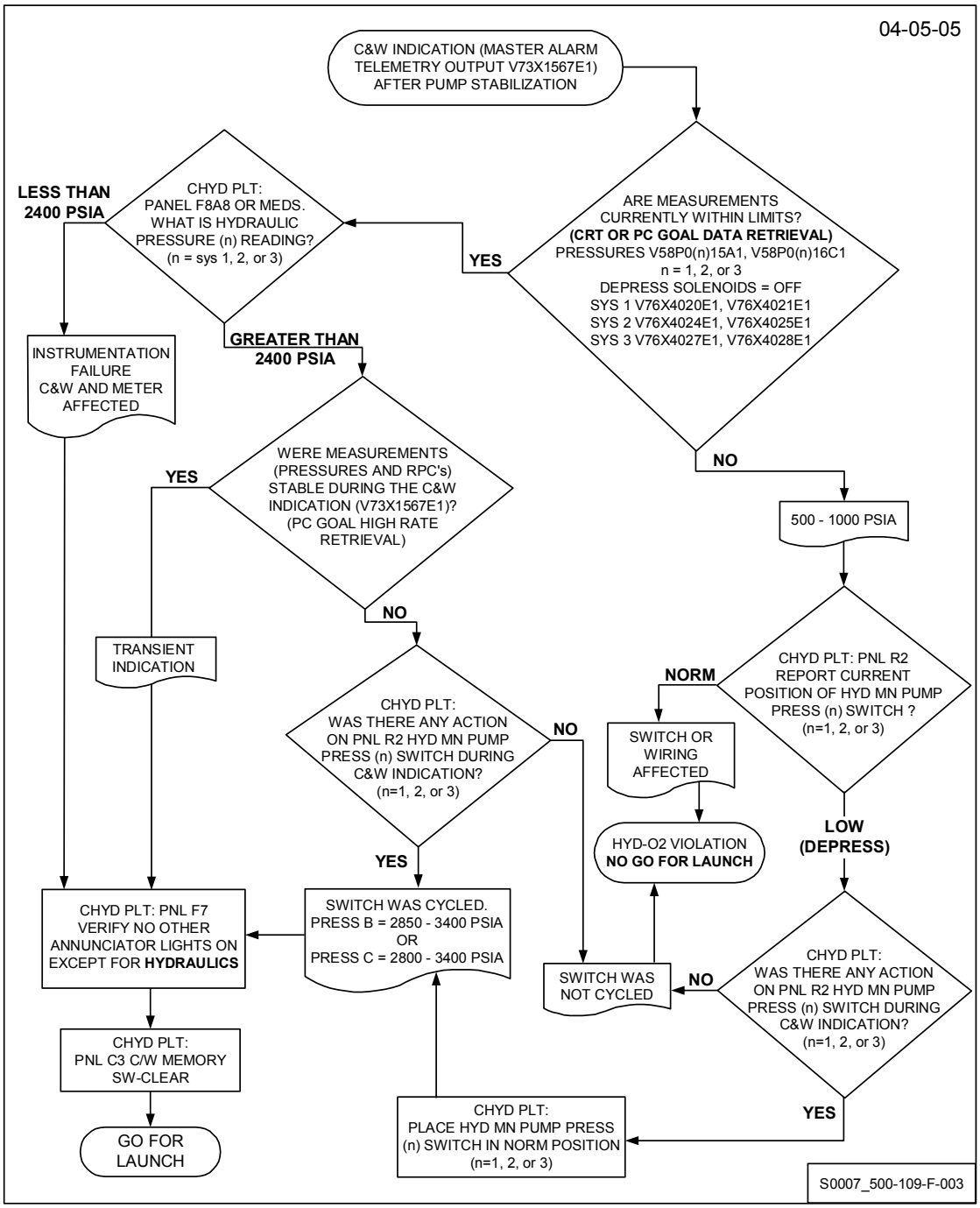


109-2

SRB HPU Primary Pressure OK Anomaly



109-3 Caution and Warning for Hydraulic System Supply Pressure (SSID HYD-02)



WSB N2 Shutoff Valve Indicates Closed and WSB RDY (OK) is On

MEL-09 WSB 2 of 2 WSB Controllers Required

NOTE

WSB N2 shutoff valve switch is a latching, dual pole On/Off switch. On = 0, Off = 1. Each respective pole of the switch provides an input into the corresponding WSB controller.

The controllers have internal logic which act as an N2 VPI. This logic feeds into WSB RDY (OK) output. The valve state is not visible to the ground except as an OK on.

Because only the B side of the switch is instrumented, it is possible to have the B side switch failed and indicating valve closed (switch off) while the A side is operating correctly. To differentiate between a B side of the switch failure and a switch scan (MDM) failure it is necessary to switch the WSB to controller B and verify the OK is on.

NOTE

If any WSB GN_2 shutoff valve indicates closed (V58S0(n)53E - on) and the respective WSB RDY IND (OK) (V58X0(n)82E) is also on, then perform the following steps.

This procedure will not be performed after T-9 minutes and counting.

This procedure requires Crew action on Panel R-2, can be performed in G9 and/or OPS 101, and takes approximately 2 minutes to complete.

WSB N2 Shutoff Valve Indicates Closed and WSB RDY (OK) is On

Not Performed:_____

109-4 CHYD PLT

```
PANEL R2
  APU/HYD
    BOILER CNTLR/HTR
    (n) SW - B
```

109-5 CHYD CRT

```
VWF19
RECORD
WSB (n) B OK - indication (ON or OFF) V58X0(n)82E1
GN2 Shut off valve indication (OP or CL)
                                       V58S0(n)53E1
```

109-6 CHYD PLT

```
PANEL R2
  APU/HYD
    BOILER CNTLR/HTR
    (n) SW - A
```

109-7 CHYD CRT

```
VWF19
RECORD
WSB (n) A OK - indication (ON or OFF) V58X0(n)82E1
GN2 Shut off valve indication (OP or CL)
                                       V58S0(n)53E1
```

NOTE

If the OK is ON for each controller, then the failure is switch scan instrumentation (MDM) only.

Violation cleared, Continue Countdown.

If the WSB OK is OFF when controller B is selected then controller B function is suspect. LCC MEL-09 requires 2 of 2 WSB controllers functional to support Launch. No additional controller troubleshooting is possible without installation of ground test equipment, Controller redundancy may be affected, MOD, Houston Flight need to assess On Orbit impacts and flight rationale.

***** End of WSB N2 Shutoff Valve Indicates Closed and WSB RDY (OK) is On *****

Evaluation of Circulation Pump Pressure Excursions Below 330 psia

NOTE

During circulation pump operations, efforts to identify TVC and aero-surface actuator thermal valve openings can be made difficult for a number of reasons including temperature sensor location as well as absence of a distinct supply to return fluid thermal gradient typical or pre-cryo loading time periods. However, the operation of thermal valves and corresponding effect of the flow demand on circulation pump pressure are well understood, and documented allowing the system experts to determine if the circulation pump pressure variations are consistent with a healthy hydraulic system.

Additionally, during the Landing Gear Final Fill (~T-10h30m) the hydraulic system is temporarily placed in a non-launch configuration by opening of the brake isolation valves. During this time period the additional flow demand placed on the circulation pump can result in pressure excursions below LCC HYD-03 330 psia minimum. Because the Landing Gear Final Fill places the system in a non-launch configuration, pressure excursions below 330 psi, in this time period, can be accepted as long as the circulation pump exhibits the expected pressure recovery and the pressure excursion is understood.

109-8 CHYD

When Evaluation is Required for Circulation Pump Pressure Excursions:

1. **Plot** applicable listed MSIDs from tables below, verify the observed circulation pump pressure excursion is consistent with changes expected due to thermal valve(s) opening, A1 Mode command, SSME valve dithering, Brake Isolation Valve activity (Landing Gear Final Fill), TVC Isolation Valve activity, and/or aero surface movement.

2. **IF** the observed Circulation Pump pressue excursion is consistent with system configuration, and thermal valve activity, and Circulation Pump pressure has recovered to LCC minimum pressure,

   THEN verify with SSME/CSME that minimum thermal requirements and SSME valve dither requirements have been maintained.

Substep 2 Not Performed:_____

3. **Evaluate** the results and make a recommendation to the OTC and NTD considering LCC IMPL-01 "KSC GENERAL LAUNCH COMMIT CRITERIA IMPLEMENTATION" Para 1.1, and HYD-03, "HYDRAULIC SYSTEM CIRCULATION PUMP PRESSURE ANOMALY" requirements.

SYSTEM 1 REFERENCE THERMAL FDs		
SYSTEM	FD	NOMENCLATURE
1	V58T0194a1	ROE RTN LN T
1	V58T0159a1	RH INBD ELVN ACTR RTN LN T
1	V58T0157a1	LH INBD ELVN ACTR RTN LN T
1	V58T0193a1	LOE RTN LN T
1	V58T0184a1	BODY FLAP RTN LN T B (FUS)
1	V58T0169a1	BODY FLAP RTN LN T 1 (PDU)
1	V58T0198a1	RSB RETURN LINE TEMP (FUS)
1	V58T1131a1	ME1 INTFC RTN LN TEMP
1	V58T0183a1	HYD 1 ET/O2 ACT RTN T
1	V58T0130a1	HYD 1 ET/H2 ACT RTN T

SYSTEM 2 REFERENCE THERMAL FDs		
SYSTEM	FD	NOMENCLATURE
2	V58T0933a1	RH INBD ELVN ACTR RTN LN T
2	V58T0883a1	LH OTBD ELVN ACTR RTN LN T
2	V58T0269a1	BODY FLAP RTN LN T (FUS)
2	V58T0288a1	BODY FLAP RTN LN TEMP (PDU)
2	V58T0284a1	RSB RTN LN T (PDU)
2	V58T0298a1	RSB RETURN LINE TEMP (FUS)
2	V58T1231a1	ME2 INTFC RTN LN TEMP
2	V58T0283a1	HYD 2 ET/O2 ACT RTN T
2	V58T0286a1	HYD 2 ET/H2 ACT RTN T

SYSTEM 3 REFERENCE THERMAL FDs		
SYSTEM	FD	NOMENCLATURE
3	V58T0983a1	ROE SYS 3
3	V58T0833a1	LIE SYS 3
3	V58T0369a1	BF SYS 3 (FUS)
3	V58T0388a1	BF SYS 3 LINE TMP (PDU)
3	V58T0384a1	RSB SYS 3 (FUS)
3	V58T0398a1	RSB SYS 3 LINE TMP (PDU)
3	V58T1331a1	TVC SYS 3
3	V58T0383a1	HYD 3 ET/O2 ACT RTN T
3	V58T0386a1	HYD 3 ET/H2 ACT RTN T

AEROSPACE COMMAND ISSUANCE INDICATORS		
SYSTEM	MSID	NOMENCLATURE
ALL	V99U2207c1	RAMP FUNCTION TEST STATUS
1	V58K1268c1	MPS ENG 2 Y ACTR A CMD
ALL	V99J2334c1	AI ACTIVE / INACTIVE STATUS IND (LDB retrieval may be required)
ALL	Ref PCG2 MECRY03	SSME Dither Commands

Background:

Hydraulic system circulation pumps are positive displacement (constant flow) pumps designated to provide ~3.0 gpm flow. Under system quiescent flow conditions pump output pressures are at or near 425 psid. Any additional flow demand proportionally reduces the pump output pressure, until at ~3.3 gpm demand, the pump reaches the limit of performance and any additional flow demands result in precipitous decreases in output pressures (Ref Figure 109-1 - Circulation Pump Performance Pressure vs. Flow).

Table 109-1: Information, Thermal Flow Valve Distribution by System

Component	System 1	System 2	System 3
ET Actr	2	2	2
Elevon Actr	4 (ALL)	2 (LOB / RIB)	2 (LIB / ROB)
Body Flap	1	1	1
Rudder / Speed Brake	NONE	1	1
TVC Actuator	1Y & 2P	2Y & 3P	1P & 3Y

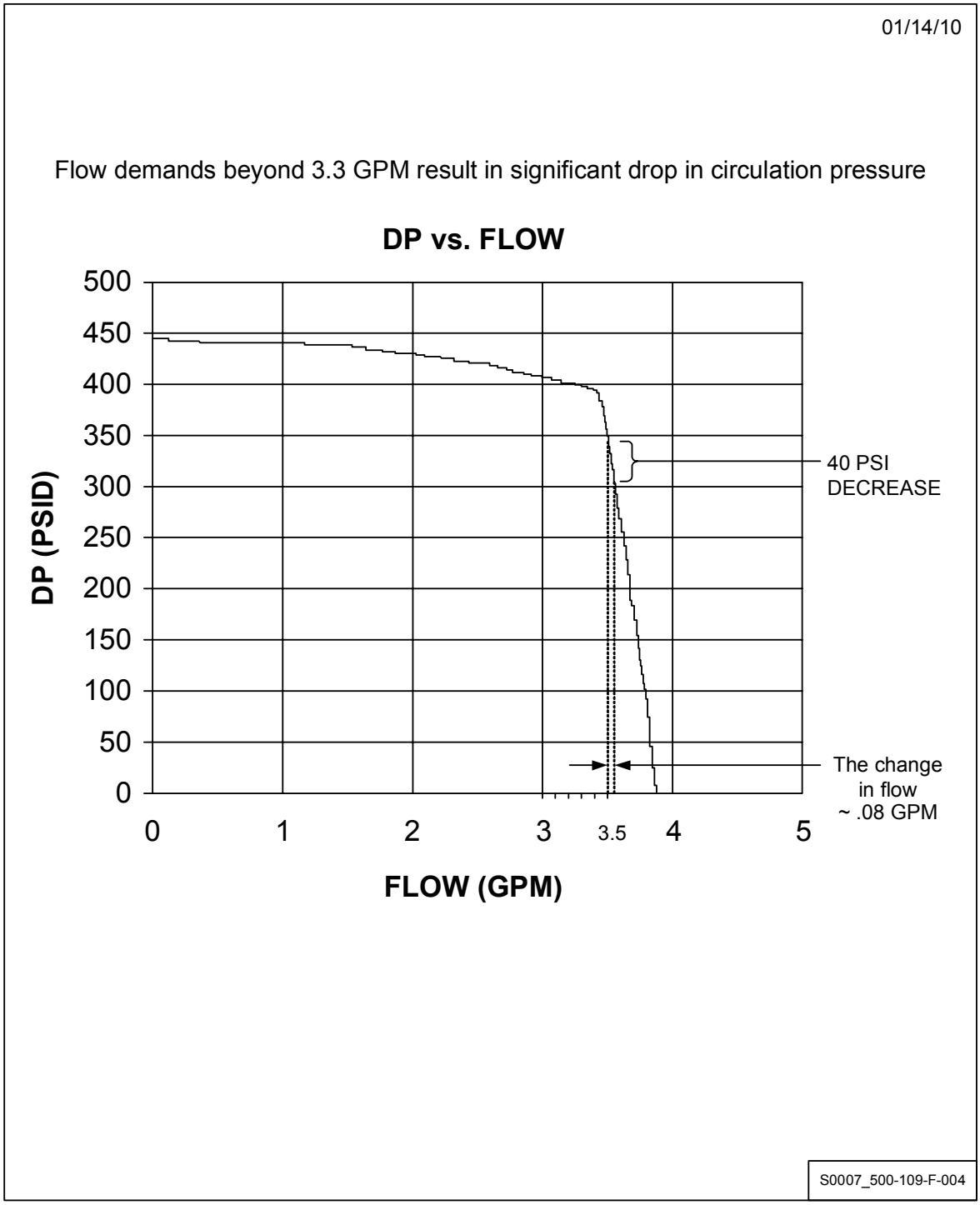


Figure 109-1: Circulation Pump Performance Pressure vs Flow
(For Reference Only)

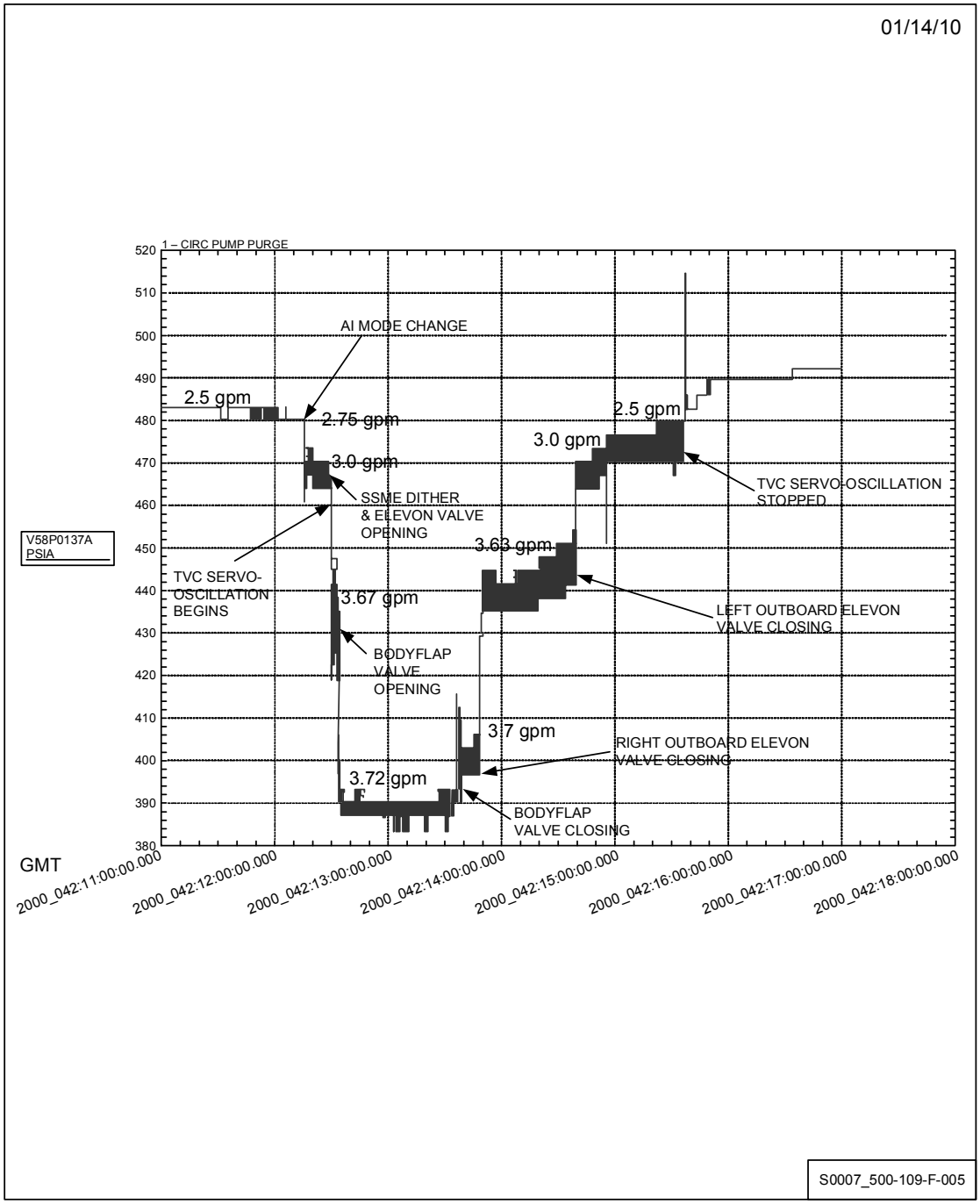


Figure 109-2: Circ Pump Pressure at Various Flows

(For Reference Only)

*** End of Operation **109** ***

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OPERATION 110 ECLSS

Shop: **ECL**
Cntrl Rm Console: **C5**
OPR: **ECL**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **1.0**

Total Cooling Loss T-6 Hrs Until T-0

110-1 **Perform** Emergency Instruction E1 - Integrated.

110-2

Loss of Facility Chilled Water

NOTE
Perform this option if Facility Chilled Water support to S70-0509/0510 refrigeration units was lost (F4-off), causing compressors to shut down due to high discharge head pressure. Console operator will have approx 30 minutes to configure refrigeration cooling to potable water source before Orbiter evaporator out temps elevate to a point which would require an emergency power down. S70-0509/0510 refrigeration units will automatically restart when condenser cooling source is restored.

Loss of Facility Chilled Water Not Performed:_____

Transfer To Potable Water Cooling

110-3

```
CONSOLE KYBD (CMD LINE)
SET _GFRK1470E_OFF
SET _GFRK2460E_OFF

CURSOR CNTL
PW (POTABLE WATER COMMAND TARGET)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

110-4

IF the potable water (PW) and chilled water (CW) indications are not invert red,

THEN perform the following:

1.
```
CONSOLE KYBD (CMD LINE)
SET _GFRK2460E_OFF
```

2.
```
CURSOR CNTL
CW (CHILLED WATER COMMAND TARGET)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

3.
```
CONSOLE KYBD (CMD LINE)
SET _GFRK1470E_OFF
```

4.
```
CURSOR CNTL
PW (POTABLE WATER COMMAND TARGET)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

110-5

IF any of the S70-0510 refrigeration compressors are still not running (C1, C2 or C3 is two amps or less),

THEN perform the following:

1. **IF** 509/510 POSITION AFFECTED:

THEN
(START COMMAND TARGET)
XMIT CURSOR KEY - PRESS

WAIT AT LEAST 90 SECS, THEN

XMIT CURSOR KEY - PRESS

Not Performed:_____
SS1

2. **IF** COMPRESSOR STILL DOES NOT START,

THEN 509/510 POSITION AFFECTED:

OVERRIDE BLOCK
XMIT CURSOR KEY - PRESS

VERIFY OVERRIDE HOLLOW BLOCK (OVERRIDE ON).

START BLOCK
XMIT CURSOR KEY - PRESS

VERIFY START BLOCK HOLLOW (ON)

Not Performed:_____
SS2

Entire Step Not Performed:_____

110-6 **Verify** S70-0510 compressors are online (C1,C2 and C3 above two amps).

110-7 CONSOLE KYBD (CMD LINE)
SET _GFRK2460E_ OFF

***** End of Transfer To Potable Water Cooling *****

110-8

Restoration of Facility Chilled Water Transfer Back to Chilled Water Cooling

NOTE
Perform this option when notified that Facility Chilled Water is restored.

Restoration of Facility Chilled Water Transfer Back to Chilled Water Cooling
Not Performed:_____

110-9

```
CURSOR CNTL
CW (CHILLED WATER COMMAND TARGET)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

110-10 **IF** the potable water (PW) indication is not Off and the chilled water (CW) indication is not On,

THEN perform the following:

1.
```
CONSOLE KYBD (CMD LINE)
SET _GFRK1470E_OFF
SET _GFRK2460E_OFF
```

2.
```
CURSOR CNTL
PW (POTABLE WATER COMMAND TARGET)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

3.
```
CONSOLE KYBD (CMD LINE)
SET _GFRK2460E_OFF
```

4.
```
CURSOR CNTL
CW (CHILLED WATER COMMAND TARGET)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

NOTE

If any of the S70-0510 refr compressors are still not running (C1,C2 or C3 is two amps or less), perform the following two substeps.

110-11 **IF** any of the S70-0510 refr compressors are still not running (C1, C2 or C3 is two amps or less),

THEN perform the following:

1. **IF** 509/510 POSITION AFFECTED:

THEN
(START COMMAND TARGET)
XMIT CURSOR KEY - PRESS
WAIT AT LEAST 90 SECS, THEN
XMIT CURSOR KEY - PRESS

Not Performed:_____
SS1

2. **IF** COMPRESSOR STILL DOES NOT START,

THEN 509/510 POSITION AFFECTED:

OVERRIDE BLOCK
XMIT CURSOR KEY - PRESS

VERIFY OVERRIDE HOLLOW BLOCK (OVERRIDE ON).

START BLOCK
XMIT CURSOR KEY - PRESS

VERIFY START BLOCK HOLLOW (ON)

Not Performed:_____
SS2

Entire Step Not Performed:_____

110-12 **Verify** S70-0510 compressors remained online (C1,C2 and C3 above two amps).

110-13

```
CONSOLE KYBD (CMD LINE)
SET _GFRK1470E_ OFF
```

***** End of Restoration of Facility Chilled Water Transfer Back to Chilled Water Cooling *****

***** End of Loss of Facility Chilled Water *****

110-14

S70-0510 Restart (510 Amperage Less Than 2)

1. S70-0509
   (POSITION AFFECTED) START BLOCK
   XMIT CURSOR

   VERIFY SOLID BLOCK (OFF)

2. **VERIFY**:

   0510 COMPRESSOR OFF (AMPERAGE LESS THAN 2)
   S70-0509 HEATER OFF
   S70-0509 PUMP OFF (IF ON, WAIT 2 MINUTES FOR SHUTDOWN LOGIC TO FINISH)

3. S70-0509
   (POSITION AFFECTED) START BLOCK
   XMIT CURSOR

   VERIFY HOLLOW BLOCK (ON)

NOTE

Problem light may cycle momentarily up to 20 minutes after startup.

4. **VERIFY**:

   PUMP STARTS (ON INDICATION).
   HEATER STARTS (ON RED INDICATION)
   COMPRESSOR STARTS (AMPERAGE GREATER THAN 5 AMPS)

5. **IF** COMPRESSOR FAILS WITHIN 20 MINUTES:

THEN
S70-0509
(POSITION AFFECTED) START BLOCK
XMIT CURSOR
VERIFY SOLID BLOCK (OFF)

VERIFY

0510 COMPRESSOR OFF (AMPERAGE LESS THAN 2)
S70-0509 HEATER OFF
S70-0509 PUMP OFF (IF ON, WAIT 2 MINUTES FOR SHUTDOWN LOGIC TO FINISH)

S70-0509
(POSITION AFFECTED) OVERRIDE BLOCK
XMIT CURSOR

VERIFY OVERRIDE HOLLOW BLOCK (OVERRIDE ON)

S70-0509
(POSITION AFFECTED) START BLOCK
XMIT CURSOR

VERIFY START BLOCK HOLLOW (ON)

VERIFY:

PUMP STARTS (ON INDICATION)
HEATER STARTS (ON RED INDICATION)
COMPRESSOR STARTS (AMPERAGE GREATER THAN 5 AMPS)

Not Performed:_____
SS5

NOTE

If the S70-0510 does not start with the override set On, no further action can be taken by LPS.

110-15

S70-0509 Restart (Unit Off)

1. S70-0509 START BLOCK
   XMIT CURSOR
   OFF, THEN ON

   VERIFY HOLLOW BLOCK (ON)

2. **VERIFY:**

   PUMP STARTS (ON INDICATION)
   HEATER STARTS (ON RED INDICATION)
   COMPRESSOR STARTS (AMPERAGE GREATER THAN 5 AMPS)

NOTE

Problem light may cycle momentarily up to 20 minutes after startup.

NOTE

The 3, S70-0509 refrigeration units provide cooling redundancy for Countdown. Nominal cooling can be handled with 2 of 3 refrigeration units operational. Critical cooling can also be accommodated with 1 of 3 refrigeration units although the loss of redundancy must be considered for continued Countdown and Pad abort contingencies.

The Problem Indication F/D transitioning to ON can be caused by many reasons. This does not necessarily indicate a loss of functionality. LCC 3R-18 personnel have insight into the PLC inputs that drive this indication. Problem Indication Reset attempts after T-6 hours are not mandatory to continue Countdown.

110-16

S70-0509 Problem Indication Reset

1. S70-0509
(POSITION AFFECTED) START BLOCK
XMIT CURSOR

VERIFY SOLID BLOCK (OFF)

2. **WAIT** (UP TO 3 MINUTES) FOR POSITION TO SHUT DOWN

VERIFY S70-0510:
COMPRESSOR OFF (AMPERAGE LESS THAN 2)
S70-0509: HEATER OFF PUMP OFF

3. S70-0509
(POSITION AFFECTED) START BLOCK
XMIT CURSOR

VERIFY HOLLOW BLOCK (ON)

4. **VERIFY:**

PUMP STARTS (ON INDICATION)
HEATER STARTS (ON RED INDICATION)
COMPRESSOR STARTS (AMPERAGE GREATER THAN 5 AMPS)
PROBLEM INDICATION OFF

NOTE

If problem light is ON or recurs, no further action can be taken by LPS. Unit will support normal cooling with problem light ON.

110-17

S70-1203 Critical Fault

NOTE

Critical fault light will be activated if 2 or more of the following listed parameters are out of tolerance:

- Pump(s) on (P1, P2 or P3 command/or indicator discrepancy)
- Pump(s) pressure (low or high)
- Reservoir level or pressure low for 5 seconds or greater
- Remote, auto and manual all On
- Power on (480 VAC power not OK)
- Primary/Secondary temperature control valves (refer/CW) full open simultaneously
- Orbiter supply pressure and pump(s) output pressure too high

110-18 **CECL**

Perform the following:

1. `IF AUTO IS ON, CURSOR MANUAL (SOLID BLOCK)`
2. `IF PUMP(S) OFF, CURSOR PUMP ON`
3. `IF FLOW IS LESS THAN 13 GPM, PRI/SEC INCR CURSOR UNTIL GPM IS ESTABLISHED`
4. `IF SUPPLY TEMPERATURE NEEDS ADJUSTMENT, TEMP PRI/SEC CURSOR, SET PERCENT HIGHER TO RAISE TEMP AND LOWER TO DECREASE TEMP, EXEC CMD`

NOTE

If critical fault light is still On, no other options are available to reset alarm.

110-19

S70-1203 Problem Indication

(No action required)

NOTE

The S70-1203 Problem ON Indication will result from a failure of the following PLC-monitored parameters. Review of Primary Support parameters (GCU Supply and Orbiter Evap OUT Temperatures) confirm Orbiter Cooling is being maintained as each of these failures do not indicate a loss of functionality, but constitute instrumentation error only. Nonetheless, prudent monitoring of the system is required during operation with an active "PROB" indication.

- Any Pump ON and NO Flow Rate Measurement - Flowmeter is not used for control function in AUTO mode of operation.
- All Pumps OFF and Flow Rate Measurement Above Zero - a satisfactory flow measurement value and nominal pump discharge pressure validates a failed pump on indicator.
- Primary Flow Control Valve Open and Close Indications both ON - failure of a valve position microswitch. A true open/close PRI valve should show both LPS and PLC indications to be matching.
- Secondary Flow Control Valve Open and Close Indications both ON - failure of a valve position microswitch. A true open/close SEC valve should show both LPS and PLC indications to be matching.

110-20

GCU Hardwire Safing Panel Operation (Refrigeration Operations Only)

NOTE

Refrigeration supply temperature is preset to 26 deg F when safing panel is operated in the SAFE REFR mode.

1. Sys SAFE switch - Safe REFR

2. If a pump(s) On light is not On,

   Pump(s) (1, 2, or 3) - On (Do not turn all three pumps on)

3. If REFR On lights are Off, (all 3 REFR)

   REFR pos - On

4. **Control** return temperature with Pri and Sec flow increase/decrease switch.

   Decrease flow to raise temperature.
   Increase flow to lower temperature.

5. **Monitor** cooling temperatures and make adjustments in flow.

110-21

GCU Hardwire Safing Panel Operation (Chilled Water Operations Only)

1. Sys Safe switch - SAFE CHW

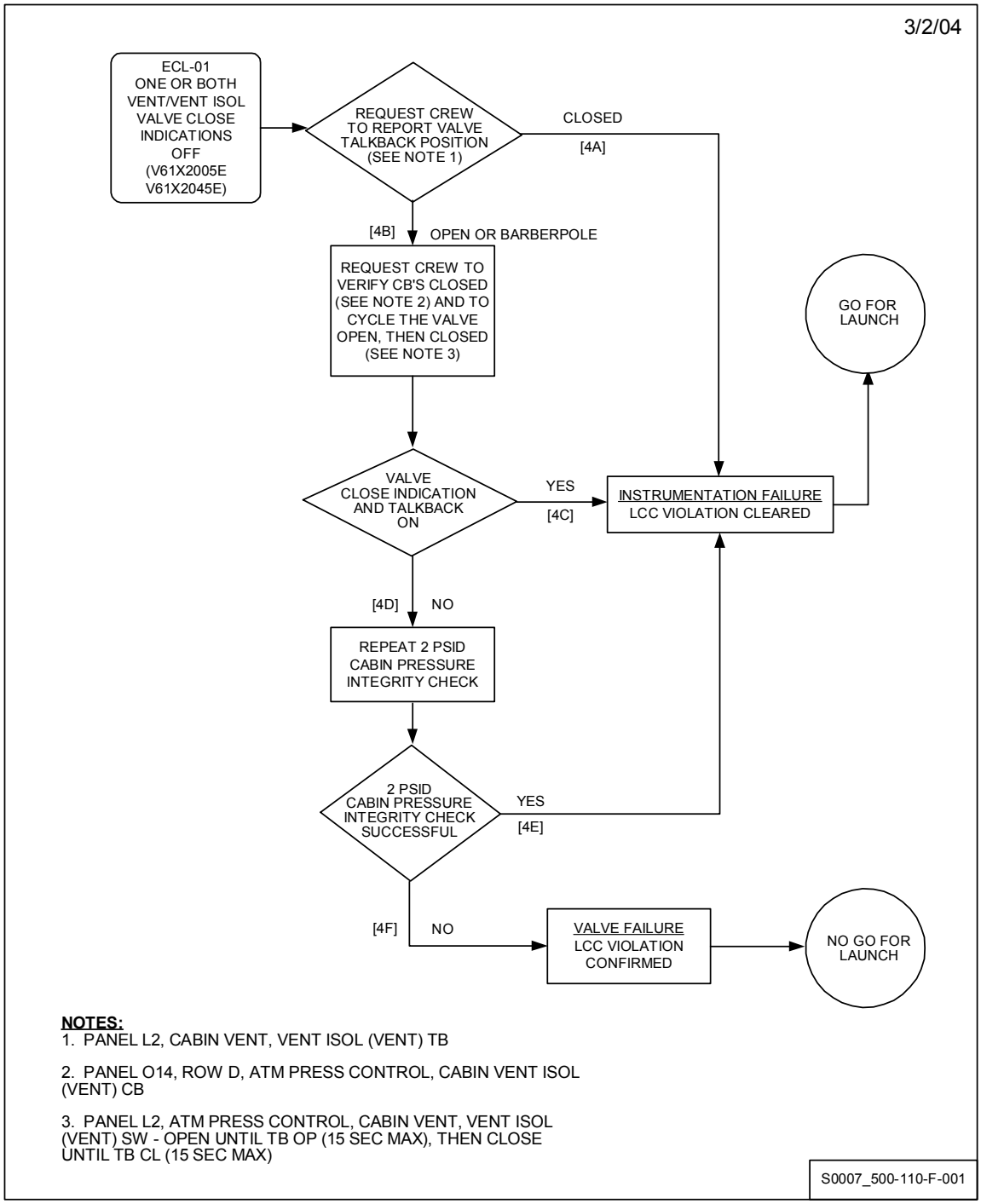
2. If a pump(s) On light is not On,

   Pump(s) (1, 2, or 3) - On (Do not turn all three pumps on)

3. PRI/SEC flow increase to - Full Open

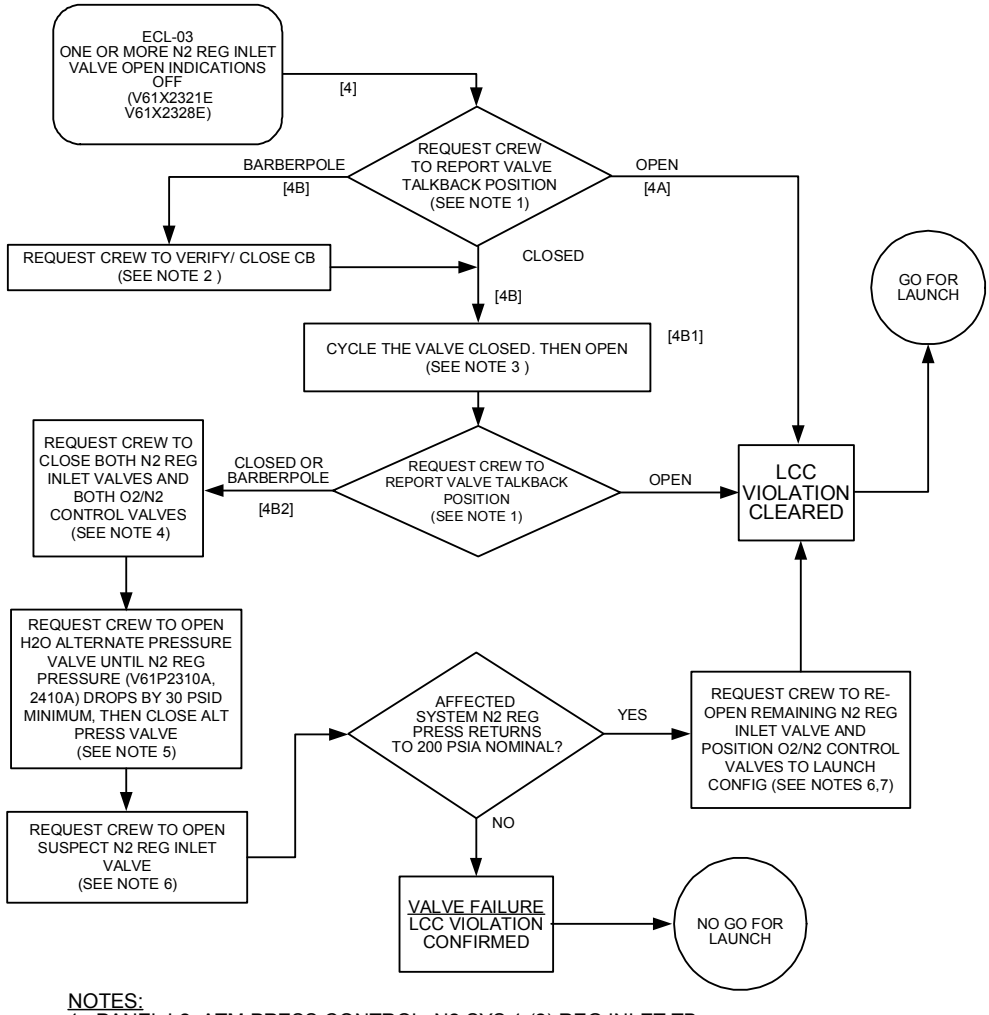
4. **Monitor** supply temp for verification of chilled water cooling (45-48 deg F)

Cabin Vent Valve Anomaly (SSID ECL-01)



N_2 Reg In Valve Anomaly (SSID ECL-03)

10/08/09

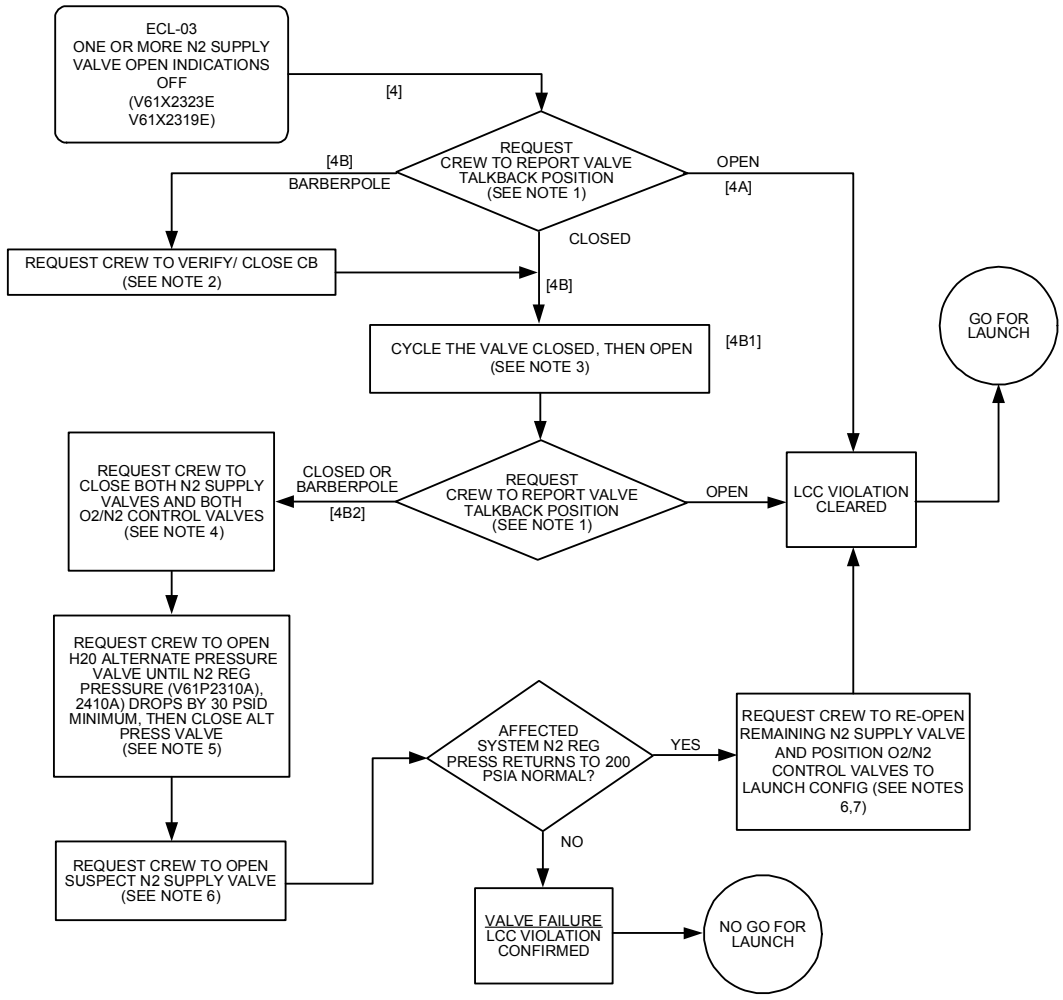


NOTES:
1. PANEL L2, ATM PRESS CONTROL, N2 SYS 1 (2) REG INLET TB
2. PANEL O14 (O15), ROW D ATM PRESS CONTROL, N2 REG INLET 1 (2) CB
3. PANEL L2, ATM PRESS CONTROL, N2 SYS 1 (2) REG INLET SW - CLOSE UNTIL TB CL (15 SEC MAX), THEN OPEN UNTIL TB OP (15 SEC MAX)
4. PANEL L2, ATM PRESS CONTROL, N2 SYS 1 REG INLET SW - CLOSE UNTIL TB CL (15 SEC MAX), THEN RELEASE
   N2 SYS 2 REG INLET SW - CLOSE UNTIL TB CL (15 SEC MAX), THEN RELEASE
   O2/N2 CNTLR VLV, SYS 1 SW - CLOSE, SYS 2 SW - CLOSE
5. PANEL L1, H2 ALTERNATE PRESS SW – OPEN
   (CAUTION: VENTING SIGNIFICANTLY MORE THAN 30 PSID EXTENDS REPRESS TIME FOR H20 TANKS)
   CECL MONITORS N2 REG PRESSURE (V61P2310A AND V61P2410A) FOR 30 PSID (MIN) DECREASE
   PANEL L1, H2 ALTERNATE PRESS SW - CLOSE
6. PANEL L2, ATM PRESS CONTROL, N2 SYS 1 (2) REG INLET SW - OPEN UNTIL TB OP (15 SEC MAX)
7. PANEL L2, ATM PRESS CONTROL, O2/N2 CNTLR VLV, SYS 1 SW - OPEN

S0007_500-110-F-002

N_2 Supply Valve Anomaly (SSID ECL-03)

10/08/09

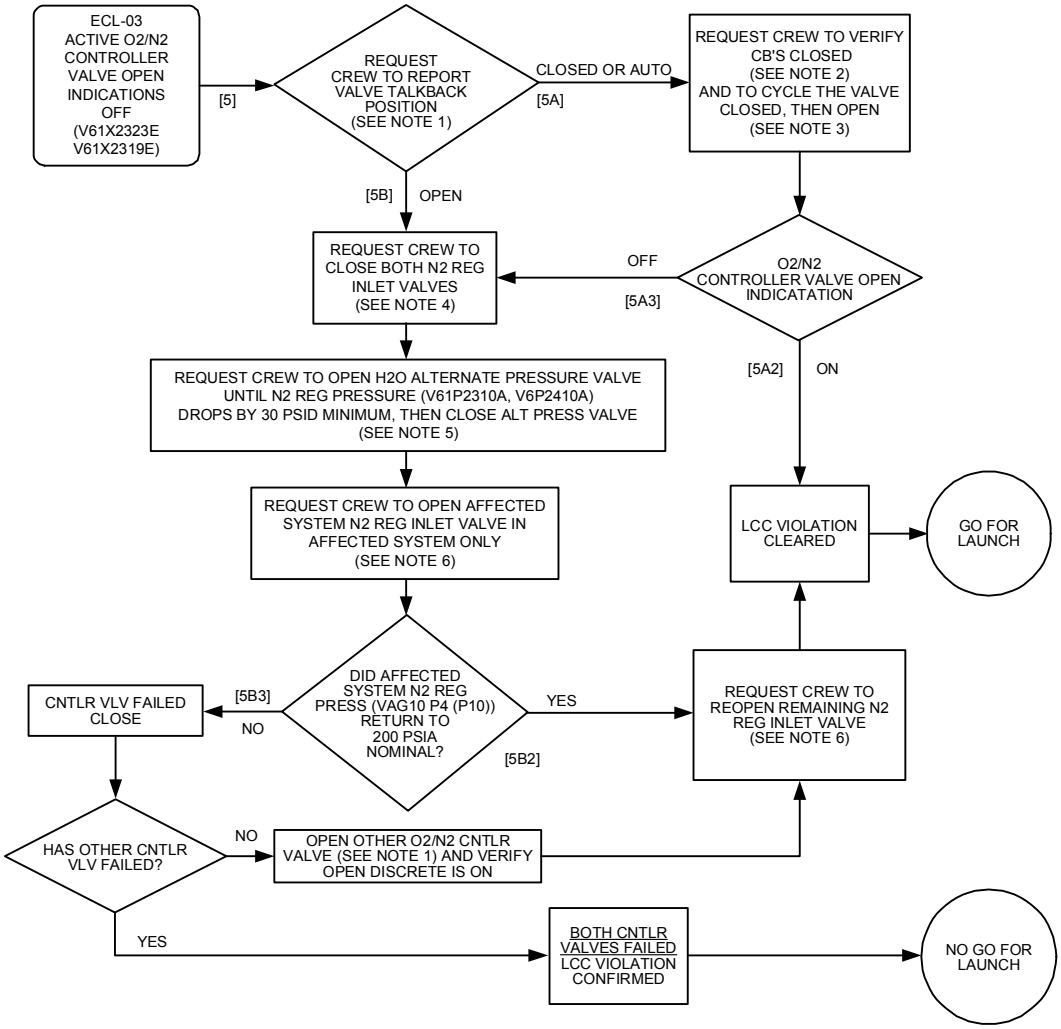


NOTES:
1. PANEL L2, ATM PRESS CONTROL, N2 SYS 1 (2) SUPPLY TB
2. PANEL O14 (O15), ROW D ATM PRESS CONTROL, N2 SUPPLY 1 (2) CB
3. PANEL L2, ATM PRESS CONTROL, N2 SYS 1 (2) SUPPLY SW - CLOSE UNTIL TB CL (15 SEC MAX), THEN OPEN UNTIL TB OP (15 SEC MAX)
4. PANEL L2, ATM PRESS CONTROL,
   N2 SYS 1 SUPPLY SW - CLOSE UNTIL TB CL (15 SEC MAX), THEN RELEASE
   N2 SYS 2 SUPPLY SW - CLOSE UNTIL TB CL (15 SEC MAX), THEN RELEASE
   O2/N2 CNTLR VLV, SYS 1 SW - CLOSE, SYS 2 SW - CLOSE
5. PANEL L1, H2 ALTERNATE PRESS SW – OPEN
   (CAUTION: VENTING SIGNIFICANTLY MORE THAN 30 PSID EXTENDS REPRESS TIME FOR H2O TANKS)
   CECL MONITORS N2 REG PRESSURE (V61P2310A AND V61P2410A) FOR 30 PSID (MIN) DECREASE
   PANEL L1, H2 ALTERNATE PRESS SW - CLOSE
6. PANEL L2, ATM PRESS CONTROL, N2 SYS 1 (2) SUPPLY SW - OPEN UNTIL TB OP (15 SEC MAX)
7. PANEL L2, ATM PRESS CONTROL, O2/N2 CNTLR VLV, SYS 1 SW - OPEN

S0007_500-110-F-003

O_2/N_2 Controller Anomaly (SSID ECL-03)

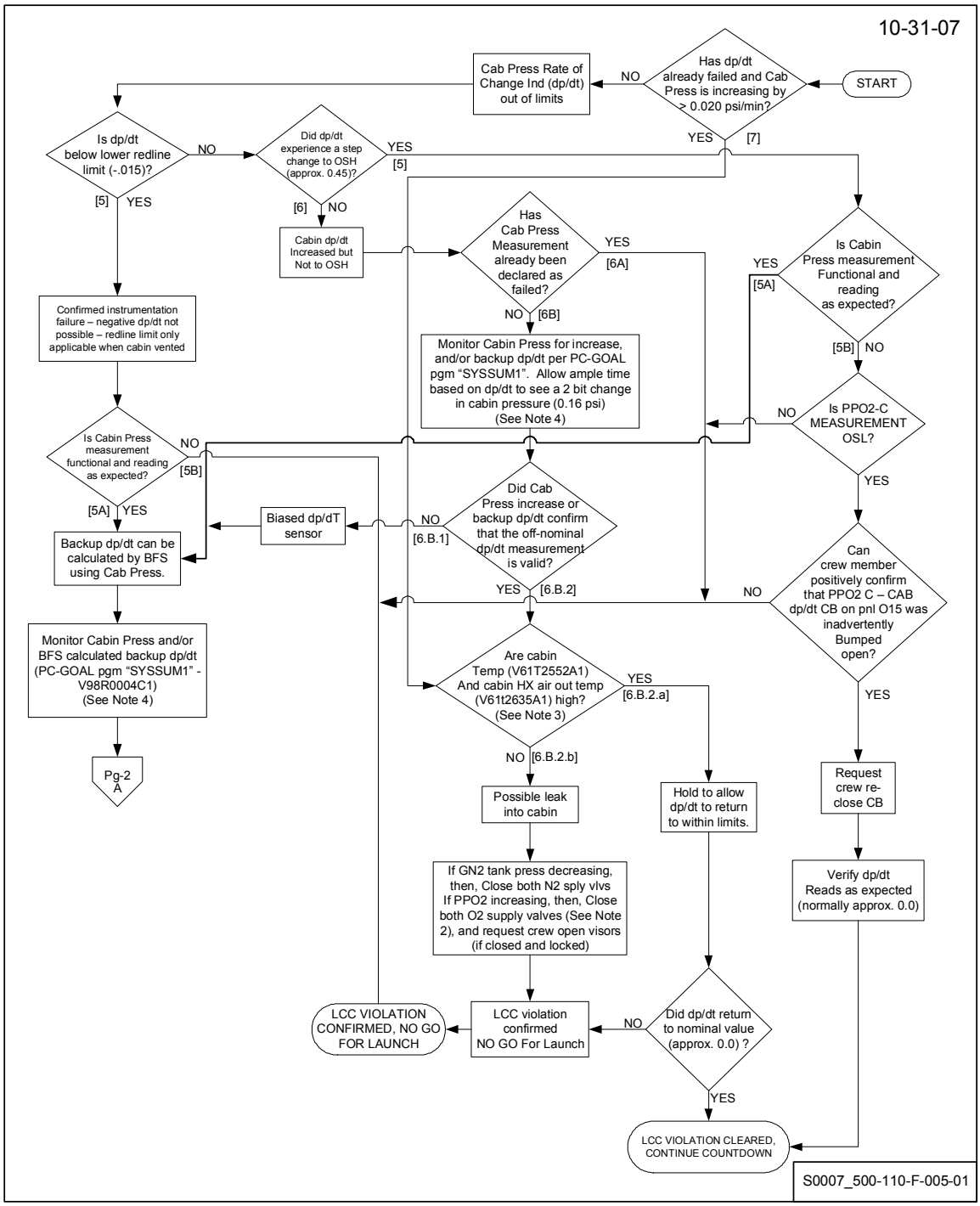
10/08/09



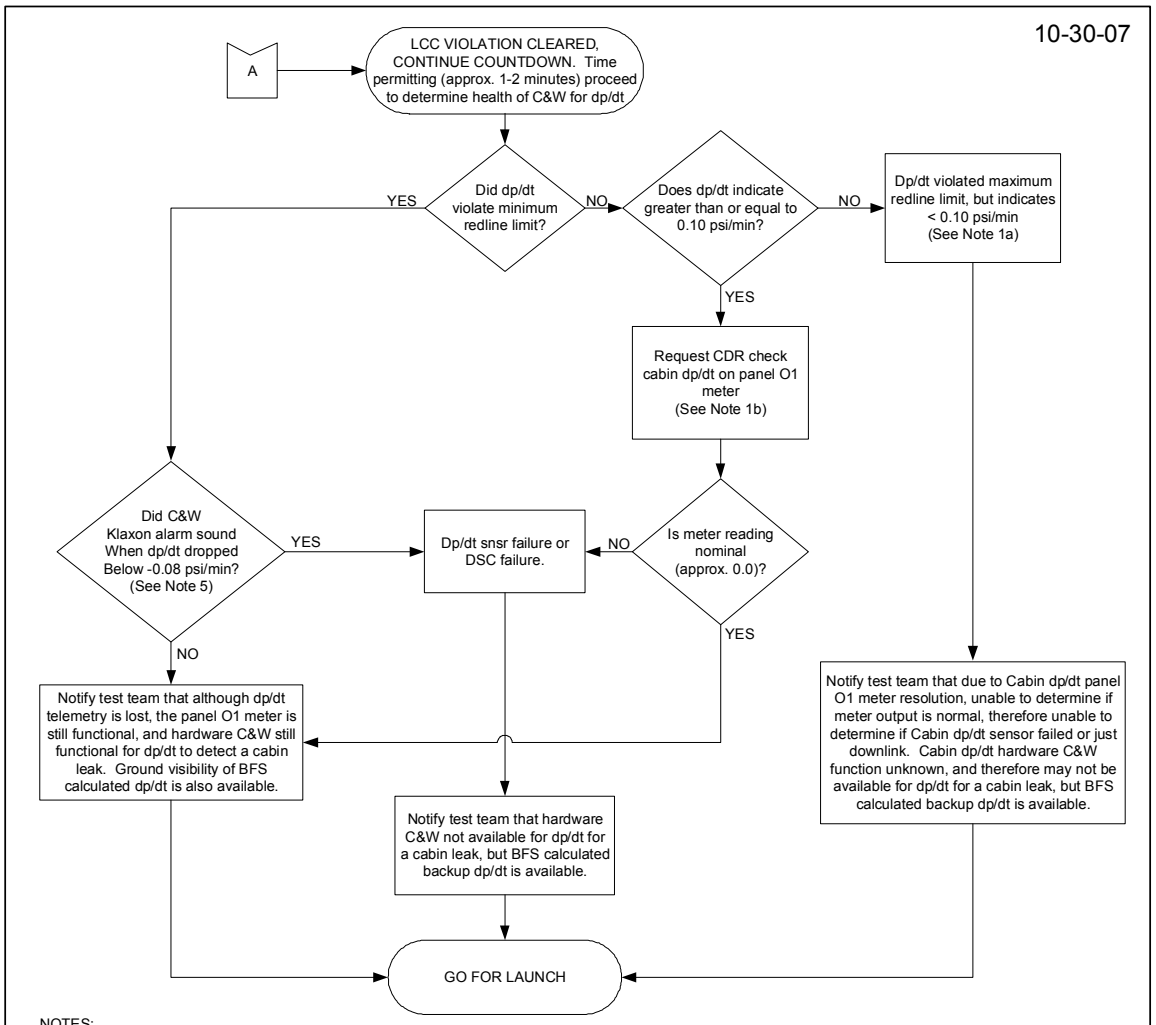
NOTES:
1. PANEL L2, ATM PRESS CONTROL, O2/N2 CNTLR VLV, SYS 1 (2) SW – OPEN/AUTO/CLOSE
2. PANEL O14 , ROW D ATM PRESS CONTROL, O2/N2 CNTLR 1 CB
   PANEL O15, ROW D, ATM PRESS CONTROL, O2/N2 CNTLR 2 CB
3. PANEL L2, ATM PRESS CONTROL, O2/N2 CNTLR VLV, SYS 1 SW - CLOSE,
   <WAIT 5 SEC> THEN OPEN
4. PANEL L2, ATM PRESS CONTROL, N2 SYS 1 REG INLET SW - CLOSE UNTIL TB CL, THEN RELEASE
   PANEL L2, ATM PRESS CONTROL, N2 SYS 2 REG INLET SW - CLOSE UNTIL TB CL, THEN RELEASE
5. PANEL L1, H2 ALTERNATE PRESS SW – OPEN
   (CAUTION: VENTING SIGNIFICANTLY MORE THAN 30 PSID EXTENDS REPRESS TIME FOR H2O TANKS)
   CECL MONITORS N2 REG PRESSURE (V61P2310A AND V61P2410A) FOR 30 PSID (MIN) DECREASE
   PANEL L1, H2 ALTERNATE PRESS SW - CLOSE
6. PANEL L2, ATM PRESS CONTROL, N2 SYS 1 (2) REG INLET SW - OPEN UNTIL TB OP, THEN RELEASE

S0007_500-110-F-004

Orbiter Cabin Pressure Anomaly (SSID ECL-04), Page 1 of 2



Orbiter Cabin Pressure Anomaly (SSID ECL-04), Page 2 of 2



NOTES:

1. Due to the O1 panel meter resolution (0.1 psi/increment) and the meter viewing angle, the dp/dt values below 0.10 psi/min may not be high enough to positively confirm or deny a corresponding change via the panel meter.

   a. For dp/dt values above the maximum redline, but below 0.10 psi/minute, the panel meter will not be checked to determine the health of the sensor.

   b. For dp/dt values greater than or equal to 0.10 psi/min nominal meter bias/parallax may cause an inability to positively verify that the meter reading is nominal (approx. zero). For these cases, the meter value will be considered to track the OI value.

2. CDR Panel L2, ATM PRESS CONTROL
   N2 SYS1, SUPPLY SW – CLOSE UNTIL TB CLOSE, THEN RELEASE; N2 SYS2, SUPPLY SW – CLOSE UNTIL TB CLOSE, THEN RELEASE
   O2 SYS1, SUPPLY SW – CLOSE UNTIL TB CLOSE, THEN RELEASE; O2 SYS2, SUPPLY SW – CLOSE UNTIL TB CLOSE, THEN RELEASE

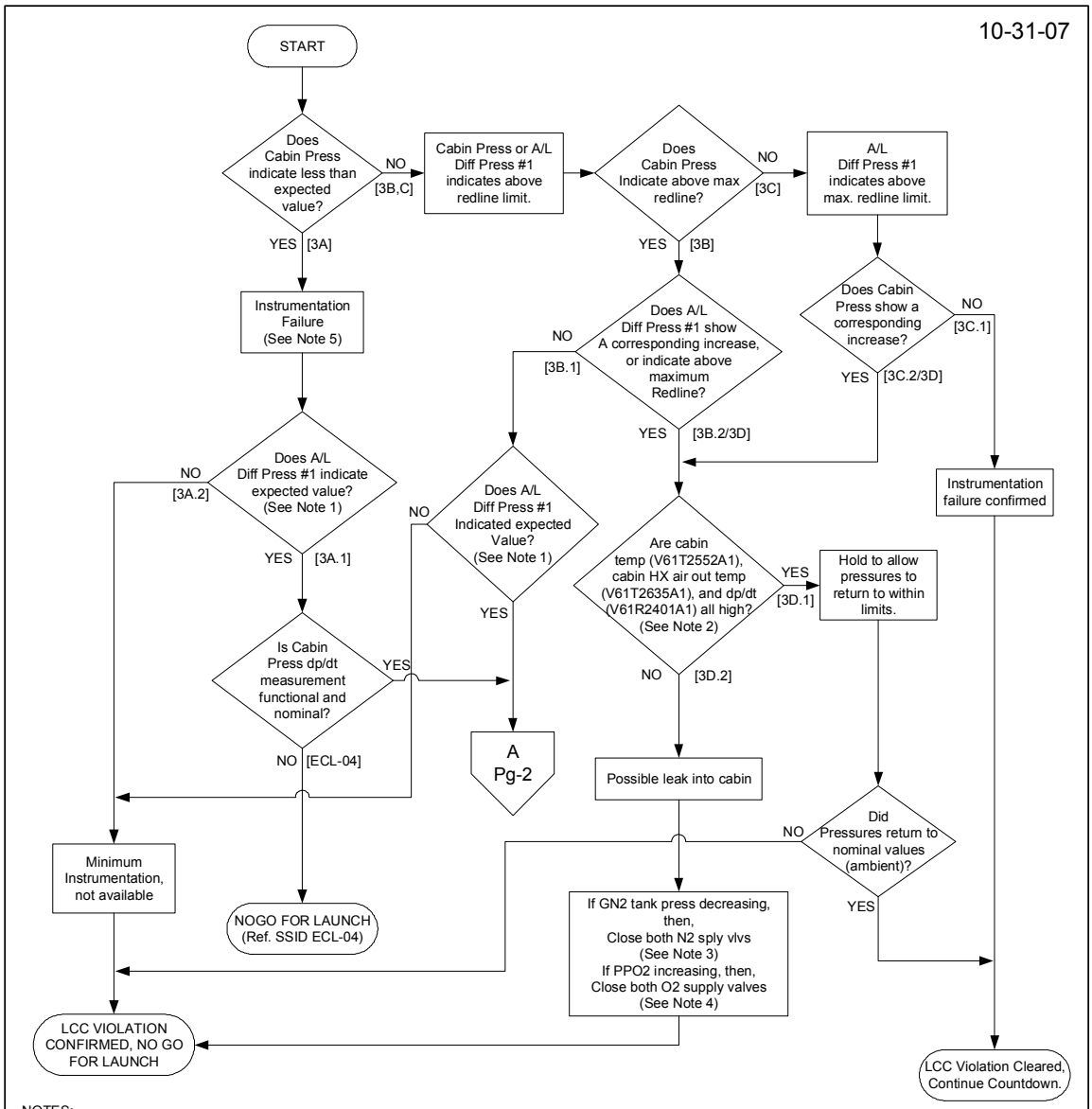
3. With nominal starting conditions of approx. 14.7 psia, and 70-80 degF in the crew cabin, a cabin temp increase of 3 degF will cause the cabin pressure to increase approximately 1 bit (0.08 psi).

4. BFS calculated dp/dt only available after transition to OPS 101 which completes at approximately T-17 or T-18 minutes. For dp/dt (V61R2401A) that exceeds the maximum redline, but are not too high (approx. less than 0.120 psi/min), the resolution of the BFS calculated dp/dt will cause significant changes in calculated values and may not approach the actual leak rate value. For those conditions, manually monitoring changes in cabin press (V61P2405A) over time may be beneficial. If analysis time is limited (less than 8 minutes for a dp/dt of 0.020 psi/min), CECL may request either BFS calculated dp/dt, or cabin pressure readings from the CDR via CRT-3 SYS SUMM 1 page (bit changes used by on-board software for cabin press are 0.04 psi versus 0.08 psi for ground measurement).

5. For redline violations below the minimum, the panel meter need not be checked to determine the health of the Caution& Warning, because the Klaxon alarm will sound (alarm limit is -0.08 psi/minute) before the output reaches the minimum redline limit, thus indicating a failure of either the sensor or the signal conditioner, rendering Caution and Warning unavailable for dp/dt.

S0007_500-110-F-005-02

Orbiter Cabin Pressure Anomaly (SSID ECL -05), Page 1 of 2



NOTES:

1. Normal values for A/L Diff Press #1 vary for each vehicle, but value is normally 0.0 – 0.32 following cabin vent after cabin leak check.

2. Thermal transient indicated by increase in Cabin Temp, Cabin HX Air-Out Temp, and dp/dt. With nominal starting conditions of approx. 14.7 psia, and 70-80 degF in the crew cabin, a cabin temp increase of 3 degF will cause the cabin pressure to increase approximately 1 bit (0.08 psi).

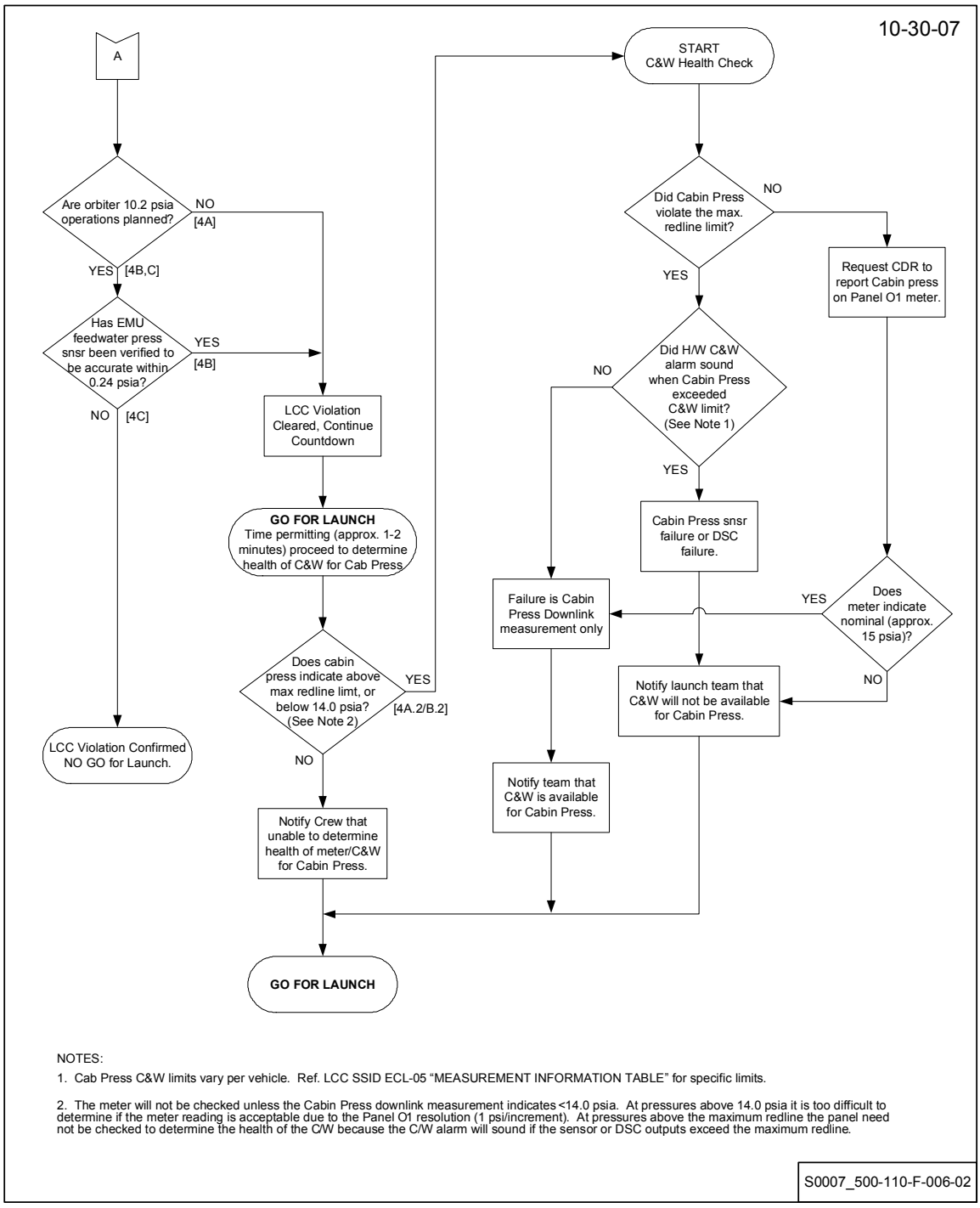
3. CDR Pnl L2, Atm Press Cntl, O2 Sys 1 & 2 Supply Switches – Close until TB's close, then release

4. CDR Pnl L2, Atm Press Cntl, N2 Sys 1 & 2 Supply Switches – Close until TB's close, then release

5. If Cabin Press indicates OSL, PPO2-A indicates OSL, and Sys 1 O2/N2 cntlr vlv open indication fails OFF (V61X2372E1), the problem may be MNA pwr via CB on pnl O14 (PNL 014, MNA, ATM PRESS CNTL, O2/N2 CNTLR 1 CB). If crew can verify CB inadvertently opened, it may be closed, and if parameters return to normal (expected), CONTINUE count. If the CB is open, but the cause is unknown proceed with this PPC flowchart. Loss of PPO2-A, and the O2/N2 Cntlr Vlv are handled per LCC's ECL-06, ECL-03, and the MEL.

S0007_500-110-F-006-01

Orbiter Cabin Pressure Anomaly (SSID ECL -05), Page 2 of 2



NOTES:

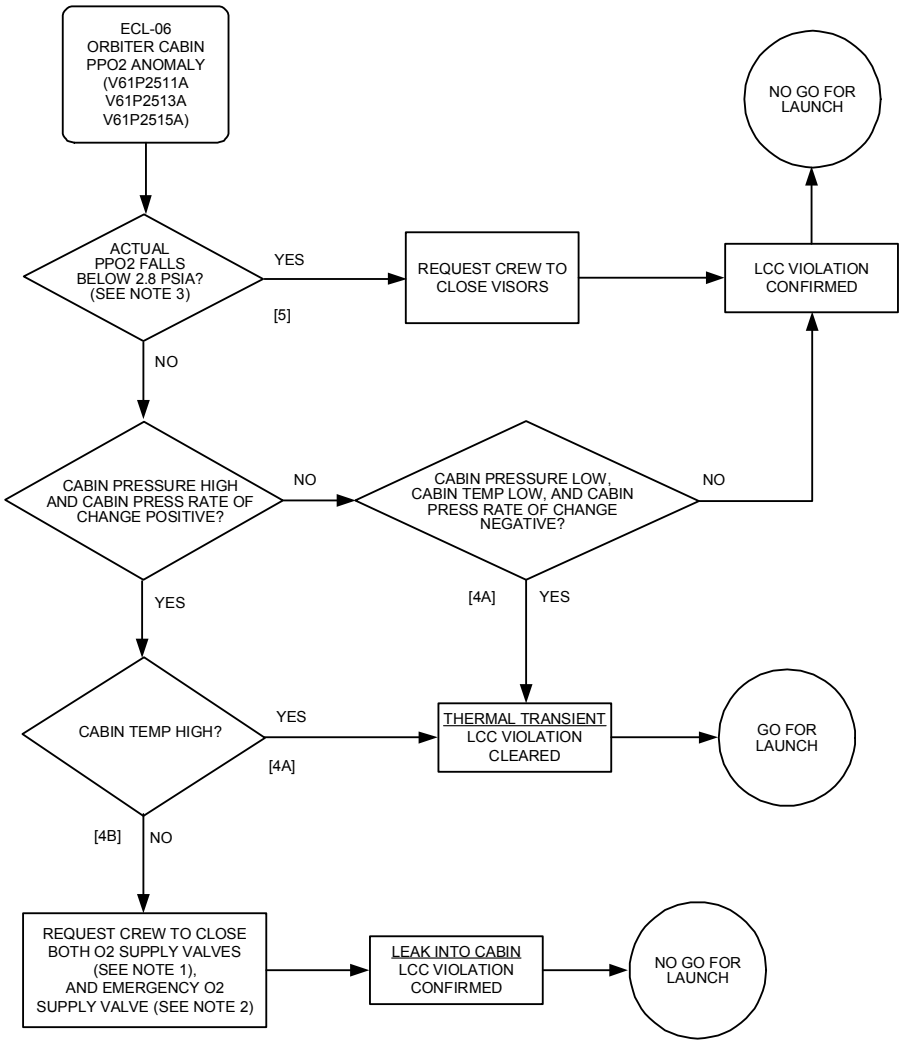
1. Cab Press C&W limits vary per vehicle. Ref. LCC SSID ECL-05 “MEASUREMENT INFORMATION TABLE” for specific limits.

2. The meter will not be checked unless the Cabin Press downlink measurement indicates <14.0 psia. At pressures above 14.0 psia it is too difficult to determine if the meter reading is acceptable due to the Panel O1 resolution (1 psi/increment). At pressures above the maximum redline the panel need not be checked to determine the health of the C/W because the C/W alarm will sound if the sensor or DSC outputs exceed the maximum redline.

S0007_500-110-F-006-02

PPO_2 Anomaly (SSID ECL-06)

10/08/09



NOTES:

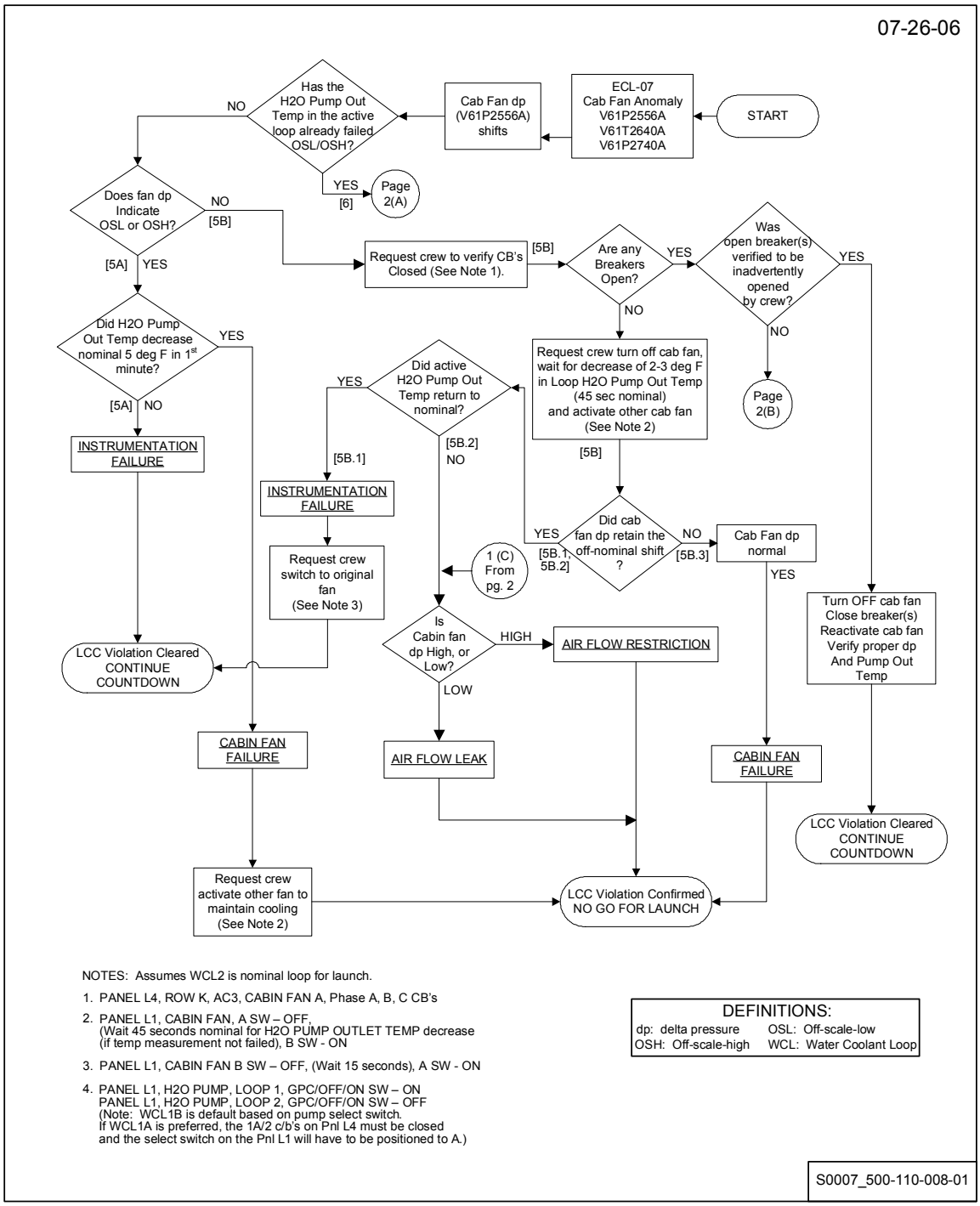
1. PANEL L2, ATM PRESS CONTROL, O2 SYS 1 SUPPLY SW - CLOSE UNTIL TB CL, THEN RELEASE
   PANEL L2, ATM PRESS CONTROL, O2 SYS 2 SUPPLY SW - CLOSE UNTIL TB CL, THEN RELEASE

2. IF EMER O2 TANK INSTALLED,
   PANEL O16, ROW D, MN C, ATM PRESS CONTROL, O2 EMER CB – CLOSE
   PANEL L2, ATM PRESS CONTROL, O2 EMER SW - CLOSE UNTIL TB CL, THEN RELEASE

3. ACTUAL PPO2 LEVEL IS VERIFIED BELOW 2.8 PSIA IF TWO OR MORE INDICATE BELOW 2.8 PSIA

S0007_500-110-F-007

Cabin Fan Anomaly (SSID ECL-07) (Page 1 of 2)



NOTES: Assumes WCL2 is nominal loop for launch.

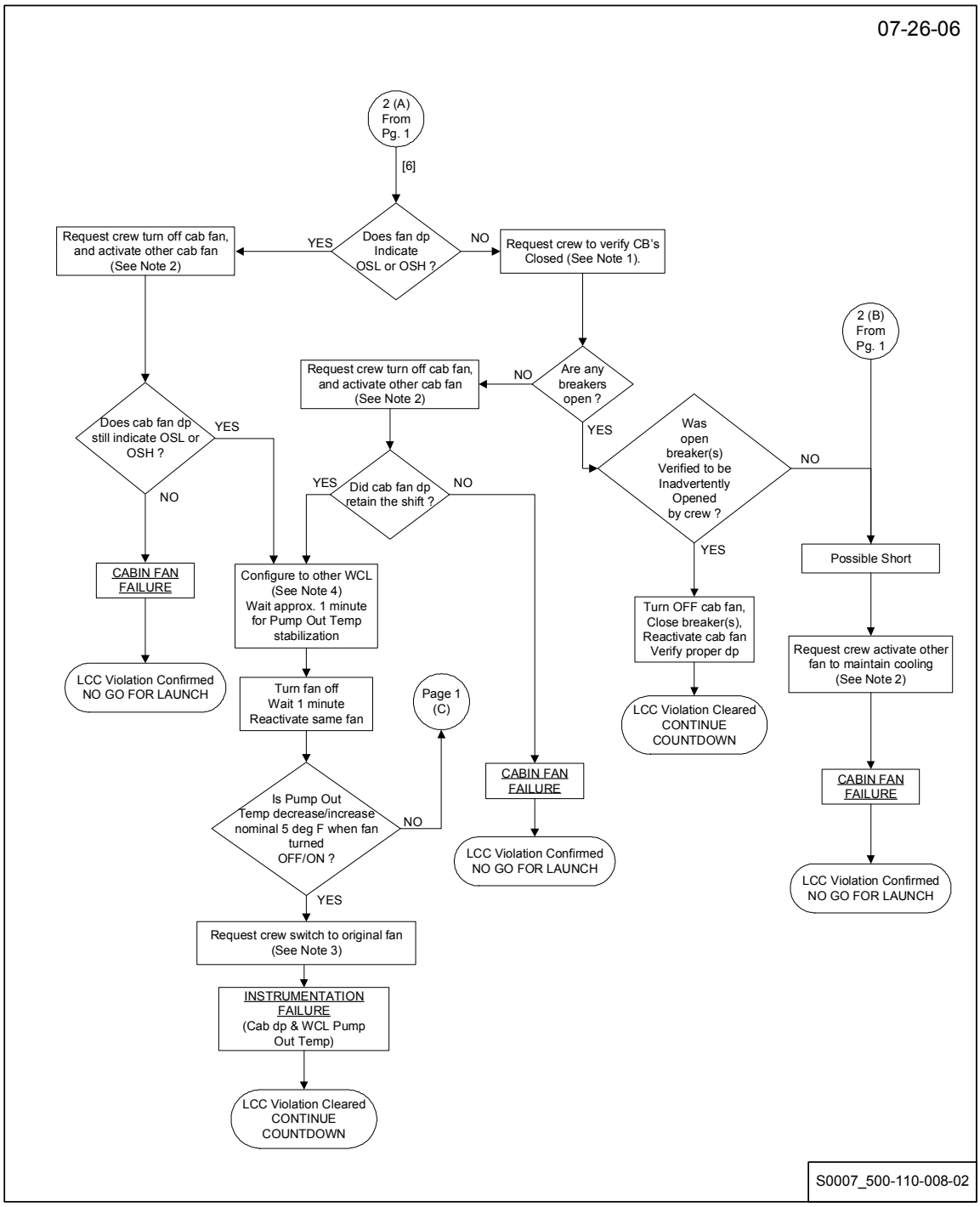
1. PANEL L4, ROW K, AC3, CABIN FAN A, Phase A, B, C CB's
2. PANEL L1, CABIN FAN, A SW – OFF,
   (Wait 45 seconds nominal for H2O PUMP OUTLET TEMP decrease
   (if temp measurement not failed), B SW - ON
3. PANEL L1, CABIN FAN B SW – OFF, (Wait 15 seconds), A SW - ON
4. PANEL L1, H2O PUMP, LOOP 1, GPC/OFF/ON SW – ON
   PANEL L1, H2O PUMP, LOOP 2, GPC/OFF/ON SW – OFF
   (Note: WCL1B is default based on pump select switch.
   If WCL1A is preferred, the 1A/2 c/b's on Pnl L4 must be closed
   and the select switch on the Pnl L1 will have to be positioned to A.)

DEFINITIONS:

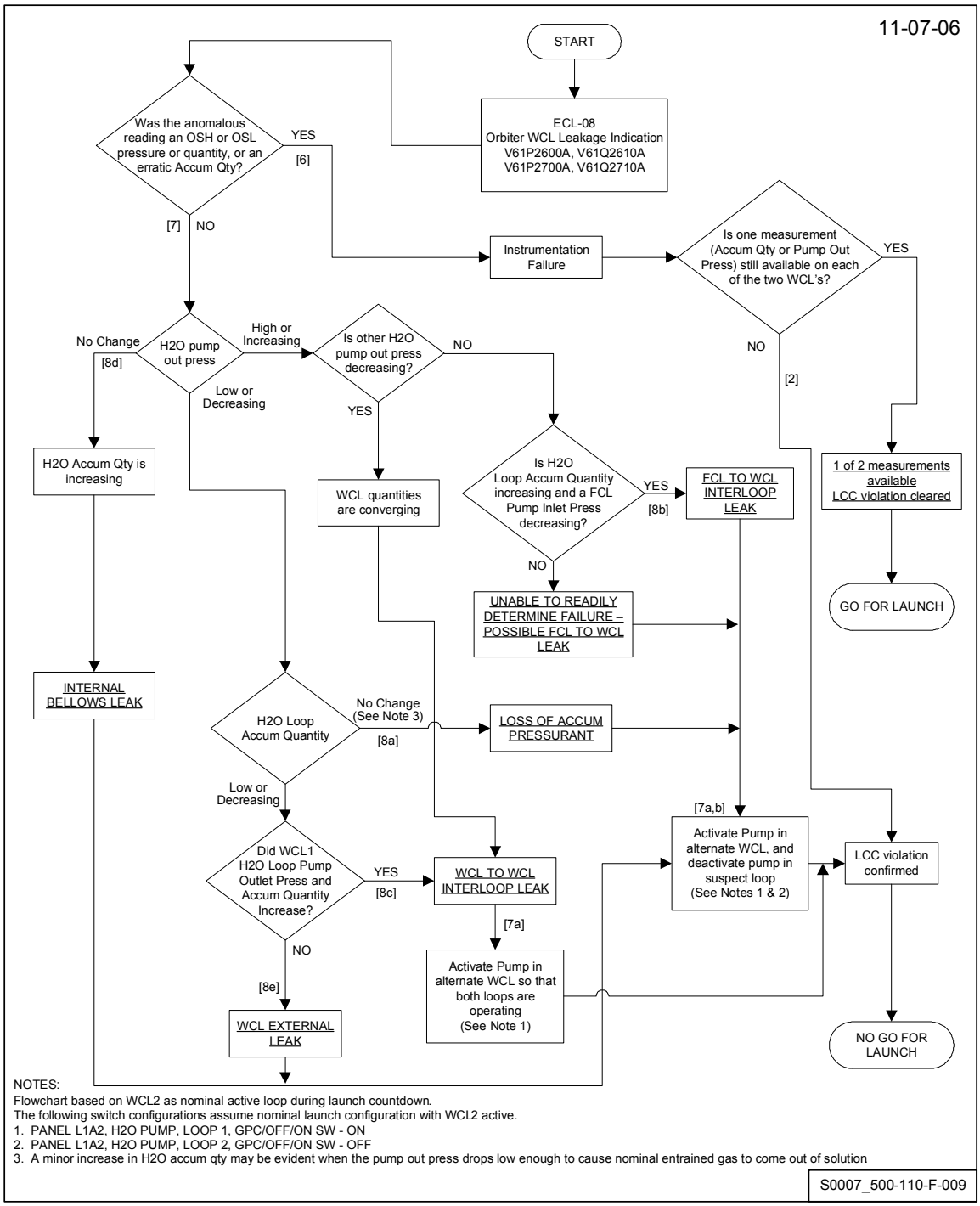
dp: delta pressure	OSL: Off-scale-low
OSH: Off-scale-high	WCL: Water Coolant Loop

S0007_500-110-008-01

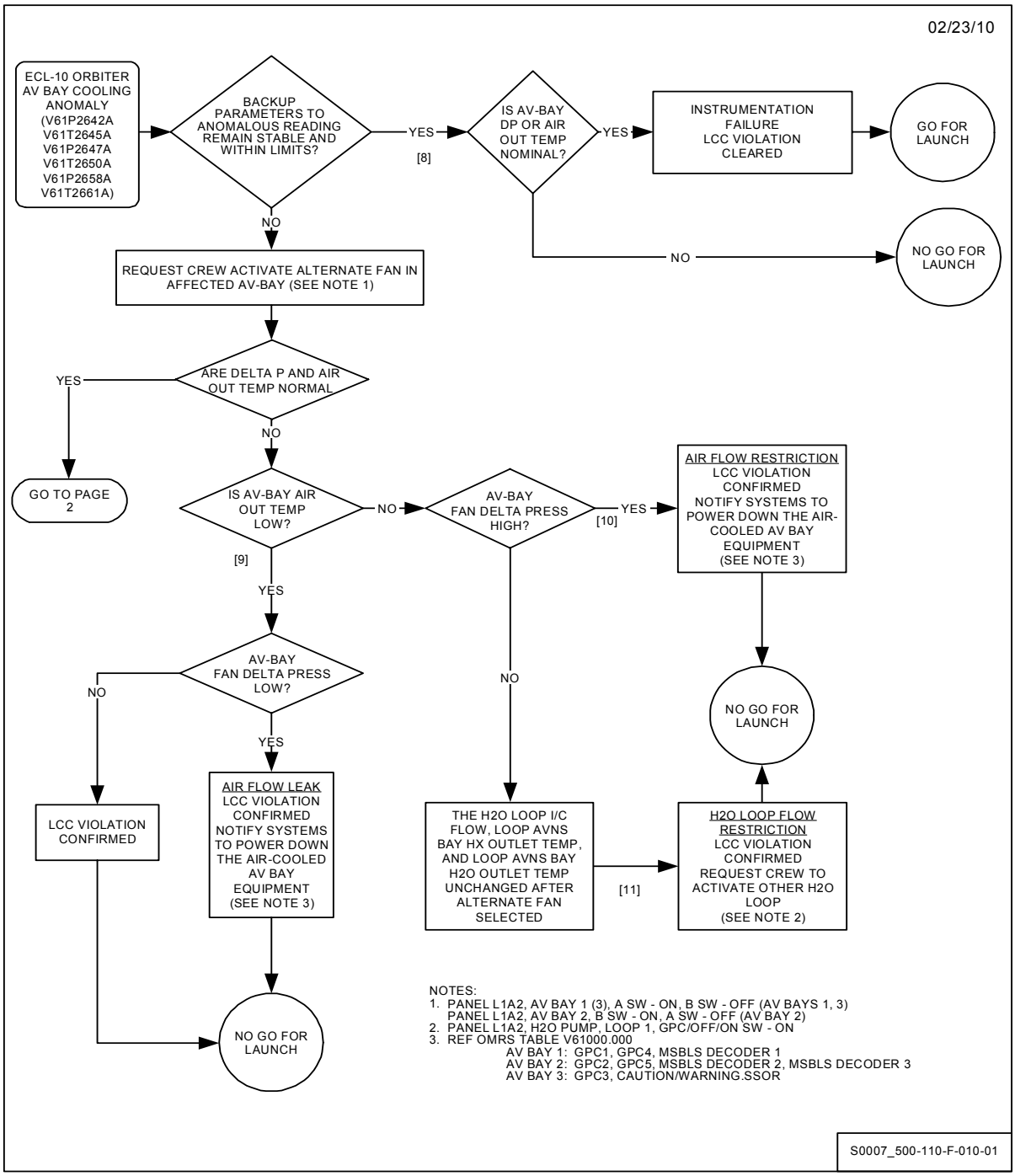
Cabin Fan Anomaly (SSID ECL-07) (Page 2 of 2)



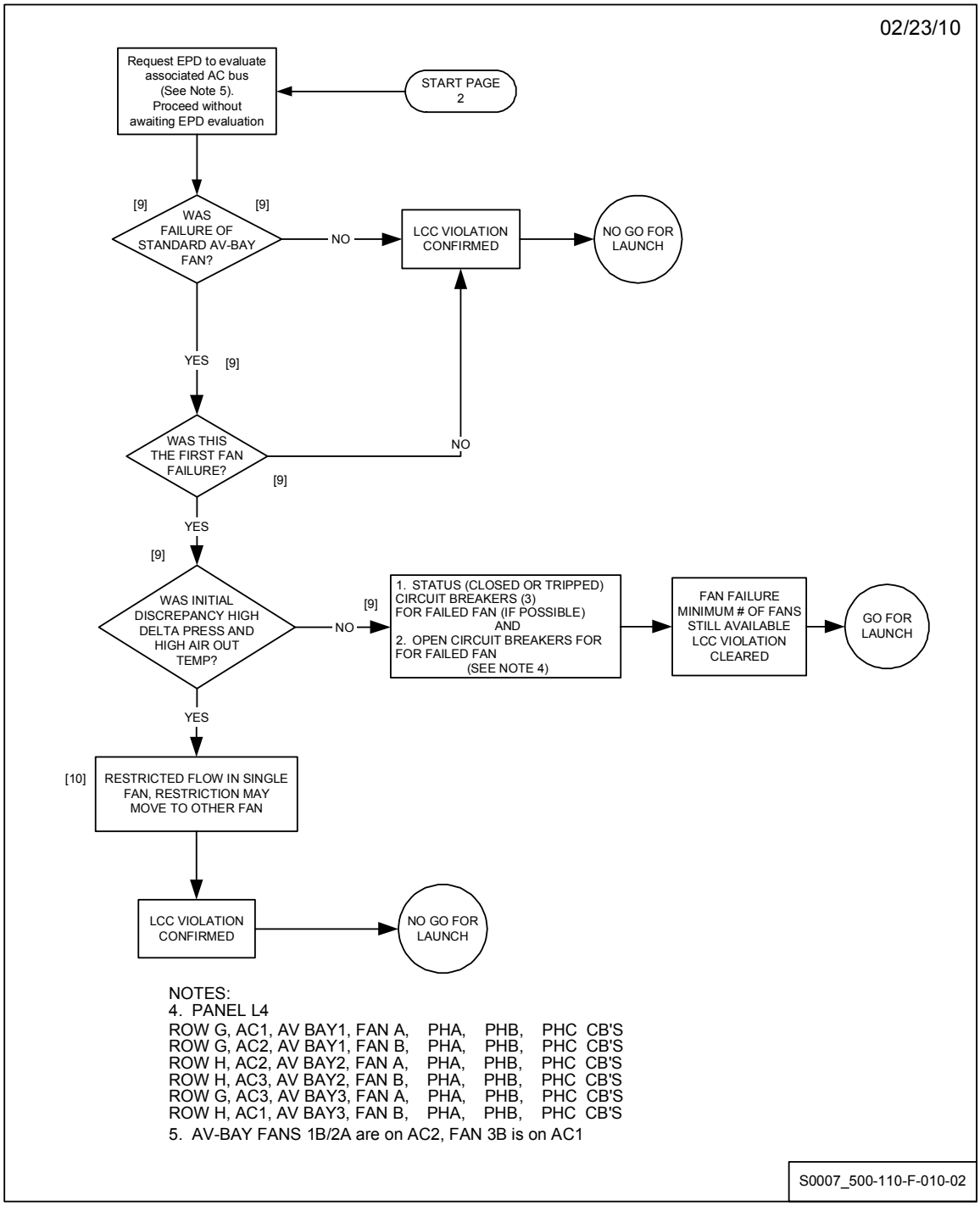
Water Coolant Loop Leakage Indication (SSID ECL-08)



Avionics Bay Cooling Anomaly (SSID ECL-10) (Page 1 of 2)



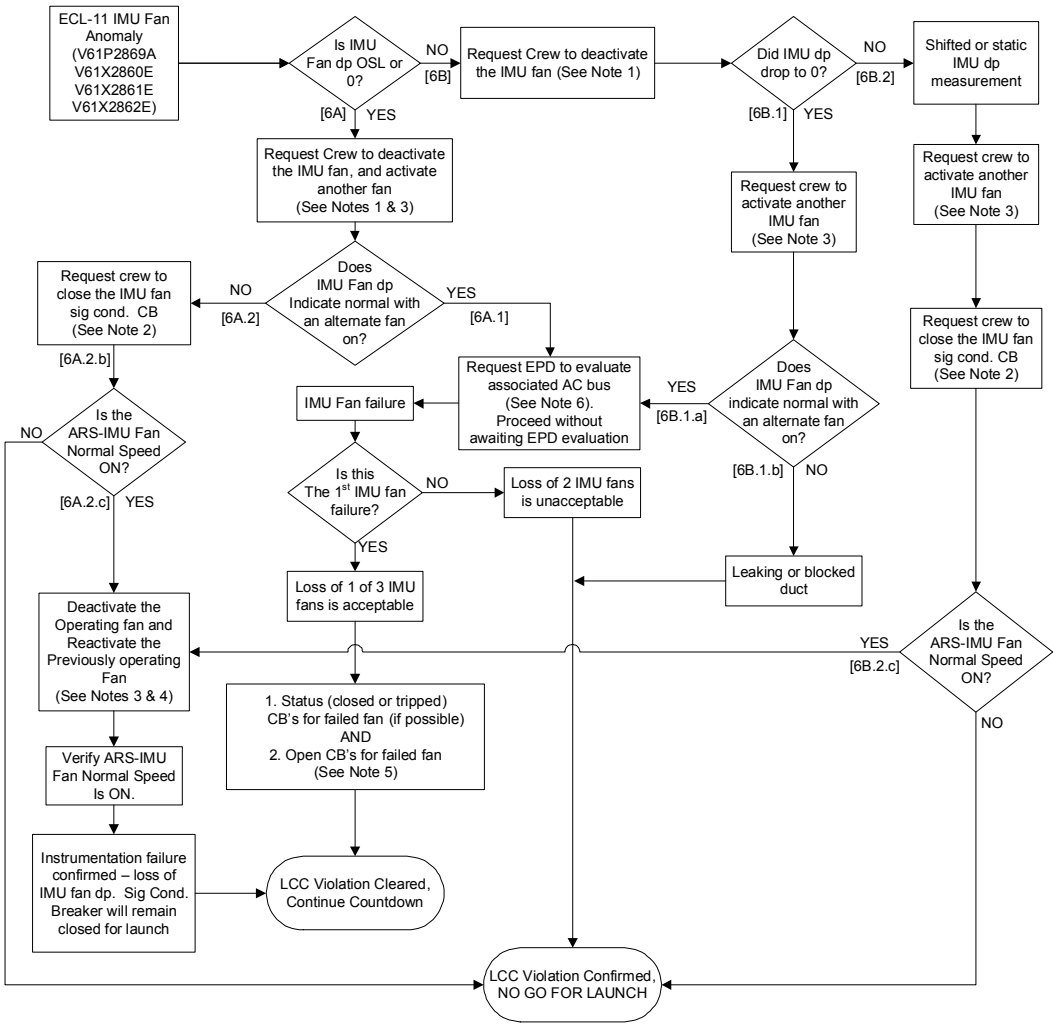
Avionics Bay Cooling Anomaly (SSID ECL-10) (Page 2 of 2)



Orbiter IMU Fan Anomaly (SSID ECL-11)

02/23/10

Orbiter IMU Fan Anomaly (SSID ECL-11)



NOTES: The switch reconfigures show all fans, but are written such that the 1st option is the nominal launch configuration (fan B operating).

1. Panel L1A2, IMU Fan B (A, or C) SW - OFF
2. Panel L4, Row J, AC3, Sig Condr, IMU Fan, PH B CB - CLOSE
3. Panel L1A2, IMU Fan A (B or C) SW - ON
4. Panel L1A2, IMU Fan B (A or C) SW – ON
5. Panel L4, Row I, AC1, IMU Fan A, PHA, PHB, PHC CB'S – OPEN
   AC2, IMU Fan B, PHA, PHB, PHC CB'S – OPEN
   AC3, IMU Fan C, PHA, PHB, PHC, CB'S - OPEN
6. IMU fan B is on AC2, IMU fan A is on AC1, and IMU fan C is on AC3

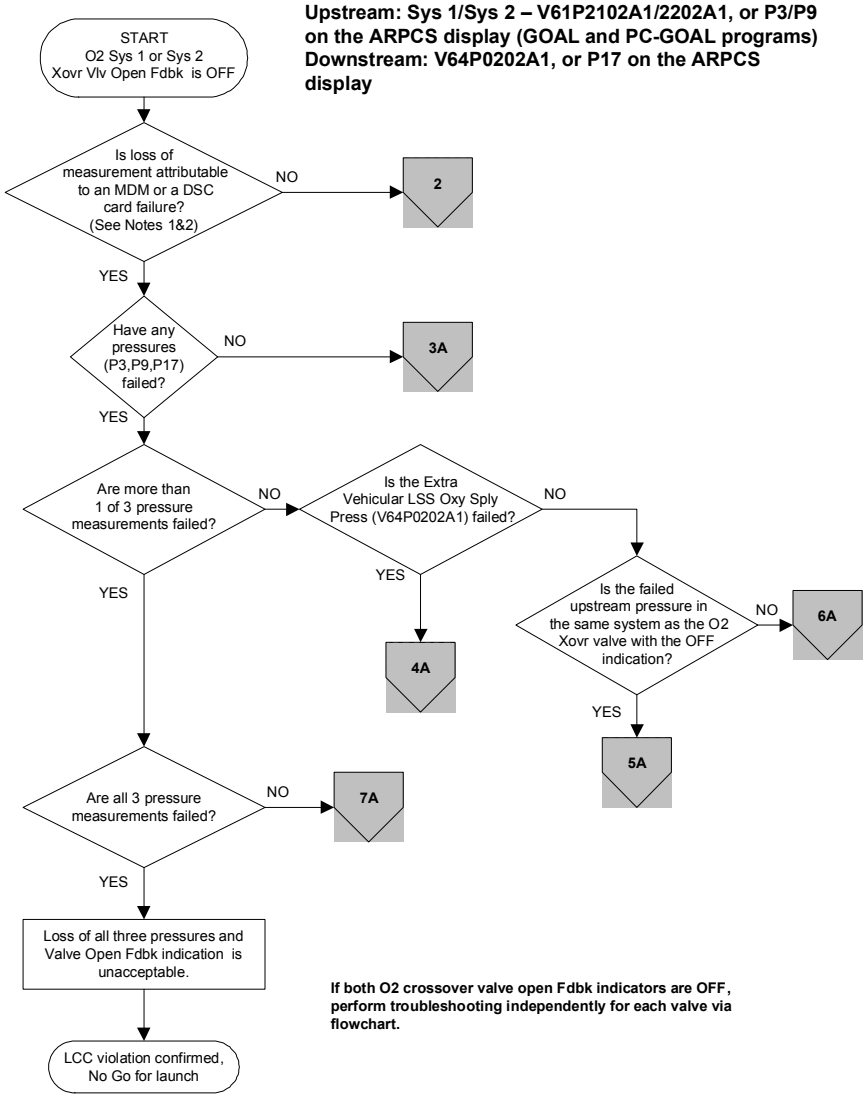
S0007_500-110-F-011

Orbiter O_2 Xover Valve Anomaly (SSID ECL-12) (Page 1 of 7) (Xover Valve OPEN Fdbk Indicator is OFF)

10/08/09

Orbiter O2 Xovr Valve Anomaly (SSID ECL-12)
(Xovr Valve Open Fdbk indicator is OFF)

References to Valve pressures are as follows:
Upstream: Sys 1/Sys 2 – V61P2102A1/2202A1, or P3/P9 on the ARPCS display (GOAL and PC-GOAL programs)
Downstream: V64P0202A1, or P17 on the ARPCS display



If both O2 crossover valve open Fdbk indicators are OFF, perform troubleshooting independently for each valve via flowchart.

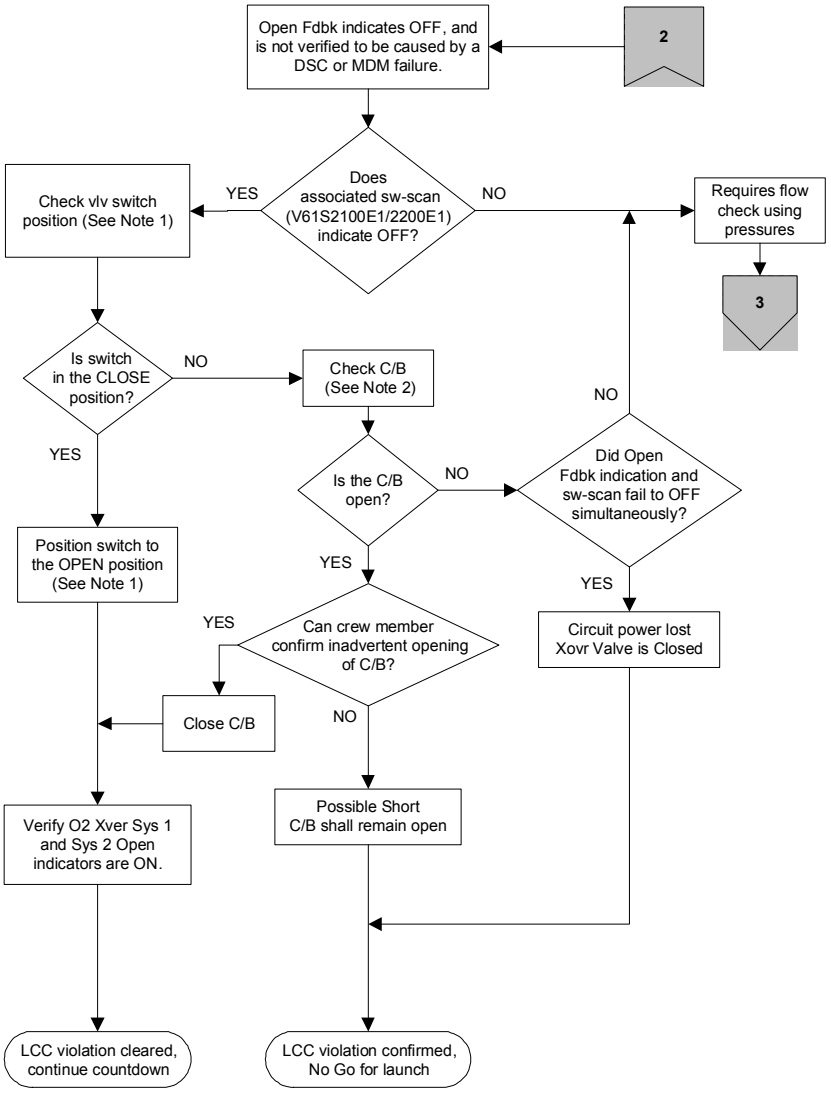
Notes:
1. O2 Xover Sys 1 Open Fdbk (V61X2103E1): MDM OF1 Card 02 and DSC OF1 card 10. MDM card and DSC function can be verified if O2/N2 Cntlr Vlv-Sys 1 Open indicator (V61X2372E1) is ON.
2. O2 Xover Sys 2 Open Fdbk (V61X2203E1): MDM OF2 Card 02 and DSC OF2 card 12. Request help from Integration console to determine health of DSC and MDM

S0007_500-110-F-021_01

Orbiter O_2 Xover Valve Anomaly (SSID ECL-12) (Page 2 of 7) (Xover Valve Open Fdbk Indicator is OFF - Circuit Check)

10/08/09

Orbiter O2 Xovr Valve Anomaly (SSID ECL-12)
(Xovr Valve Open Fdbk indicator is OFF – Circuit Check)



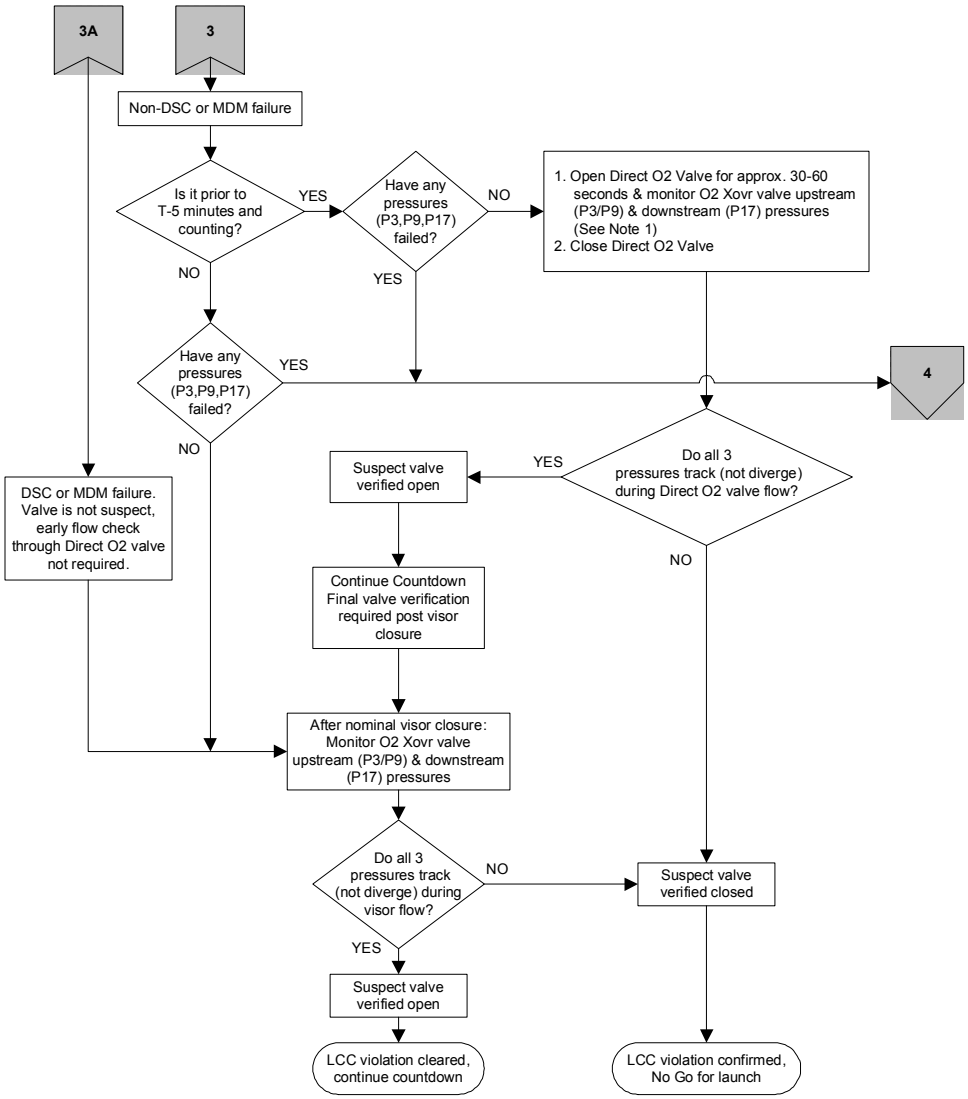
Notes:
1. CDR-PNL L2, Atm Press Control, O2 Xovr, Sys 1 Sw (Sys 2 Sw) – OPEN or CLOSE
2. Sys 1 C/B: CDR-PNL O14, Row D, Atm Press Control, O2 Xovr 1 CB – OPEN or CLOSE
   Sys 2 C/B: PLT-PNL O15, Row D, Atm Press Control, O2 Xovr 2 CB – OPEN or CLOSE

S0007_500-110-F-021_02

Orbiter O_2 Xover Valve Anomaly (SSID ECL-12) (Page 3 of 7) (Xover Valve Functional Check utilizing Pressures with O2 Xovr Sys Open Fdbk Indicating OFF)

10/08/09

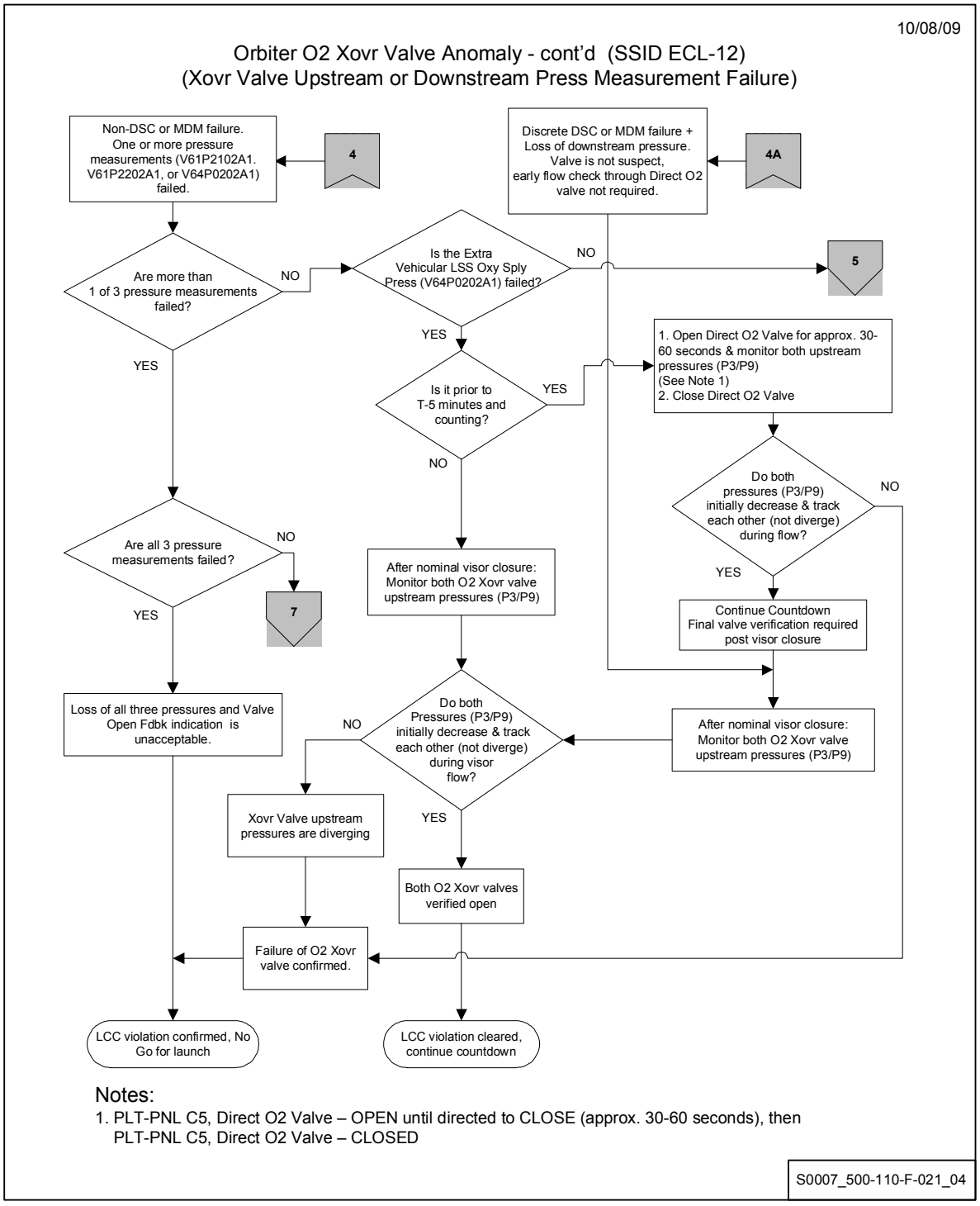
Orbiter O2 Xovr Valve Anomaly (SSID ECL-12)
(Valve functional check utilizing pressures with O2 Xovr Sys Open Fdbk indicating OFF)



Notes:
1. PLT-PNL C5, Direct O2 Valve – OPEN until directed to CLOSE (approx. 30-60 seconds), then PLT-PNL C5, Direct O2 Valve – CLOSED

S0007_500-110-F-021_03

Orbiter O_2 Xover Valve Anomaly (SSID ECL-12) (Page 4 of 7)
(Xover Valve Upstream or Downstream Press Measurement Failure)

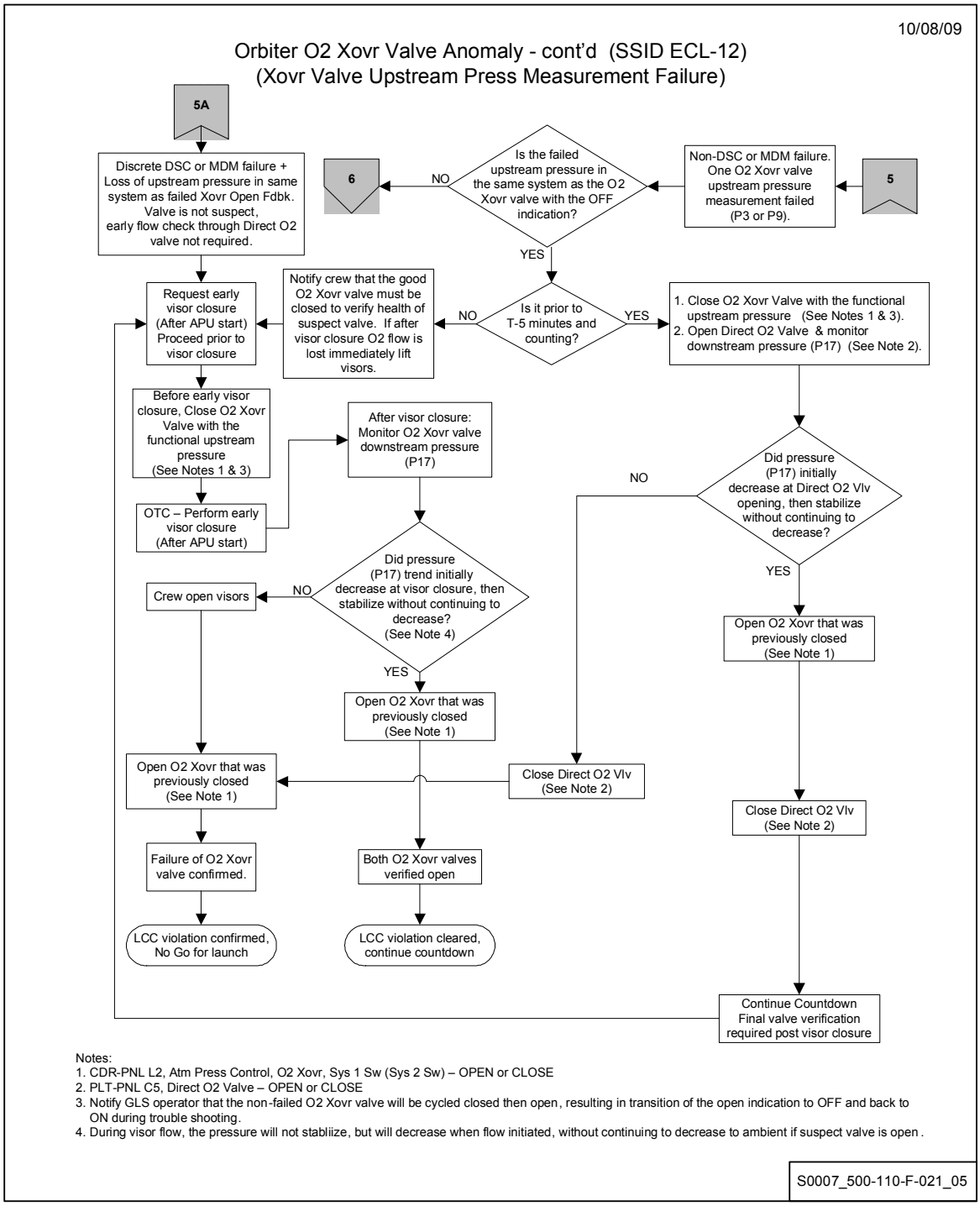


Notes:

1. PLT-PNL C5, Direct O2 Valve – OPEN until directed to CLOSE (approx. 30-60 seconds), then PLT-PNL C5, Direct O2 Valve – CLOSED

S0007_500-110-F-021_04

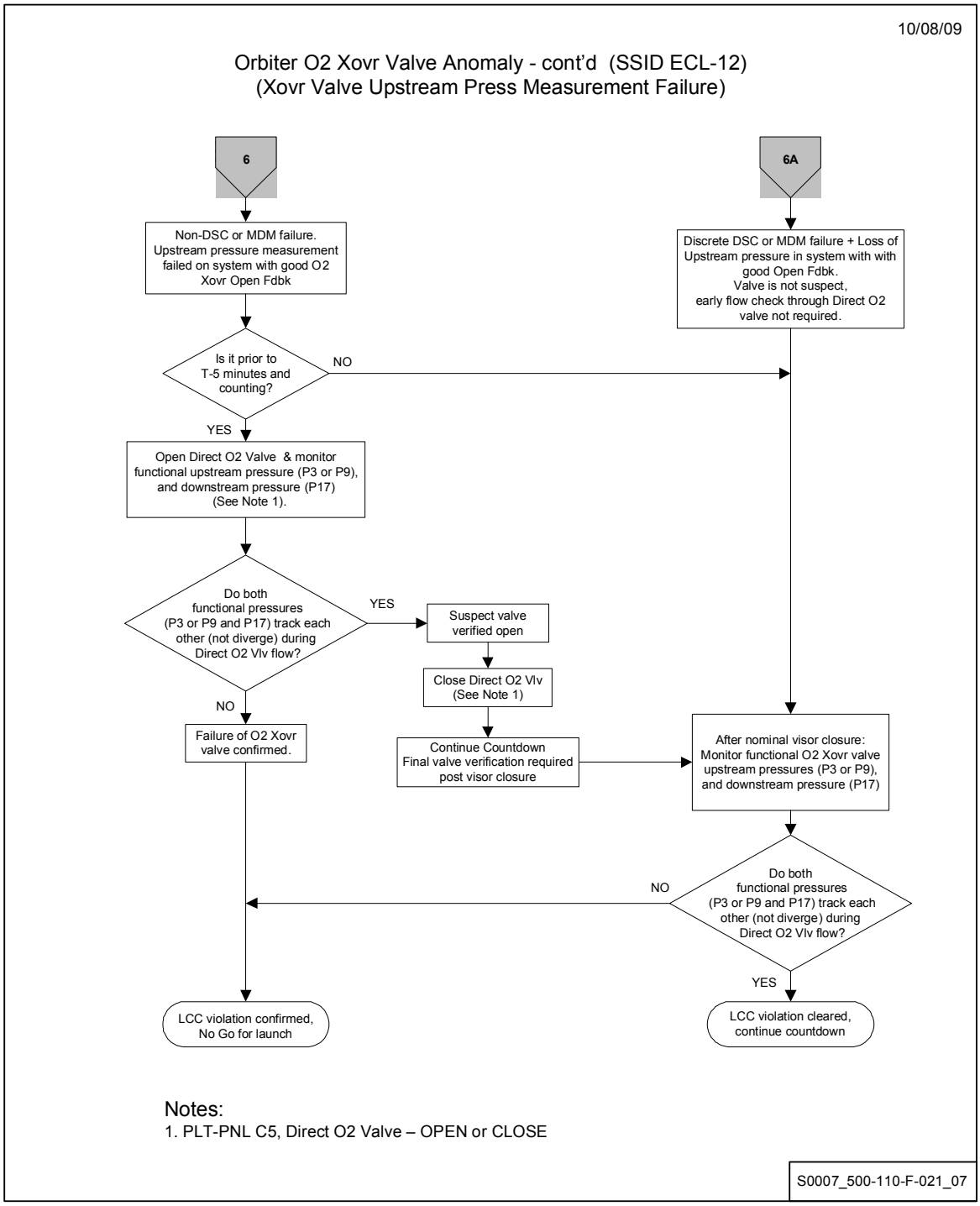
Orbiter O_2 Xover Valve Anomaly (SSID ECL-12) (Page 5 of 7) (Xover Valve Upstream Press Measurement Failure)



Notes:
1. CDR-PNL L2, Atm Press Control, O2 Xovr, Sys 1 Sw (Sys 2 Sw) – OPEN or CLOSE
2. PLT-PNL C5, Direct O2 Valve – OPEN or CLOSE
3. Notify GLS operator that the non-failed O2 Xovr valve will be cycled closed then open, resulting in transition of the open indication to OFF and back to ON during trouble shooting.
4. During visor flow, the pressure will not stabliize, but will decrease when flow initiated, without continuing to decrease to ambient if suspect valve is open.

S0007_500-110-F-021_05

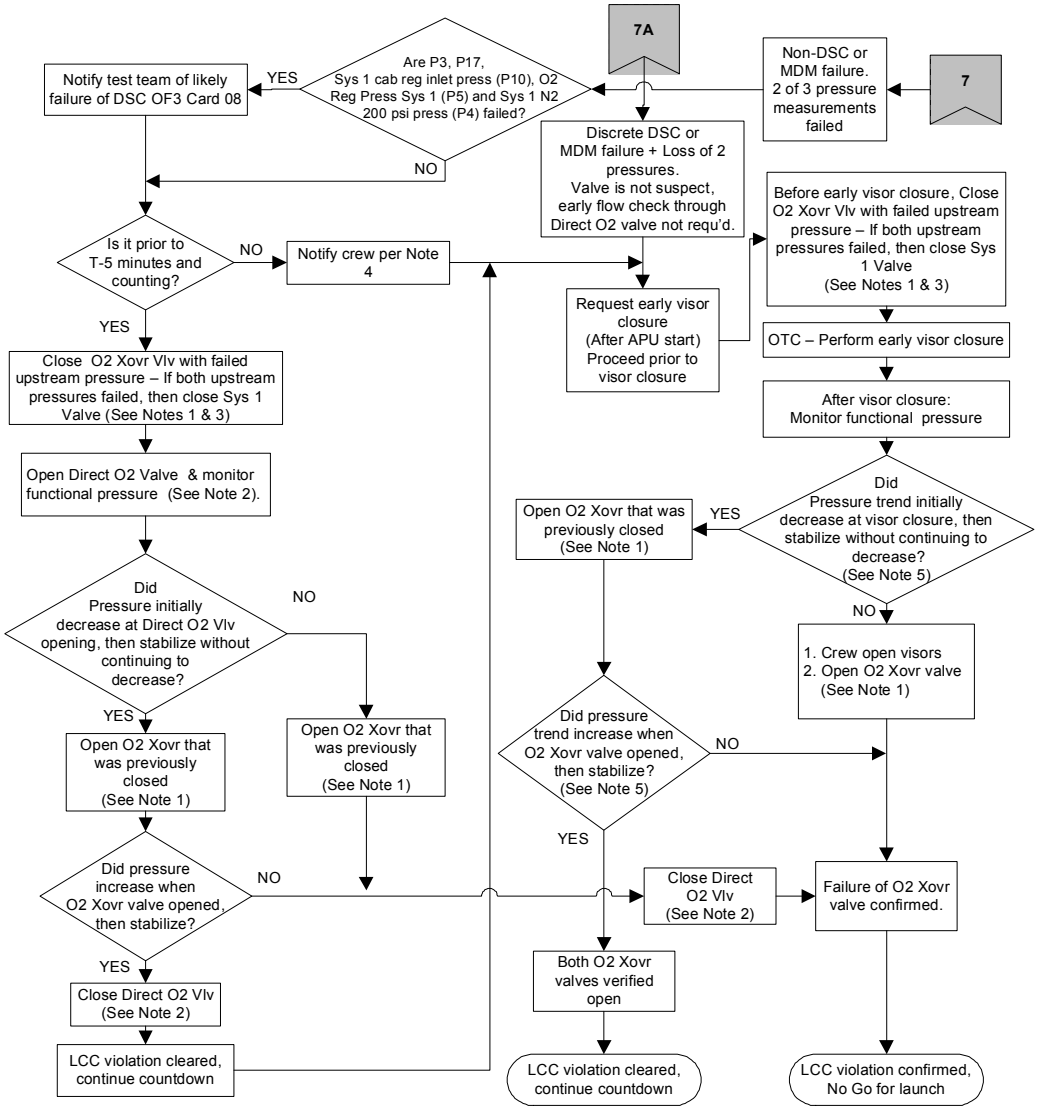
Orbiter O_2 Xover Valve Anomaly (SSID ECL-12) (Page 6 of 7) (Xover Valve Upstream Press Measurement Failure)



Orbiter O_2 Xover Valve Anomaly (SSID ECL-12) (Page 7 of 7) (Multiple Pressure Measurements Failed)

10/19/09

Orbiter O2 Xovr Valve Anomaly - cont'd (SSID ECL-12)
(Multiple pressure measurements failed)

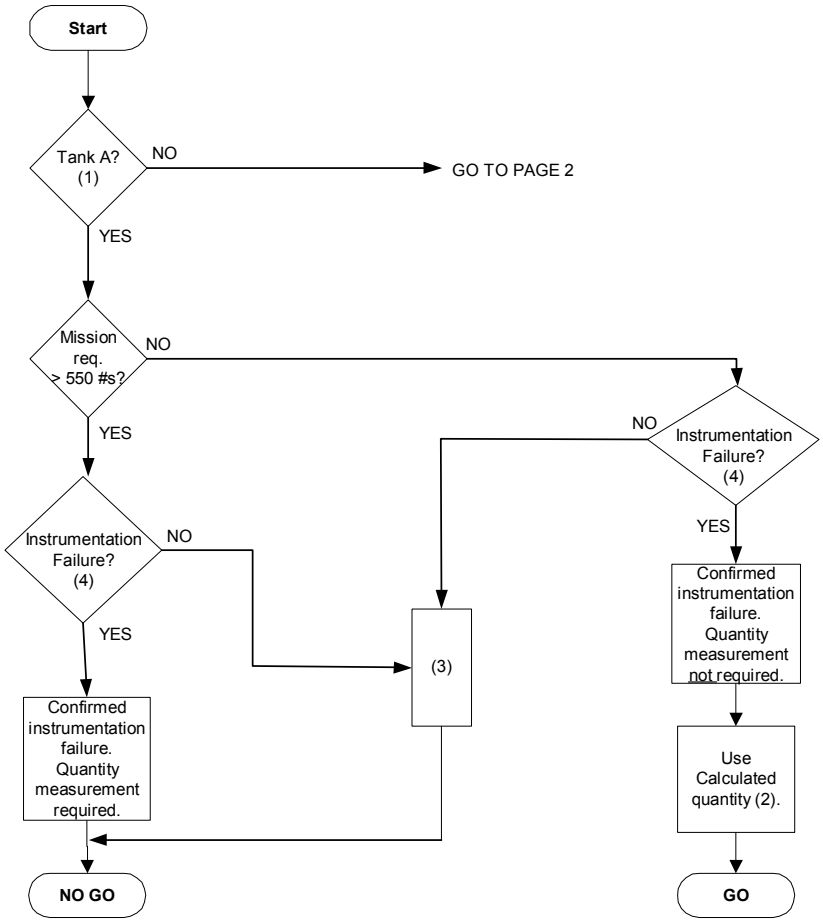


Notes:
1. CDR-PNL L2, Atm Press Control, O2 Xovr, Sys 1 Sw (Sys 2 Sw) – OPEN or CLOSE
2. PLT-PNL C5, Direct O2 Valve – OPEN or CLOSE
3. If the non-failed O2 Xovr valve will be closed, then notify GLS operator that the non-failed O2 Xovr valve will be cycled closed then open, resulting in transition of the open indication to OFF and back to ON during trouble shooting .
4. If the failed Xovr valve Open Fdbk is not in the same system as the failed upstream pressure , then notify the crew that the good O2 Xovr valve must be closed to verify the health of the suspect valve . If after visor closure O2 flow is lost, immediately lift visors.
5. During visor flow, the pressure will not stabliize, but will decrease when flow initiated, without continuing to decrease to ambient if suspect valve is open .

S0007_500-110-F-021_06

Potable Water Tank Quantity Anomaly (SSID ECL-20)

3/2/04



(1) Max Qty Tank A as follows (Limits apply when count resumed post hold)

Time	Normal Repress	Early Repress
T-9 (m)	81.7%	90.1%
T-5 (m)	82.5%	90.9%
T-31 (s)	83.5%	91.9%

(2) Quantity calculation

Calculated = FC amps X 0.02371 = #/hr H2O.

(3) Possible problems / conditions

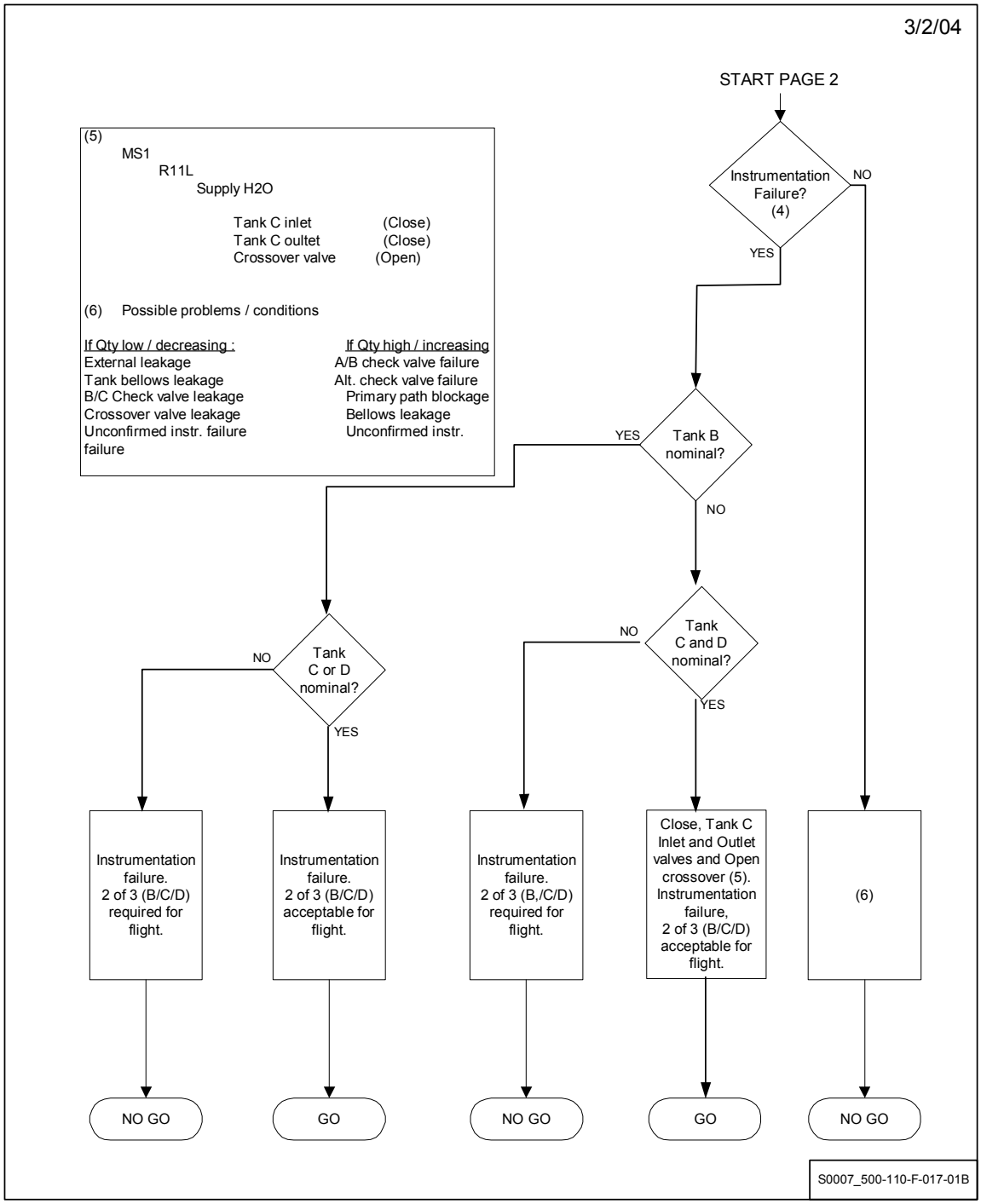
If Qty low / decreasing :
External leakage
A/B check valve leakage
Tank A bellows sticking / leakage
Alt check valve leakage
Primary water path blockage
Overboard relief / leakage
Unconfirmed instr. failure

If Qty high / increasing
H2 in fuel cell water
Tank A bellows leakage
Unconfirmed instr. failure

(4) Quantity at high/low limit and or exhibiting a step function change is confirmed instrumentation failure.

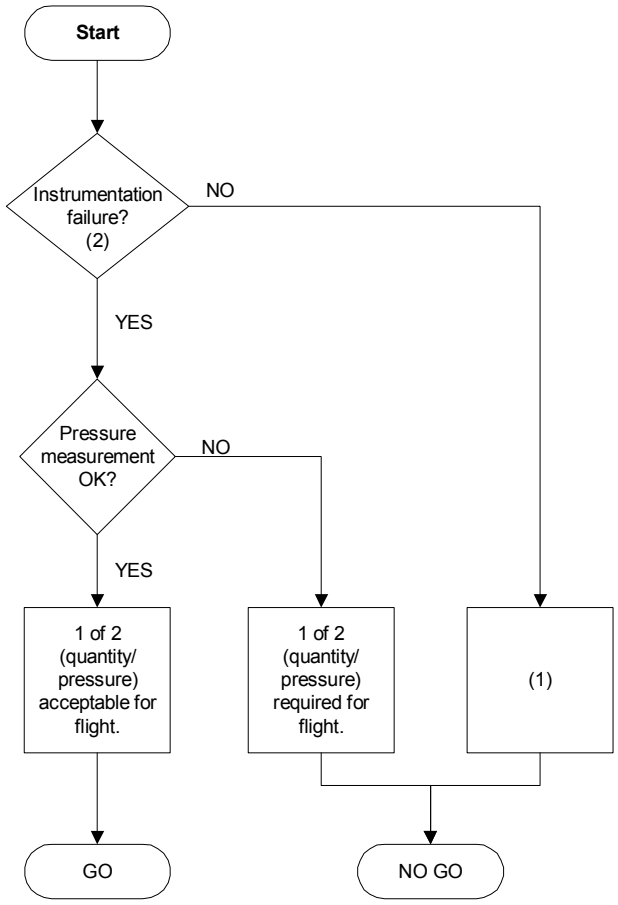
S0007_500-110-F-017-01A

Supply Water Tank Quantity Anomaly (SSID ECL-20)



Waste Water Tank Quantity Anomaly (SSID ECL-21)

01-16-04



(1) POSSIBLE PROBLEMS/CONDITIONS

IF QTY LOW/DECREASING:

EXTERNAL LEAKAGE UNCONFIRMED INSTR. FAILURE

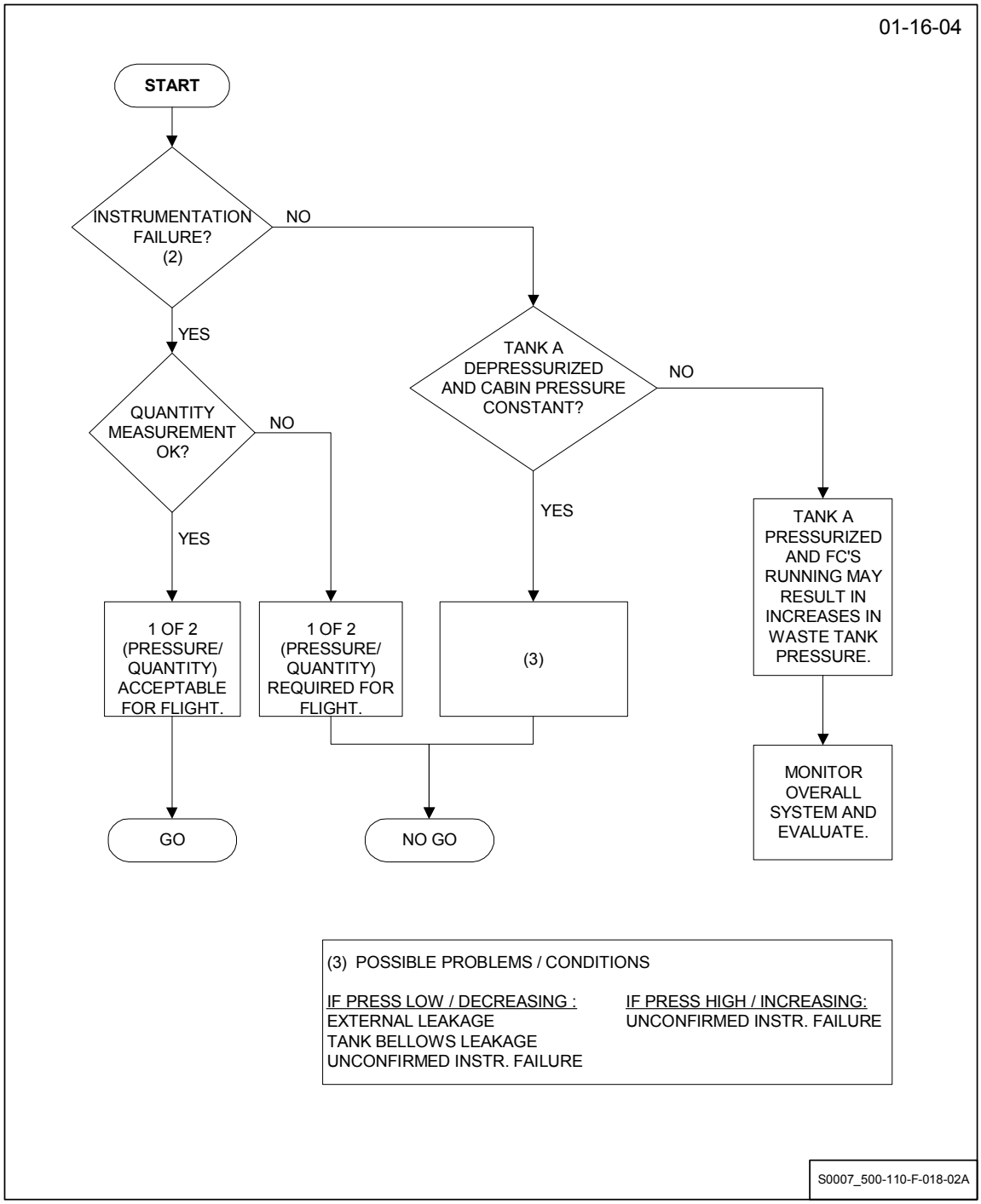
IF QTY HIGH/INCREASING:

BELLOWS LEAKAGE UNCONFIRMED INSTR. FAILURE

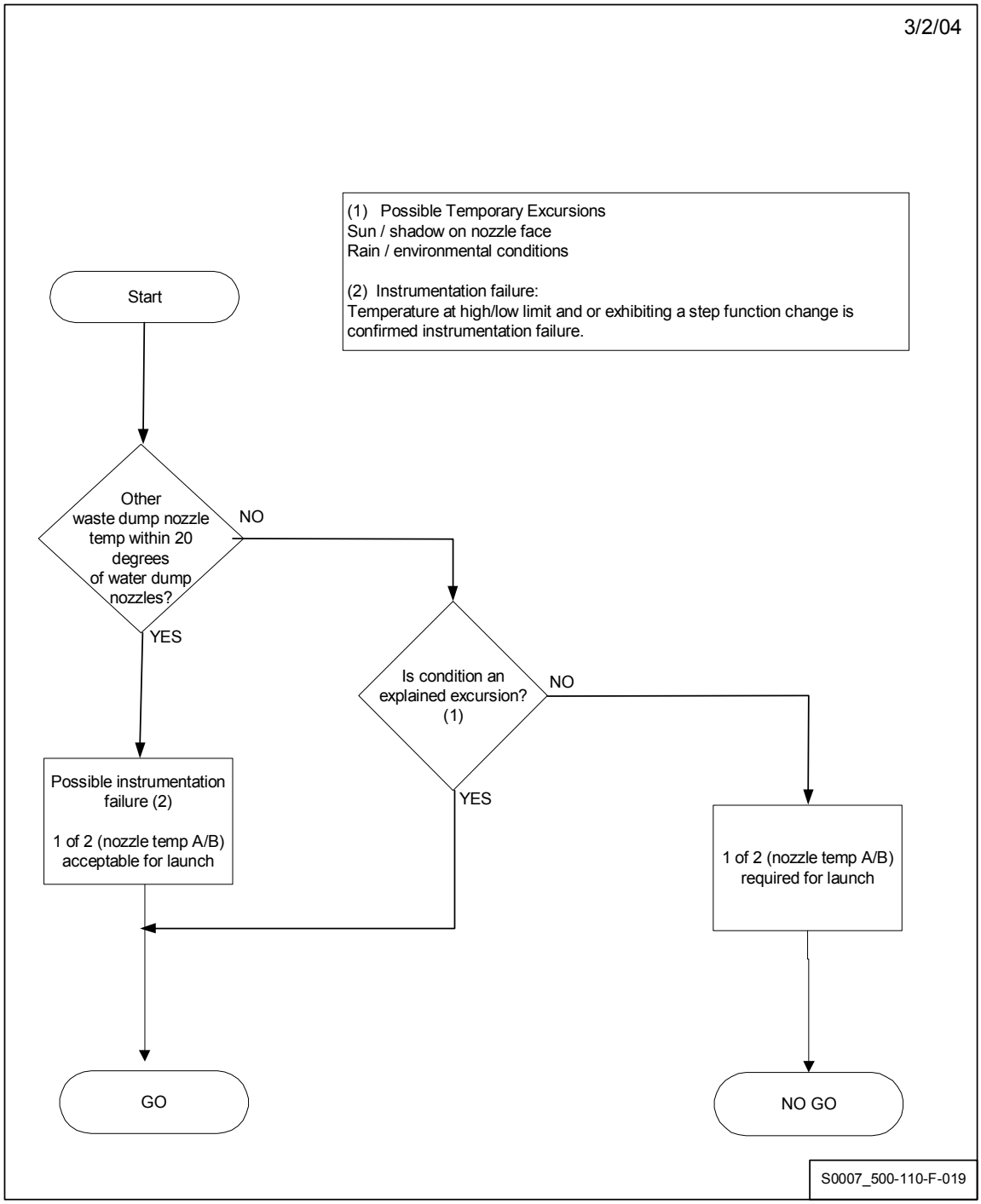
(2) QUANTITY AT HIGH/LOW LIMIT AND OR EXHIBITING A STEP FUNCTION CHANGE IS CONFIRMED INSTR. FAILURE.

S0007_500-110-F-018-01A

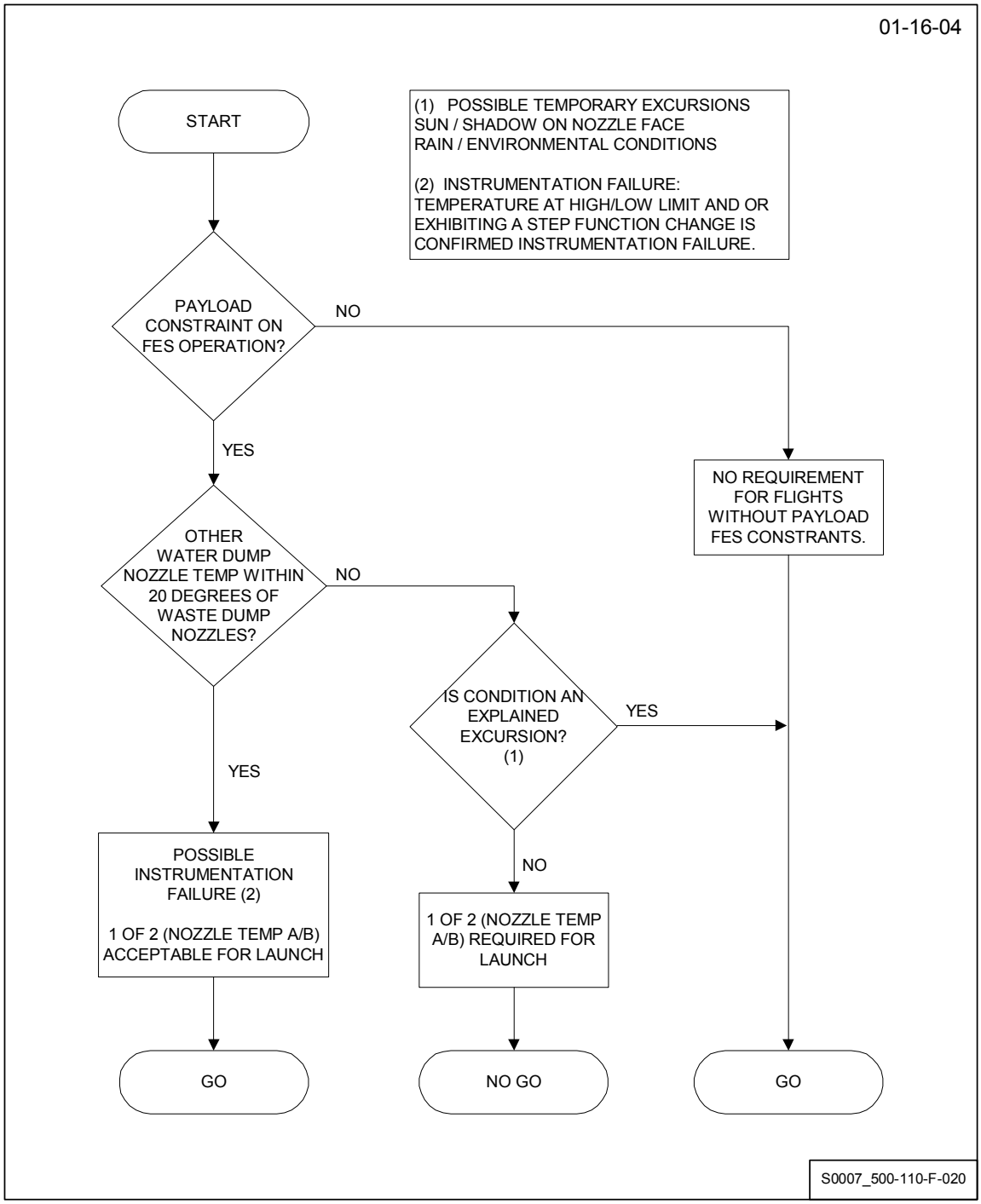
Waste H_2O Liquid Pressure Anomaly (SSID ECL-21)



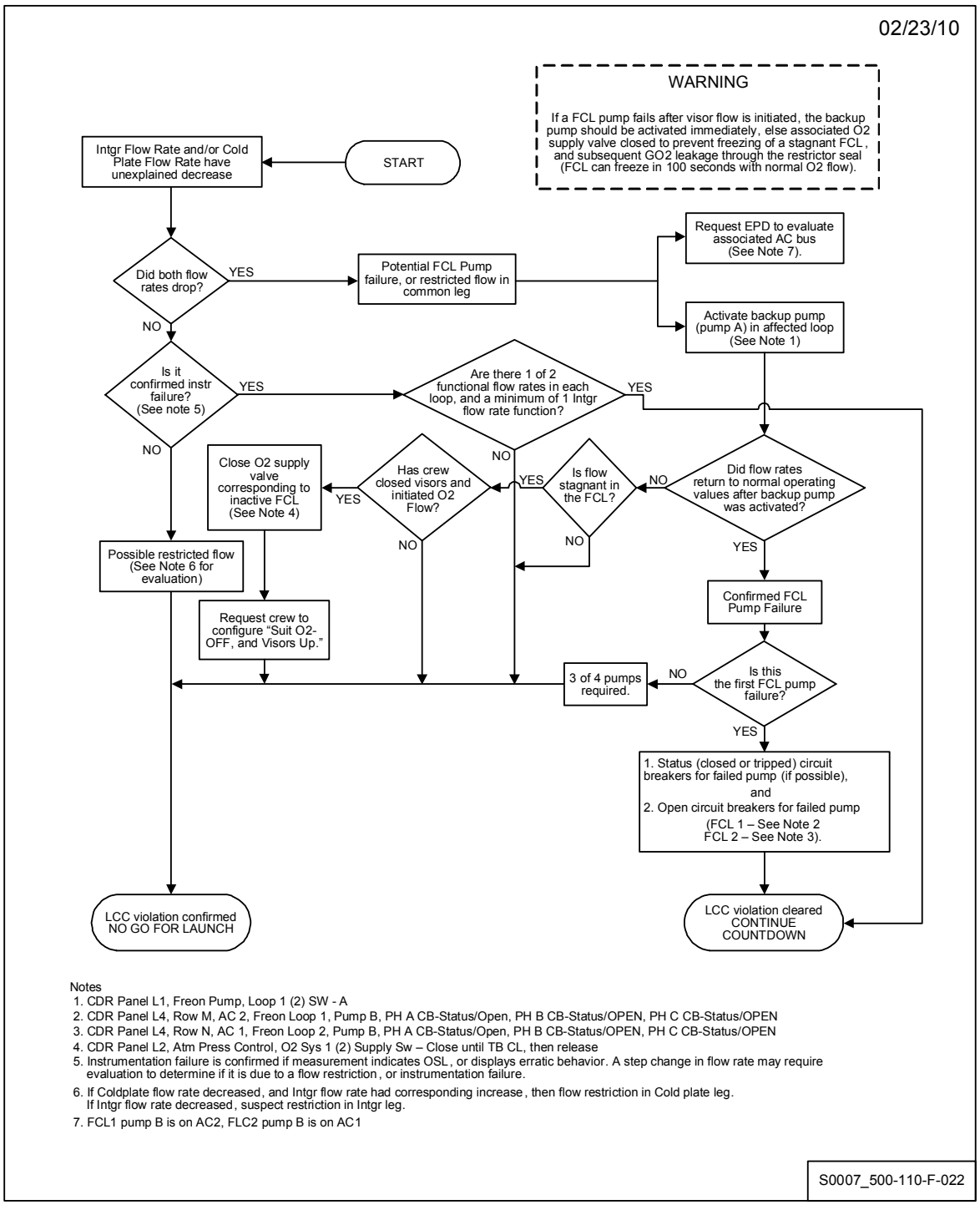
Waste H_2O Dump Nozzle Temp Anomaly (SSID ECL-22)



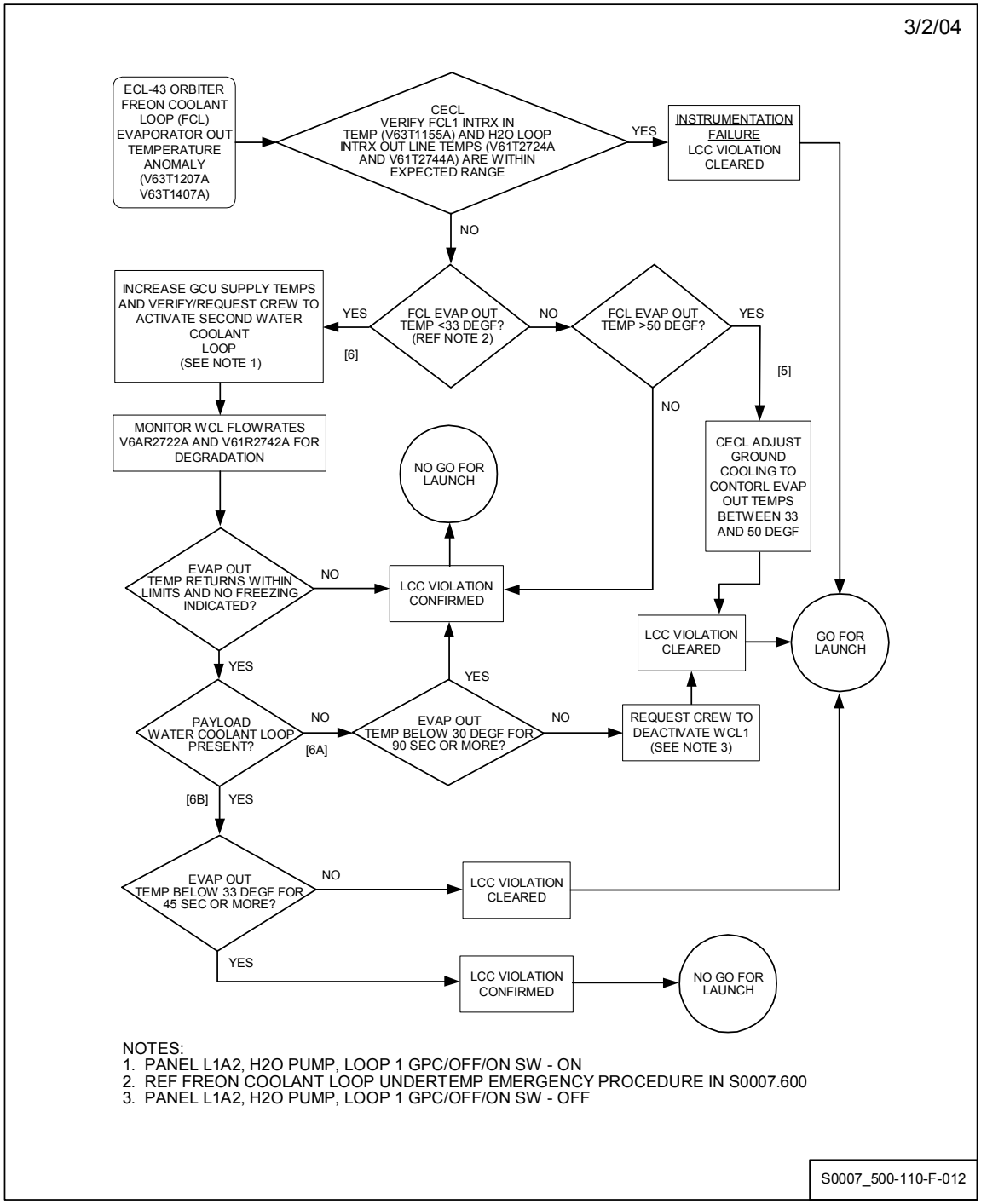
Supply H_2O Dump Nozzle Temperature Anomaly (SSID ECL-23)



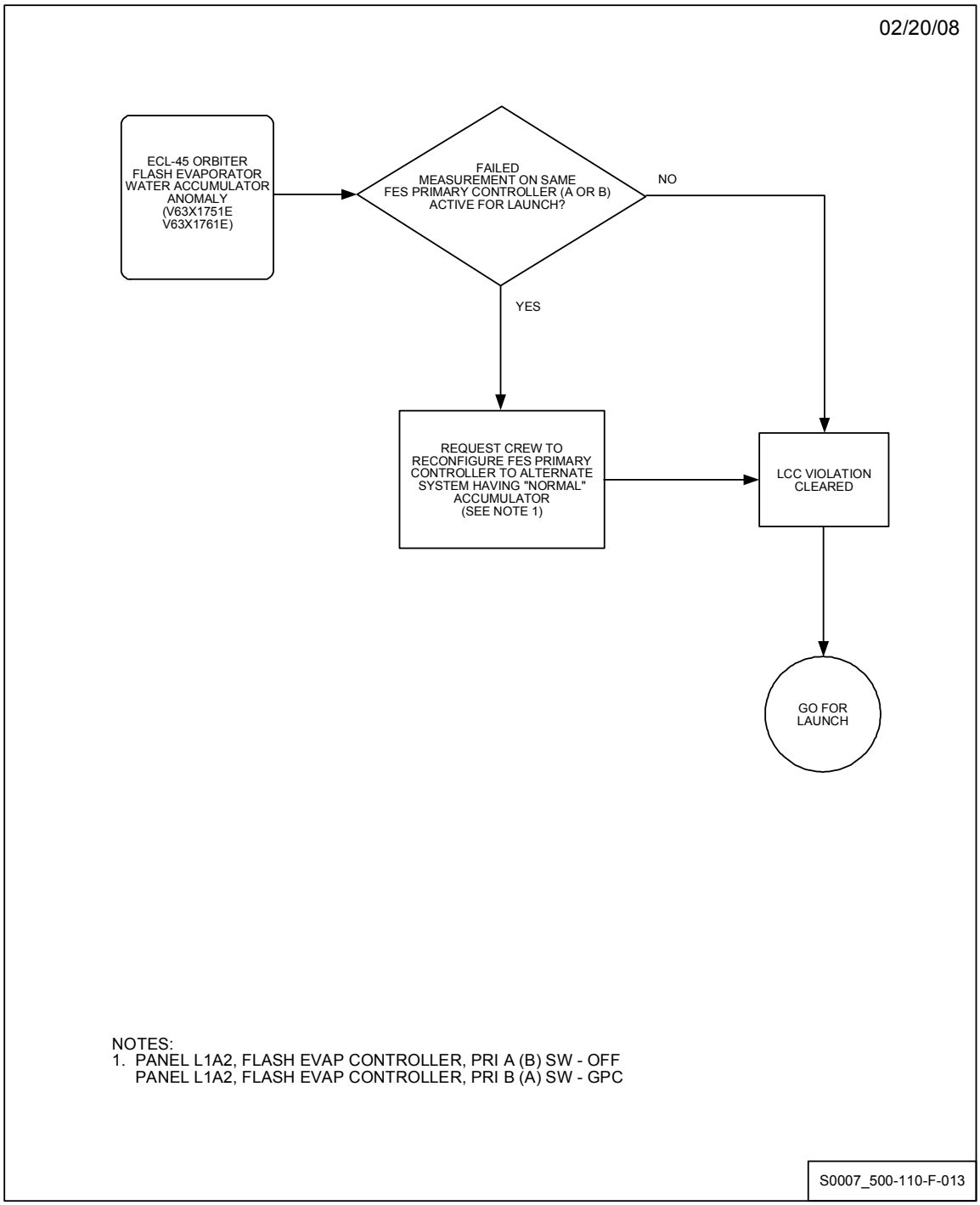
Freon Flow Rate Anomaly (SSID ECL-40)



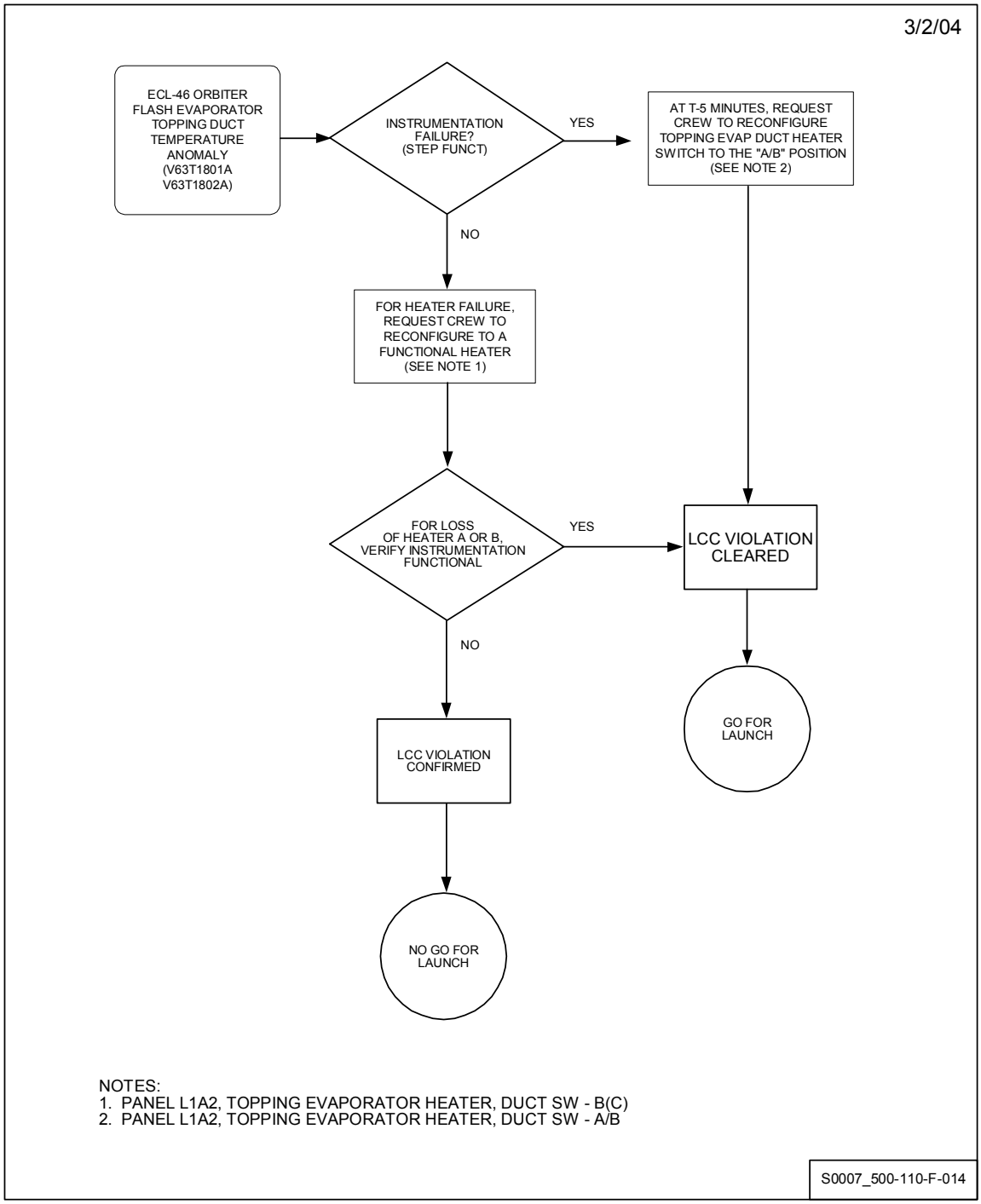
FCL Evaporator Out Temp Anomaly (SSID ECL-43)



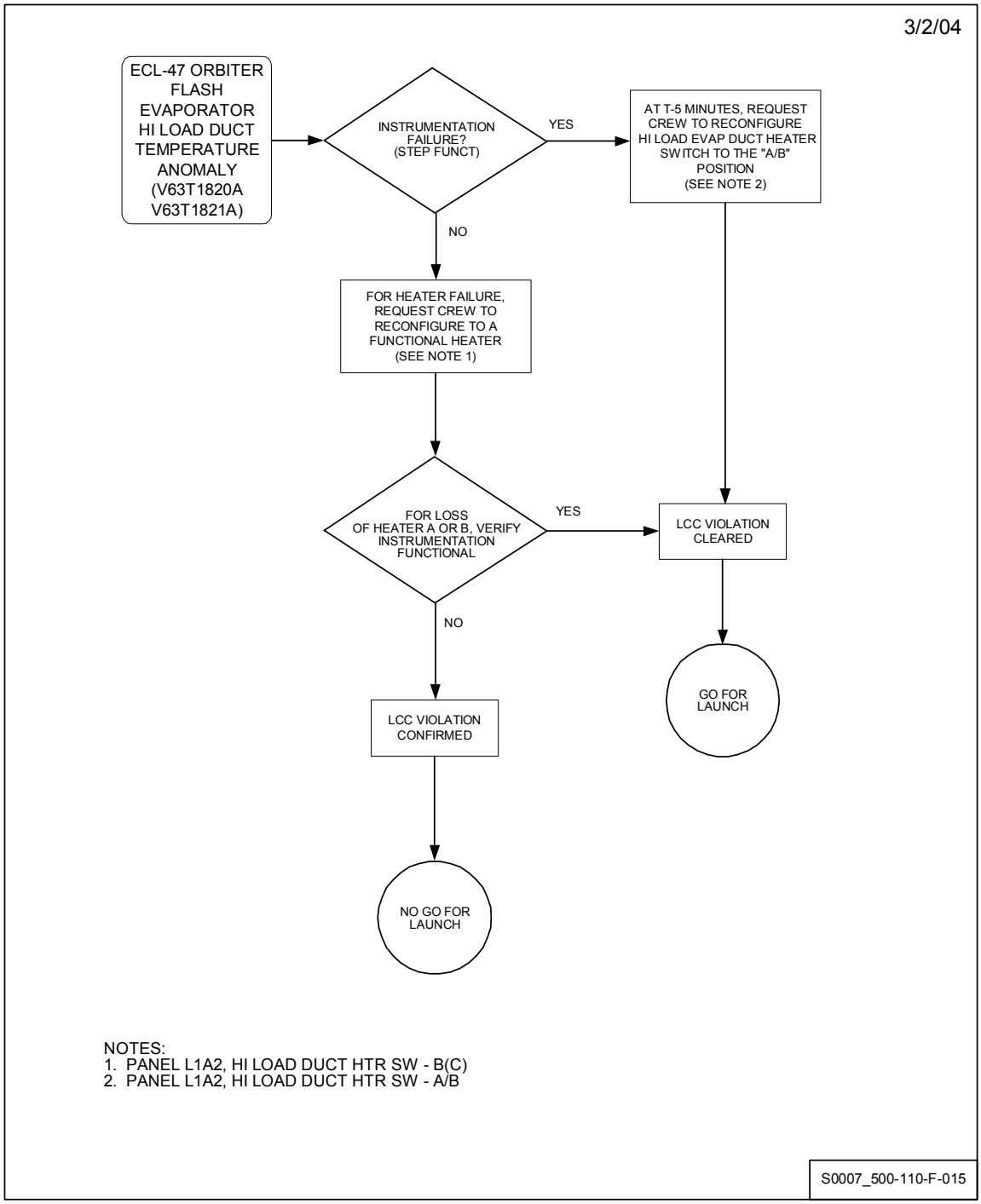
FES Water Accumulator Anomaly (SSID ECL-45)



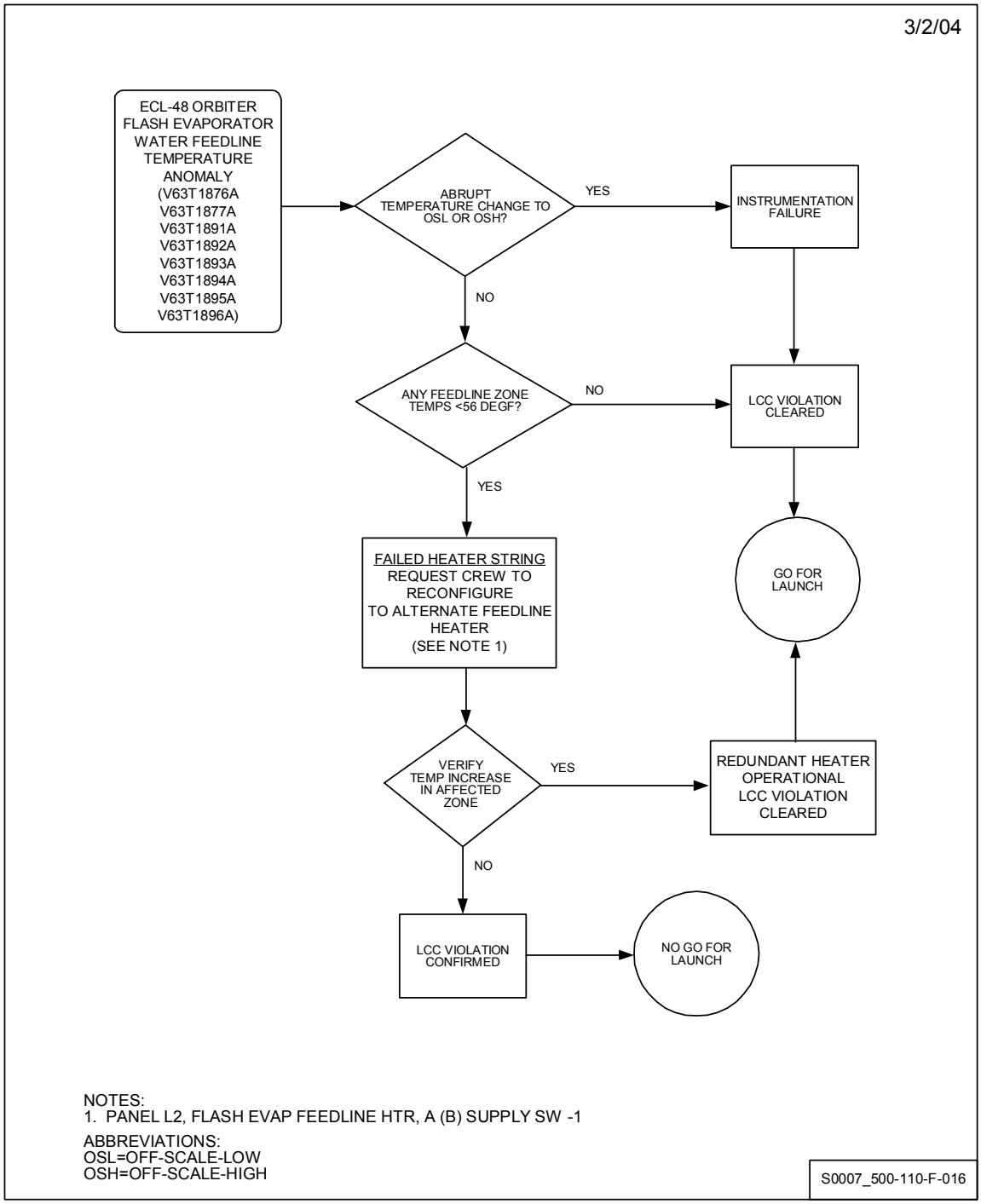
FES Topping Duct Temperature Anomaly (SSID ECL-46)



FES High Load Duct Temperature Anomaly (SSID ECL-47)



FES Water Feedline Temperature Anomaly (SSID ECL-48)



*** End of Operation **110** ***

OPERATION 111 DPS/BFS

Shop: **DPS**
Cntrl Rm Console: **C12**
OPR: **DPS**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **1.0**

Index To Operation 111

1. PASS/BFS MEDS Anomaly Recovery (SSID DPS-01A/BFS-10A)

2. GPC I-Fail Contingency (SSID DPS-02)

3. PASS FC/PL MDM Bypass Recovery (SSID DPS-03)

4. Reserved

5. MMU2 I/O Error Recovery (SSID DPS-06a)

6. BFS I/O Error PCM Recovery (SSID BFS-15)

7. BFS Payload MDM Bypass Recovery (SSID BFS-09)

8. G9 Quick Recycle

9. Remote BFS Deactivation

10. PASS GPC Downlist Recovery (SSID DPS-29)

11. BFS Mode to Standby/Run

12. MEDS Program Note Listing

1. PASS/BFS/MEDS Anomaly Recovery Flowchart

NOTE

Perform PASS/BFS/MEDS Anomaly Recovery Option if a PASS (SSID DPS-01A) or BFS (SSID BFS-10A) MEDS anomaly occurs during Countdown.

Option 1 Not Performed:_____

NOTE

The following table is an abbreviated list of acceptable MEDS conditions that are no constraint to flight. It is provided to facilitate a quick response for the most common acceptable conditions post T-9 Min by pre-determining the outcome of the MEDS Anomaly Flowchart for the specific conditions listed.

Table 111-1 **Acceptable MEDS Conditions - Post T-9 Min Quick Look (a)** Pg 1 of 2

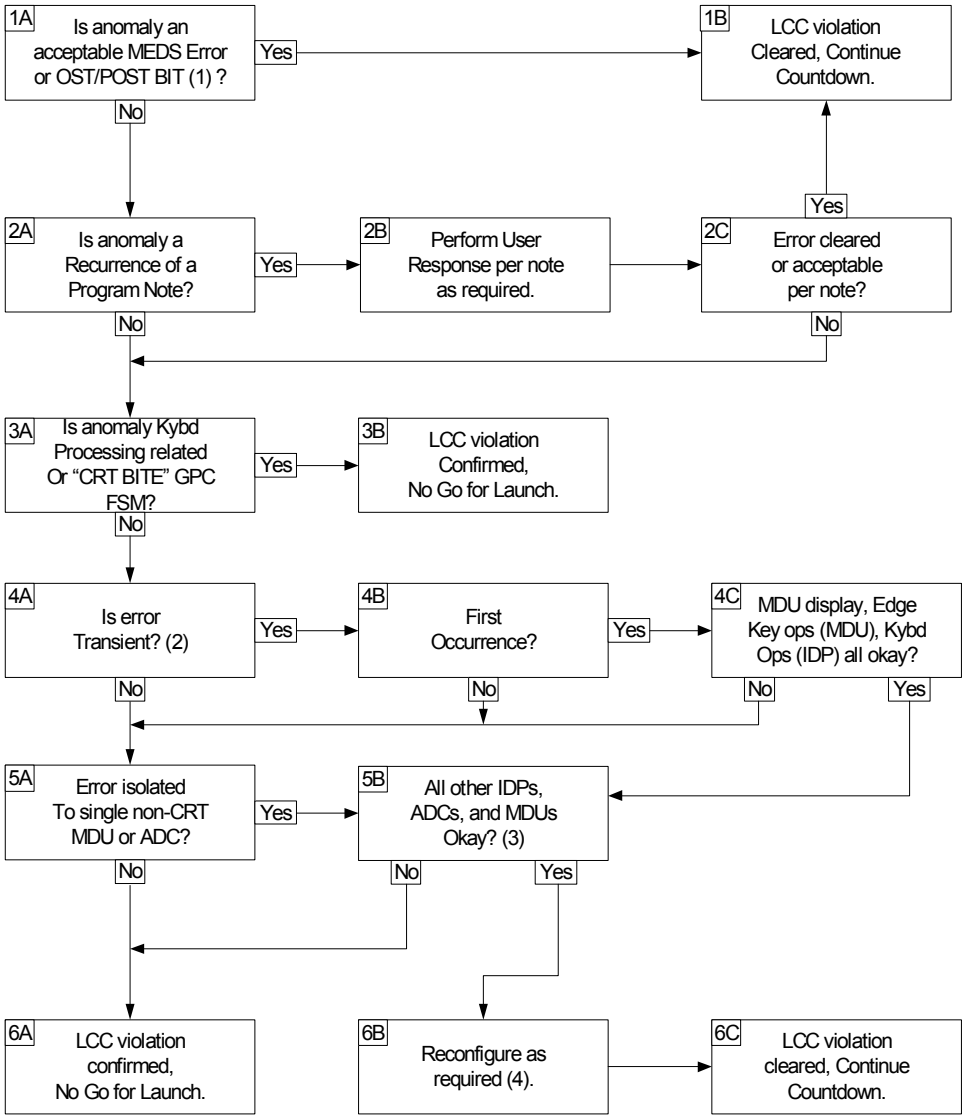
IDP SW1-3 (b)	Condition	Description/Recommendation (c)
IDP ERRORS		
x9xx xx11 xxx1	DR109735	IDP Software Long Foreground Cycle Recommendation: Continue Count. Condition is acceptable per User Note.
x9xx xx4B xxx1	HW-0010	Transient DK MIA Word Error Indication Recommendation: Check with Crew. If CRTx display is nominal and IDP can call/resume GPC Fault Sum, Continue Count. Condition is acceptable per User Note.
x9xx xx4D xxx1 and/or xAxx 0001 xxx1	SCS1 / MSU Failure	Recommendation: Continue Count. Error is excluded from LCC. MSU is not required for IDP operation.
ADC ERRORS		
x9xx xxxx xxxN and/or xAxx xxxx xxxN (N = A or B)	ADC Failure (3 of 4 Req)	Recommendation: Continue Count. Single ADC fail is allowed per LCC due to redundancy level. Crew may port mode as required - no constraint to resuming count.

Table 111-1 **Acceptable MEDS Conditions - Post T-9 Min Quick Look (a)** Pg 2 of 2		
IDP SW1-3 (b)	**Condition**	**Description/Recommendation (c)**
MDU ERRORS		
xAxx 0008 xxx2 and xCxx DB05 xxx2	DR109762	Extended Duration MDU Lamp TEC Bit Fail (CRT) <u>Recommendation:</u> Check with Crew. If display is acceptable, Continue Count. Condition is acceptable per User Note.
xAxx 0008 xxx2 and xCxx D905 xxx2	HW-0007 HW-0008	Transient Luminance Cntl Loop Fail (CRT) Max Bright Luminance Cntl Loop Fail (CRT) <u>Recommendation:</u> Check with Crew. If display is acceptable, Continue Count. Condition is acceptable per User Note.
x9xx xxxx xxxN and/or xAxx xxxx xxxN (N = 3-9)	Non-CRT MDU Failure (5 of 6 Req)	<u>Recommendation:</u> Continue Count. Single non-CRT fail is allowed due to redundancy level. Crew may reconfigure displays as required - no constraint to resuming count.
See Table 3	MDU Excluded Error	<u>Recommendation:</u> If signature matches acceptable MDU BIT error per Table 3, Continue Count. Condition is benign and excluded from LCC.

(a) Not a complete list - refer to MEDS Anomaly Flowchart for other conditions
(b) An 'x' in SWs indicates Don't Care
(c) The recommendation assumes no additional MEDS faults occurred previously during Countdown. Hold Count if multiple anomalies occur.

MEDS ANOMALY FLOWCHART

12-23-08



(Numbers in parentheses refer to Supporting Notes on following page)

S0007_500-111-F-001

MEDS FLOWCHART SUPPORTING NOTES

(1) The MEDS indications that have been deemed acceptable are as follows: (Reference Table 5 to determine reporting LRU ID)

- MEDS errors specified in Table 1 are acceptable for Flight.
- IDP OST/POST Summary BIT errors specified in Table 2 are acceptable for flight if they occur as a result of the associated Detailed BIT indications.
- MDU OST/POST Summary BIT errors defined in Table 3 are acceptable for flight if the occur as a result of the associated Detailed BIT indications.
- ADC OST/POST Summary BIT errors defined in Table 4 are acceptable for flight.

All other IDP/MDU/ADC OST/POST Summary BIT errors require evaluation.

(2) A transient error includes any of the following conditions:

- Single occurrence of an "I/O Error CRT x" GPC FSM
- Single occurrence of a MEDS error*
- Single occurrence of an OST/POST BIT error that clears*
- Single occurrence of a crew reported display anomaly that clears*
- Single occurrence of an SW3 Display/Format Fill error or Checksum error that clears

* For MDUs and ADCs, an error condition that is cleared by power cycling the LRU is also considered a transient. If remaining hold time does not permit power cycle, the anomaly will be treated as hard failed.

Power cycle of ADC requires access to Panel R-14 and will not be attempted if the Circuit Breaker is tripped, or if the ASP has departed the Crew Module.

(3) Only a single MEDS LRU anomaly is acceptable. Any transient or hard failed anomaly reported against any other IDP, MDU, ADC or MDU/ADC port, except for Excluded Errors, User Note conditions, or IDP/CRT 4 anomalies if excluded by the MEL, violates redundancy requirements.

MEDS FLOWCHART SUPPORTING NOTES (Cont)

(4) Crew may power off failed LRU and reconfigure displays, FC buses, and/or port mode MDUs as required to work around a single failed non-CRT MDU or ADC.

a.) Completion of MEDS reconfiguration is not a constraint to continuation of Countdown. If remaining hold time does not permit completion of MEDS reconfiguration, it is acceptable for the Crew to complete it while the Countdown progresses, or during ascent.

b.) Crew may clear MEDS Fault Summary Messages at their discretion as time permits.

MEDS Flowchart Supporting Data:

Table 1 - Acceptable MEDS Errors*	
Error Code	**MEDS Error Description**
SW2 Hex**	
XX08	CST MM IN USE ERROR
XX11	DAS FOREGROUND EXTENDED
XX12	MSU SPIN-UP ERROR
XX4D	MSU I/O ERROR
XX50	OPERATOR REQUEST ERROR - MSU

* The MEDS Errors listed in this table are acceptable for flight.
All other MEDS errors require evaluation.

** XX = Don't Care

Table 2 - Acceptable IDP BIT Errors*			
OST/POST SUMMARY		**DETAILED BIT**	**IDP Summary/Detailed BIT Error Description**
SW2 BIT #	SW2 Hex	SW2 Hex	
08	0080	-	HDX Software Status
		F014	HDX SCSI Event Queue
		F015	HDX MSU Event Queue
15	0001	-	SCSI/MSU Fail
		F023	SCSI Failure 1
		F024	SCSI Failure 2
		F025	SCSI Failure 3
		F026	MSU Failure

* The IDP Summary BIT errors listed in this table are acceptable for flight if they occur as a result of the specified Detailed BIT indications. All other IDP Summary/Detailed BIT combinations require evaluation.

Table 3 - Acceptable MDU BIT Errors*			
OST/POST SUMMARY		**DETAILED BIT**	**MDU Summary/Detailed BIT Error Description**
SW2 BIT #	SW2 Hex	SW2 Hex	
01	4000	-	R3000 RAM Fail
		DD12	R3000 RAM Scrubber Fail
02	2000	-	EEPROM Fail
		DE03	EEPROM Write Fail
04	0800	-	Primary 1553B Fail
		DA12	Primary 1553B RAM Scrubber Fail
05	0400	-	Secondary 1553B Fail
		D712	Secondary 1553B RAM Scrubber Fail
07	0100	-	Spare (Unassigned)
		ALL	None defined - Disregard all
08	0080	-	Data Acquisition Fail
		DB04	Data Acquisition Backlight Sensor Fail
10	0020	-	GC RAM Fail
		D31A	GC CBIT Scrubber Fail
12	0008	-	Power Supply/Lamp Fail
		D905	Luminance Control Loop Fail
		DA05	Lamp Filament Fail
		DB05	Lamp TEC Fail
13	0004	-	Timer Fail
		DD07	Timer 1 Accuracy Fail
		DE07	Timer 1 Control Fail
		DF07	Timer 1 Interrupt Fail
14	0002	-	Miscellaneous Fail
		D503	UDI Interface Fail
15	0001	-	Overtemperature Sensor Fail
		D104	Ambient Temperature Sensor Fail
		D204	LCD Temperature Sensor Fail

* The MDU Summary BIT errors listed in this table are acceptable for flight if they occur as a result of the specified Detailed BIT indications. All other MDU Summary/Detailed BIT combinations require evaluation.

Table 4 - Acceptable ADC BIT Errors*		
OST/POST Summary		**ADC Summary BIT Error Description**
SW2 BIT #	SW Hex	
01	4000	Spare (Unassigned)
02	2000	Spare (Unassigned)
08	0080	Spare (Unassigned)
09	0040	Spare (Unassigned)
10	0020	Spare (Unassigned)

* The ADC Summary BIT errors listed in this table are acceptable for flight.
All other ADC Summary BIT indications require evaluation.

Table 5 - LRU ID Field Decode*			
ID Field SW3 Binary	**LRU Name**	**ID Field SW3 Binary**	**LRU Name**
0001	IDP	0111	MFD1
0010	CRT	1000	MFD2
0011	CDR1	1001	AFD1
0100	CDR2	1010	ADC1
0101	PLT1	1011	ADC2
0110	PLT2	Other	Invalid

* LRU ID Field (SW3 BITS 12-15) identifies the LRU reporting status in SW2.

***** End of 1. PASS/BFS MEDS Anomaly Recovery Flowchart *****

2. GPC I-Fail Contingency (CIF) (SSID-DPS-02)

NOTE
Perform next option if GPC I-Fail occurs prior to T-20 min.

Option 2 Not Performed:_____

111-1 **OTC** **CDPS**

Perform evaluation for GPC _____ I-Fail indication.

111-2 **CDPS** **OTC**

Evaluate health of suspect GPC per following: **Verify**

IF all of the following conditions are TRUE:

```
CRT (VAS59 PG-B)
AREA1 DOWNLIST VALID
GPC 1-4 IN REDUNDANT SET
ALL GPC U-FAILS - "G" GREEN

CRT (VAS97 PG-B)
NO "GPC X" FAULT SUMMARY MESSAGES
```

THEN ☐
Anomaly is confirmed instrumentation failure of the GPC _____ I-Fail indication and is not a constraint to Launch.

ELSE ☐
Anomaly is GPC _____ failure.

Perform Redundant Set GPC Fail Recovery for GPC _____ per OMI V9001VL2

Do not perform remainder of this option.

NOTE
Perform next two steps if master alarm has occurred.

111-3 CDPS CDR

PANEL F2
MASTER ALARM PB - PRESS, RELEASE

Not Performed:_____

111-4 CDPS CDR

GPC _____ I-FAIL CAM LIGHT IS INOPERATIVE. USE FAULT SUM PAGE FOR GPC FAIL INDICATIONS.

Not Performed:_____

***** End of 2. GPC I-Fail Contingency Option (SSID DPS-02) *****

3. PASS Flight Critical and Payload MDM Bypass Recovery (SSID DPS-03)

NOTE

Perform next option if a PASS Flight Critical or Payload MDM Return Word PROM Sequence bypass occurs.

MDM bypass will result in commfault flags being set in the FSW, which may affect GNC RM Switch Monitor selection of sensory inputs. These commfaults will be reset following a successful switchover to the alternate port, with no residual deleterious effects to the operation of GNC RM Switch Monitor.

If in Ops 1, bypass of an AFT MDM/element may result in RSLS erroneously indicating a ME Pad Data Path Fail. (DR101362)

Option 3 Not Performed:_____

111-5 CDPS NTD

MDM _____ Bypass has occurred. This is a violation of SSID DPS-03. Data from MDM _____ is currently invalid (stale).

111-6 CDPS

```
CONSOLE KYBD
CBTU RBSR _____ (RECORD MDM)
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

RECORD RESULTS: _____
```

NOTE
I/O reset and MDM port moding may affect IMU preflight cal/alignment.

111-7 **CDPS** **OTC**
OTC **CGNC**

IF in G9,

THEN
I/O reset and MDM port moding will occur.
Request CGNC permission to proceed.

Not Performed:_____

NOTE
I/O reset is for data gathering purposes only.

111-8 **CDPS**

```
CONSOLE KYBD
DEUE DEST,GN,1
XMIT CMD KEY - PRESS
DEUE I/O RESET EXEC
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

NOTE

PL MDM Bypass status is not downlisted in G9 Format 44. PL Bypass check will instead use corresponding "I/O ERROR PL1/PL2" FSMs.

111-9 CDPS

IF recovering from Flight Critical MDM Bypass,

THEN perform:

CURSOR CNTL (SAS01 PG-B)
BCE BYPASS STATUS (VAS60)
XMIT CURSOR KEY - PRESS

CRT (VAS60 PG-B)
RECORD BYPASS STATUS OF MDM:_____

PFK 2 KEY - PRESS

Not Performed:_____

111-10 CDPS

```
CURSOR CNTL (SAS01 PG-B)
DPS
XMIT CURSOR KEY - PRESS
FSP UTILITY PROGRAM (VASE2)
XMIT CURSOR KEY - PRESS

PFK-2 KEY - PRESS
```

111-11 CDPS

```
APPL PAGE (VASE2 PG-B)
PFK-3 KEY - PRESS

CRT (VASE2 PG-B)
RECORD IF "I/O ERROR XXX" OR OTHER UNEXPECTED
FAULT MESSAGES OCCURRED COINCIDENT WITH I/O
RESET:_____________________________
```

111-12 CDPS

```
CONSOLE KYBD
DEUE SPEC 1 PRO
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

CRT (VAS59 PG-B)
CRT 1 DISP ID = 10
```

NOTE

If in Ops 1 and port moding a FC String, BFS will downmode string due to discrepant PASS/BFS bypass flags. (Ref SSIDs BFS-05, BFS-06)

NOTE

Following step will mode affected flight critical/PL string to alternate port. Item number for next step is as follows:

	PRI	SEC
FC String 1 (FF1/FA1)	Item 15	Item 16
FC String 2 (FF2/FA2)	Item 17	Item 18
FC String 3 (FF3/FA3)	Item 19	Item 20
FC String 4 (FF4/FA4)	Item 21	Item 22
PL 1/2 (PL1/PL2)	Item 23	Item 24

111-13 CDPS

```
CONSOLE KYBD
DEUE ITEM___________EXEC
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
DEUE RESUME
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

111-14 CDPS

```
APPL PAGE (VASE2 PG-B)
PFK-1 KEY - PRESS
PFK-6 KEY - PRESS

CRT (VASE2 PG-B)
VERIFY PORT MODED STRING (FC1-4 OR PL) IS ACTIVE
ON SELECTED PORT (* BY ITEM NO.)
```

111-15 CDPS

CONSOLE KYBD
CBTU RBSR _____ (RECORD MDM)
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

RECORD RESULTS: _____

111-16 CDPS

IF RECOVERING FROM Flight Critical MDM BYPASS,

THEN PERFORM:

CURSOR CNTL (SAS01 PG-B)
BCE BYPASS STATUS (VAS60)
XMIT CURSOR KEY - PRESS

CRT (VAS60 PG-B)

RECORD BYPASS STATUS OF MDM: _____

PFK 2 KEY - PRESS

Not Performed:_____

111-17 CDPS

APPL PAGE (VASE2 PG-B)
PFK-3 KEY - PRESS

CRT (VASE2 PG-B)
RECORD IF "I/O ERROR XXX" OR OTHER UNEXPECTED FAULT MESSAGE OCCURRED COINCIDENT WITH PORT MODE:_____

PFK-15 KEY - PRESS

111-18 **CDPS OTC**
OTC NTD

IF an unexpected fault message occurred or MDM remains bypassed,

THEN report:
MDM _____ Recovery unsuccessful. MDM data went invalid (stale) at _____ (GMT of Bypass) and remains invalid.
DPS is NO GO for Launch.

Return to control procedure and do not perform remainder of this operation.

Not Performed:_____

111-19 **CDPS**

```
CONSOLE KYBD
DEUE SPEC 99 PRO
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
DEUE RESUME
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

Reconfigure BFS

NOTE
Perform this option if BFS is in OPS 1.

Reconfigure BFS Not Performed:_____

111-20 CDPS CDR

PANEL C2
LEFT CRT SEL SW - 3
CRT 3
MAJ FUNC SW - GNC

111-21 CDPS CDR

IF PRIOR TO IMU PLATFORM RELEASE (T-4 MIN)
OR IF FC STRING 4 WAS PORT MODED,

THEN

LEFT KYBD (BFS)
I/O RESET
EXEC
MSG RESET

Not Performed:_____

NOTE

Perform next two steps if after IMU platform release (T-4 min) and FC string 1, 2 or 3 was port moded.

111-22 CDPS CDR

```
LEFT KYBD (BFS)
OPS 000
PRO

LEFT KYBD (BFS)
OPS 101
PRO
MSG RESET
```

Not Performed:_____

111-23 OTC CDR

Configure BFS horizontal situation display per your checklist.
Report completion.

Not Performed:_____

111-24 CDPS CDR

```
PANEL C2
LEFT CRT SEL SW - 1
```

***** End of Reconfigure BFS *****

111-25 **CDPS OTC**
OTC NTD

Port Moding of _____ (FC or PL) String _____ to _____ (Primary or Secondary) is complete.
MDM _____ Bypass has been cleared and data is now valid.
Data was invalid (stale) from _____ (GMT of Bypass) to _____ (GMT Bypass cleared).

DPS is Go for Launch.

Not Performed:_____

***** End of 3. PASS FC/PL MDM Bypass Recovery (SSID DPS-03) *****

4. Reserved

5. MMU2 I/O Error Recovery (SSID DPS-06a)

NOTE

Perform following contingency option if an "I/O ERROR MMU2" or "OFF/BUSY MMU2" FSM annunciated during G1 transition (MMU2 pre-positioning).

Option 5 Not Performed:_____

111-26 **CDPS** **OTC**
OTC **ALL**

MMU2 error occurred during OPS transition. DPS transition back to G9 for MMU2 recovery is required.

111-27 **NTD** **OTC**
TBC
PTC
CSPE
OTC **CGNC**
CGLS
CMPL
TBC **CLOX**
CLHY

DPS will be transitioning to G9 for contingency operations.
Verify ready to proceed.

111-28 **NTD** **ALL**

Console operators discontinue all LDB commands and reads during PASS OPS transition.

111-29 **NTD** **OTC**
OTC **CDPS**

Perform recycle to G9 for MMU recovery.

111-30 **CDPS**

```
CURSOR CNTL (VASP9 PG-B)
CLEAR ALL
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS

CRT (VASP9)
MESSAGE DELETED
```

111-31 **CDPS**

```
PFP (VASJ6)
PFPK2 KEY - PRESS (TERMINATE)
```

111-32 **CDPS**

IF GPC DUMP AND COMPARE IN PROGRESS,

THEN

```
CONSOLE KYBD
$OCU
TERM PGM KEY - PRESS
```

Not Performed:_____

111-33 **CDPS**

```
CONSOLE KYBD
VASJ6
PERF PGM KEY - PRESS
```

111-34 **CDPS**

```
PFP (VASJ6)
PFPK4 KEY - PRESS (COUNTDOWN RECYCLE)

FOLLOW RECYCLE PROMPTS

CRT (VASJ6 PG-B)
"RECYCLE COMPLETE"
```

111-35 **CDPS OTC**
OTC NTD
NTD ALL

Transition back to G9 is complete.

111-36 **CDPS**

```
APPL PAGE (VASJ6 PG-B)
PFK1 KEY - PRESS (RECYCLE CMPLT CONTINUE)
PFK1 KEY - PRESS (BSR CONTINUE)
PFK1 KEY - PRESS (NBAT CONTINUE)
```

111-37 **CDPS**

```
CONSOLE KYBD
DEUE DEST,GN,1
XMIT CMD KEY - PRESS
DEUE SPEC 1 PRO
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

CRT (VAS59 PG-B)
CRT 1 DISP ID = 10
```

111-38 CDPS

```
CONSOLE KYBD
DEUE ITEM 2 EXEC
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
DEUE RESUME
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

111-39 CDPS

```
CURSOR CNTL (SAS01 PG-B)
DPS
XMIT CURSOR KEY - PRESS
FSP UTILITY PROGRAM (VASE2)
XMIT CURSOR KEY - PRESS

PFK-2 KEY - PRESS
```

111-40 CDPS

```
APPL PAGE (VASE2 PG-B)
PFK-7 KEY - PRESS

CRT (VASE2 PG-B)
VERIFY GNC ASSIGNED TO MM2 (* BY ITEM 2)
```

111-41 CDPS

```
APPL PAGE (VASE2 PG-B)
PFK-15 KEY - PRESS
```

111-42 **CDPS** **OTC**
OTC **CAFC**

Request CAFC perform ECP AI Mode 1 for MPS TVC CMD initialization.

111-43 **CAFC**

```
PFP (SAB20/SWB02)
SWB02 KEY - PRESS

PFP
ORB AI MODE 1 - PRESS
```

111-44 **CAFC** **OTC**
OTC **NTD**

ECP AI Mode 1 complete. Ready for transition to G1.

111-45 **NTD** **CSPE**

Verify G9 contingency operations complete and vehicle ready to transition back to G1.

111-46 **NTD** **OTC**
TBC
PTC
OTC **CGNC**
CGLS
CMPL
TBC **CLOX**
CLHY

DPS will be transitioning to G1 from contingency operations. **Verify** ready to proceed.

111-47 **NTD** **ALL**

Console operators discontinue all LDB commands and reads during PASS OPS G9 to G1 transition.

111-48 **NTD** **OTC**
OTC **CDPS**

Proceed with G1 transition.

> **NOTE**
> During G1 transition, VASJ6 will annunciate error message indicating MMU 2 was accessed during OPS transition. This is expected for current system configuration.

111-49 **CDPS**

```
PFP (VASJ6)
PFPK3 KEY - PRESS (OPS 101 SELECT)

CRT (VASJ6)
VERIFY MESSAGES:

"OPS TRANSITION IN PROGRESS"
"PASS IN 101, ACTIVE DOWNLIST"
"SSID DPS-06A WAS VIOLATED,"
"MMU2 WAS ACCESSED FOR OPS 101 TRANSITION"
```

111-50 **CDPS**

```
APPL PAGE (VASJ6 PG-B)
PFK-1 KEY - PRESS (CONTINUE WITH BFS)

PFP (VASJ6)
PFPK5 KEY - PRESS (T-20M D&C SELECT)
```

111-51 **CDPS**

CRT (VASP9)

Report if any MMU1 or MMU2 LCCs annunciated:

111-52 **CDPS**

```
CONSOLE KYBD
DEUE SPEC 1 PRO
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

CRT (VAS59 PG-B)
CRT 1 DISP ID = 10
```

111-53 **CDPS**

```
CONSOLE KYBD
DEUE ITEM 1 EXEC
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
DEUE RESUME
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
DEUE FAULT SUMM
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

CRT (VAS59 PG-B)
CRT 1 DISP ID = 990
```

111-54 **CDPS**

```
CURSOR CNTL (SAS01 PG-B)
DPS
XMIT CURSOR KEY - PRESS
FSP UTILITY PROGRAM (VASE2)
XMIT CURSOR KEY - PRESS

PFK-2 KEY - PRESS
```

111-55 **CDPS**

```
APPL PAGE (VASE2 PG-B)
PFK-7 KEY - PRESS

CRT (VASE2 PG-B)
VERIFY GNC ASSIGNED TO MM1 (* BY ITEM 1)
```

111-56 **CDPS**

```
APPL PAGE (VASE2 PG-B)
PFK-15 KEY - PRESS
```

111-57

CDPS	**OTC**
OTC	**NTD**
NTD	**ALL**

PASS OPS Transition to G1 complete.

NOTE

Perform next two steps if required to clear RSLS hold flag, V90X8667X1, which will have been initialized to ON by RSLS at G9 to G1 transition and will be cleared upon initial Launch Sequence Resume Command.

111-58 **CGLS**

Verify MSRB milestone inhibited due to RSLS hold flag.

Not Performed:_____

111-59 **CGLS**

```
CONSOLE KYBD
PFP (RESUME)
PFPK1 - PRESS
PFP (RESUME EXECUTE)
PFPK6 - PRESS

VERIFY GND AND ONBOARD CLOCKS RESUME AND RE-ENTER
HOLD AT T-9 MIN.
```

Not Performed:_____

111-60 **OTC** **CGLS**

Review expected hits and reset as required.

111-61 CDPS OTC

IF no MMU1 or MMU2 LCCs were violated during OPS 1 transition,	**Verify**
THEN MMU2 recovery is complete. DPS back in G1 and ready for BFS transition to G1. DPS is Go for Launch.	☐
ELSE MMU2 recovery unsuccessful. DPS is No Go for Launch.	☐

***** End of 5. MMU2 I/O Error Recovery (SSID DPS-06a) *****

6. BFS I/O Error PCM Recovery (SSID BFS-15)

NOTE
Perform following option if BFS "I/O ERROR PCM" Fault Summ message occurs prior to T-5 minutes.

Option 6 Not Performed:_____

111-62 **OTC** **CDPS**
CISL

Perform BFS I/O Error PCM recovery.

111-63 **CDPS**

Perform the following:

1. **Report** If LCC BFS-08, Loss of BFS Downlist, violated in conjunction with this error:

BFS-08 Violated _____

BFS-08 Not Violated _____

2. **Report** if single "I/O Error PCM" Fault Summ message occurred, or if multiple errors occurred:

Single error _____

Multiple errors _____

111-64 CISL

Perform the following:

1. **Report** if LCC INS-01, OI PCM BSR Anomaly, or INS-05, OI MDM Wrap Anomaly violated in conjunction with this error:

INS-01/05 violated _____

INS-01/05 not violated _____

2. **Report** currently operating PCMMU:

PCMMU1 _____

PCMMU2 _____

NOTE
If LCC BFS-08 or INS-01/05 were violated in conjunction with this error, disposition problem per the respective LCC and do not perform the remainder of this option.

111-65 CDPS CDR

IF A CRT IS NOT ASSIGNED TO BFS GPC,

THEN

```
PANEL C3
BFC CRT
  SELECT SW - 3+1
  DISPLAY SW - ON
```

Not Performed:_____

111-66 CDPS CDR

```
PANEL C2
LEFT CRT SEL SW - 3

CRT 3
  MAJ FUNC SW - SM
```

Not Performed:_____

111-67 CDPS CDR

```
L KYBD (BFS)
SYS SUMM
SYS SUMM

CRT 3
BFS SM SYS SUMM 2
```

REPORT IF ANY OVERBRIGHT 'M' CHARACTERS APPEAR IN STATUS FIELD OF ANY DISPLAYED PARAMETER:

_____'M' PRESENT _____'M' NOT PRESENT

Not Performed:_____

111-68 CDPS OTC

IF the following conditions are true:

1. No over bright "M" (missing data) characters displayed on BFS SM SYS Summ

2. Only single "I/O ERROR PCM" Fault Summ message was annunciated.

THEN BFS I/O Error PCM fault was transient error and does not degrade BFS FDA capability.

Recommend continue.

Return to control procedure

Not Performed:_____

NOTE

If PCMMU switch has previously occurred during Countdown due to a failure, hold count and do not perform remainder of this option.

111-69 **CDPS** **OTC**
OTC **CISL**

Request switch to alternate PCMMU per instrumentation detailed workaround steps (OMI S0007.500, Operation 113, Detail A, "PCM Switch to Alternate PCM").

Not Performed:_____

NOTE

PCM OI E-Bit errors are expected on OI/PDI reads for up to one major cycle following alternate PCMMU activation.

111-70 **CDPS**

Report if unexpected PCMMU I/O errors are received following PCMMU switch:

Unexpected errors _____

No unexpected errors _____

Not Performed:_____

111-71 **CDPS** **CDR**

```
CRT 3
BFS SM SYS SUMM 2
```

REPORT IF ANY OVERBRIGHT 'M' CHARACTERS APPEAR IN STATUS FIELD OF ANY DISPLAYED PARAMETER:

___ 'M' PRESENT ___ 'M' NOT PRESENT

Not Performed:_____

NOTE

If unexpected I/O errors were encountered or over bright 'M' (missing data) characters were displayed on BFS SM SYS SUMM, hold count and do not perform remainder of this option.

Reload Flight TFL

NOTE

Perform this option if flight TFL reload is required.

Reload Flight TFL Not Performed:_____

111-72 **OTC** **CDPS**

IF currently in G1,

THEN perform G9 quick recycle per DPS/BFS options (OMI S0007.500, Operation 111, Option 8).

Not Performed:_____

111-73 **OTC** **CDPS**
CISL

Perform TFL reload for flight per instrumentation detailed workaround steps (OMI S0007.500, Operation 113, Detail B, "TFL Reload For Flight").

111-74 **OTC** **CDPS**

IF after T-20 minutes,

THEN transition back to G1 per DPS/BFS options (OMI S0007.500, Operation 111, Option 8).

Not Performed:_____

***** End of Reload Flight TFL *****

111-75 CDPS OTC

BFS I/O Error PCM fault recovery successful.

Recommend continue.

Not Performed:_____

***** End of 6. BFS I/O Error PCM Recovery *****

7. BFS Payload MDM Bypass Recovery (SSID BFS-09)

NOTE
Perform next option if BFS PL MDM bypass occurs with BFS in run mode.

Option 7 Not Performed:_____

111-76 **OTC** **CDPS**

Perform recovery for MDM PL ___ (record) bypass

111-77 **CDPS** **CDR**

```
PANEL C2
LEFT CRT SEL SW - 3
```

NOTE
I/O reset is for data gathering purposes only.

111-78 **CDPS** **CDR**

```
LEFT KYBD
I/O RESET
EXEC
```

111-79 **CDPS**

```
APPL PG (VASB9 PG-B)
PFK-1 KEY - PRESS

CRT (VASB9 PG-A)

RECORD BYPASS STATUS OF MDM:__________
```

111-80 **CDPS** **CDR**

```
PANEL O6
GENERAL PURPOSE COMPUTER
  MODE
      5 SW - STBY
```

111-81 **CDPS**

```
CONSOLE KYBD
CBTU RBSR PF ___ (RECORD)
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

RECORD RESULTS: _____
```

111-82 **CDPS** **CDR**

```
PANEL C2
LEFT CRT SEL SW - 1
```

111-83 **CDPS** **CDR**

```
LEFT KYBD (G1)
SPEC 1
PRO

CRT 1
DPS UTILITY
```

NOTE
Following step will mode PL 1/2 to secondary port.

111-84 **CDPS** **CDR**

```
LEFT KYBD
ITEM 24
EXEC

CRT 1
PL 1/2 24 *
```

111-85 **CDPS** **CDR**

```
LEFT KYBD (G1)
RESUME
MSG RESET
```

111-86 CDPS CDR

```
PANEL C2
LEFT CRT SEL SW - 3
```

111-87 CDPS

```
CONSOLE KYBD
CBTU RBSR PF ___ (RECORD)
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

CRT
```

RECORD RESULTS:_____

NOTE

BFS will not port mode PL MDM until after I/O reset is performed. Therefore, PL MDM I/O errors are expected in the next step.

111-88 CDPS CDR

```
PANEL O6
GENERAL PURPOSE COMPUTER
  MODE
    5 SW - RUN
```

111-89 CDPS CDR

```
LEFT KYBD (BFS)
I/O RESET EXEC
MSG RESET
```

111-90 CDPS CDR

```
PANEL C2
LEFT CRT SEL SW - 1
```

111-91 **CDPS**

```
APPL PAGE (VASB9 PG-B)
PFK-1 KEY - PRESS

CRT (VASB9 PG-A)

RECORD BYPASS STATUS OF MDM:_____
```

111-92 **CDPS** **OTC**

IF MDM Bypass is cleared, **Verify**

THEN PL 1/2 string is operating on secondary mode. ☐
PL MDM Bypass has been cleared.
DPS is ready to resume Count.

ELSE PL MDM Bypass recovery unsuccessful. ☐
DPS is No Go for Launch.

***** End of 7. BFS Payload MDM Bypass Recovery (SSID BFS-09) *****

8. G9 Quick Recycle

NOTE

Following option will transition DPS back to G9 from T-9 min configuration to support contingency operations, then transition back to G1. Remaining Shuttle systems will maintain a T-9 min configuration.

Perform this option if DPS quick G9 recycle is required.

Option 8 Not Performed:_____

111-93 **NTD** **OTC**
TBC
PTC
CSPE
OTC **CGNC**
CGLS
CMPL
TBC **CLOX**
CLHY

DPS will be transitioning to G9 for contingency operations.
Verify ready to proceed.

111-94 **NTD** ***FLT**

IF BFS stored program commands have been sent but not cleared,

THEN clear BFS SPC buffer. **Report** completion.

Not Performed:_____

111-95 **NTD** **ALL**

Console operators discontinue all LDB commands and reads during PASS OPS G1 to G9 transition.

111-96 **NTD** **OTC**
OTC **CDPS**

Perform quick recycle to G9.

111-97 **CDPS**

```
CURSOR CNTL (VASP9 PG-B)
RETURN TO HOST
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VASP9 PG-B)
INHIBIT LCC MONITORING
XMIT CURSOR KEY - PRESS
```

111-98 **CDPS**

```
CURSOR CNTL (SAS01 PG-B)
DPS INIT DISPLAY (SAS01)
XMIT CURSOR KEY - PRESS

CURSOR CNTL (SAS01 PG-B)
TERMINATE OPS MGR5 (SAS25)
XMIT CURSOR KEY - PRESS

PFK 2 KEY - PRESS
```

111-99 **CDPS**

```
CONSOLE KYBD
VASJ6
PERF PGM KEY - PRESS
```

NOTE

G9 recycle is performed by sequencer VASJ6. If BFS is active in OPS 101, VASJ6 will first prompt CDR to perform a BFS recycle to OPS 0 Standby.

Once BFS recycle is complete, program will transition PASS to G9 via DEU equivalent. PASS G9 transition takes approximately 90 seconds.

111-100 **CDPS**

```
PFP (VASJ6)
PFPK4 KEY - PRESS (COUNTDOWN RECYCLE)

FOLLOW RECYCLE PROMPTS

CRT (VASJ6)

VERIFY MSG: "RECYCLE COMPLETE"
```

111-101

CDPS	**OTC**
OTC	**NTD**
NTD	**ALL**

Transition to G9 complete.

111-102 **CDPS**

```
CURSOR CNTL (VASP9 PG-B)
ACTIVATE LCC MONITORING
XMIT CURSOR KEY - PRESS

PFK-1 KEY - PRESS
```

111-103 **CDPS**

```
APPL PAGE (VASJ6 PG-B)
PFK-1 KEY - PRESS (RECYCLE CMPLT CONTINUE)
PFK-1 KEY - PRESS (BSR CONTINUE)
PFK-1 KEY - PRESS (NBAT CONTINUE)
```

111-104 **OTC** **CAFC**

Perform ECP AI Mode 1 for MPS TVC CMD initialization.

111-105 **CAFC**

```
PFP (SAB20/SWB02)
SWB02 KEY - PRESS

PFP
ORB AI MODE 1 - PRESS
```

111-106 **CAFC** **OTC**
OTC **NTD**

ECP AI Mode 1 complete. Ready for transition to G1

111-107 **NTD** **CSPE**

Verify G9 contingency operations complete and vehicle ready to transition back to G1.

111-108 **NTD** **OTC**
TBC
PTC
OTC **CGNC**
CGLS
CMPL
TBC **CLOX**
CLHY

DPS will be transitioning to G1. **Verify** ready to proceed.

111-109 **NTD** **ALL**

Console operators discontinue all LDB commands and reads during PASS OPS G9 to G1 transition.

NOTE
Do not proceed with next step until G9 contingency steps are complete.

G1 Transition

111-110 **NTD** **OTC**
OTC **CDPS**

Transition back to G1.

BFS One Shot Data Transfer

NOTE
BFS one shot data transfer must be reperformed if any of the following have occurred:

- BFS GPC RE-IPL
- Launch polynomial update
- SRM chamber pressure Cal update
- IMU preflight Cal
- OMS B Crossfeed Bypass

Perform this option if BFS one shot data transfer required.

BFS One Shot Data Transfer Not Performed:_____

111-111 **CDPS** **CDR**

Perform PASS/BFS transfer prep per the T-32 min. point in your checklist.

111-112 **CDPS**

```
CRT (VASJ6 PG-B)
ONE SHOT ENABLED - INVERT GREEN
```

111-113 **CDPS**

```
PFP (VASJ6)
PFPK1 KEY (ONE SHOT SELECT) - PRESS

CRT (VASJ6 PG-B)
ONE SHOT COMPLETE MILESTONE IN INVERT GREEN
```

***** End of BFS One Shot Data Transfer *****

111-114 **CDPS**

```
PFP (VASJ6)
PFPK3 KEY - PRESS (OPS 101 SELECT)

CRT (VASJ6)

VERIFY "TRANSITION CPLT" MILESTONE - INVERT GREEN
```

111-115 **CDPS** **OTC**
OTC **NTD**
NTD **ALL**

PASS G1 transition complete. DPS ready for BFS transition to G1.

111-116 **OTC** **CDR**

Take BFS to OPS 1 per your checklist.

NOTE
Dump and compare will take approximately 10 minutes.

111-117 **CDPS**

```
PFP (VASJ6)
PFPK5 KEY - PRESS (T-20 MIN D&C SELECT)
```

111-118 **CDPS** **OTC**

G1 dump and compare in progress.

111-119 CDR OTC

BFS OPS 1 transition complete.

111-120 CVFS

```
CRT (VASB9)
VERIFY

BFS TRACKING PASS ON FC 1-4
NSP STAT GOOD
```

111-121 CVFS NTD

Ready for BFS uplink.

111-122 NTD *FLT

Perform BFS preflight uplink loading. **Report** completion.

111-123 OTC PLT

Configure PASS and BFS Horizontal Situation displays.
Report completion.

111-124 OTC CDR

Configure yaw steering per your checklist. **Report** completion.

111-125 CVFS NTD
NTD OTC

T-20 min GPC dump is complete.

111-126 **CDPS**

IF EXPECTED MISCOMPARES OCCUR,

THEN

APPL PAGE (VASJ6 PG-B)
PFK-3 KEY - PRESS

Not Performed:_____

111-127 **CDPS**

IF UNEXPECTED MISCOMPARES OCCUR,

THEN

APPL PAGE (VASJ6 PG-B)
PFK-2 KEY - PRESS

Not Performed:_____

111-128 **CDPS**

CURSOR CNTL (SAS01 PG-B)
DPS INIT DISPLAY
XMIT CURSOR KEY - PRESS

CURSOR CNTL (SAS01 PG-B)
ACTIVATE OPS MGR 5 (SAS25)
XMIT CURSOR KEY - PRESS

PFK-2 KEY - PRESS

111-129 **NTD** ***FLT**

IF BFS SPC buffer was cleared for quick recycle option,

THEN Transmit BFS stored program commands. **Report** completion.

Not Performed:_____

NOTE

Perform next two steps to clear RSLS hold flag, V90X8667X1, which will have been initialized to ON by RSLS at G9 to G1 transition and will be cleared upon initial Launch Sequence Resume Command.

111-130 **CGLS**

Verify MSRB milestone inhibited due to RSLS hold flag.

111-131 **CGLS**

```
CONSOLE KYBD
PFP (RESUME)
PFPK1 - PRESS
PFP (RESUME EXECUTE)
PFPK6 - PRESS
```

VERIFY GND AND ONBOARD CLOCKS RESUME AND RE ENTER HOLD AT T-9 MIN.

111-132 **OTC** **CGLS**

Review expected hits and reset as required.

***** End of 8. G9 Quick Recycle *****

9. Remote BFS Deactivation

NOTE
Perform next option if BFS is to be powered OFF via CMD Decoders.

Option 9 Not Performed:_____

111-133 **CDPS**

```
CURSOR CNTL (SAS01 PG-B)
DPS
XMIT CURSOR KEY - PRESS

CURSOR CNTL (SAS01 PG-B)
DPS UTILITY PROGRAM (VSSD4)
XMIT CURSOR KEY - PRESS

PFK-2 KEY - PRESS
```

111-134 **CDPS**

```
CURSOR CNTL (VSSD4 PG-B)
GPC5 DN/ARM
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VSSD4 PG-B)
GPC POWER UP/DN - EXEC
XMIT CURSOR KEY - PRESS

CRT (VSSD4 PG-B)
SUCCESSFUL COMPLETION
```

111-135 **CDPS**

```
APPL PAGE (VSSD4 PG-B)
PFK-15 KEY - PRESS
```

NOTE

Perform next three steps if VASJ6 is in recycle awaiting BFS transition to OPS 0.

111-136 **CDPS**

```
PFP (VASJ6)
TERMINATE KEY - PRESS
```

Not Performed:_____

111-137 **CDPS**

```
CONSOLE KYBD
VASJ6
PERF PGM KEY - PRESS
```

Not Performed:_____

111-138 **CDPS**

```
PFP (VASJ6)
COUNTDOWN RECYCLE KEY - PRESS
```

Not Performed:_____

NOTE

Following steps will be performed after Crew Module access is available.

111-139 **CDPS** **CDR**

```
PANEL O6
GENERAL PURPOSE COMPUTER
  MODE
    5 SW - STBY
```

111-140 CDPS

```
CURSOR CNTL (SAS01 PG-B)
DPS
XMIT CURSOR KEY - PRESS

CURSOR CNTL (SAS01 PG-B)
DPS UTILITY PROGRAM (VSSD4)
XMIT CURSOR KEY - PRESS

PFK-2 KEY - PRESS
```

111-141 CDPS

```
CURSOR CNTL (VSSD4 PG-B)
GPC5 UP/ARM
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VSSD4 PG-B)
GPC POWER UP/DN - EXEC
XMIT CURSOR KEY - PRESS

CRT (VSSD4 PG-B)
SUCCESSFUL COMPLETION
```

111-142 CDPS

```
APPL PAGE (VSSD4 PG-B)
PFK-15 KEY - PRESS
```

Configure BFS to OPS 0

NOTE
Perform this option if BFS is in G-1.

Configure BFS to OPS 0 Not Performed:_____

111-143 CDPS CDR

```
PANEL C2
L CRT SEL SW-3
CRT 3
  MAJ FUNC SW - GNC
```

111-144 CDPS CDR

```
PANEL C3
BFC CRT
  SELECT SW - 3 + 1
    DISPLAY SW - ON
```

111-145 CDPS CDR

```
L KYBD (BFS)
OPS 000
PRO
```

111-146 CDPS CDR

```
PANEL C2
L CRT SEL SW - 1
```

***** End of Configure BFS to OPS 0 *****

111-147 CDPS

```
CRT (VASB9 PG-B)
MAJOR MODE 0
```

111-148 CDPS CDR

```
PANEL C3
BFC CRT
  DISPLAY SW - OFF
```

111-149 CDPS CDR

```
PANEL O6
GENERAL PURPOSE COMPUTER
  MODE
    5 SW - HALT
  OUTPUT
    5 SW - NORMAL
```

***** End of 9. Remote BFS Deactivation *****

10. PASS GPC Downlist Recovery (DPS-29)

NOTE

Perform "PASS GPC Downlist Recovery" option if GPC Area 1 (PASS) downlist is lost during Countdown or Scrub/Recycle operations.

Conditions for use:

- Area 1 (PASS) downlist invalid
- OI data remains valid (else possible PCMMU problem - Ref SSID INS-01)
- Area 2 (BFS) downlist remains valid, if BFS is not in HALT (else possible GPC FEP problem - Ref SSID LPS-18)
- LDB remains valid (required for IDP equivalent commanding)

This option will attempt to recover PASS downlist by changing the downlist GPC from GPC1 to GPC2 via Spec 0, Item 44. If downlist cannot be recovered by switching downlist GPCs, problem is most likely in the PCMMU.

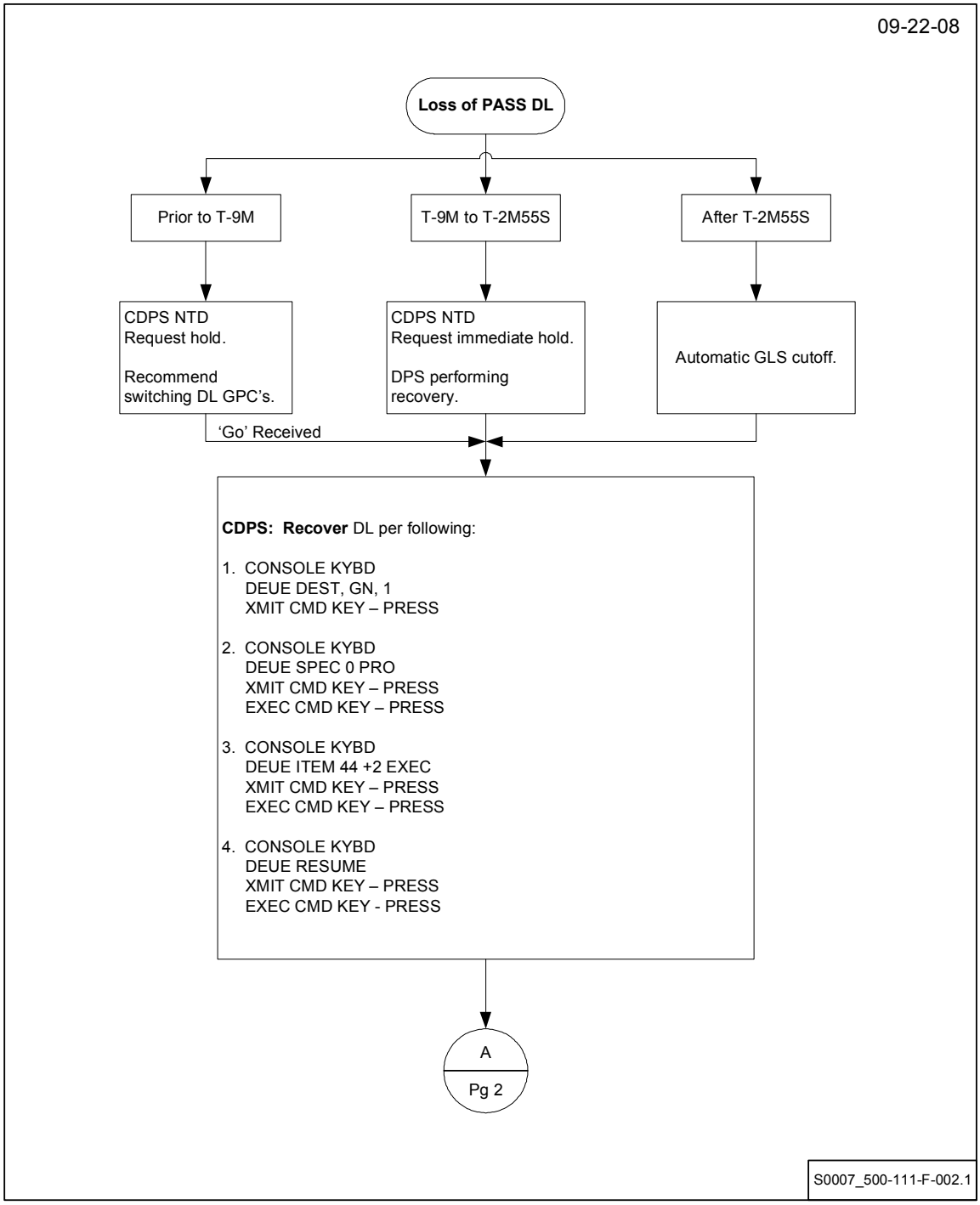
Reporting of the problem to the Test Team varies depending on countdown time:

- Prior to T-9M, DPS will report the loss of downlist as a violation of SSID DPS-29, with recommendation to hold.
- Between T-9M and T-2M55S, DPS will request immediate hold to perform recovery. If data is lost during the Aerosurface Drive or MPS Gimbal profiles, the Test Team will reperform the profiles once data is restored.
- After T-2M55S through T-0, GLS will automatically perform cutoff.

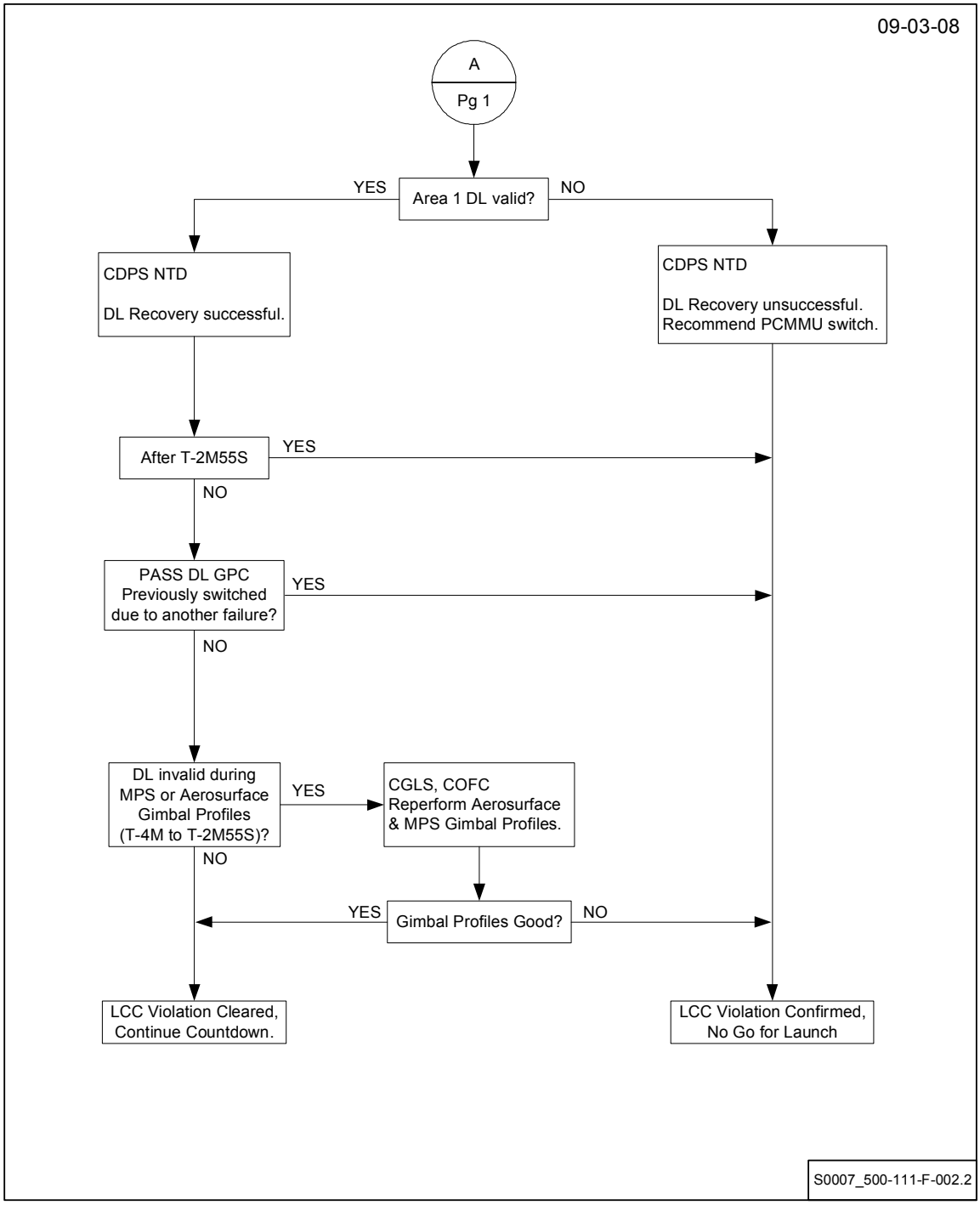
Prior to T-9M, DPS will recommend switching DL GPCs to attempt recovery, and will proceed once a Test Team "Go" is received. After T-9M, DPS will expedite recovery by switching DL GPCs without prior notification to the Test Team. DPS will report recovery status at the next opportunity.

Option 10 Not Performed:_____

PASS GPC Downlist Recovery Flowchart (Page 1 of 2)



PASS GPC Downlist Recovery Flowchart (Page 2 of 2)



***** End of 10. PASS GPC Downlist Recovery *****

11. BFS Mode to Standby/Run

NOTE
Perform following option if PASS LDB command path to PL MDMs required after BFS has been moded to Run (post T-20 Min).

Option 11 Not Performed:_____

111-150 OTC CDPS

Establish LDB command path to PL MDMs.

111-151 CDPS CDR 212

```
PANEL O6
GENERAL PURPOSE COMPUTER
  MODE
    5 SW - STANDBY
```

111-152 CDPS

```
CRT (VAS59 PG-B)
PL 1&2 COMMANDED BY GPC1
```

111-153 CDPS OTC

LDB command path to PL MDMs established.

NOTE

Do not proceed with remainder of this option until PL MDM LDB commanding is complete.

111-154 OTC CDPS

LDB command path to PL MDMs no longer required.
Return BFS to Run Mode.

111-155 CDPS CDR 212

```
PANEL O6
GENERAL PURPOSE COMPUTER
  MODE
    5 SW - RUN
```

111-156 CDPS

```
CRT (VAS59 PG-B)
PL 1&2 COMMANDED BY BFS
NO BFS PL MDM BYPASSES
NO UNEXPLAINED BFS FAULT MESSAGES
```

111-157 CDPS OTC

BFS mode to Run complete.

111-158 OTC CGLS

Review expected GLS hits and reset as required.
Report completion.

***** End of 11. BFS Mode to Standby/Run *****

12. MEDS Program Note Listing

MEDS Notes	
Number	**Description**
DR109726	Timeout I/O Errors During VM Dump
DR109734	Errors on 1553B When MDU/ADC'S Change State
DR109735	IDP Software Long Foreground Cycle
DR109736	IDP Does Not Return From H/W CST
DR109752	Invalid Branch Error During VM Load
DR109762	Extended Duration MDU Lamp TEC Bit Failures
DR109791	Loss of Data on One Flight Critical Bus
DR109796	Keyboard Input During IDP CST
H/W-0001	Transient ADC Channel Failure Indications
H/W-0002	MDU Does Not Power On
H/W-0003	IDP FC and/or DK Errors Due to Abrupt Termination of GPC Output
H/W-0004	MSU Spin Up Errors at Power On
H/W-0005	IDP MSU Write Index Window Sync Error
H/W-0006	ADC Channel Fail When Input Exceeds Valid Range
H/W-0007	Transient Power Supply/Lamp Fail - Luminance Cntl Loop Fail Indications
H/W-0008	Luminance Control Error
H/W-0009	Transient OST SCSI/MSU Fail Indication
H/W-0010	Transient DK MIA Word Error Indication

*** End of Operation **111** ***

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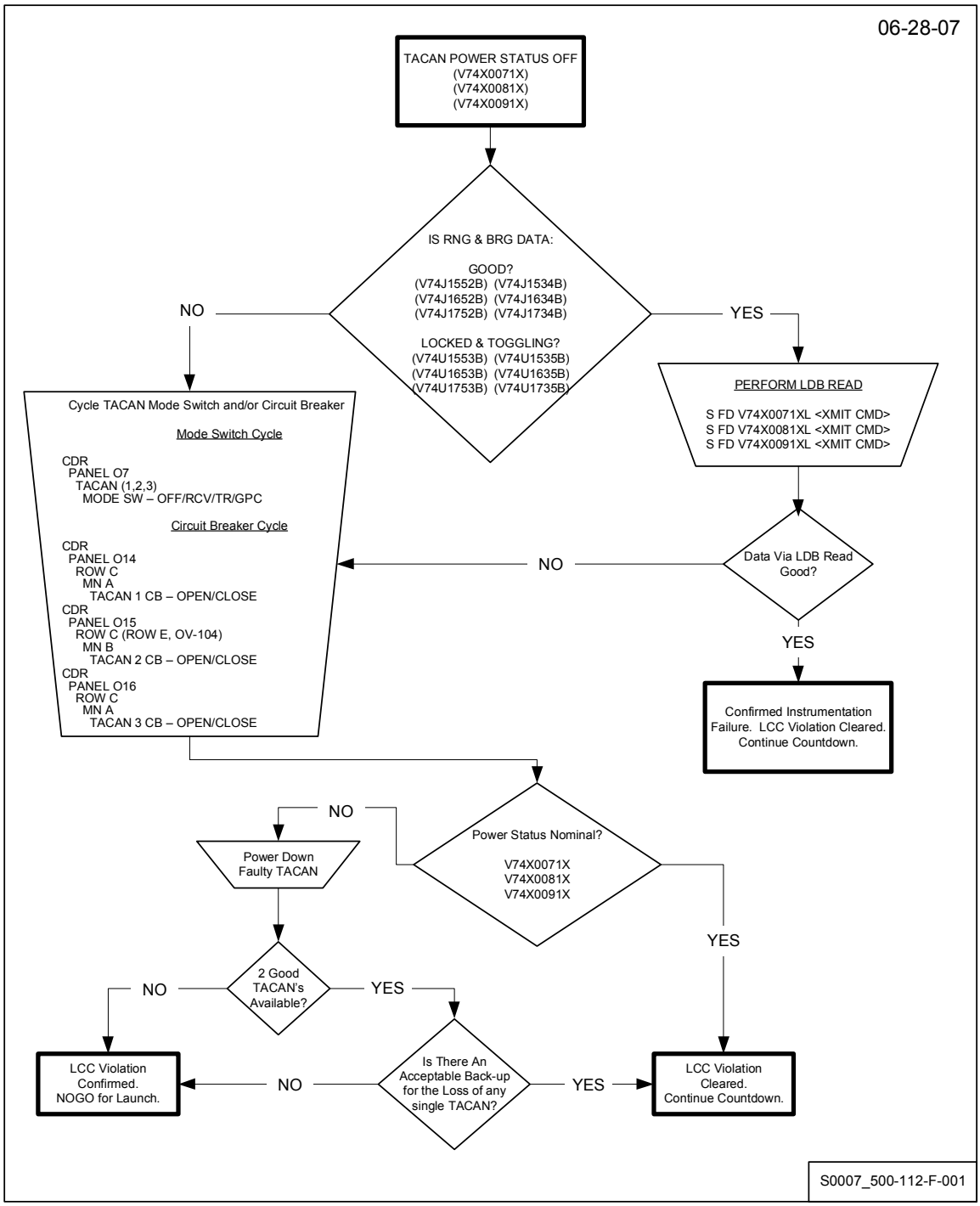
OPERATION 112 COMM and Track

Shop: **COM**
Cntrl Rm Console: **C2**
OPR: **COM**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **1.0**

NOTE
This operation contains logic flow diagrams for LCC preplanned procedures.

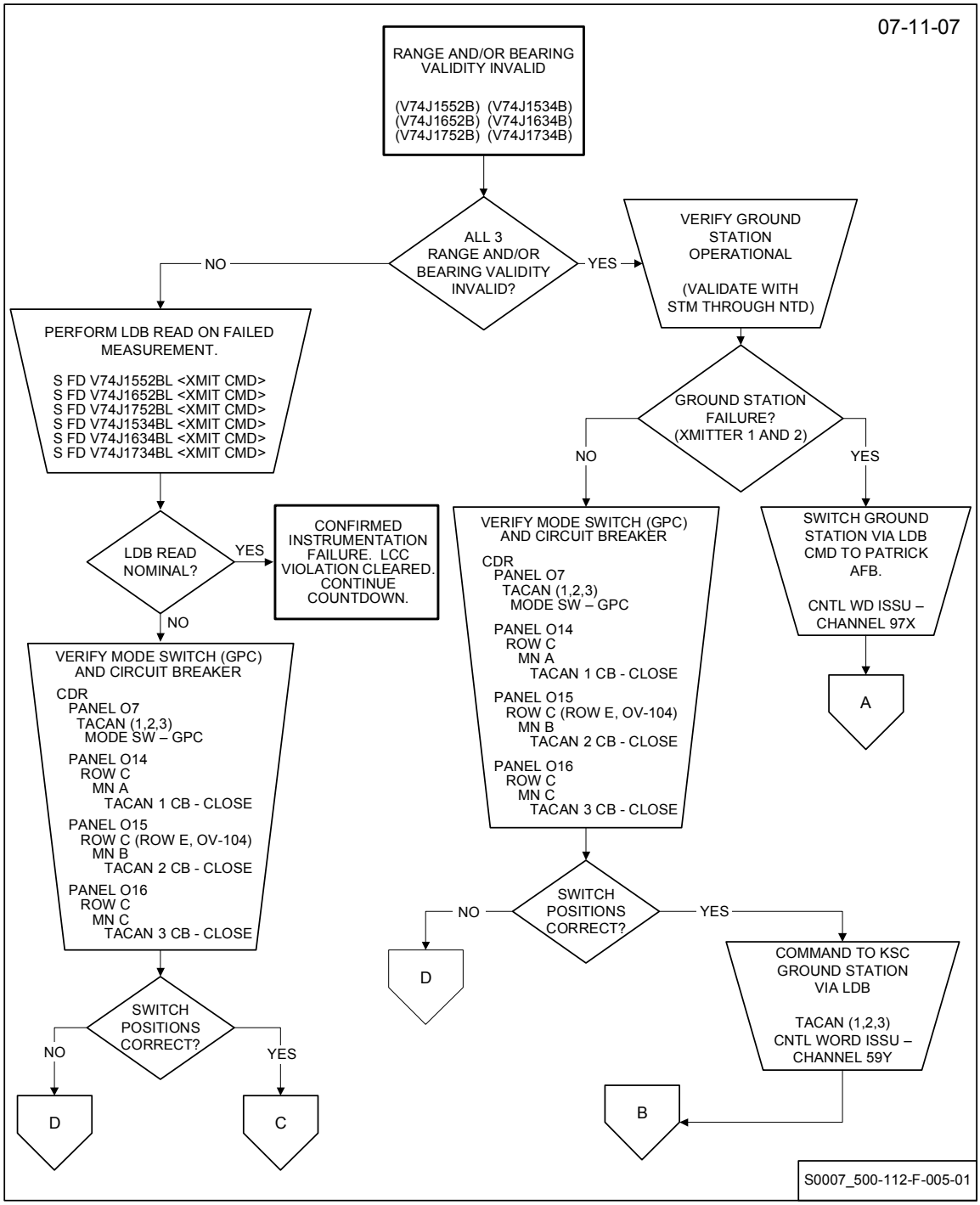
112-1

TACAN Power Status Preplanned Procedure (SSID CT-01)

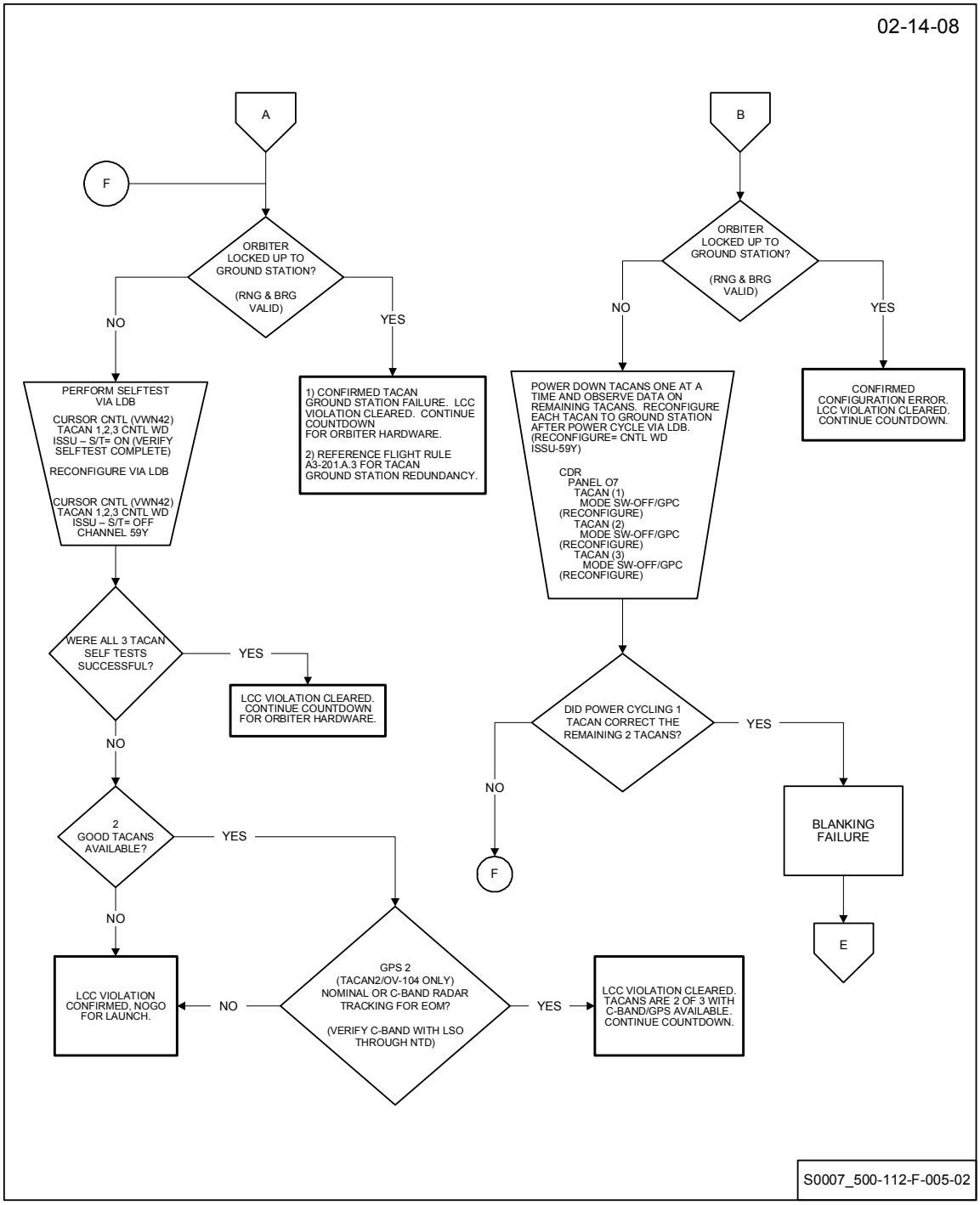


112-2

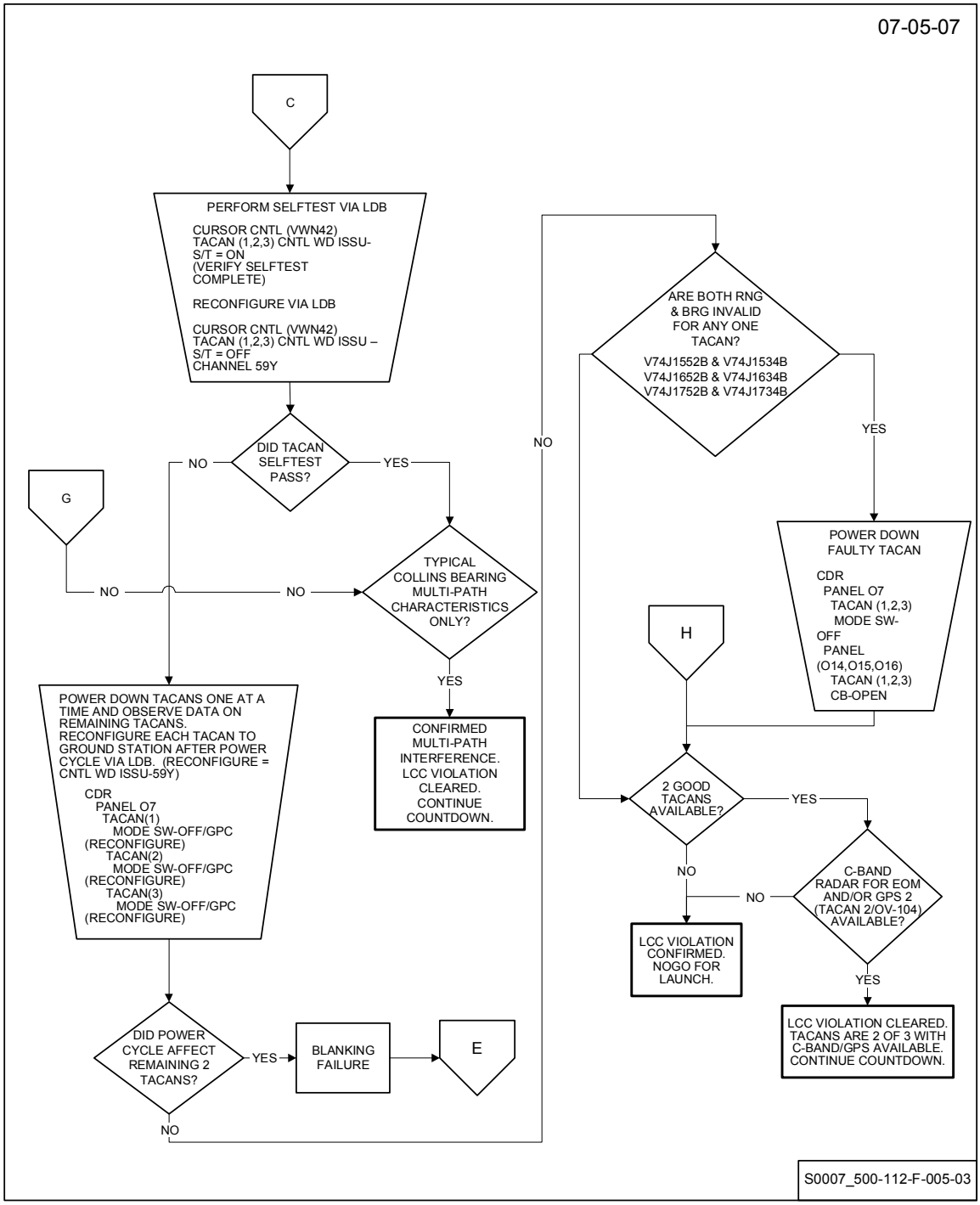
TACAN Validity Preplanned Procedure (SSID CT-01) (Page 1 of 4)



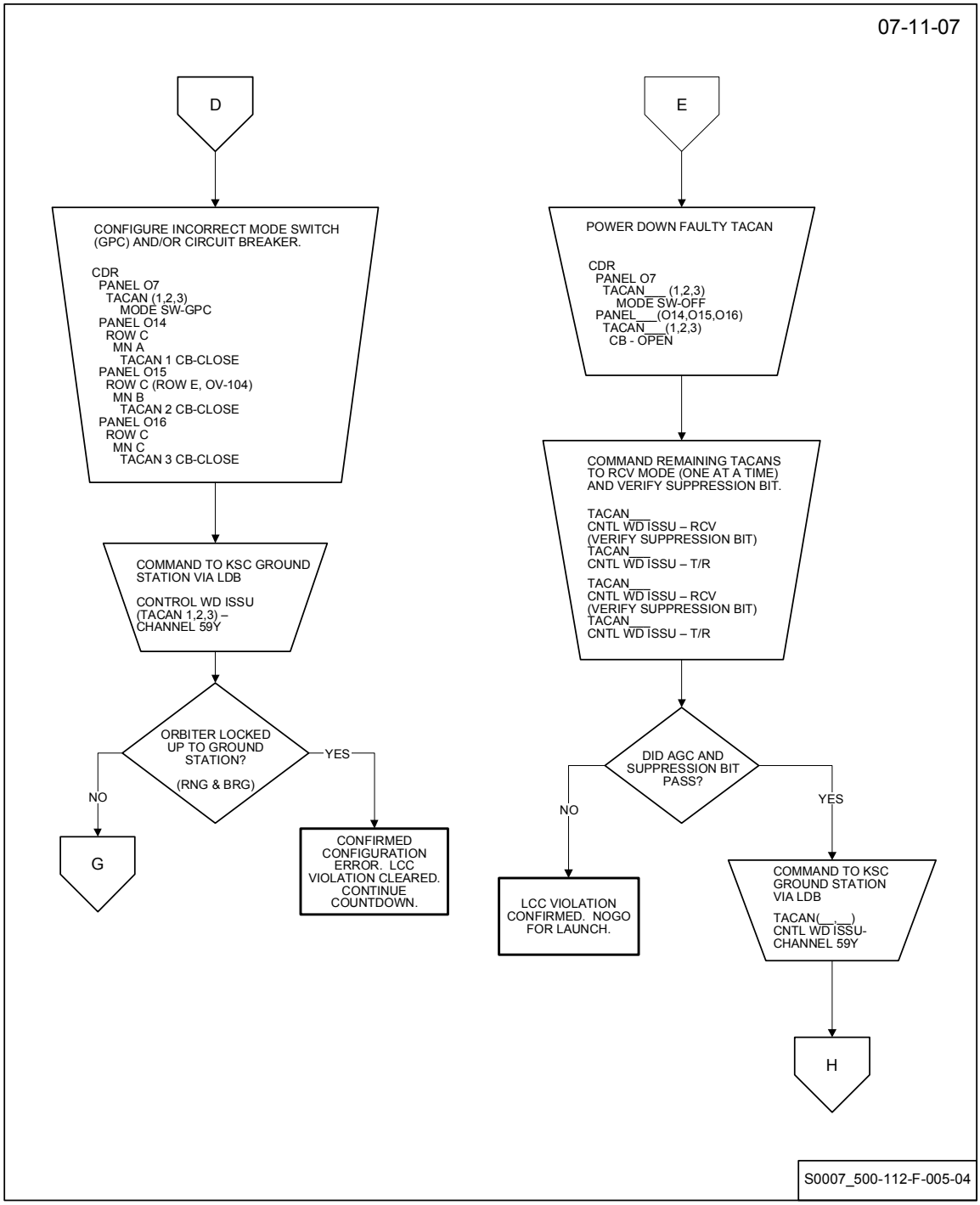
TACAN Validity Preplanned Procedure (SSID CT-01) (Page 2 of 4)



TACAN Validity Preplanned Procedure (SSID CT-01) (Page 3 of 4)

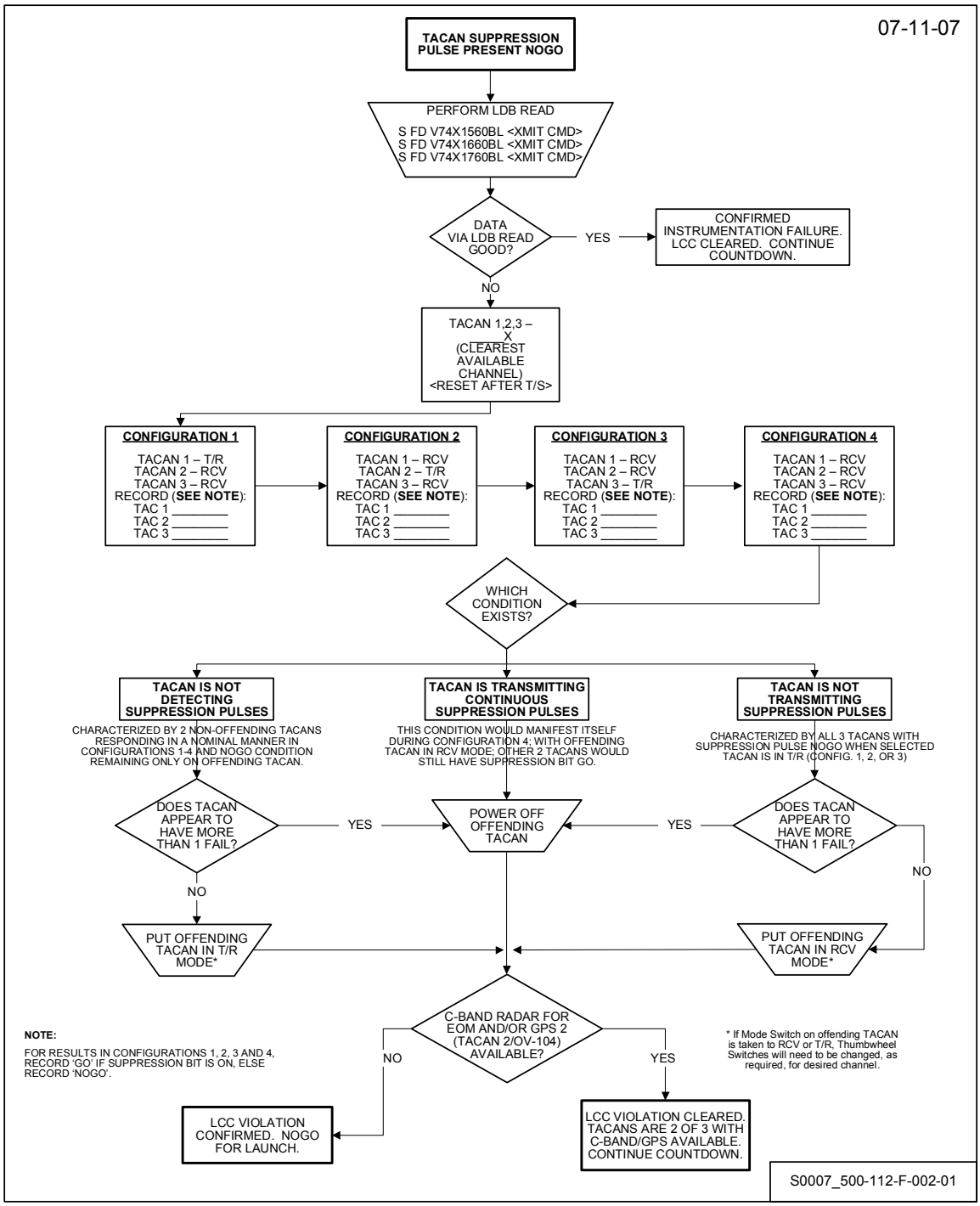


TACAN Validity Preplanned Procedure (SSID CT-01) (Page 4 of 4)



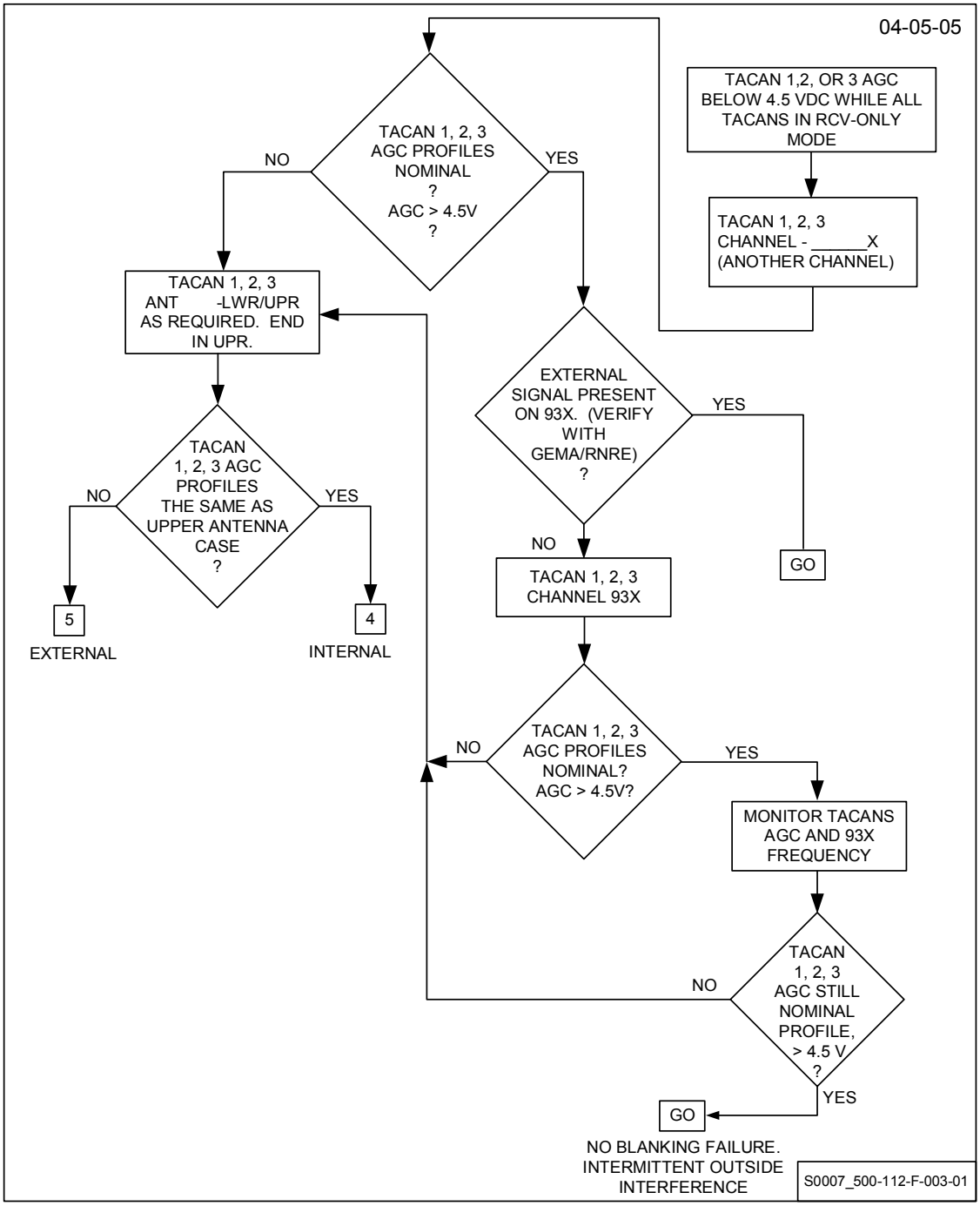
112-3

TACAN Blanking - Test Preplanned Procedure

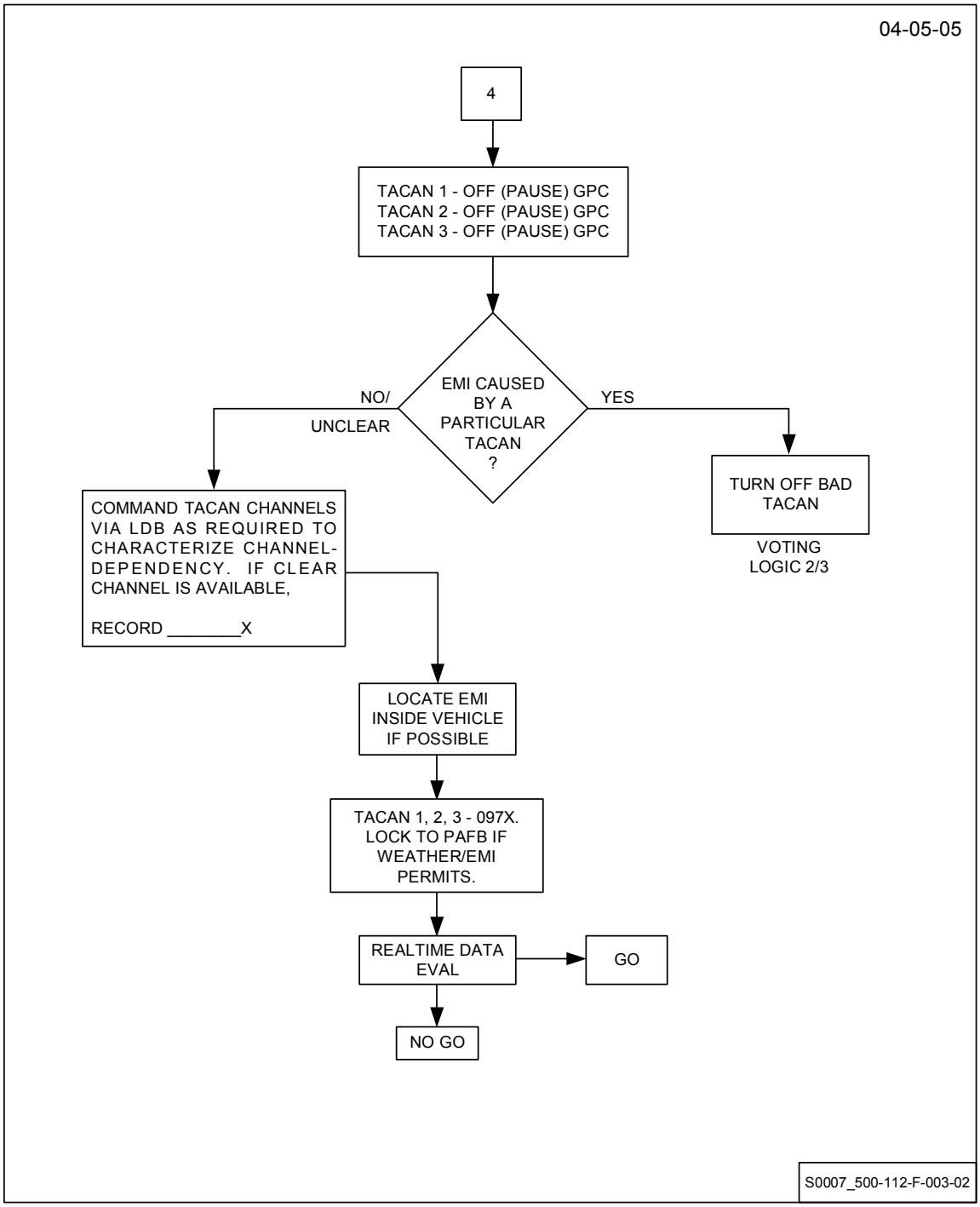


112-4

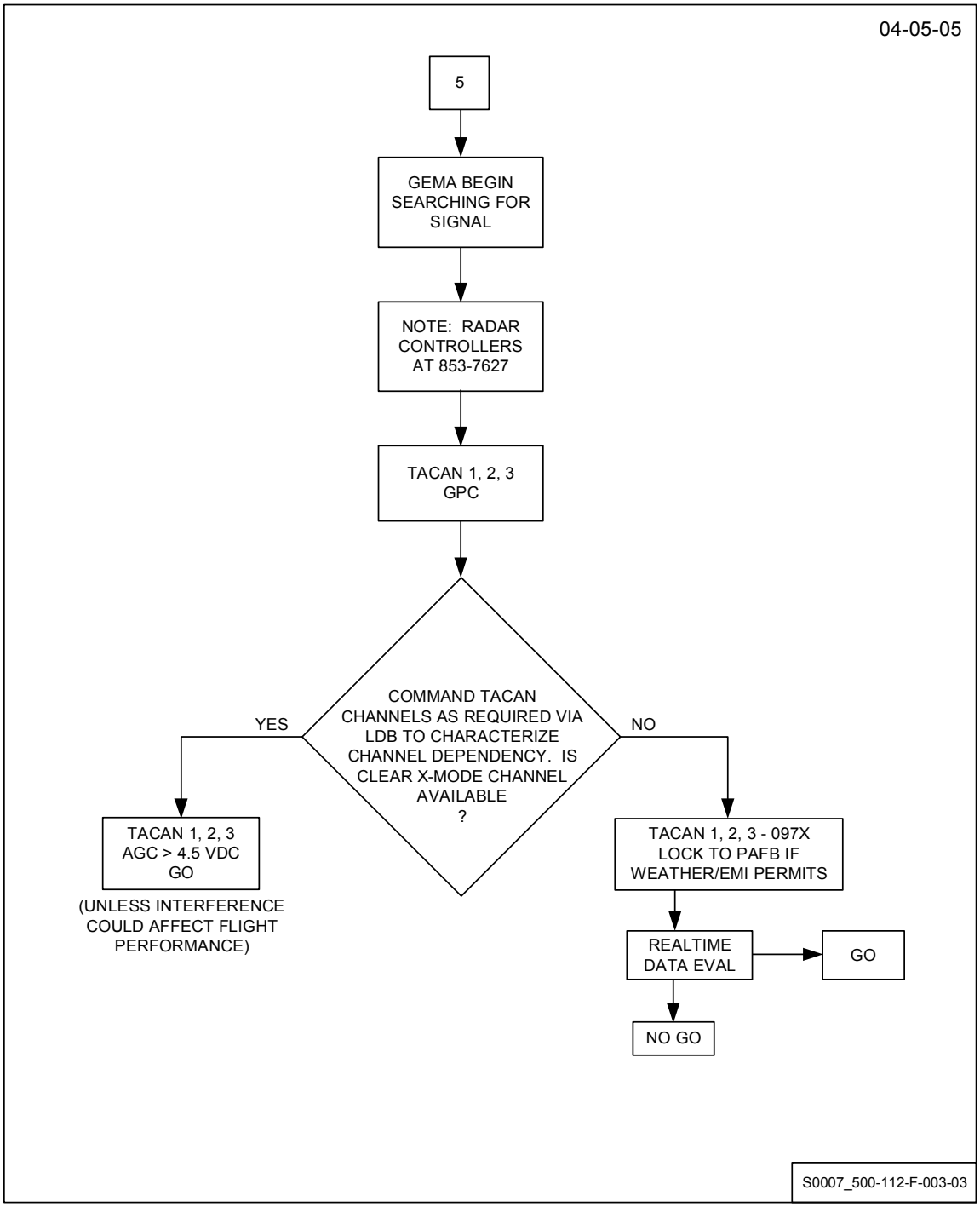
TACAN AGC (Interference) Preplanned Procedure (Page 1 of 3)



TACAN AGC (Interference) Preplanned Procedure (Page 2 of 3)

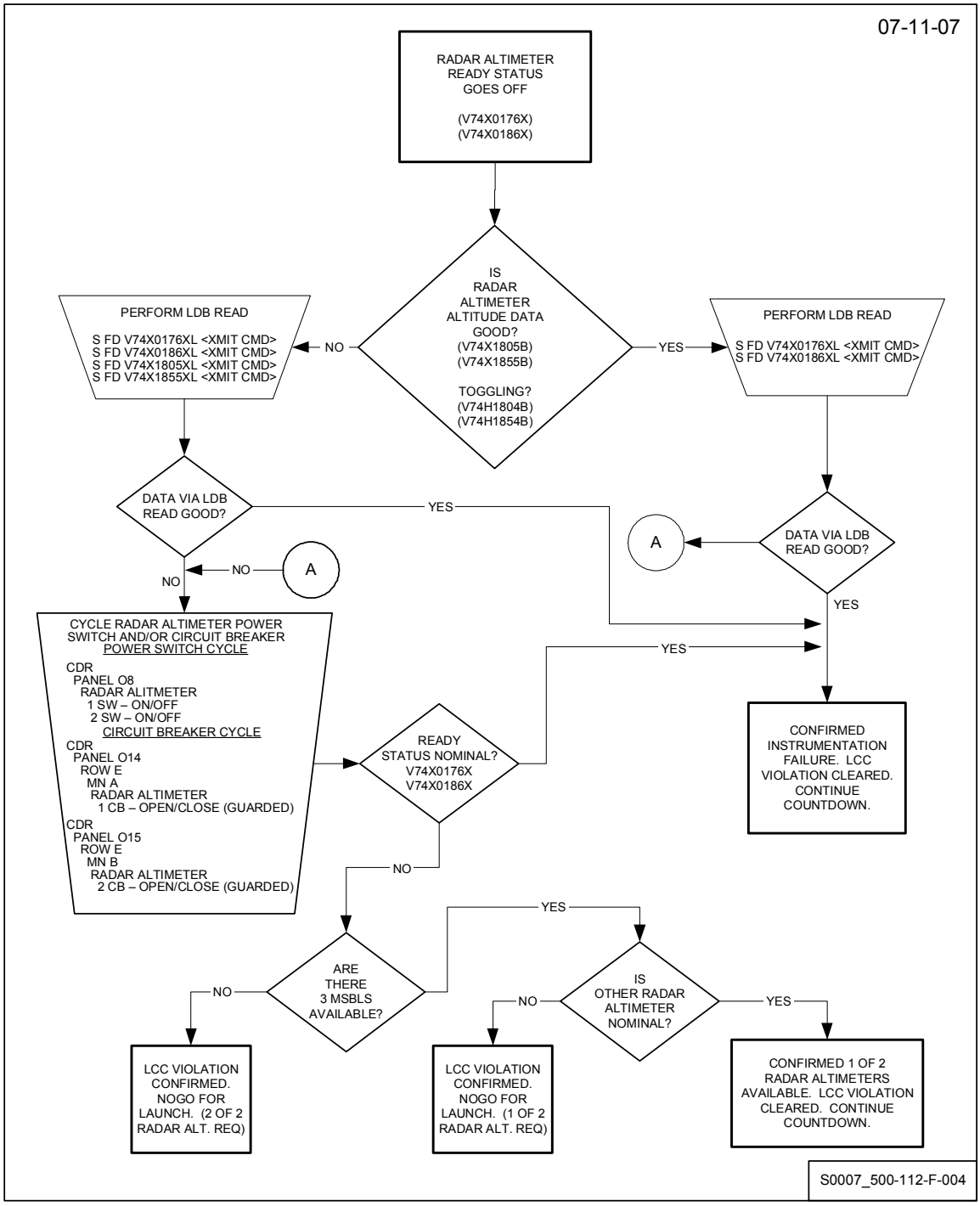


TACAN AGC (Interference) Preplanned Procedure (Page 3 of 3)



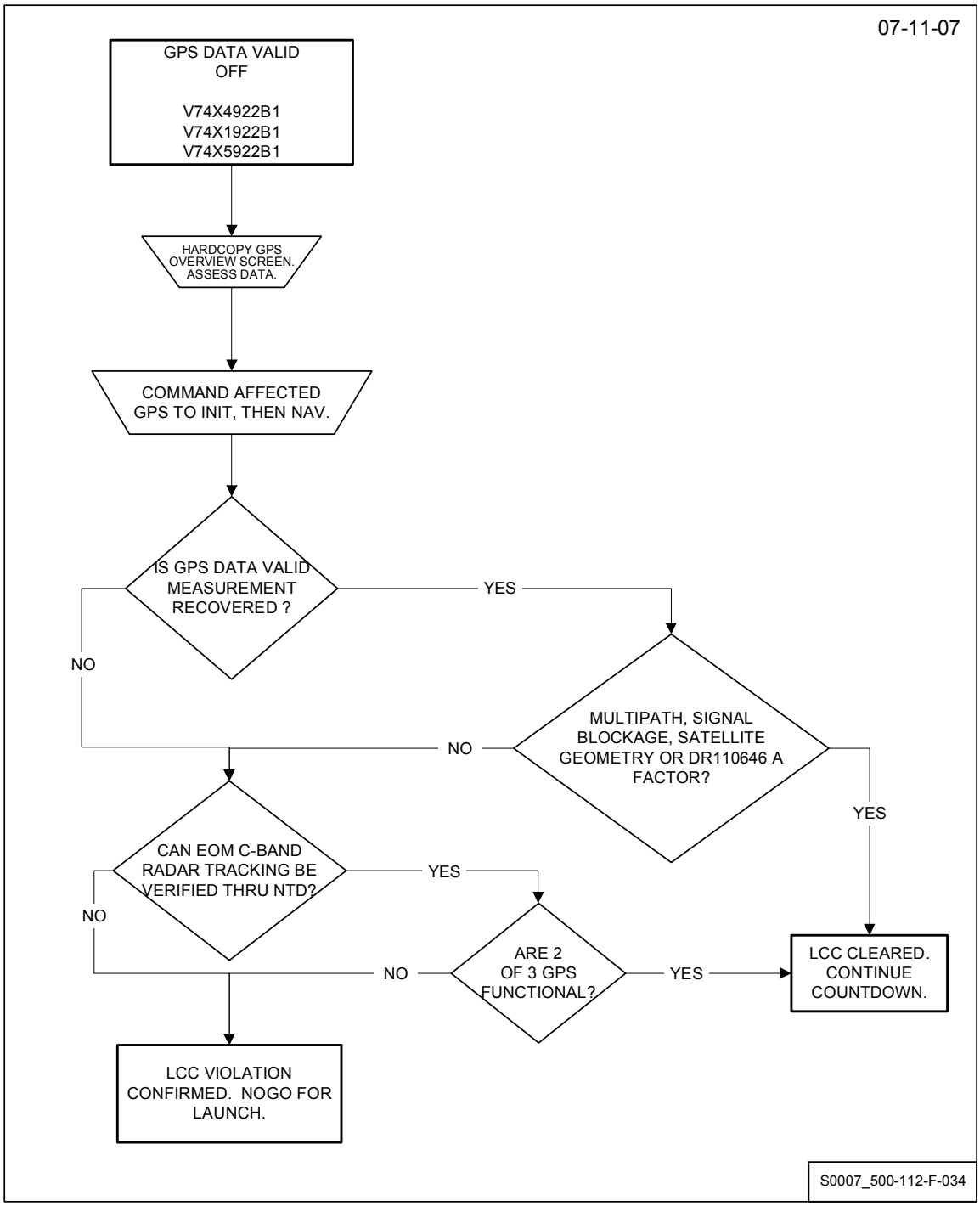
112-5

Radar Altimeter Ready Status Preplanned Procedure (SSID CT-08)



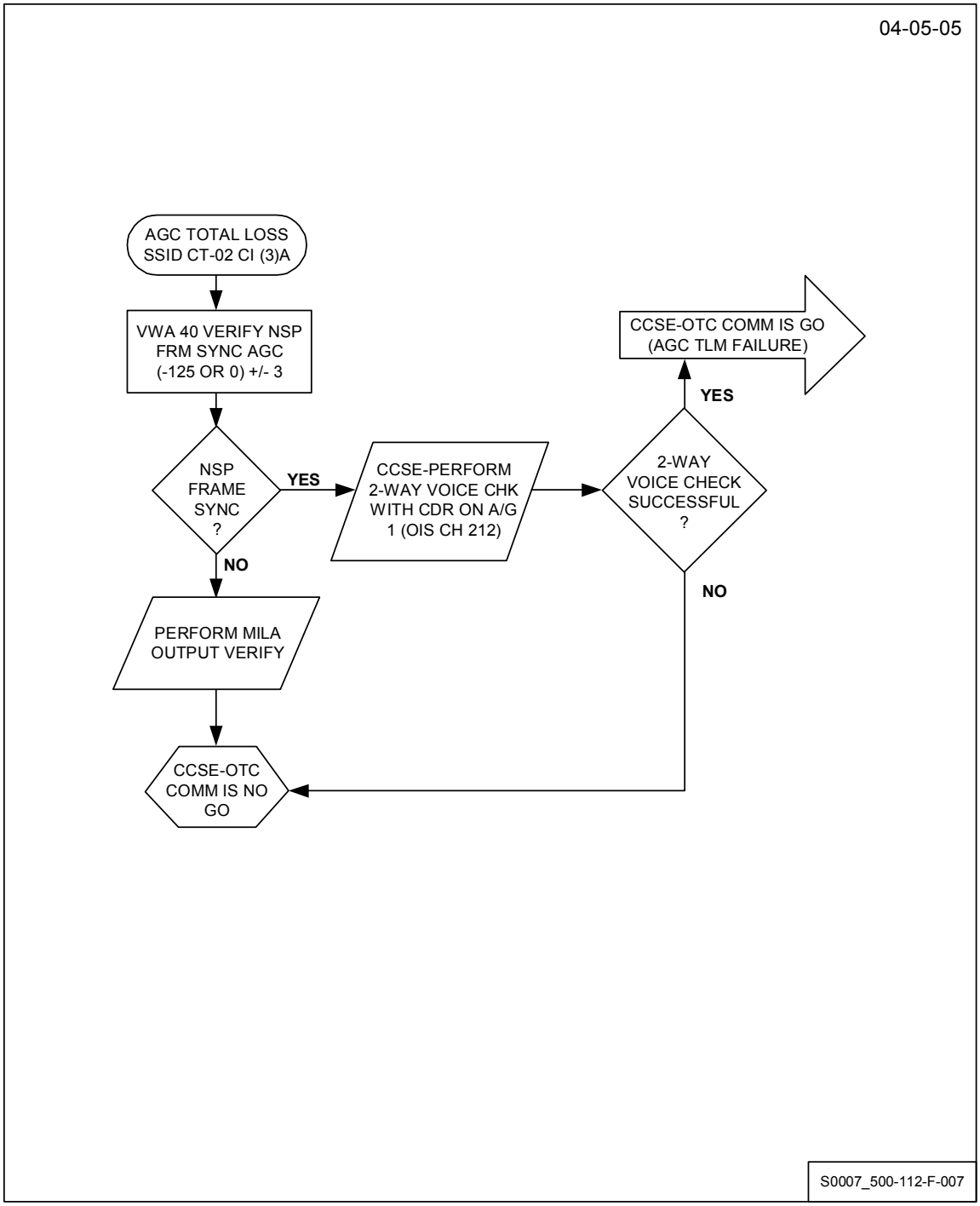
112-6

3-String GPS Data Valid Off



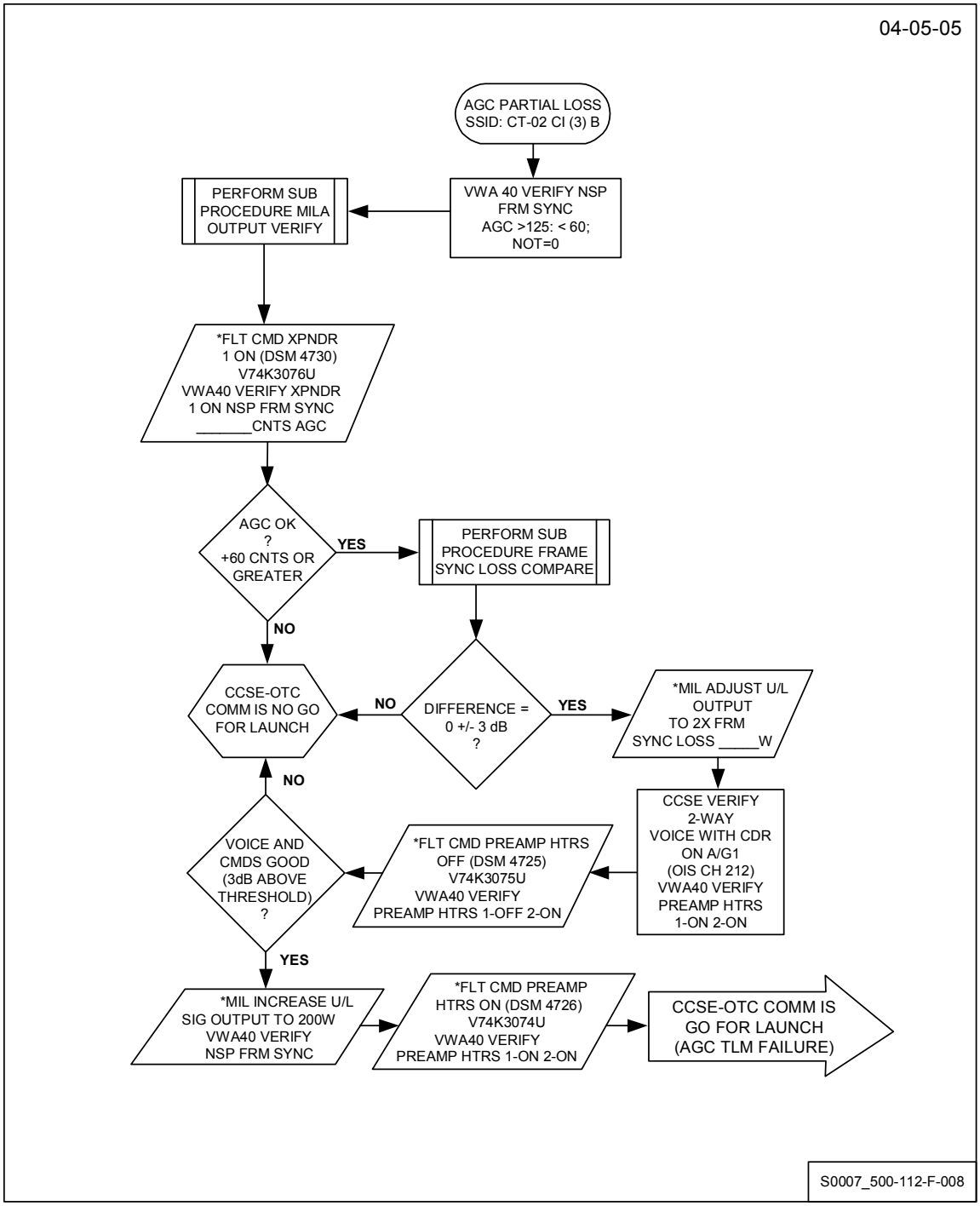
112-7

LCC Procedure - COMM AGC Loss (SSID CT-02)



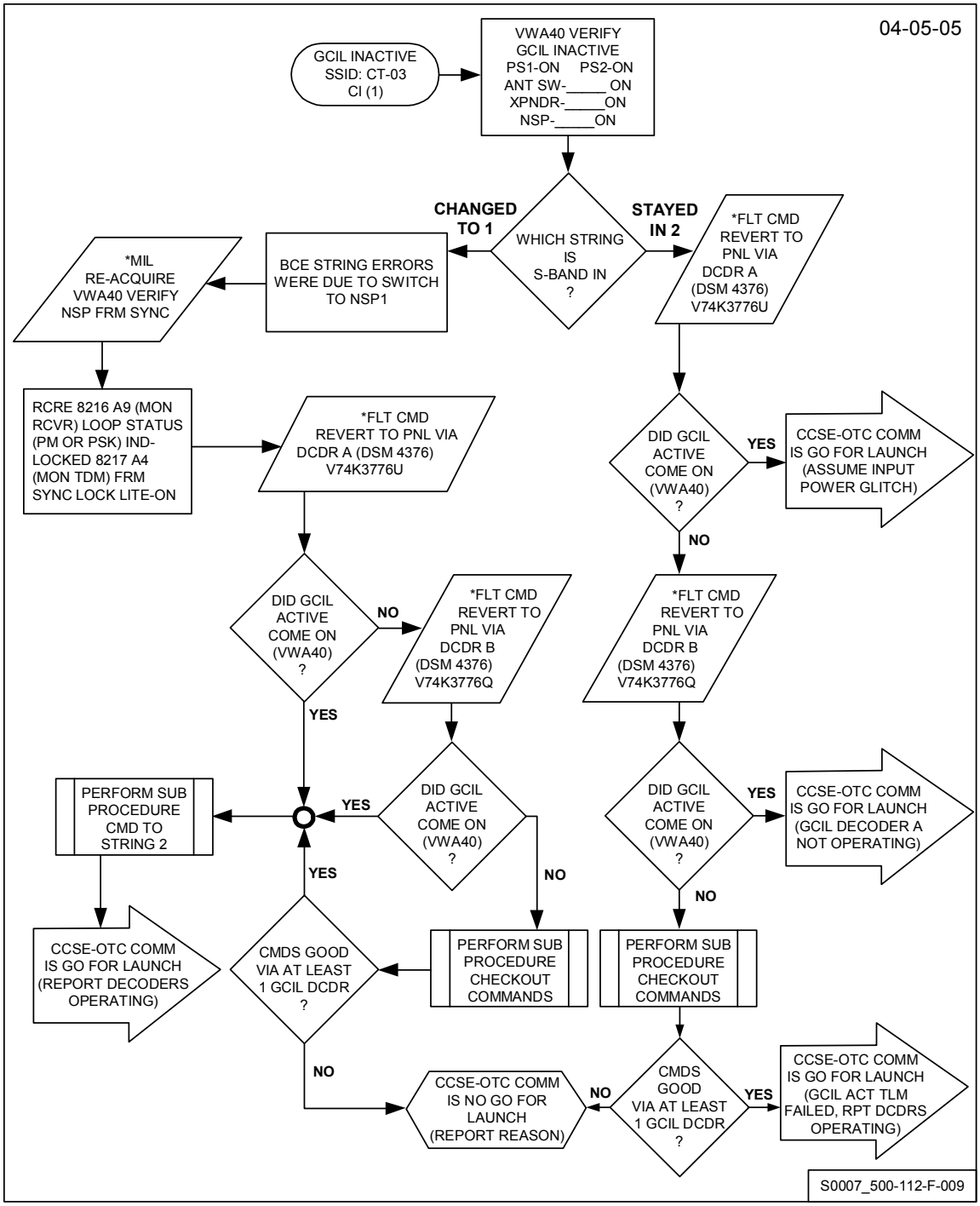
112-8

LCC Procedure - AGC Partial Loss (SSID CT-02)



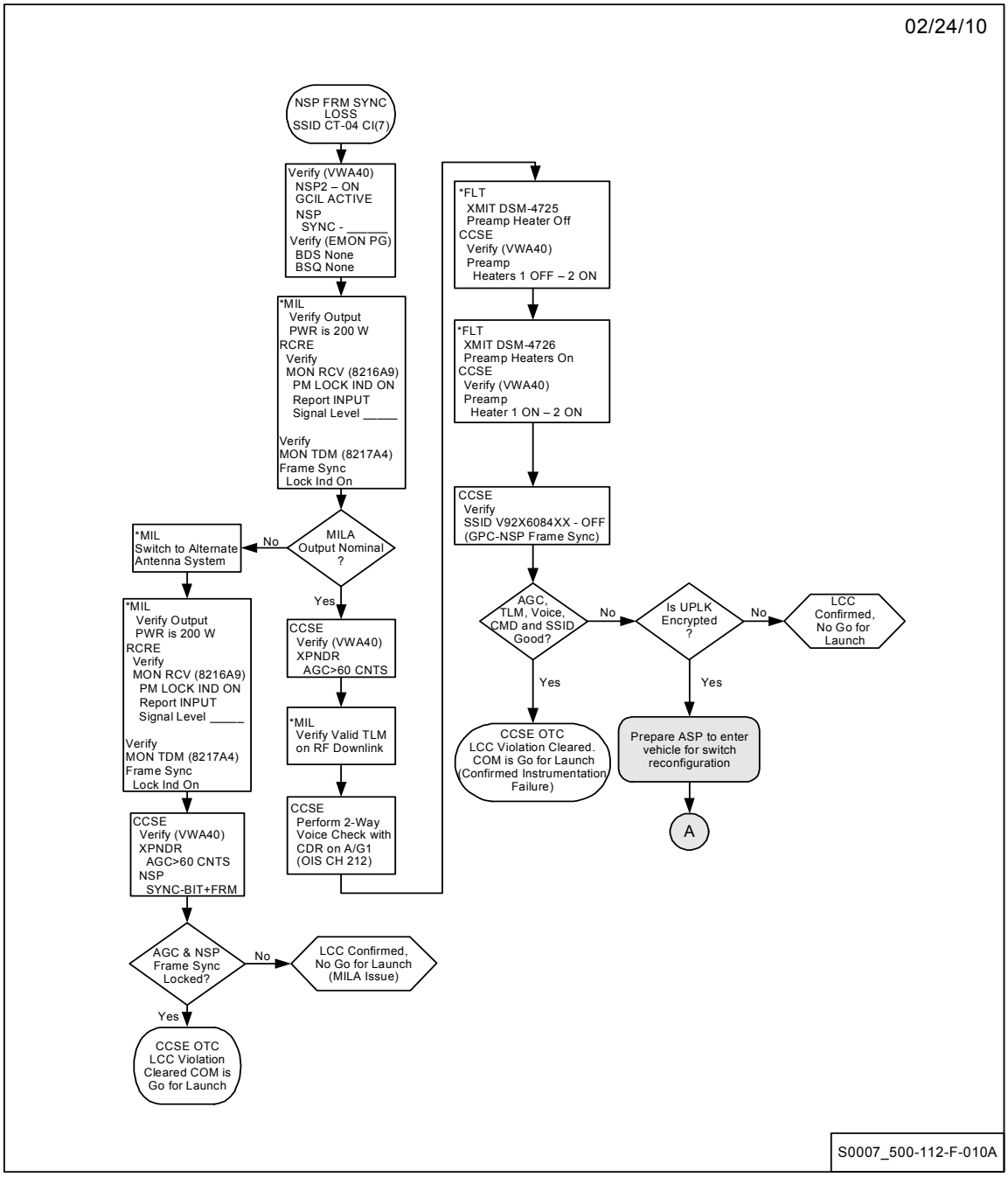
112-9

LCC Procedure - GCIL Inactive (SSID CT-03)

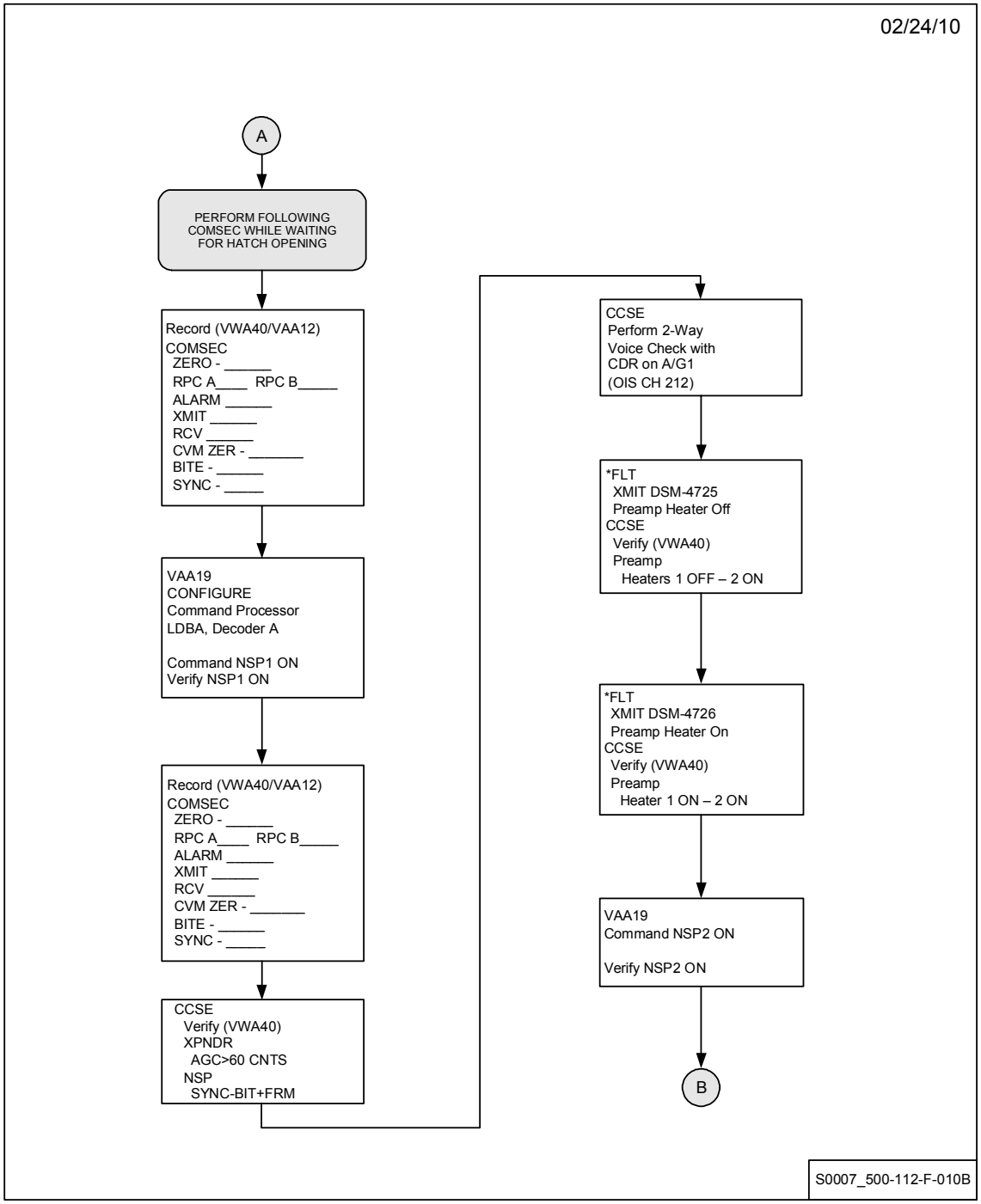


112-10

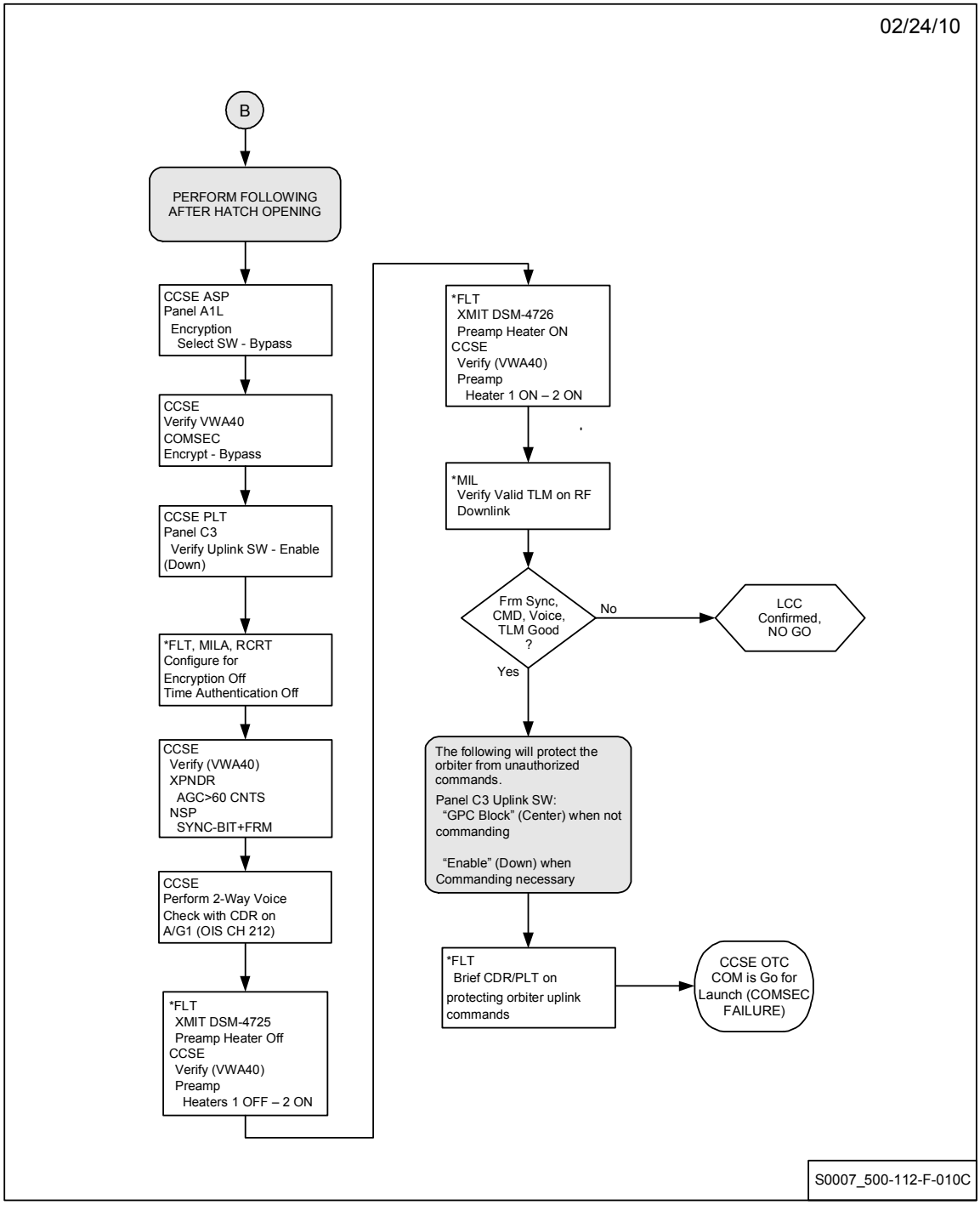
LCC Procedure - Steady State NSP Frame Sync Loss (SSID CT-04) Page 1 of 3



LCC Procedure - Steady State NSP Frame Sync Loss (SSID CT-04)
Page 2 of 3

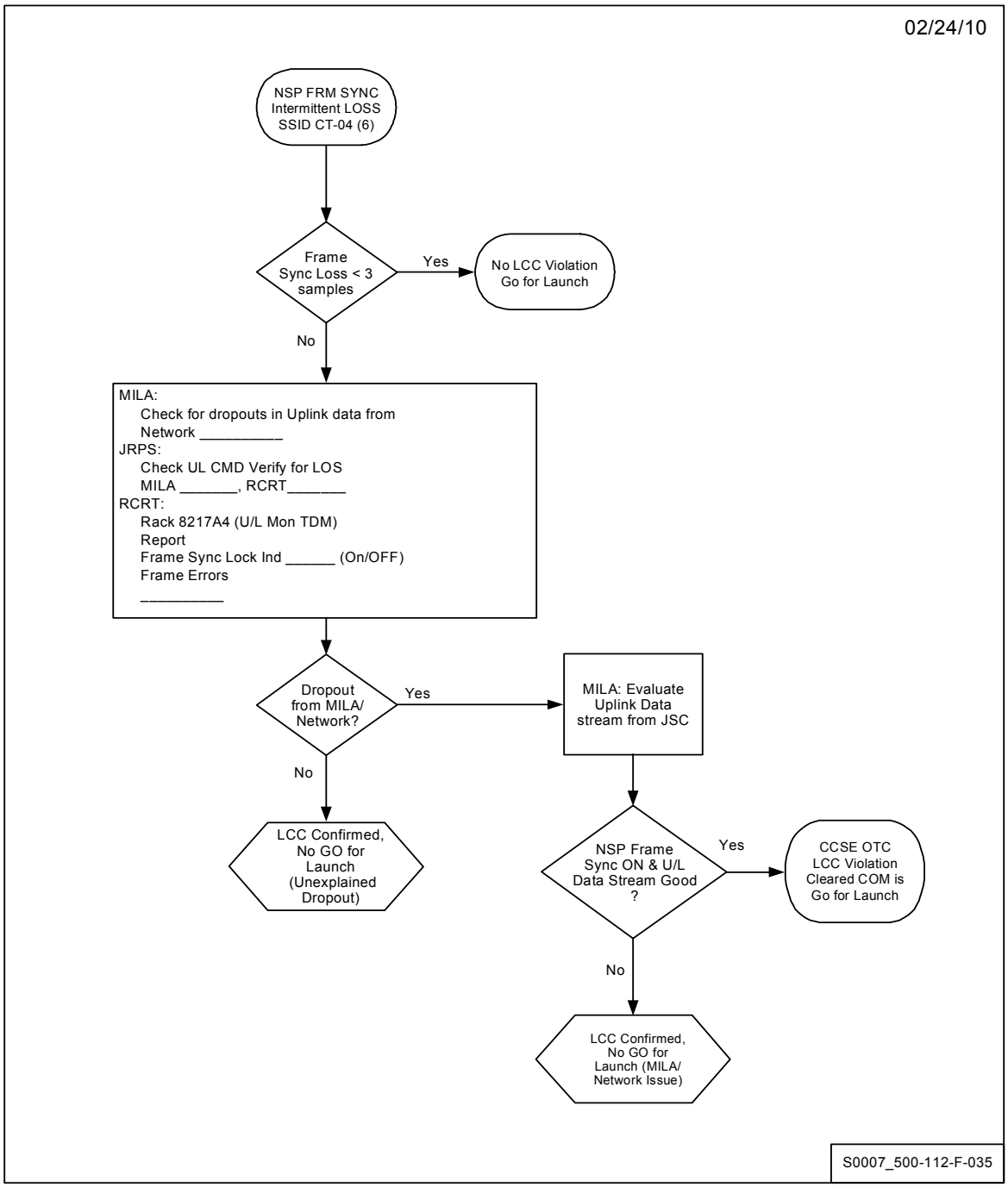


LCC Procedure - Steady State NSP Frame Sync Loss (SSID CT-04)
Page 3 of 3



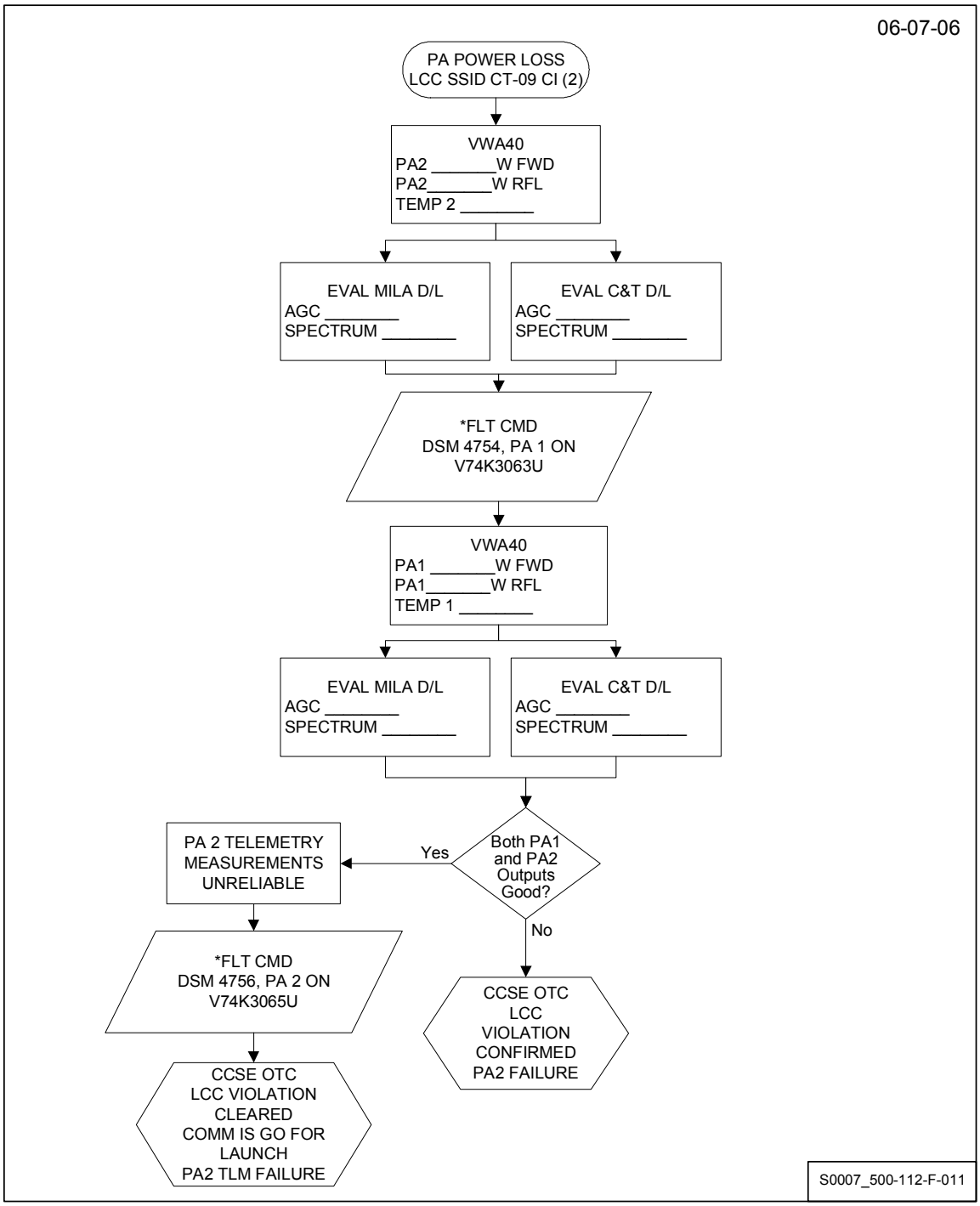
112-11

LCC Procedure - Intermittent NSP Frame Sync Loss (SSID CT-04)



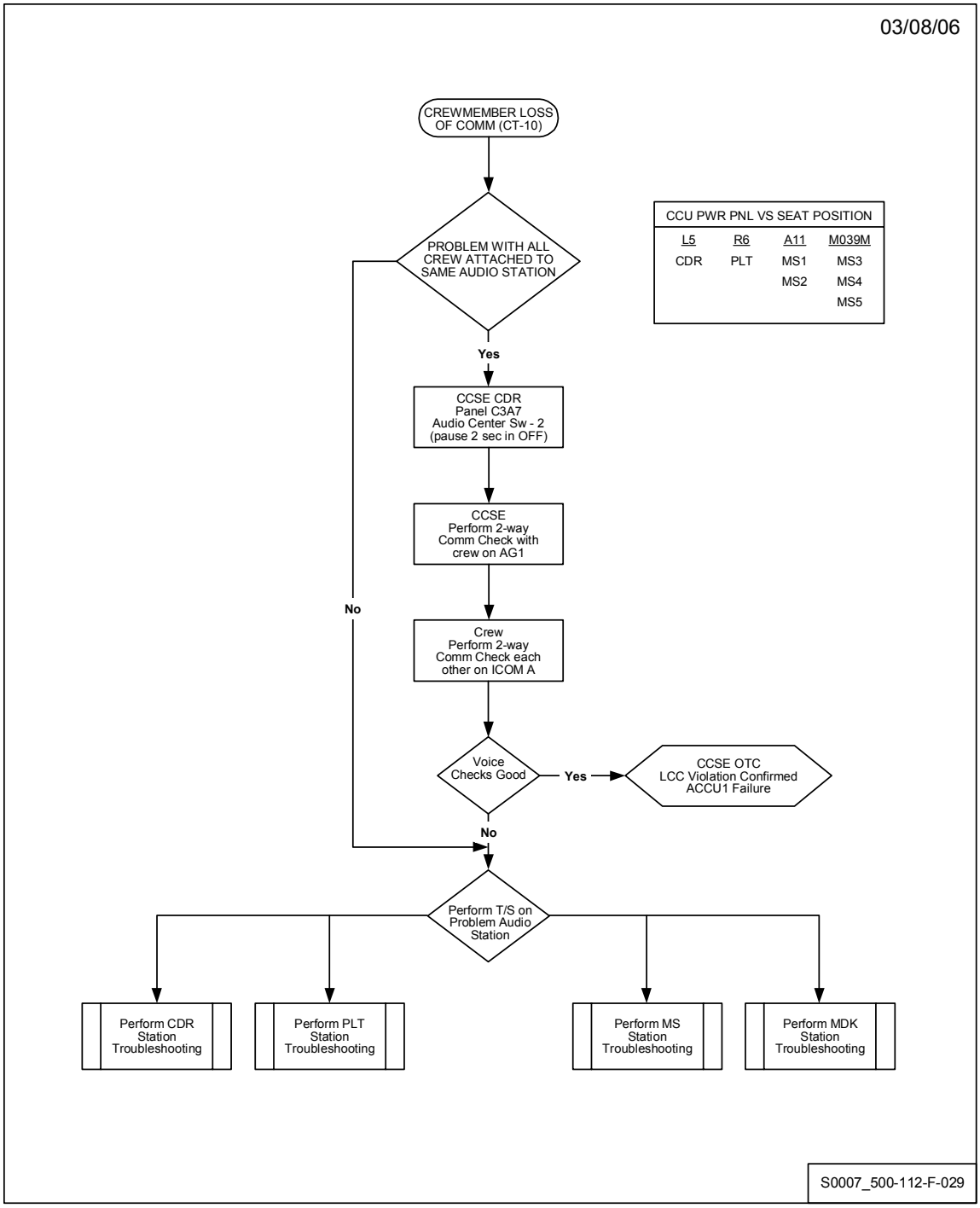
112-12

LCC Procedure - PA Power Output Loss (SSID CT-09)

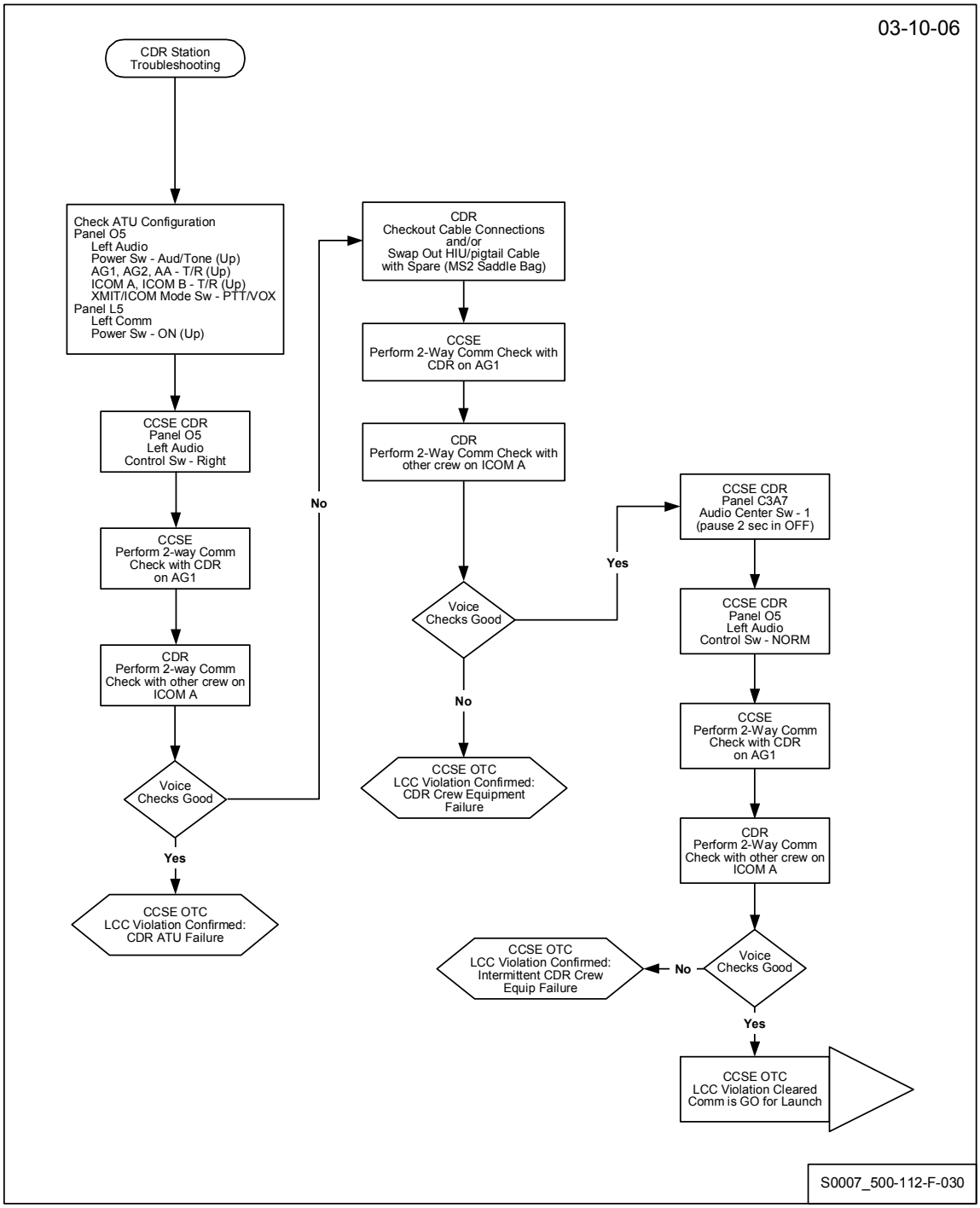


112-13

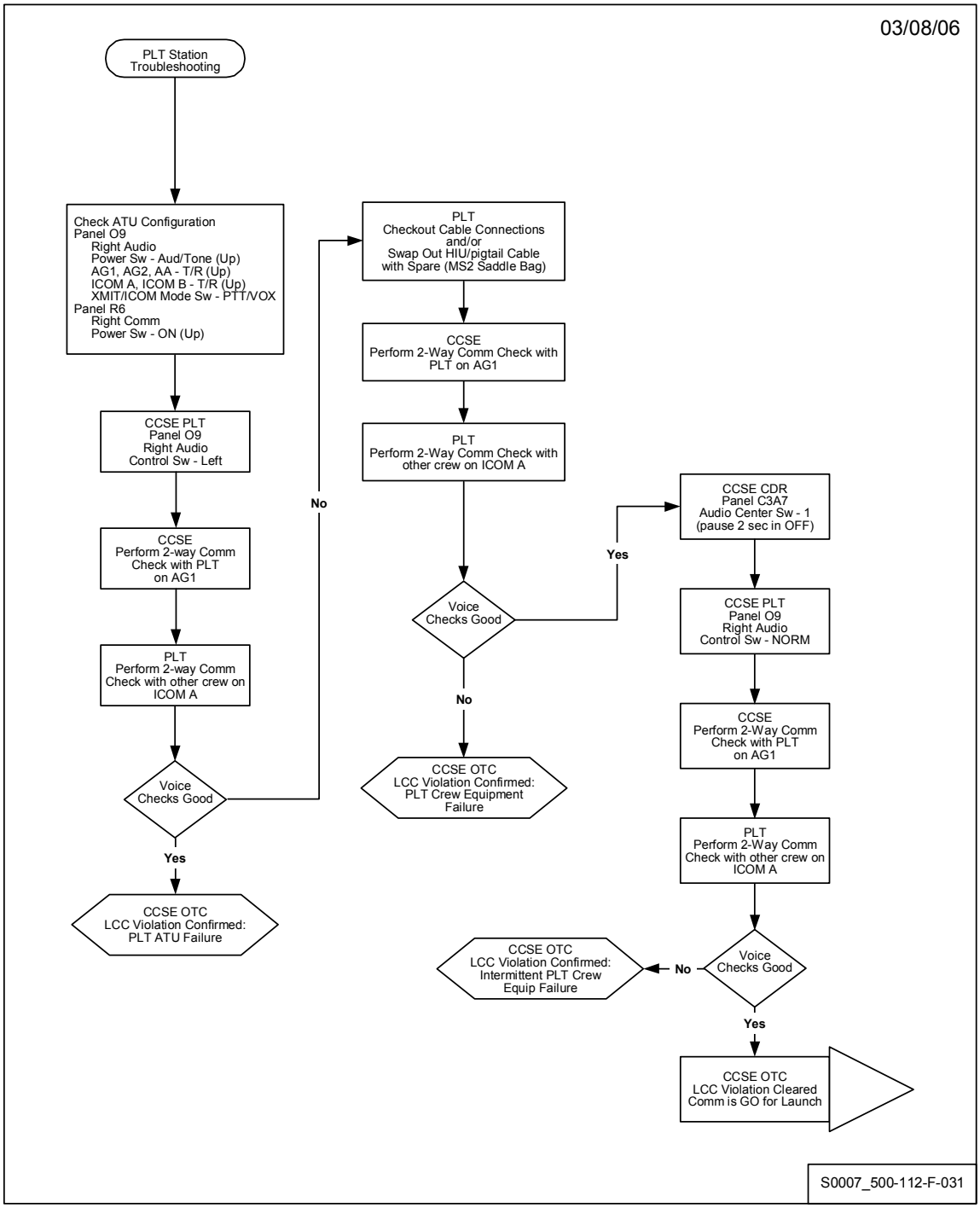
LCC Procedure - Crew Member Loss of Comm (SSID CT-10)



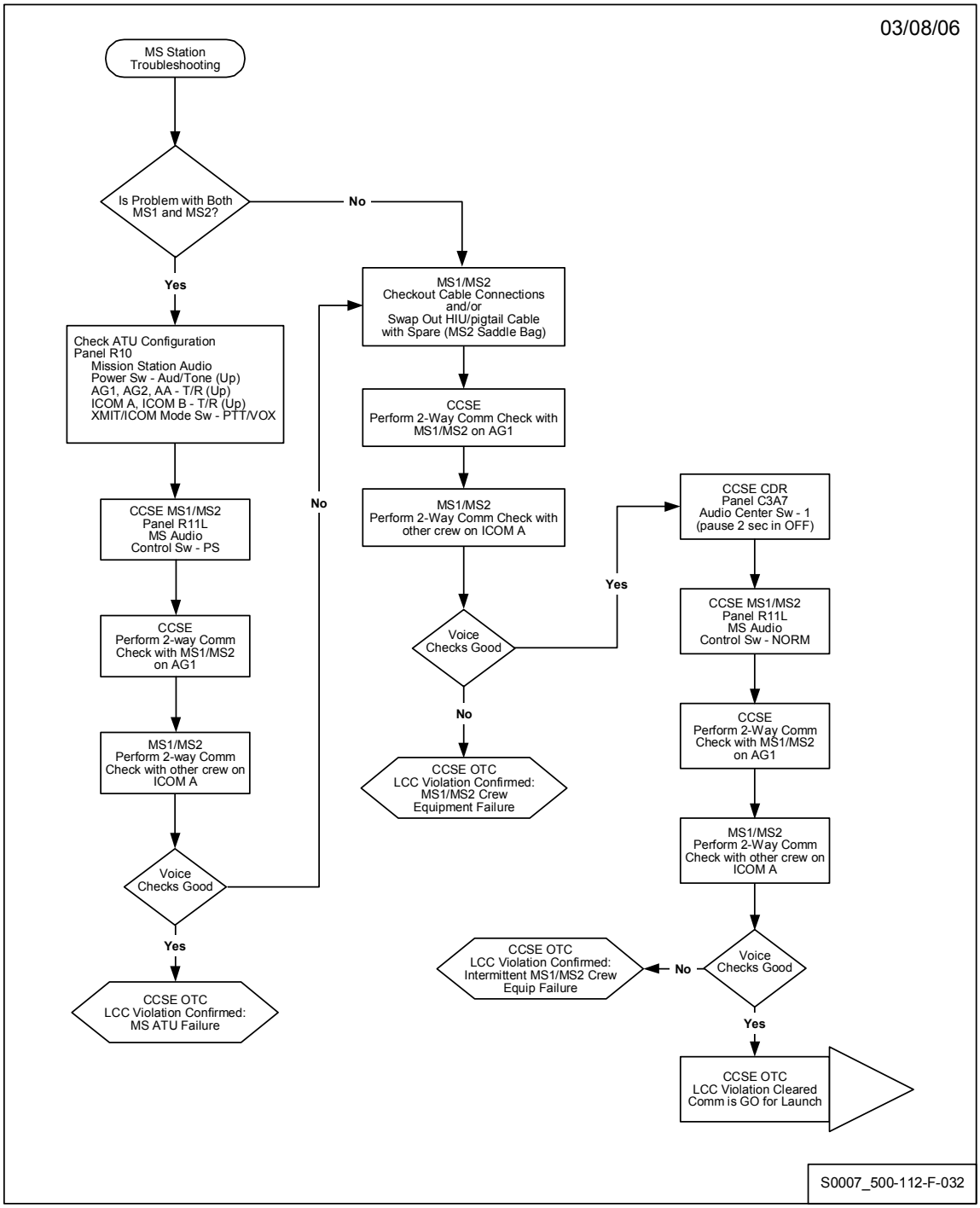
Crew Member Loss of Comm (SSID CT-10) - CDR Station Troubleshooting



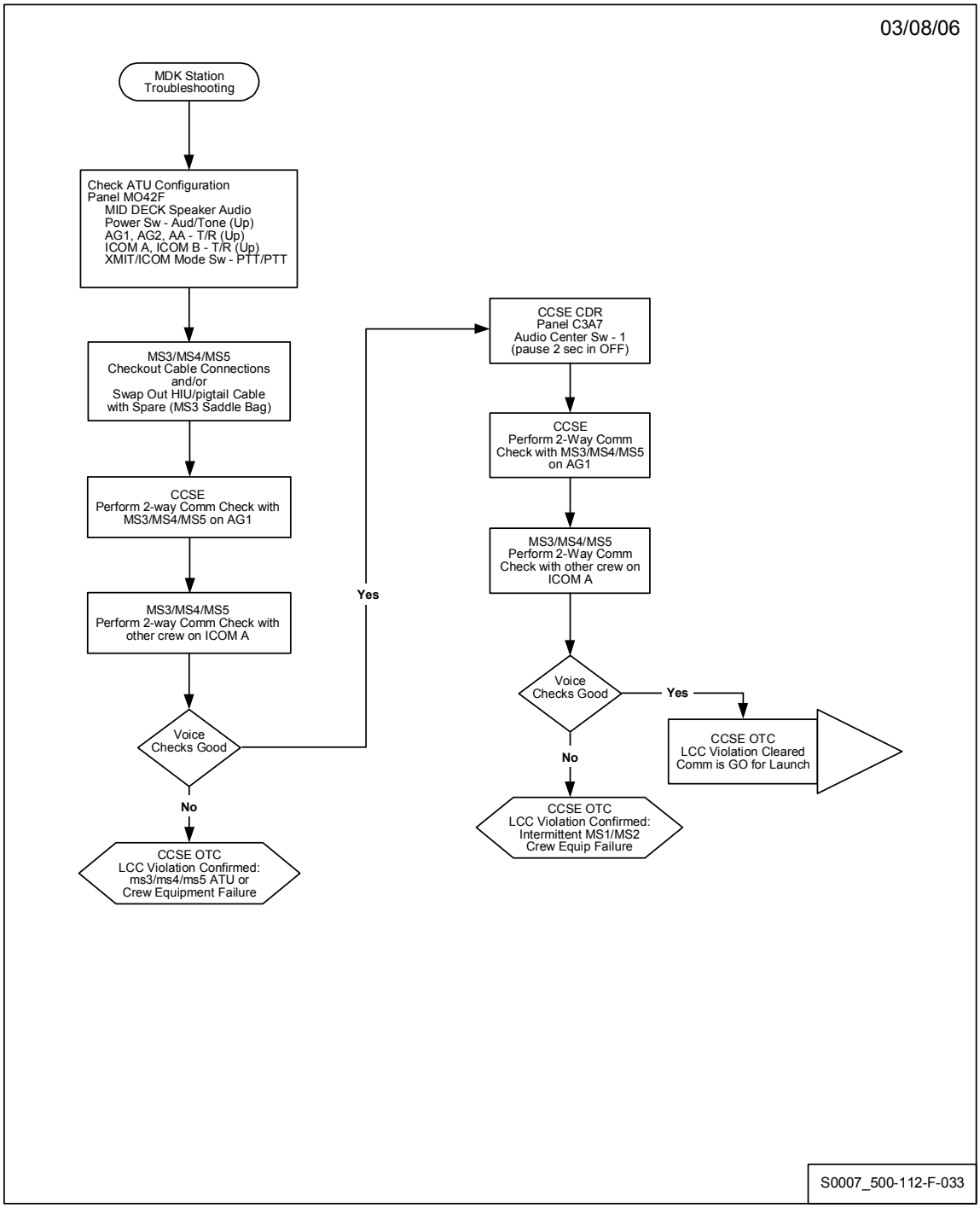
Crew Member Loss of Comm (SSID CT-10) - PLT Station Troubleshooting



Crew Member Loss of Comm (SSID CT-10) - MS Station Troubleshooting

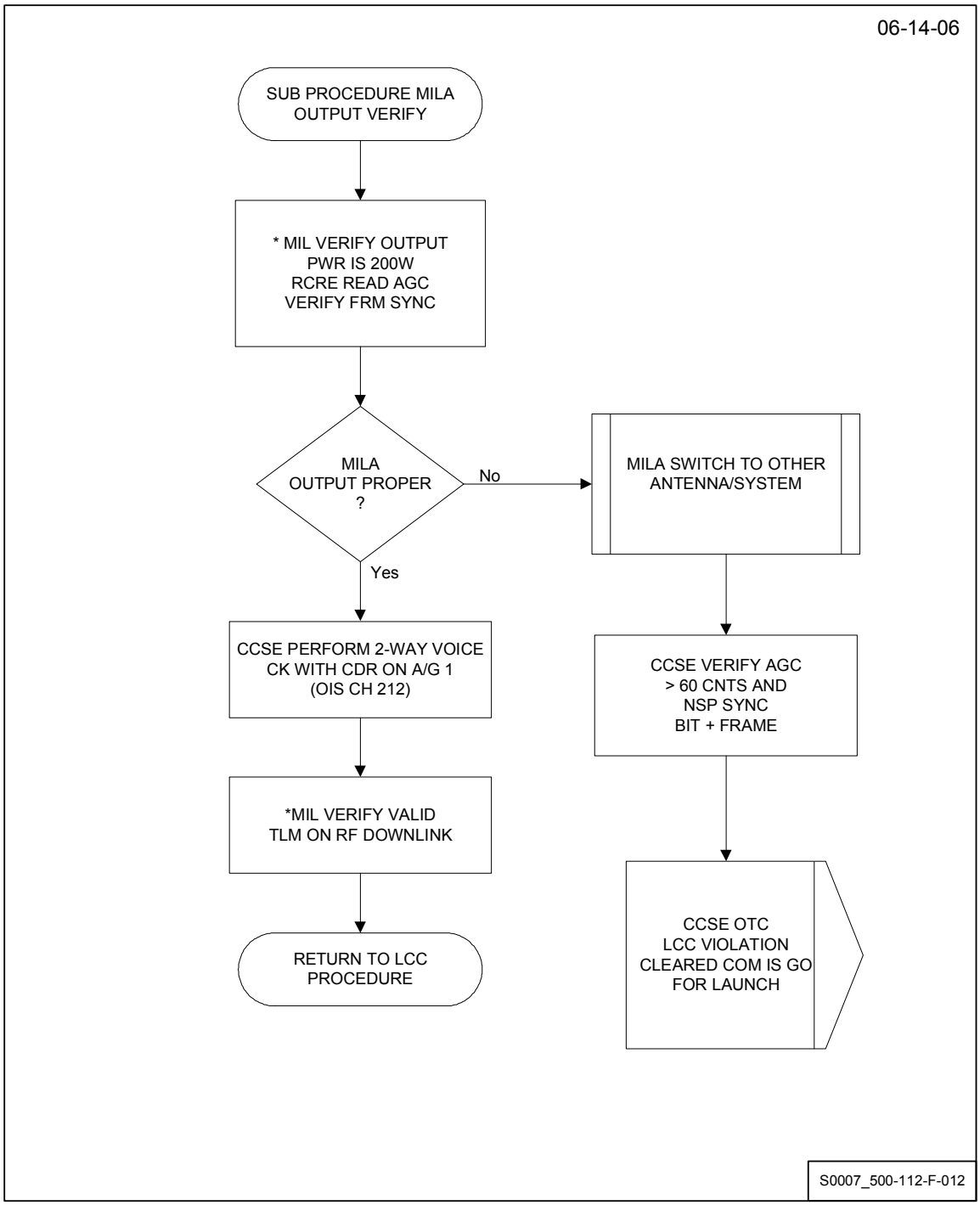


Crew Member Loss of Comm (SSID CT-10) - MDK Station Troubleshooting



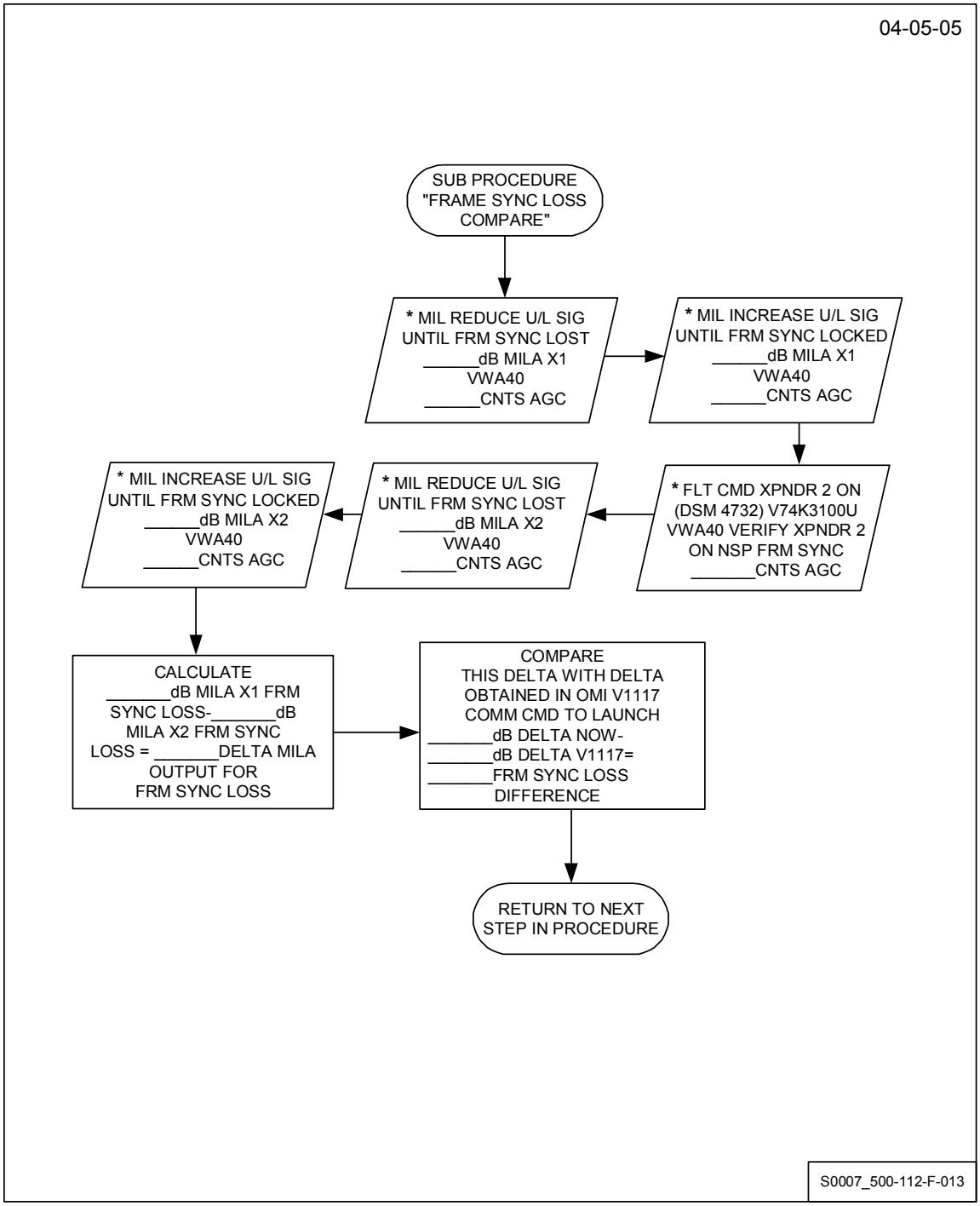
112-14

LCC Sub Procedure - MILA Output Verify



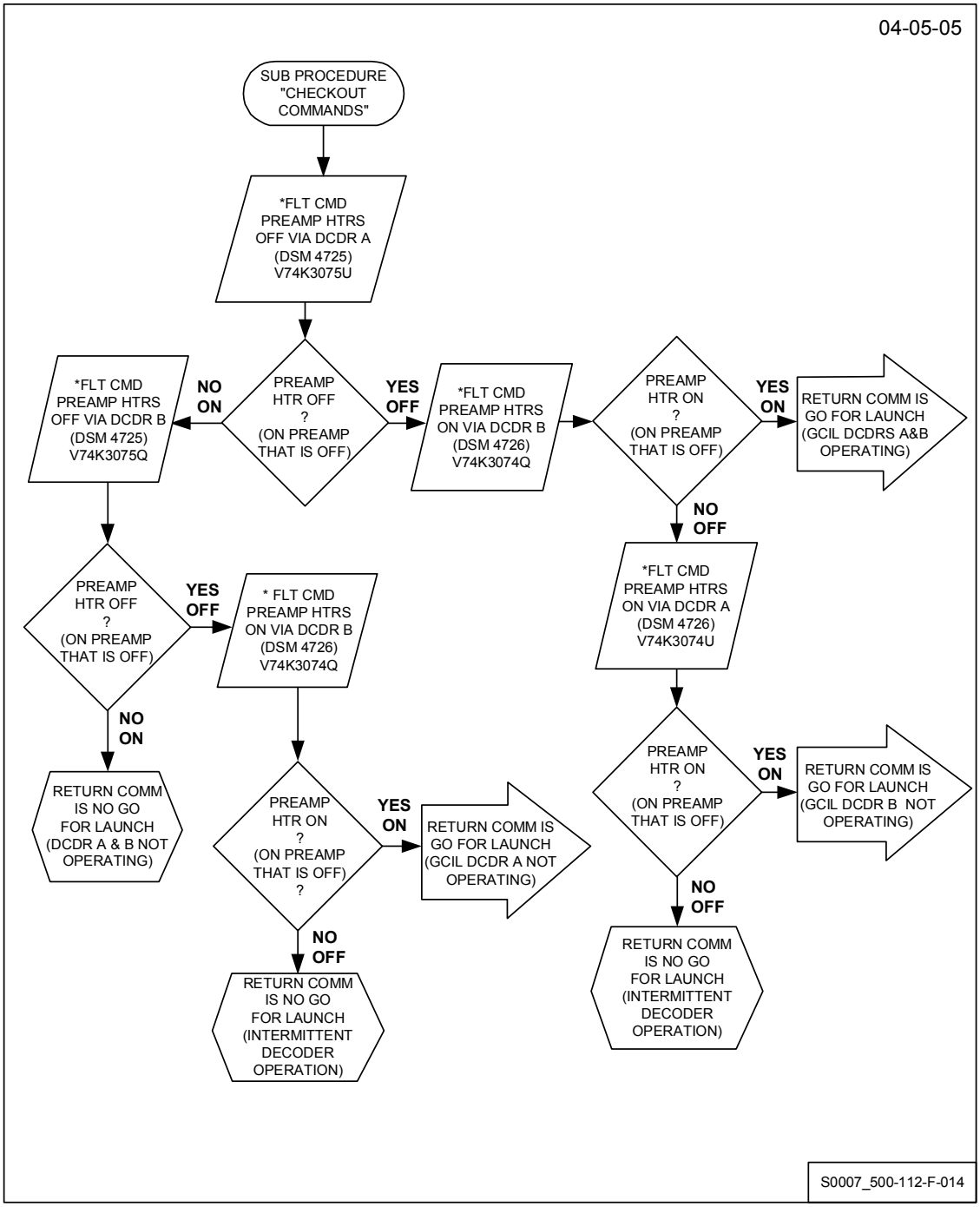
112-15

COMM LCC Sub Procedure - Frame Sync Loss Compare



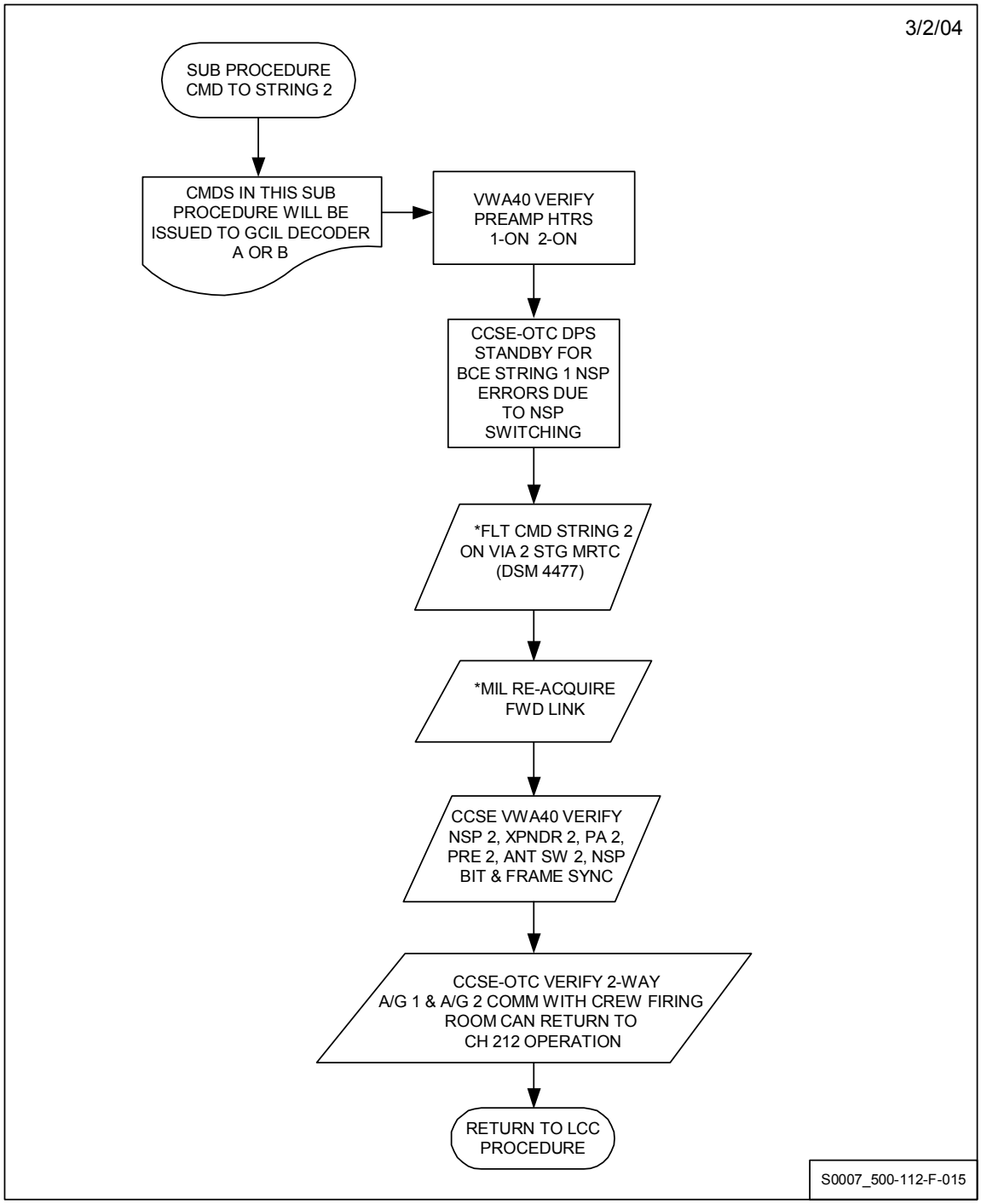
112-16

COMM LCC Sub Procedure - Checkout Commands



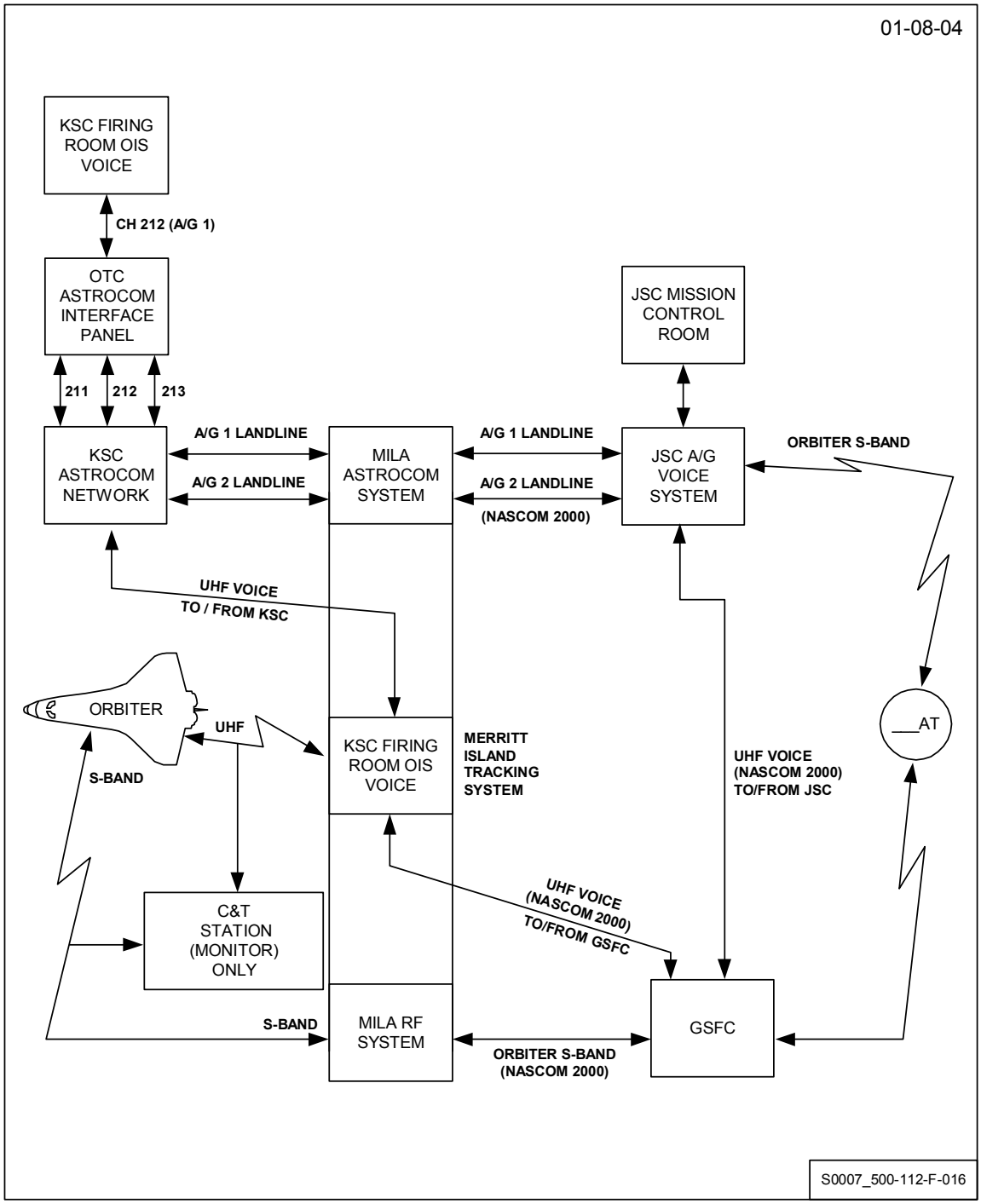
112-17

COMM LCC Sub Procedure - Command to String 2



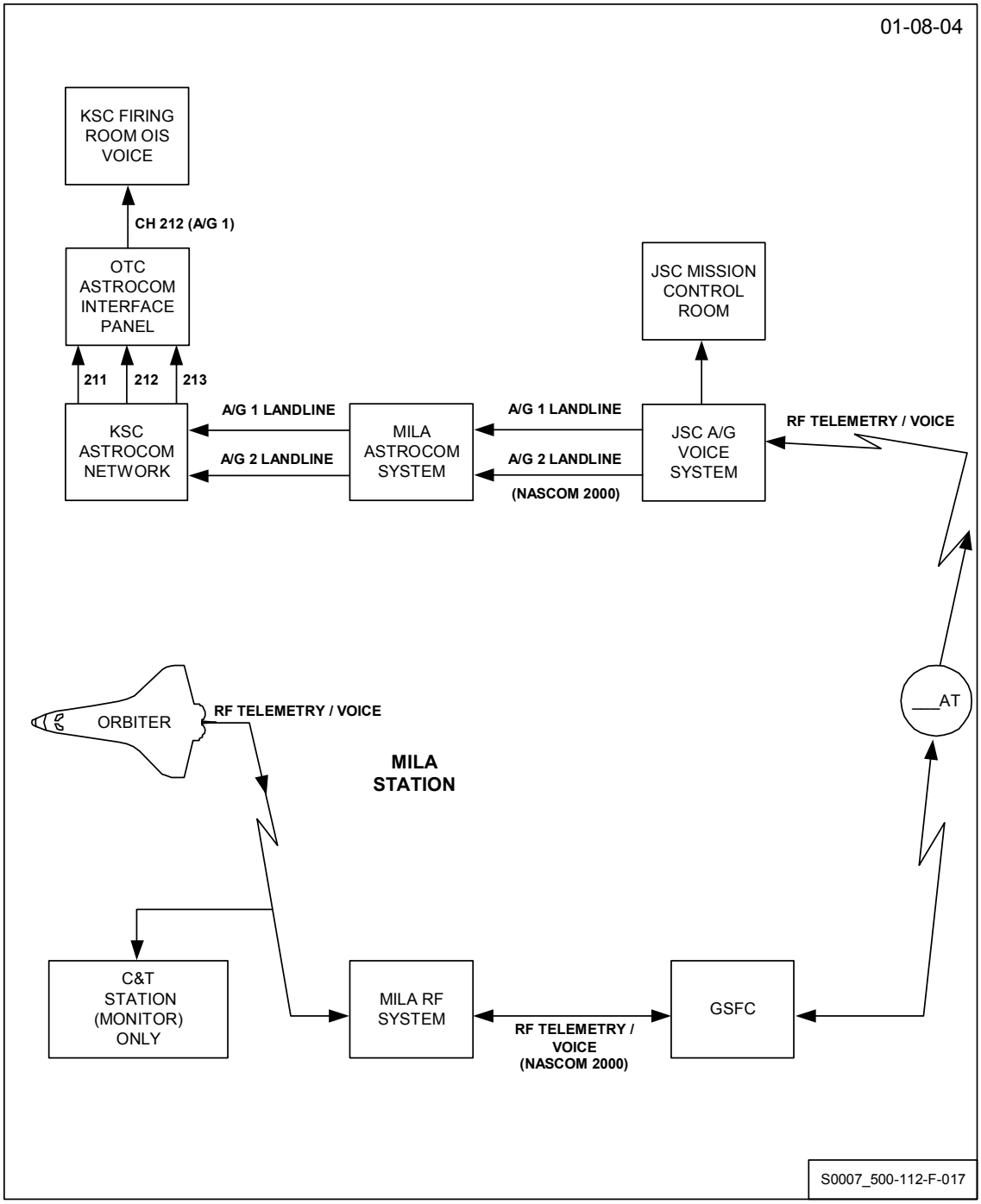
112-18

S-BAND/UHF Uplink/Downlink Network



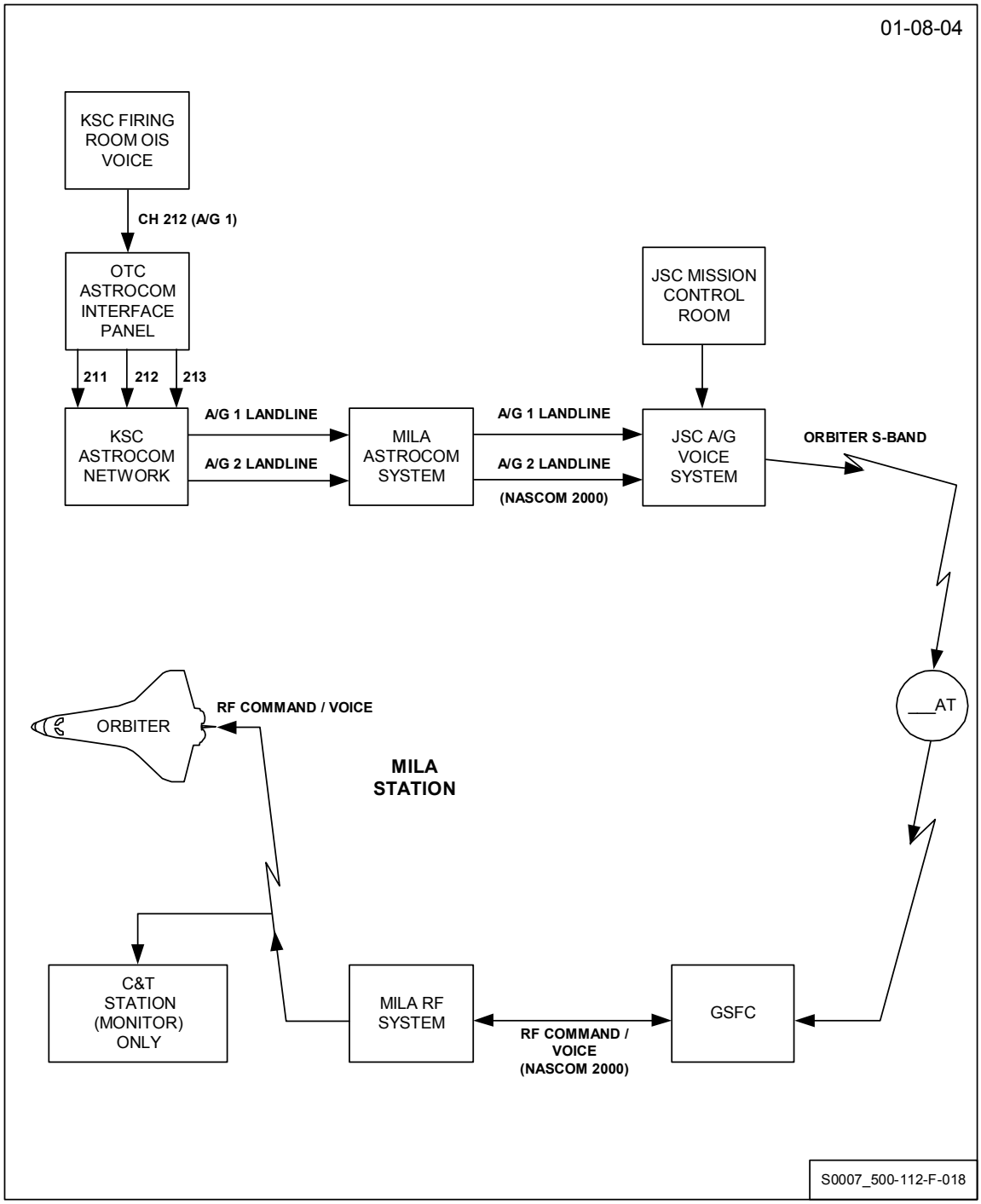
112-19

A/G Orbiter Downlink Network



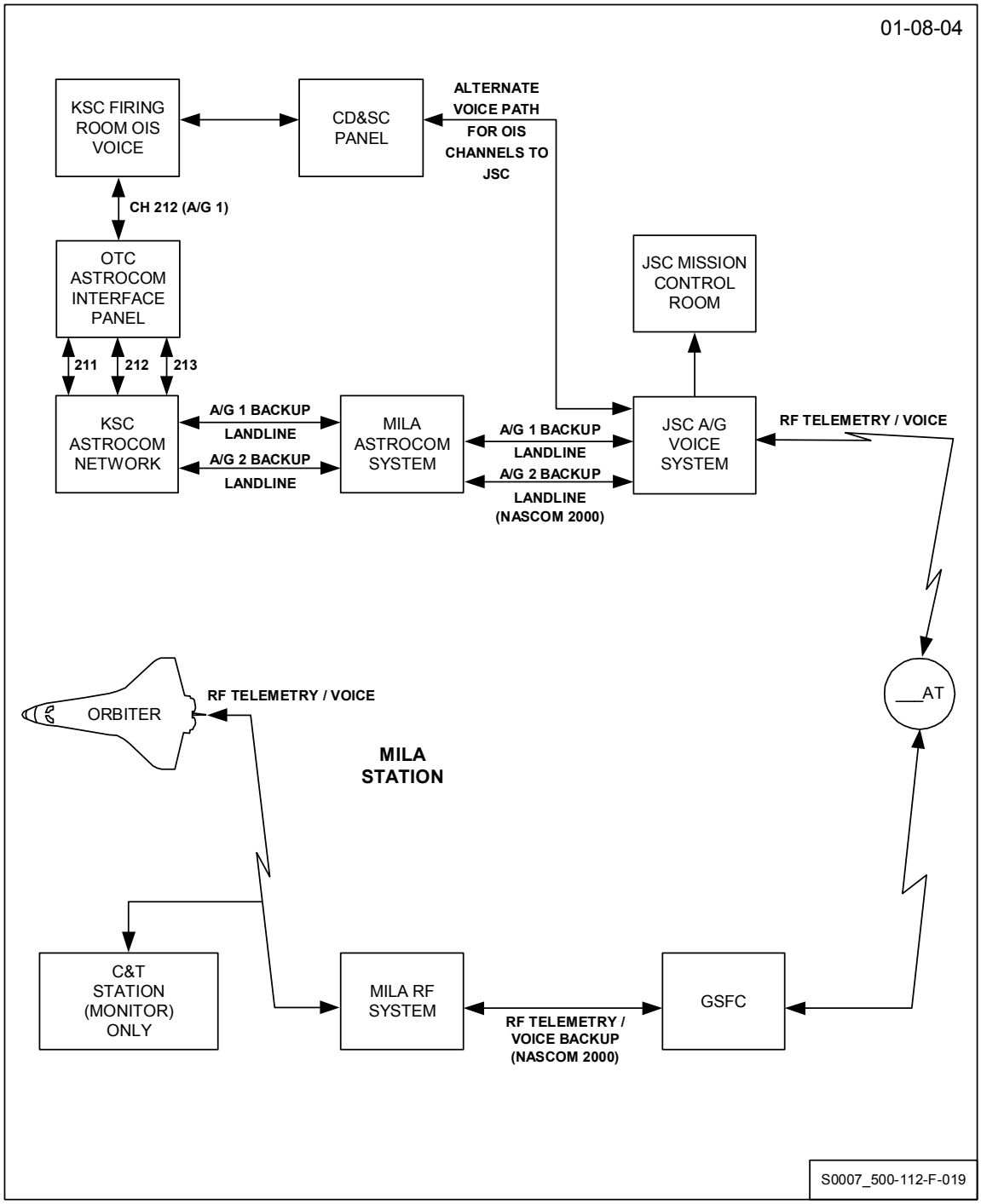
112-20

A/G Orbiter Uplink Network



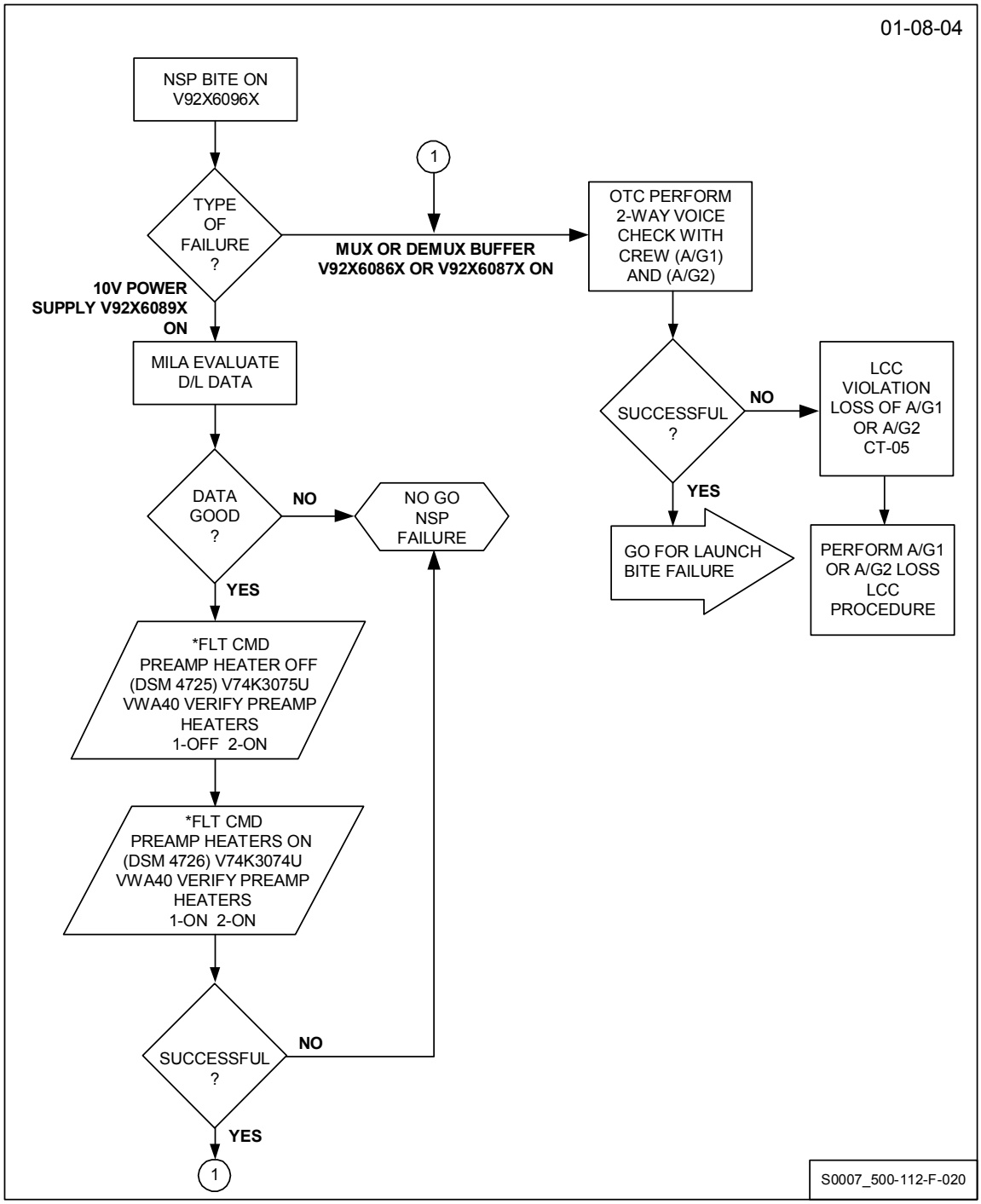
112-21

A/G Backup Landlines and Alternate Voice Paths



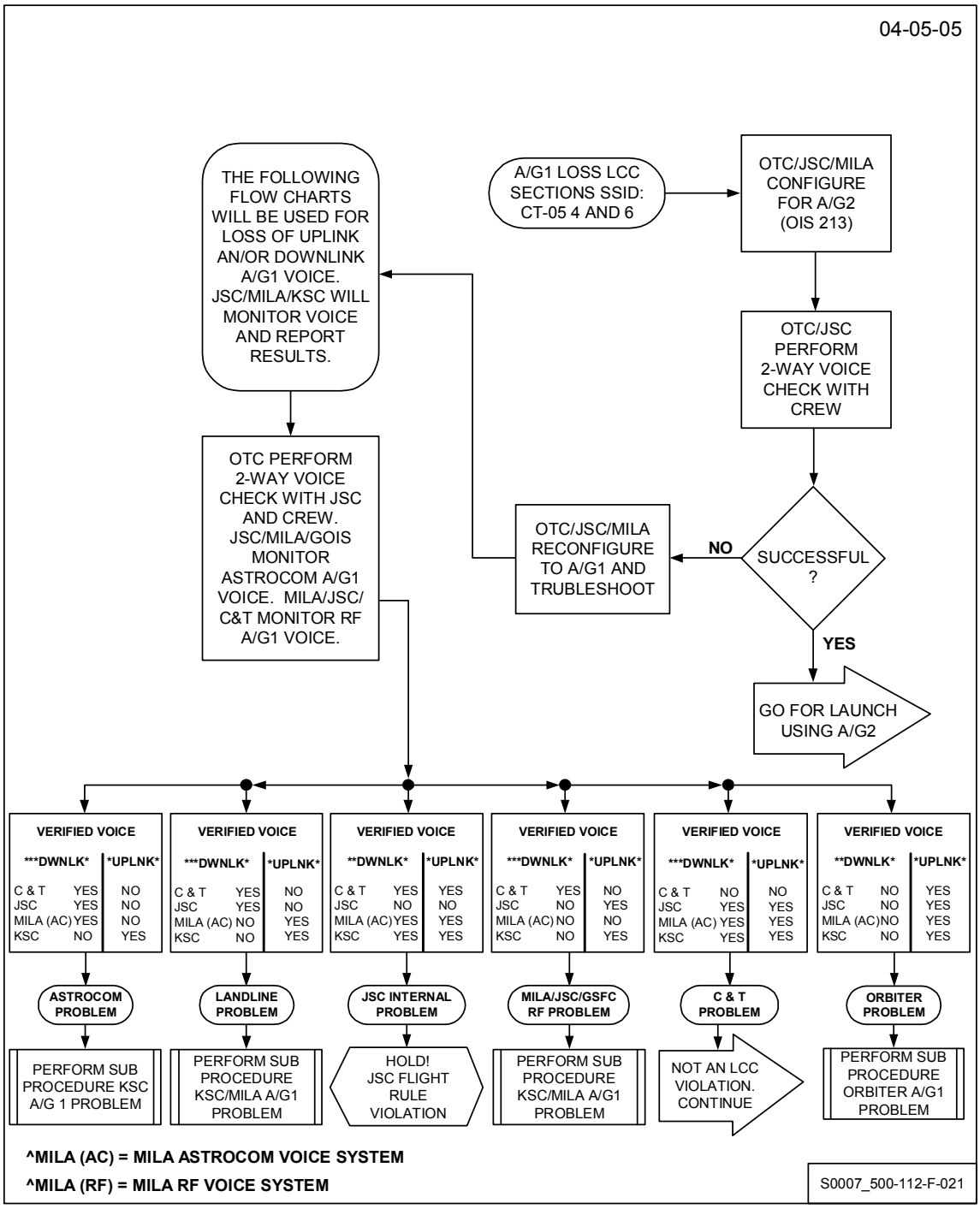
112-22

LCC Procedure - NSP Bite Failure



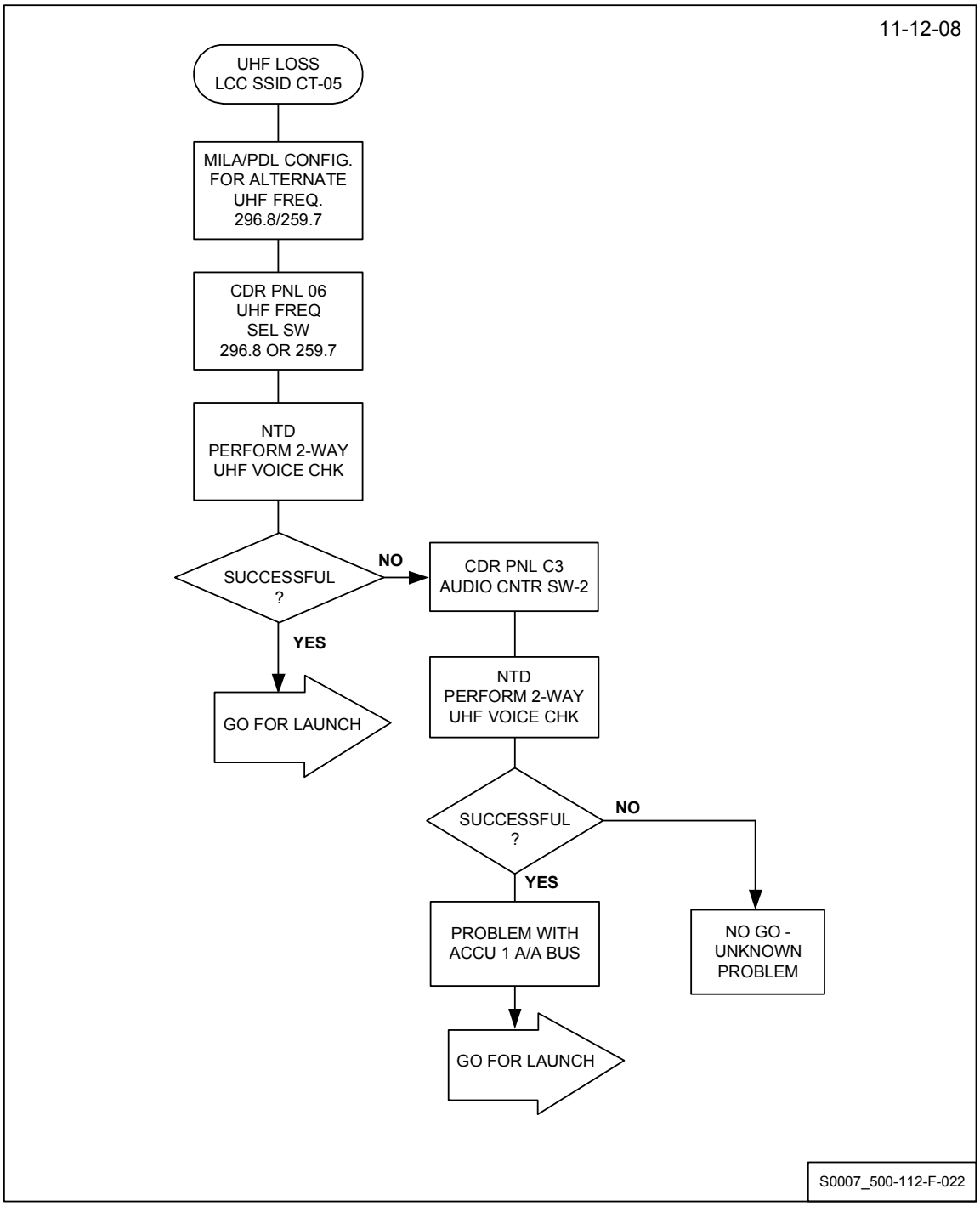
112-23

LCC Procedure - A/G1 Loss



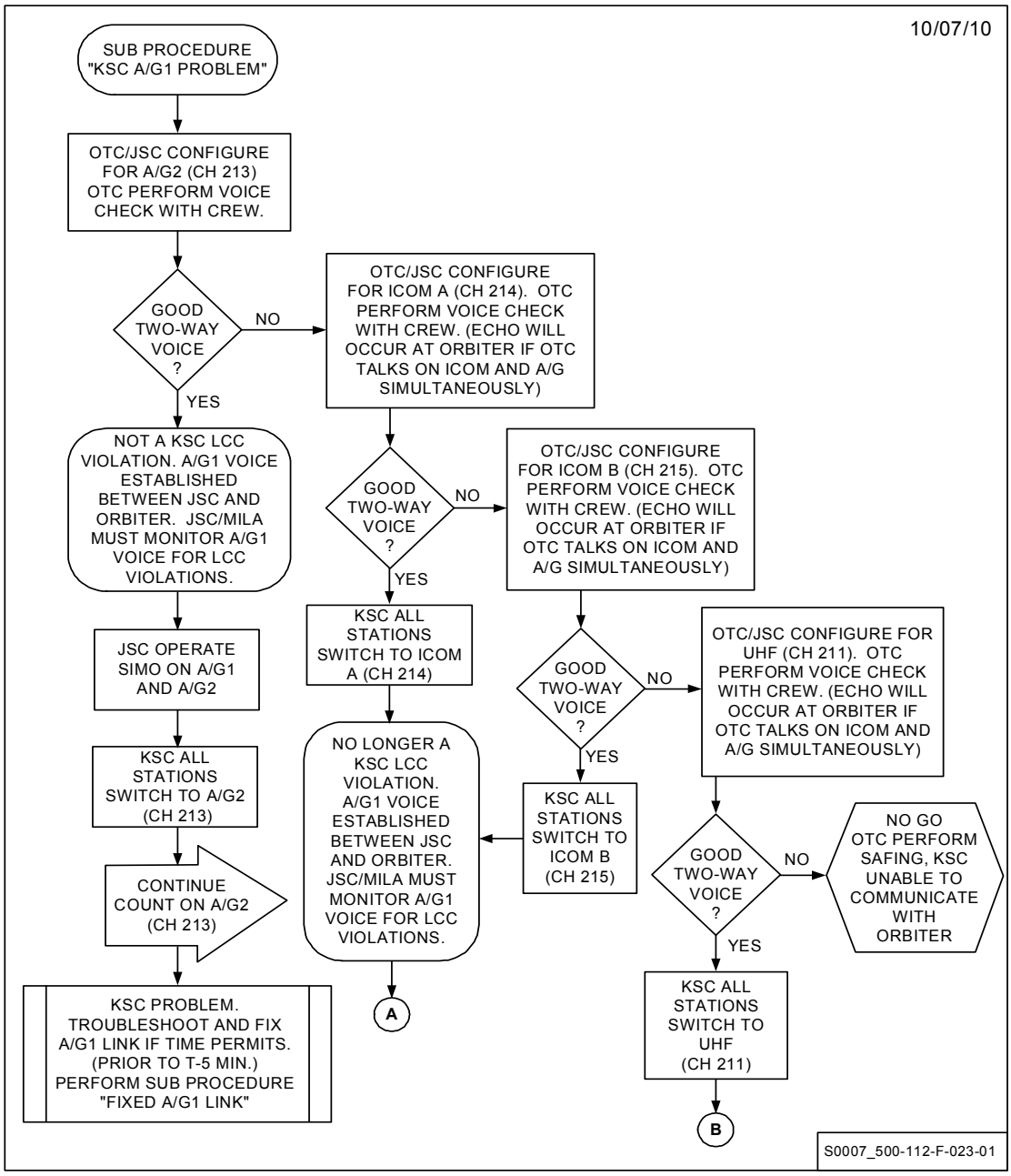
112-24

LCC Procedure - UHF Voice Loss

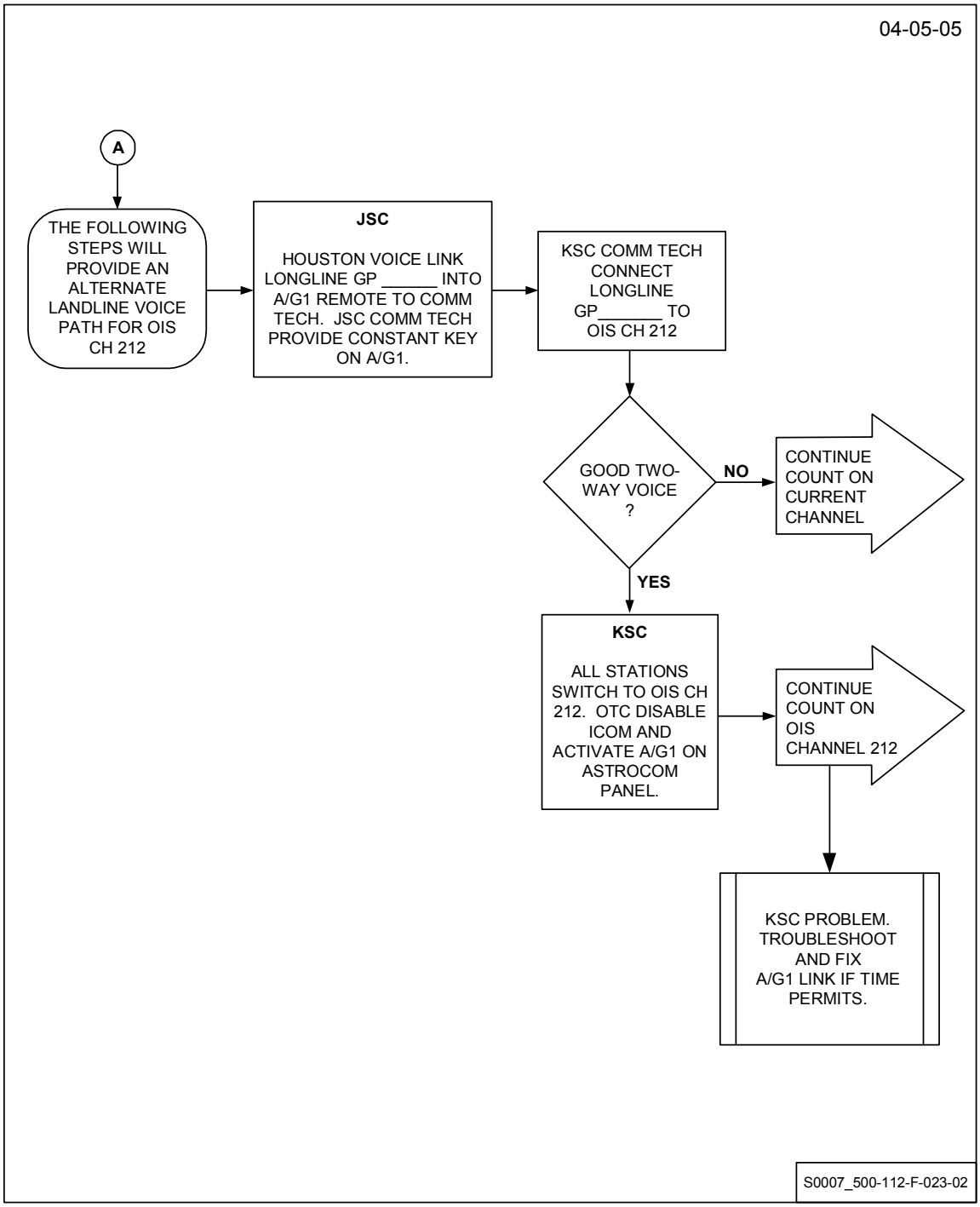


112-25

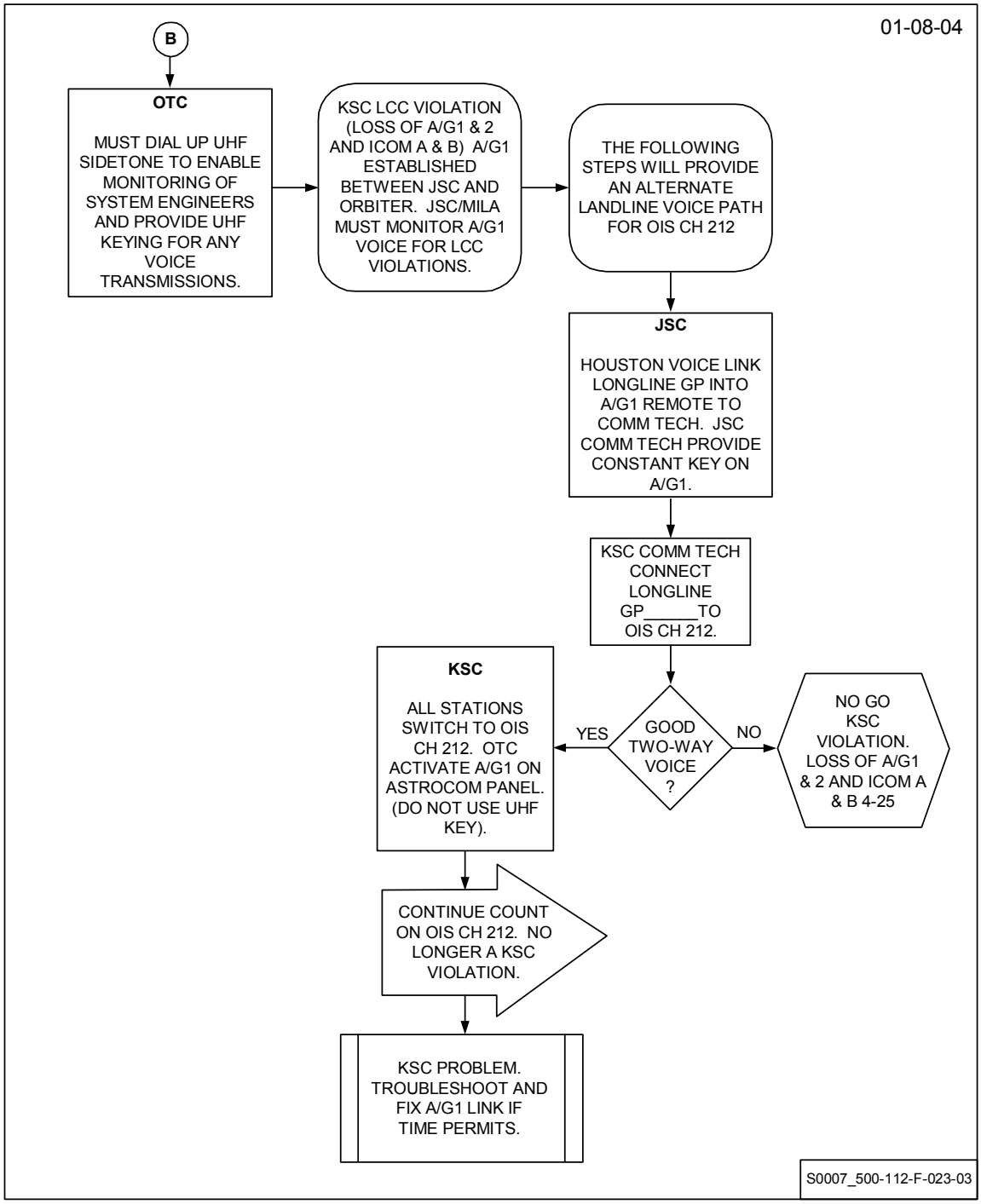
LCC Sub-Procedure - KSC A/G1 Problem (Page 1 of 3)



LCC Sub-procedure - KSC A/G1 Problem (Page 2 of 3)

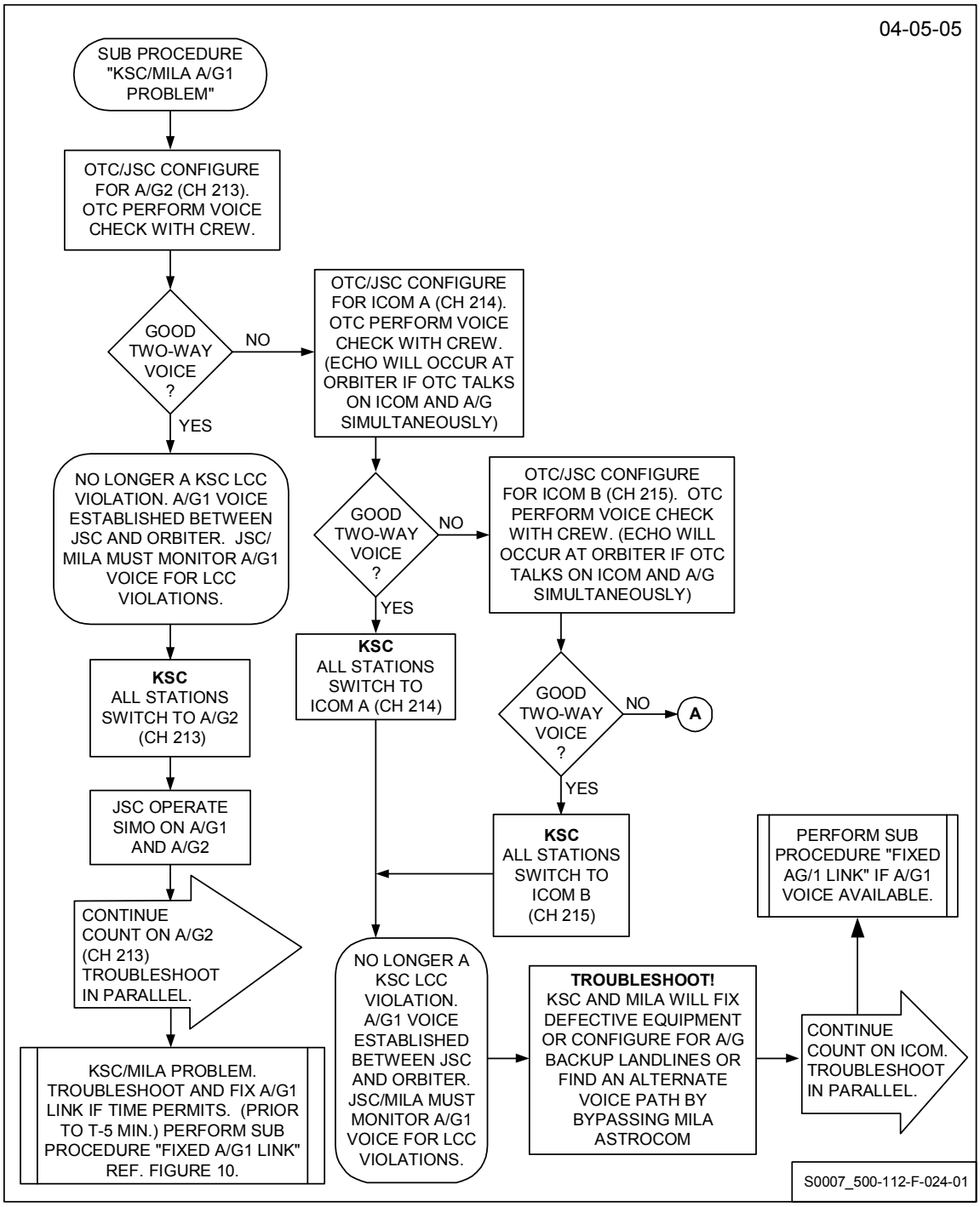


LCC Sub-procedure - KSC A/G1 Problem (Page 3 of 3)

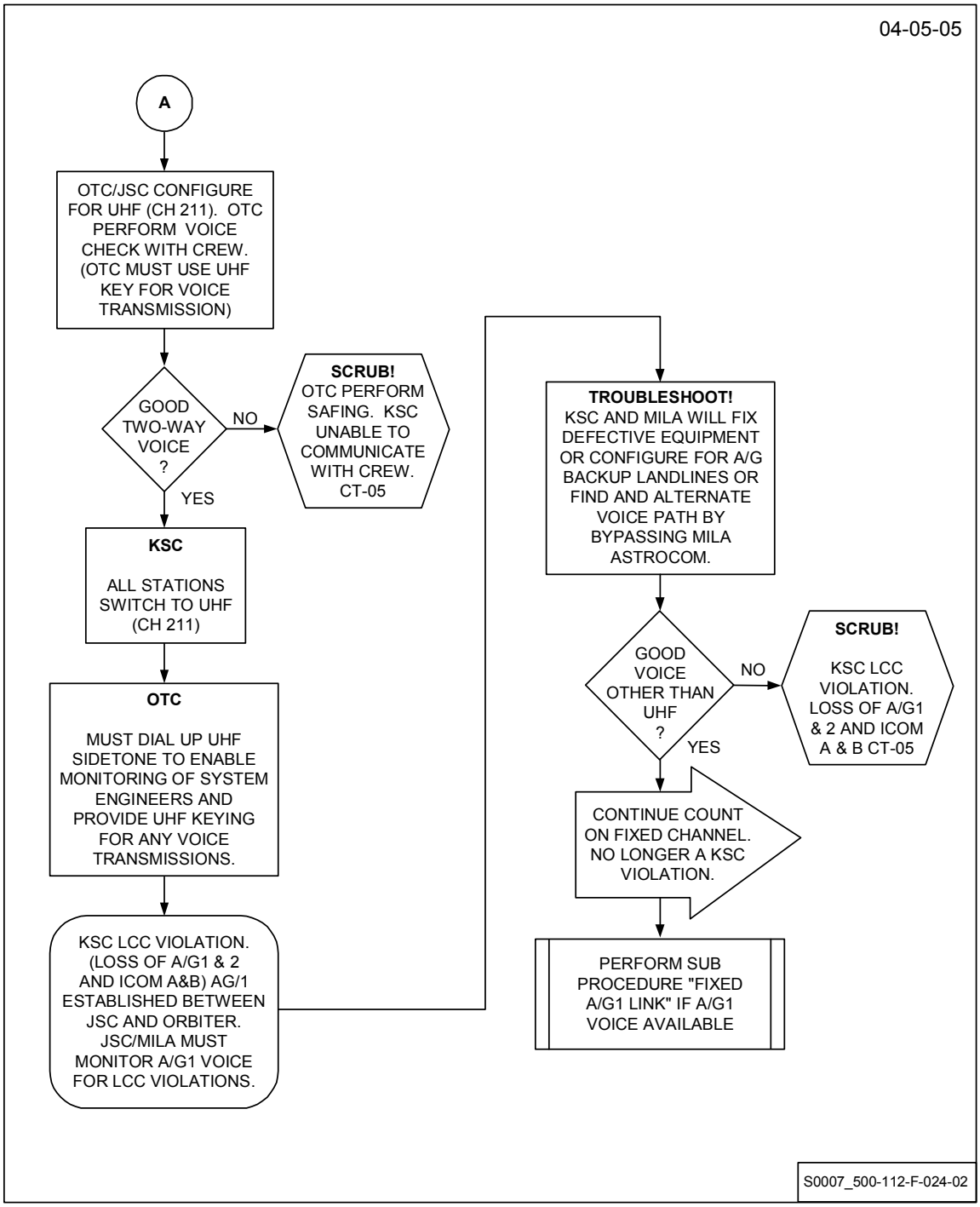


112-26

LCC Sub-Procedure - KSC/MILA AG1 Problem (Page 1 of 2)

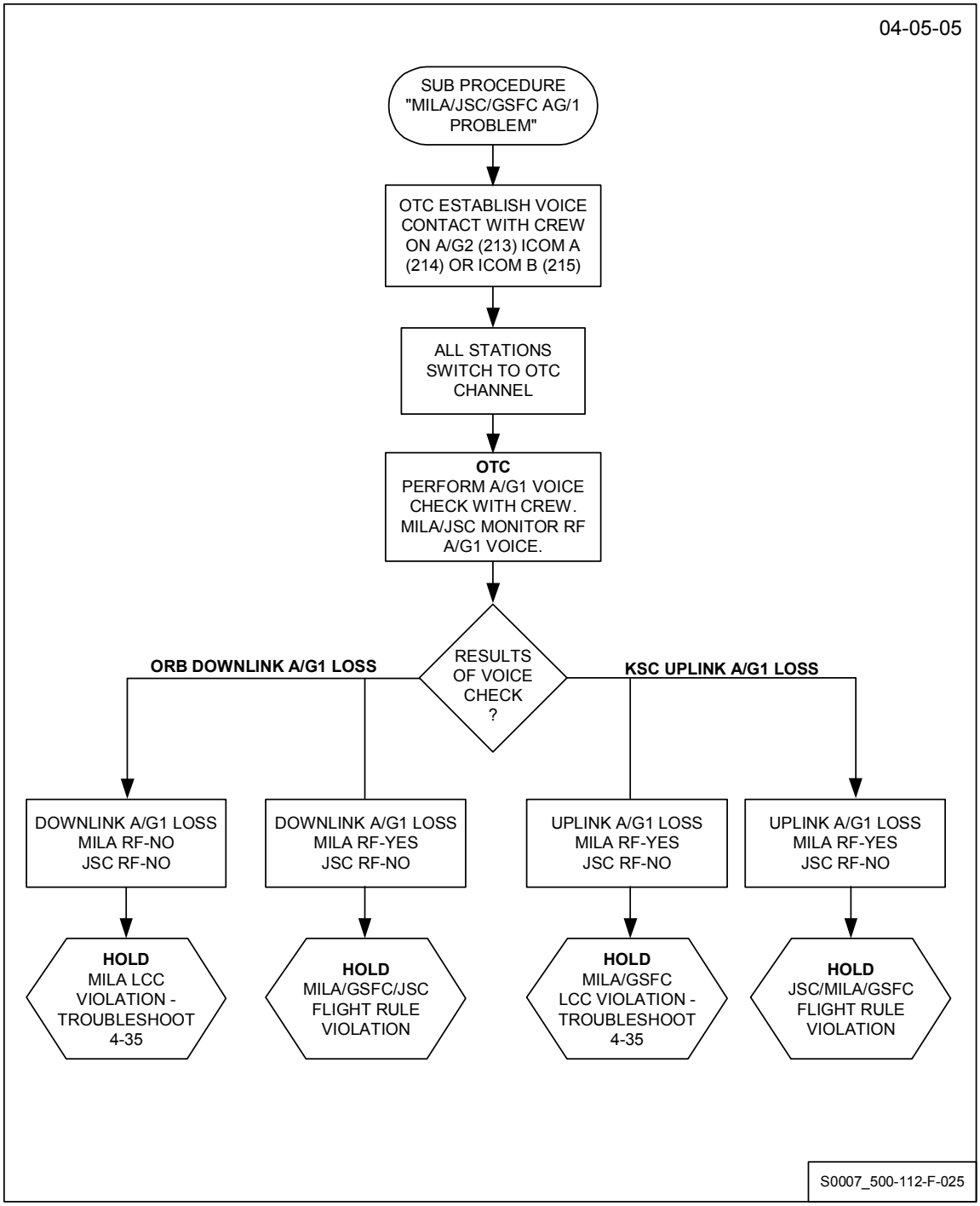


LCC Sub-procedure - KSC/MILA AG1 Problem (Page 2 of 2)



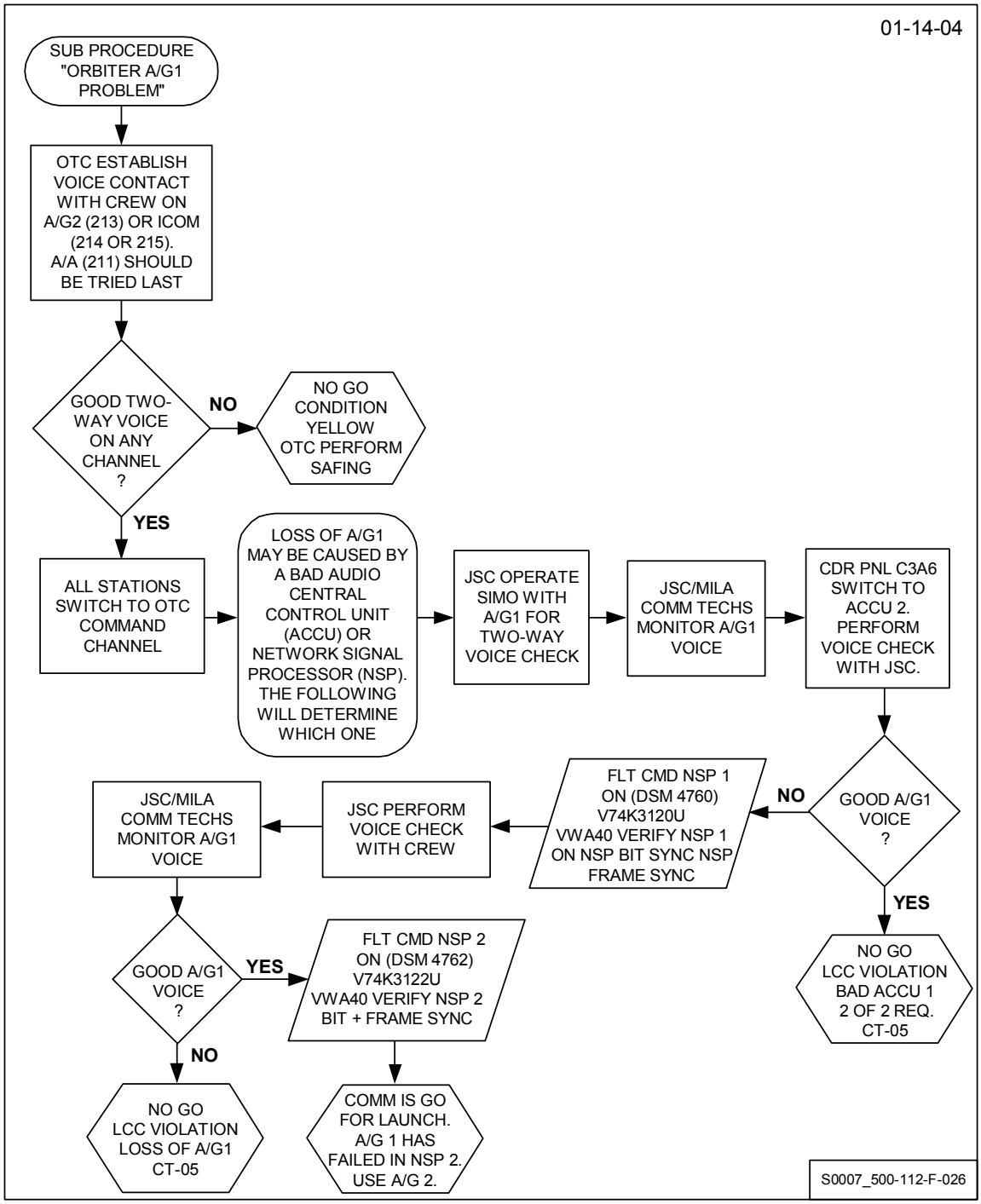
112-27

LCC Procedure - MILA/JSC/GSFC AG1 Problem



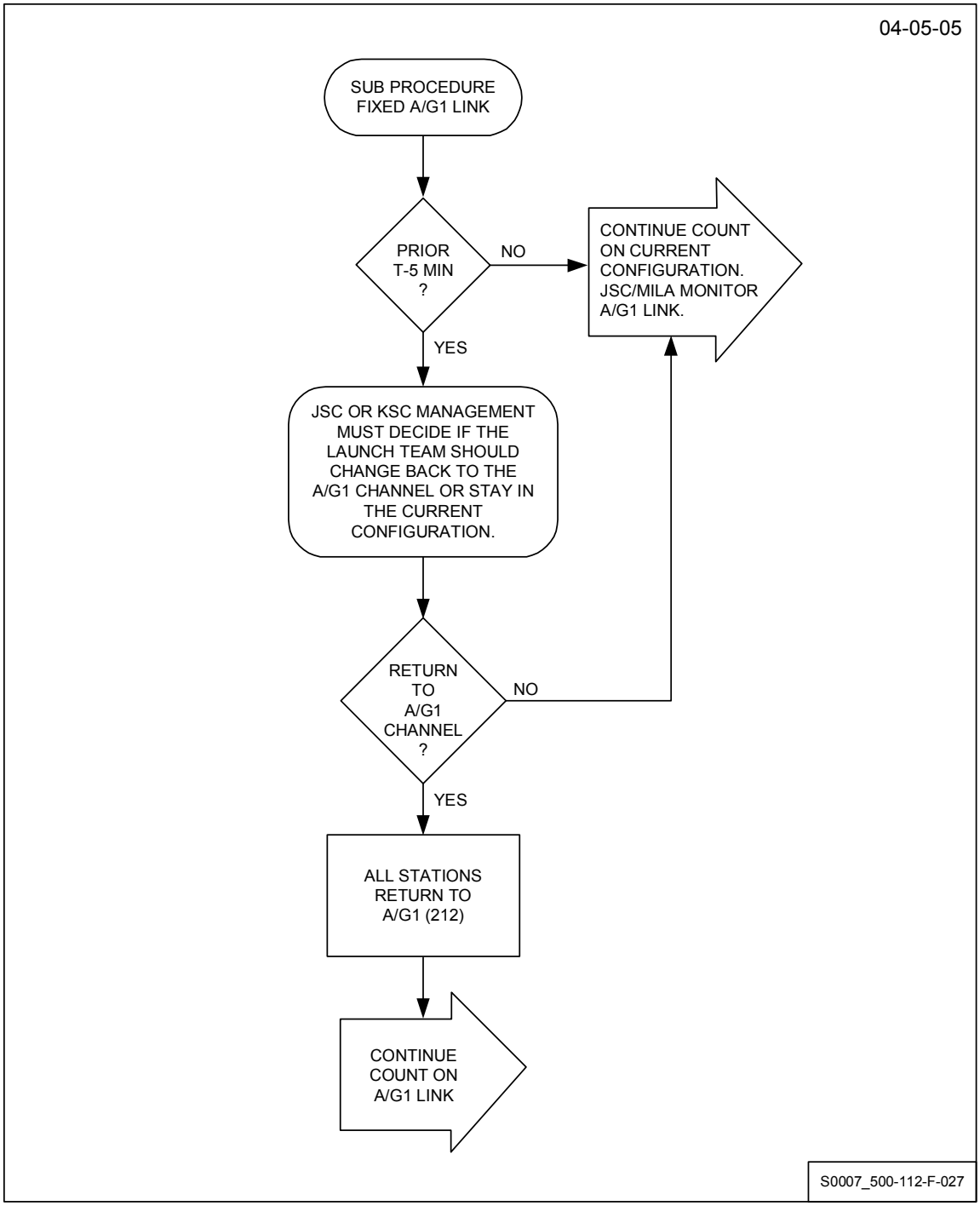
112-28

LCC Procedure - Orbiter AG1 Problem



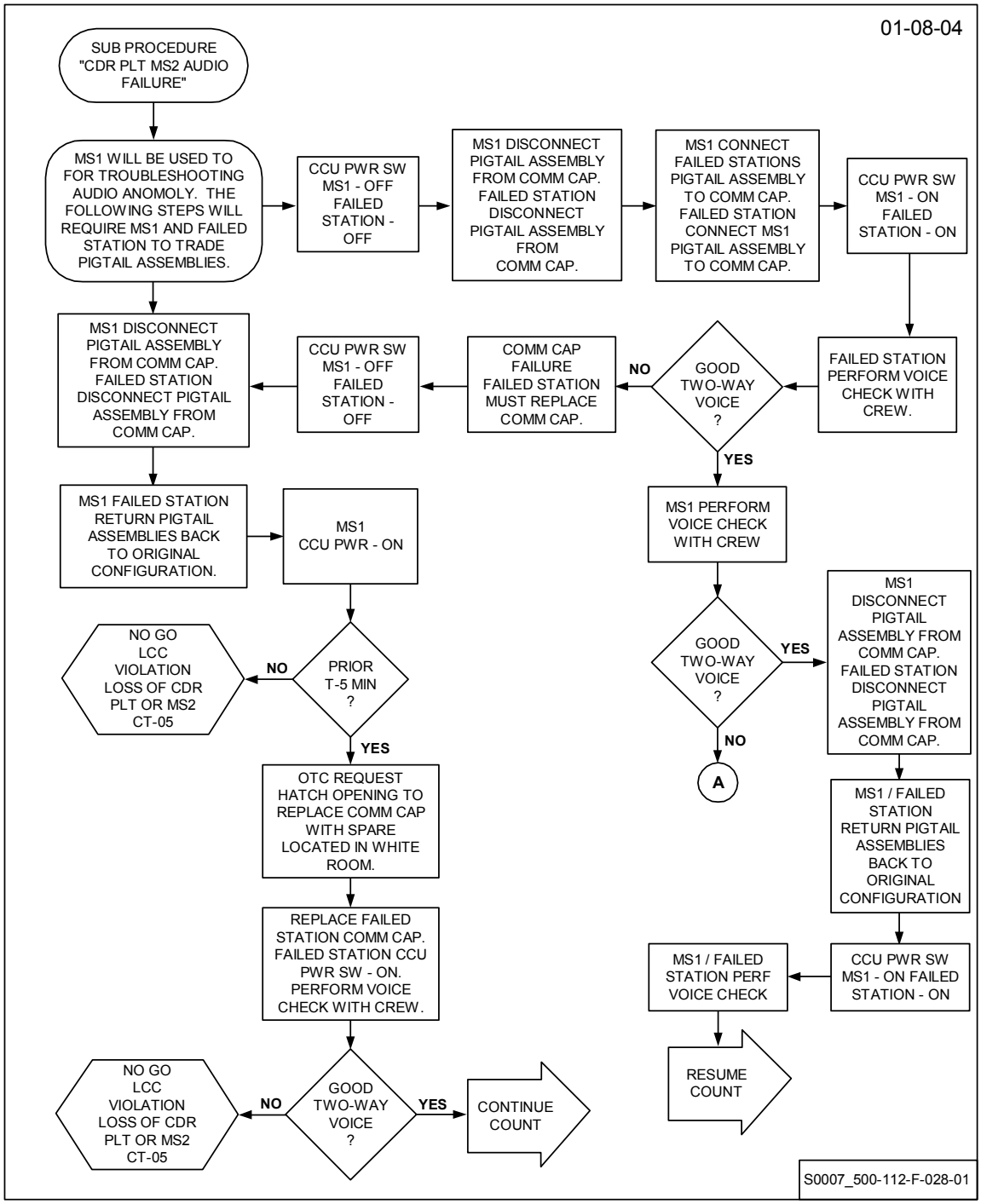
112-29

LCC Procedure - Fixed AG1 Link

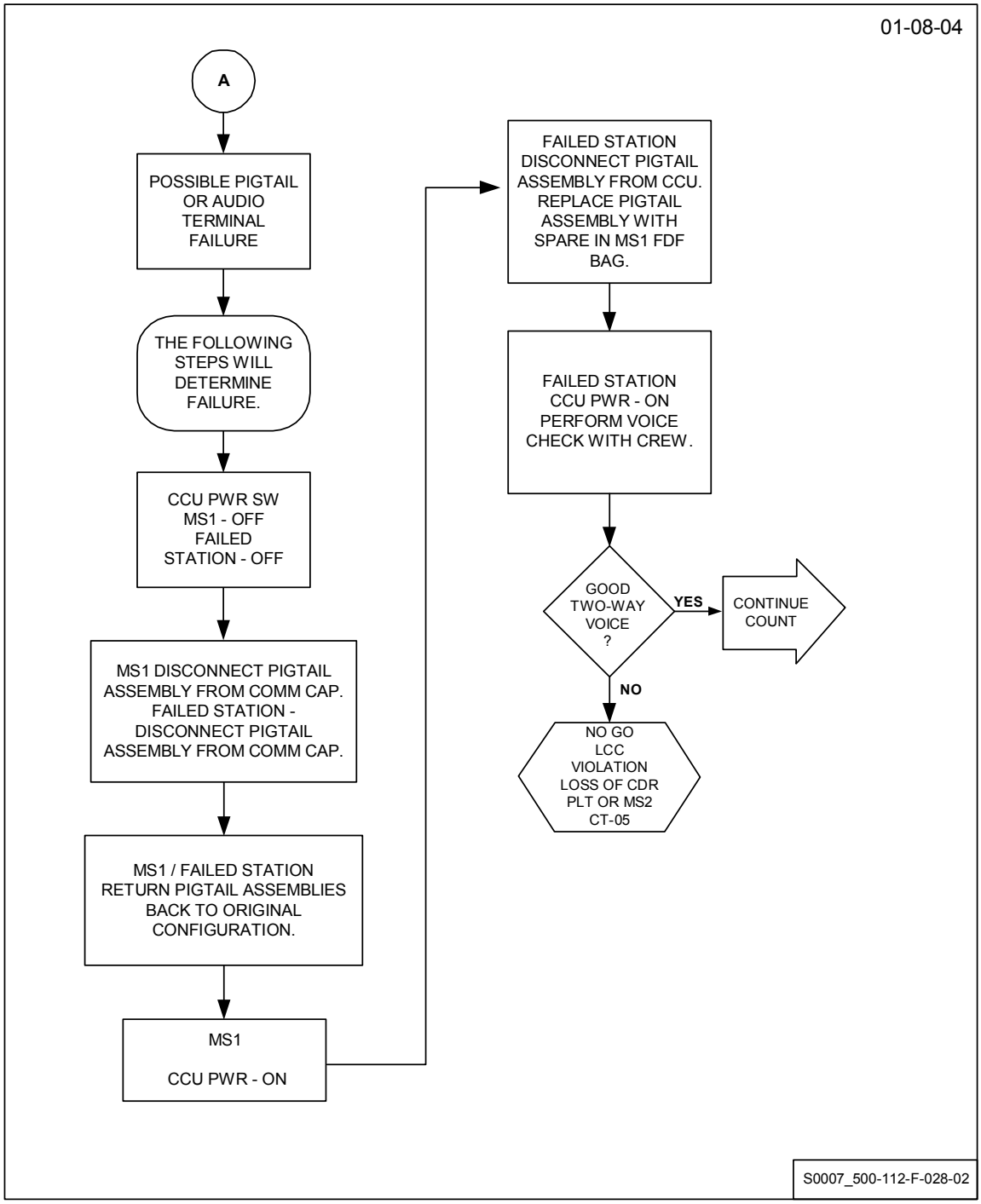


112-30

CDR PLT or MS2 Voice Failure (Page 1 of 2)



CDR PLT or MS2 Voice Failure (Page 2 of 2)



PSP/GPC Lockup Recovery Procedure

112-31 **OTC** **CCSE**

Perform PSP Critical Power Down.

112-32 **CCSE**

```
CONSOLE KYBD
ISSUE V74K3205UL,,,,CRITICAL (PSP OFF)
XMIT CMD
EXEC CMD

VERIFY (VAA06)
PSP - OFF
```

112-33 **CCSE** **OTC**

PSP Power Down successful.

PSP 2 Activation

NOTE
Perform this option if payload requires PSP 2.

PSP 2 Activation Not Performed:_____

112-34 CCSE OTC

Verify GPC's in G9/XXX/60 format.

112-35 OTC CCSE

Perform PSP 2 Activation.

112-36 CCSE

```
CONSOLE KYBD (VAA06)
PERF PGM KEY - PRESS
RESM PGM KEY - PRESS
SELECT APP PG-B
```

112-37 CCSE

```
CURSOR CNTL
CMD PROCESSING
XMIT CURSOR KEY - PRESS
```

VERIFY CMD PROCESSING SKELETON

112-38 CCSE

```
CURSOR CNTL
CMD MODE LDBA
XMIT CURSOR KEY - PRESS

VERIFY LDBA ON
TERMINATE AND RETURN
XMIT CURSOR KEY - PRESS
```

112-39 **CCSE**

```
CURSOR CNTL
POWER SEL - PSP
XMIT CURSOR KEY - PRESS
POWER SYS - 2
XMIT CURSOR KEY - PRESS
P/L UMB CMDS
XMIT CURSOR KEY - PRESS

CRT (VAA06)
VERIFY

PSP 2 ON
PSP P/L UMB CMDS ON
```

112-40 **CCSE** **OTC**

PSP Activation complete.

112-41 **OTC** **CDPS**

Perform PSP2 I/O Reset.

112-42 **CDPS**

```
CONSOLE KYBD
ENTER DEUE KEY - PRESS

CRT

VERIFY DEUE DESTINATION = DEU1, GNC, LDBA
```

112-43 **CDPS**

```
CONSOLE KYBD
DEUE SPEC 62 PRO
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

CRT (VAS59 PG-B)

VERIFY CRT 1 DISP ID = 0620
```

112-44 **CDPS**

```
CONSOLE KYBD
DEUE ITEM 7 EXEC
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
DEUE RESUME
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

112-45 **CDPS** **OTC**

PSP I/O Reset complete.

112-46 **CCSE**

```
CRT (VAA06)
VERIFY

PSP INIT ON

PSP STATUS
8984 A829
0810 FFFF
FFFF
```

112-47 **CCSE** **OTC** **132**
OTC **NTD** **232**
NTD **PTC** **232**

PSP 2 Activation complete. Ready for LDB commanding.

***** End of PSP 2 Activation *****

PSP 1 Activation

NOTE
Perform this option if payload requires PSP 1.

PSP 1 Activation Not Performed:_____

112-48 CCSE OTC

Verify GPC's in G9/XXX/60.

112-49 OTC CCSE

Perform PSP1 Activation.

112-50 CCSE

```
CONSOLE KYBD (VAA06)
PERF PGM KEY - PRESS
RESM PGM KEY - PRESS
```

112-51 CCSE

```
CURSOR CNTL
CMD PROCESSING
XMIT CURSOR KEY - PRESS

CRT

VERIFY CMD PROCESSING SKELETON
```

112-52 CCSE

```
CURSOR CNTL
CMD MODE LDBA
XMIT CURSOR KEY - PRESS
VERIFY LDBA ON
TERMINATE AND RETURN
XMIT CURSOR KEY - PRESS
```

112-53 **CCSE**

```
CURSOR CNTL
POWER SELECT - PSP
XMIT CURSOR KEY - PRESS
POWER SYS - 1
XMIT CURSOR KEY - PRESS
PSP COMMAND OUTPUT - PL UMB
XMIT CURSOR KEY - PRESS

CRT (VAA06)
VERIFY

PSP 1 ON
P/L UMB CMDS ON
```

112-54 **CCSE** **OTC**

PSP Activation complete.

112-55 **OTC** **CDPS**

Perform PSP1 I/O Reset.

112-56 **CDPS**

```
CONSOLE KYBD
ENTER DEUE KEY - PRESS

CRT

VERIFY DEUE DESTINATION = DEU1, GNC, LDBA
```

112-57 **CDPS**

```
CONSOLE KYBD
DEUE SPEC 62 PRO
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

CRT (VAS59 PG B)

VERIFY CRT 1 DISP ID = 0620
```

112-58 **CDPS**

```
CONSOLE KYBD
DEUE ITEM 6 EXEC
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

DEUE RESUME
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

112-59 **CDPS** **OTC**
CCSE

PSP I/O Reset complete.

112-60 **CCSE**

```
CRT (VAA06)
VERIFY

PSP INIT ON
PSP STATUS
8984 A829
0810 FFFF
FFFF
```

112-61 **CCSE** **OTC** **132**
OTC **NTD** **232**
NTD **PTC** **232**

PSP 1 Activation complete. Ready for LDB commanding.

***** End of PSP 1 Activation *****

Switch from Low to High Frequency Option

NOTE
Perform this option if configured for low frequency.

Switch from Low to High Frequency Option Not Performed:_____

112-62 **CCSE** ***FLT**

IF JSC has U/L command capability,

THEN transmit DSM 4741 (xpndr freq high)

Not Performed:_____

NOTE
Perform next two steps if U/L command capability does not exist.

112-63 **CCSE**

PERFORM THE FOLLOWING:

1. CONSOLE KYBD (VAA19)
   PERF PGM KEY - PRESS
   SELECT APP PG-B
2. CURSON CNTL (VAA19)
   CMD PROCESSING
   XMIT CURSOR KEY - PRESS

   VERIFY VAA24 DISPLAYED

3. CURSOR CNTL (VAA24)
   LDB A
   XMIT CURSOR KEY - PRESS

   VERIFY LDB A IND - ON

4. CURSOR CNTL (VAA24)
   TERMINATE AND RETURN
   XMIT CURSOR KEY - PRESS

   VERIFY VAA19 DISPLAYED

Not Performed:_____

112-64 **CCSE**

CURSOR CNTL (VAA19)
XPNDR FREQ
XMIT CURSOR KEY - PRESS
PFP (VAA19) - PRESS
FREQ HIGH - PRESS

Not Performed:_____

112-65 **CCSE**

CRT (VAA19)

VERIFY XPNDR FREQ HIGH

112-66 **CCSE** ***MIL**

Acquire two-way lock on S-band high freq.
Set RF output for 200 watts.

112-67 **CCSE**

CRT (VAA19)

VERIFY NSP FRAME SYNC LOCKED

112-68 **CCSE** **RCRT**

LOCK RECIEVERS TO HIGH FREQUENCY MILA UPLINK AND ORBITER DOWNLINK AS FOLLOWS:

1. RACK 8216A7
CHANNEL SW - 2
LOOP STATUS PM LIGHT - LOCKED

2. RACK 8216A9
CHANNEL SW - 4
LOOP STATUS LIGHT - LOCKED

3. RACK 8217
PANELS A4 AND A7
FRAME SYNC LOCKED LIGHTS - ON

T:_____

112-69 **CCSE** ***MIL**
OTC

Xpndr switch to high freq complete.

112-70 **CCSE**

Activate EMON for power amp RF out high freq.

A SX V74E4512A1
A SX V74E4513A1
I SX V74E4512A2
I SX V74E4513A2

112-71 **CCSE**

```
CONSOLE KYBD (VAA19)
TERM PGM KEY - PRESS
```

***** End of Switch from Low to High Frequency Option *****

Switch from High to Low Frequency Option

NOTE
Perform this option if configured for High Frequency.

Switch from High to Low Frequency Option Not Performed:_____

112-72 **CCSE** ***FLT**

IF JSC has U/L command capability,

THEN transmit DSM 4740 (xpndr freq low)

Not Performed:_____

NOTE
Perform next two steps if U/L command capability does not exist.

112-73 **CCSE**

PERFORM THE FOLLOWING:

1. CONSOLE KYBD (VAA19)
   PERF PGM KEY - PRESS
   SELECT APP PG-B

2. CURSOR CNTL (VAA19)
   CMD PROCESSING
   XMIT CURSOR KEY - PRESS

   VERIFY VAA24 DISPLAYED

3. CURSOR CNTL (VAA24)
   LDB A
   XMIT CURSOR KEY - PRESS

   VERIFY LDB A IND - ON

4. CURSOR CNTL (VAA24)
TERMINATE AND RETURN
XMIT CURSOR KEY - PRESS

VERIFY VAA19 DISPLAYED

Not Performed:_____

112-74 **CCSE**

CURSOR CNTL (VAA19)
XPNDR FREQ
XMIT CURSOR KEY - PRESS
PFP (VAA19) - PRESS
FREQ LOW - PRESS

Not Performed:_____

112-75 **CCSE**

CRT (VAA19)

VERIFY XPNDR FREQ LOW

112-76 **CCSE** ***MIL**

Acquire two-way lock on S-band low freq.
Set RF output for 200 watts.

112-77 **CCSE**

CRT (VAA19)

VERIFY NSP FRAME SYNC LOCK IND - ON

112-78 **CCSE** **RCRT**

LOCK RECIEVERS TO LOW FREQUENCY MILA UPLINK AND ORBITER DOWNLINK AS FOLLOWS:

1. RACK 8216A7
CHANNEL SW - 1
LOOP STATUS PM LIGHT - LOCKED

2. RACK 8216A9
CHANNEL SW - 3
LOOP STATUS LIGHT - LOCKED

T:_____

112-79 **CCSE** ***MIL**
OTC

Xpndr switch to low freq complete.

112-80 **CCSE**

Activate EMON for power amp RF out low freq.

A SX V74E4512A2
A SX V74E4513A2
I SX V74E4512A1
I SX V74E4513A1

112-81 **CCSE**

CONSOLE KYBD (VAA19)
TERM PGM KEY - PRESS

***** End of Switch from High to Low Frequency Option *****

TACAN Channel Select (59Y)

NOTE

Steps involving Crit 1, 1R and/or 1S items are contained in the following operation.

NOTE

This is a contingency and will be performed only if TACAN channel deselect occurs.

TACAN Channel Select (59Y) Not Performed:_____

112-82 OTC CNSE 132

Perform TACAN channel select.

112-83 CNSE

PERFORM THE FOLLOWING:

1. CURSOR CNTL (VWN99)
   CTRL WORD ISU 1

2. XMIT CURSOR KEY - PRESS

3. **FOLLOW** SOFTWARE DIRECTIONS FOR Y-MODE, T/R, CHANNEL 59, AND S/T OFF.

4. EXEC CMD KEY - PRESS

112-84 **CNSE**

PERFORM THE FOLLOWING:

1. CURSOR CNTL (VWN99)
   CTRL WORD ISU 2

2. XMIT CURSOR KEY - PRESS

3. **FOLLOW** SOFTWARE DIRECTIONS FOR Y-MODE, T/R, CHANNEL 59, AND S/T OFF.

4. EXEC CMD KEY - PRESS

112-85 **CNSE**

PERFORM THE FOLLOWING:

1. CURSOR CNTL (VWN99)
   CTRL WORD ISU 3

2. XMIT CURSOR KEY - PRESS

3. **FOLLOW** SOFTWARE DIRECTIONS FOR Y-MODE, T/R, CHANNEL 59, AND S/T OFF.

4. EXEC CMD KEY - PRESS

112-86 **CNSE** **OTC** **132**

TACAN Channel Select complete.

***** End of TACAN Channel Select (59Y) *****

TACAN Multipath Verification (Optional)

NOTE
Perform optional steps as required to verify suspected multipath problem with one or more TACANS at Pad.

TACAN Multipath Verification (Optional) Not Performed:_____

112-87 **CNSE OTC**
OTC TPE 132

Request permission to send command up LDB to

TACAN(s) _____, _____, _____ to look at PAFB ground station (97X)

112-88 **CNSE**

CURSOR CNTL (VWN99)
(CURSOR TO CONTROL WORD FUNCTION
DESIGNATOR FOR TACAN(S) _____, _____, _____)

XMIT CURSOR KEY - PRESS

112-89 **CNSE**

CONSOLE KYBD

FOLLOW SOFTWARE DIRECTIONS FOR X-MODE, T/R, CHANNEL 97, AND S/T OFF.

EXEC CMD KEY - PRESS

112-90 **CNSE**

```
CURSOR CNTL (VWN99)
UP/LO ANT LCK FUNCTION DESIGNATOR FOR TACAN(S)
_____, _____, _____ - U
XMIT CURSOR KEY - PRESS
```

112-91 **CNSE**

Observe bearing data for 5 minutes.

112-92 **CNSE**

```
CURSOR CNTL (VWN99)
(CURSOR TO CONTROL WORD FUNCTION DESIGNATOR FOR
TACAN(S) _____,_____,_____)
XMIT CURSOR KEY - PRESS
```

112-93 **CNSE**

CONSOLE KYBD

FOLLOW SOFTWARE DIRECTIONS FOR Y-MODE, T/R, CHANNEL 59, AND S/T OFF.

EXEC CMD KEY - PRESS

NOTE
Wait for lock-up on Channel 59Y before proceeding.

112-94 CNSE

```
CURSOR CNTL (VWN99)
UP/LO ANT LCK FUNCTION DESIGNATOR FOR TACAN(S)
_____, _____, _____ - L
XMIT CURSOR KEY - PRESS
```

***** End of TACAN Multipath Verification (Optional) *****

Flight Crew Loss of Communication

NOTE

This procedure will be implemented at NTD direction if total communication with Flight Crew lost (no voice response on A/G1, A/G2, ICOM A, ICOM B, UHF and PRC-112). Perform steps below as required.

Flight Crew Loss of Communication Not Performed:_____

112-95 NTD OVCC 212

Initiate Flight Crew aided egress, communication has been lost with Flight Crew.

112-96 NTD *PRL NET 105

Initiate Flight Crew rescue, communication has been lost with Flight Crew.

Support: FIRE

112-97 NTD CCSE 212

Any indication of communication system failure preventing all communication with Flight Crew.

112-98 **NTD** **CECL**

Any smoke/fire indications

PP02 readings satisfactory

112-99 **NTD** **ALL**

Communication with Flight Crew has been lost; Flight Crew rescue in progress per Emergency Instruction E1 - Integrated "Flight and Ground Crew Emergency/Egress Escape."

NOTE
Continuing activity will be in accordance with "Flight and Ground Crew Emergency/Egress Escape" and S0007 scrub/recycle procedures as directed by NTD.

***** End of Flight Crew Loss of Communication *****

*** End of Operation **112** ***

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OPERATION 113 Instrumentation

Shop: **INS**
Cntrl Rm Console: **C9**
OPR: **INS**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **1.0**

General Instructions for Instrumentation LCC Workarounds

NOTE

1. The instrumentation workarounds are listed in flow diagrams. When the flow diagrams references "use detail X" the operator is to use the detailed steps in the back of this section for operational steps. All other functions in the flow chart are to be performed as the chart specifies.

2. These workarounds only apply to hard failures and single failures. Multiple failures will have to be addressed realtime. When multiple failures do occur, work all applicable workarounds.

3. All failures require a call to the NTD to state the failure and LCC item and recommend hold at next available point.

   Example (T-20 min thru Launch):

   CISL NTD

   Request hold at next GLS milestone for performance of Instrumentation workaround. We have an LCC violation INS-01, page number -X, measurement V75X2121D, PCMMU power BITE bit has failed.

4. In all areas where it is stated that OI data is affected, the failed PCMMU should be switched as soon as possible in order to restore good data to the Firing Room.

5. For failures from other systems, Instrumentation should be notified of the function designator. Instrumentation must then determine the DSC/MDM associated with the affected measurement, and determine if a card or LRU failure exists.

NOTE

6. Instrumentation Console Personnel should perform research from the mission specific MEL and File II OMRS prior to working this procedure and determine the following information:

   A. Number of PSP's required for mission: _____

   B. MTU divider/IRIG-B outputs required for payload:

      4.608 MHz timing_____

      1024 KHz timing_____

      10 Hz_____

      1 Hz_____

      IRIG-B_____

   C. Formats for mission:

      HDR_____

      LDR_____

7. For workarounds that have light bulb failures, the following equipment should be staged:

   (2) 5120002888739 jeweler's screwdriver set
   (1) 624000K367436 lamp

List of Flowcharts

LCC INS-01 - PCM BITE Bits **Step No.**

- INS-01/PCM Power Status 113-1
- INS-01/PCM MTU BITE 113-2
- INS-01/Fetch PROM Parity 113-3
- INS-01/128 Kb Formatter 113-4
- INS-01/Input Data Valid 113-5
- INS-01/OI/PL RAM Parity 113-6
- INS-01/Toggle Buffer Parity 113-7
- INS-01/No Response Comp Bus 113-8

LCC INS-02 - OPS Recorders

- INS-02A/SSR Anomaly 113-9

LCC INS-03 - MTU BITE Bits

- INS-03 MTU Amp 1 113-10
- INS-03/MTU Amp 2 113-11
- INS-03/MTU Frequency Difference 113-12
- INS-03/MTU OSC 1 Temp 113-13
- INS-03/MTU OSC 2 Temp 113-14
- INS-03/MTU PS 1 Volt 113-15
- INS-03/MTU PS 2 Volt 113-16
- INS-03/MTU CMD Channel A 113-17
- INS-03/MTU CMD Channel B 113-18
- INS-03/MTU CMD Channel C 113-19
- INS-03/MTU IRIG-B 113-20
- INS-03/MTU Frequency Div 1 113-21
- INS-03/MTU Frequency Div 2 113-22
- INS-03/MTU Frequency Div 3 113-23

LCC INS-04 - DSC BITE Bits **Step No.**

- INS-04/DSC BITE Fail 113-24

LCC INS-05 - MDM WRAP Fail

- INS-05/MDM WRAP Fail 113-25

LCC INS-06 - C&W Fail

- INS-06/C&W Failure 113-26
- LCC SRM-11 - SRM Case Acreage Temperature Anomaly 113-27

Non LCC Inst Workarounds

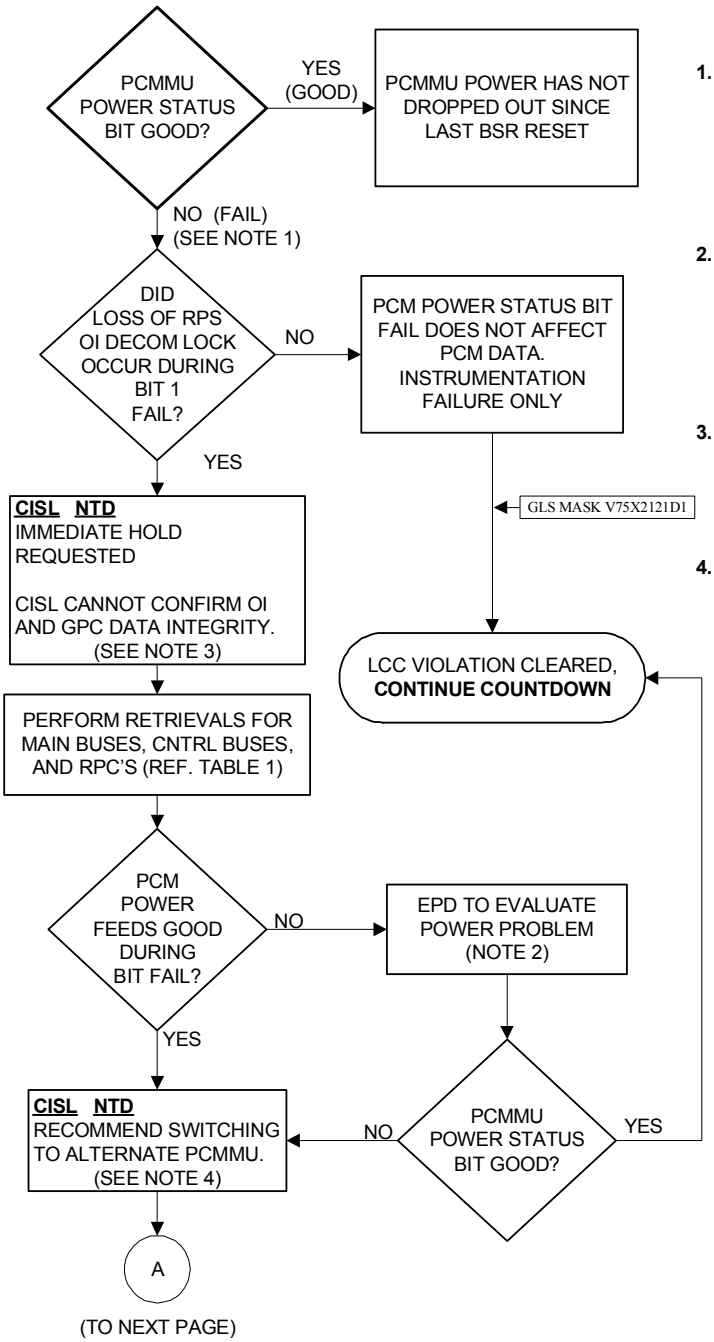
- Recorder Start Uncommanded 113-28
- NSP Record Mode MUX Fail 113-29
- DSC/MDM Card Fail 113-30
- C&W Light Bulb Fail 113-31
- Recorder Run Time 113-32
- MADS Activation Fail 113-33
- OI Data Dropouts 113-34

113-1

PCM Power Status (SSID INS-01)

01/19/09

INS-01 PCMMU BITE BIT 1 - POWER STATUS BIT (V75X2121D)



NOTES

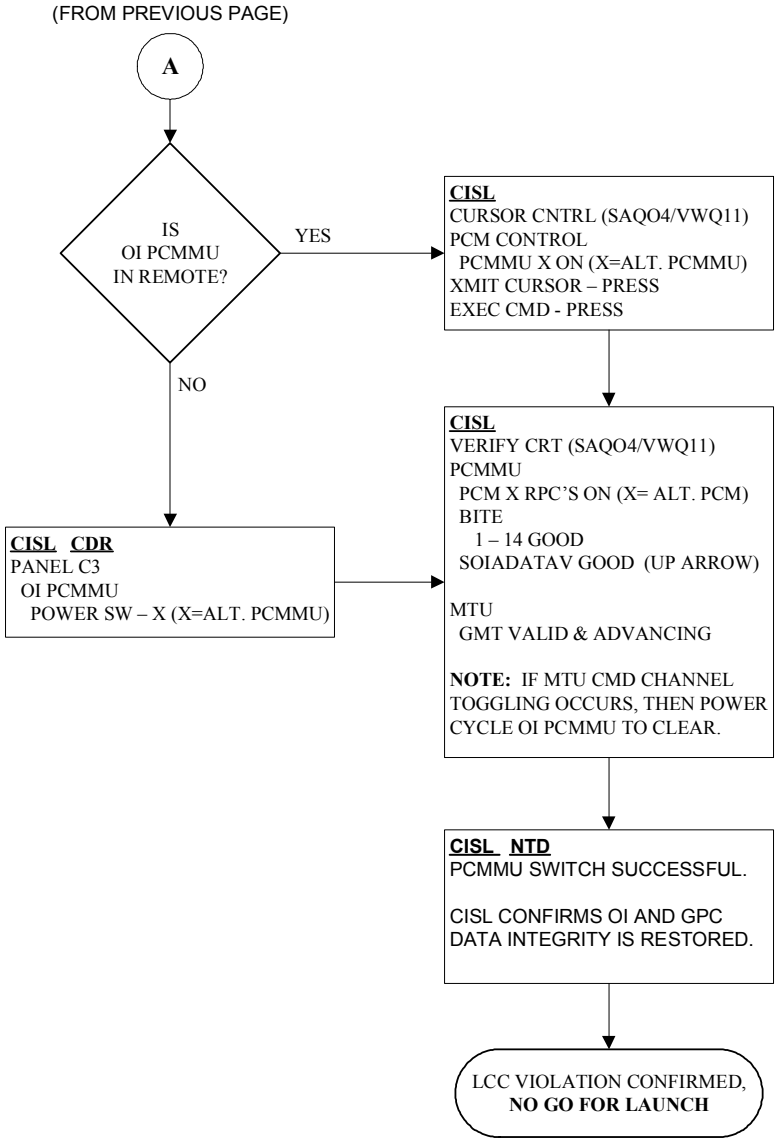
1. A FAILED PCM BITE BIT 1 INDICATES THAT THE SECONDARY VOLTAGE OF THE POWER SUPPLY IS LESS THAN 4.5 VDC FOR 200 MILLISECONDS OR LONGER. A BUS VOLTAGE OF LESS THAN 16VDC FROM BOTH FEEDS WILL CAUSE THIS CONDITION.
2. LOSS OF ONE PCM POWER FEED IS NOT AN LCC VIOLATION, BUT A LOSS OF ONE PCM POWER FEED ALONG WITH A PCM BITE BIT 1 FAIL IS AN LCC VIOLATION SINCE THIS MAY INDICATE PCM POWER SUPPLY FAILURE.
3. FOR FAILURES OCCURRING AFTER GLS MAINLINE ACTIVATION, CDT WILL HOLD AUTOMATICALLY. AFTER T-2M55S, GLS CUTOFF WILL OCCUR PER LPS-19.
4. PCMMU SWITCHING WILL INTERRUPT GPC AND OI DATA UNTIL THE FEPs REACQUIRE LOCK.

TABLE 1	
PCM 1 POWER	
MAIN A	V76V0100A1
MAIN C	V76V0300A1
CB AB1	V76V0120A1
CB CA1	V76V0320A1
RPC MN A	V76X4265E1
RPC MN C	V76X4267E1
SW SCAN	V75S2107E1
PCM 2 POWER	
MAIN A	V76V0100A1
MAIN B	V76V0200A1
CB AB1	V76V0120A1
CB BC1	V76V0220A1
RPC MN A	V76X4272E1
RPC MN B	V76X4274E1
SW SCAN	V75S2109E1

S0007_500-113-F-001.1

09-10-08

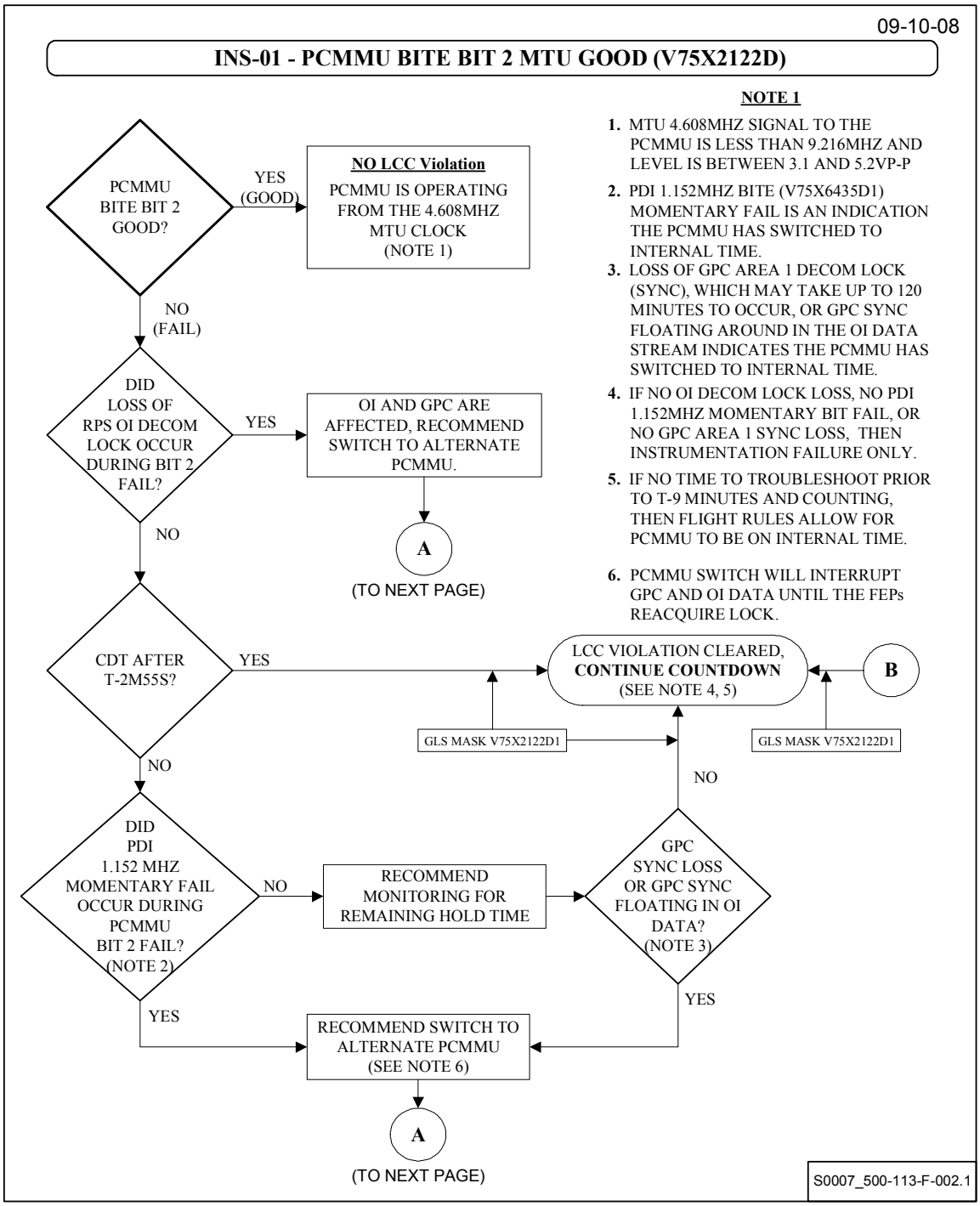
INS-01 PCMMU BITE BIT 1 - POWER STATUS BIT (V75X2121D)



S0007_500-113-F-001.2

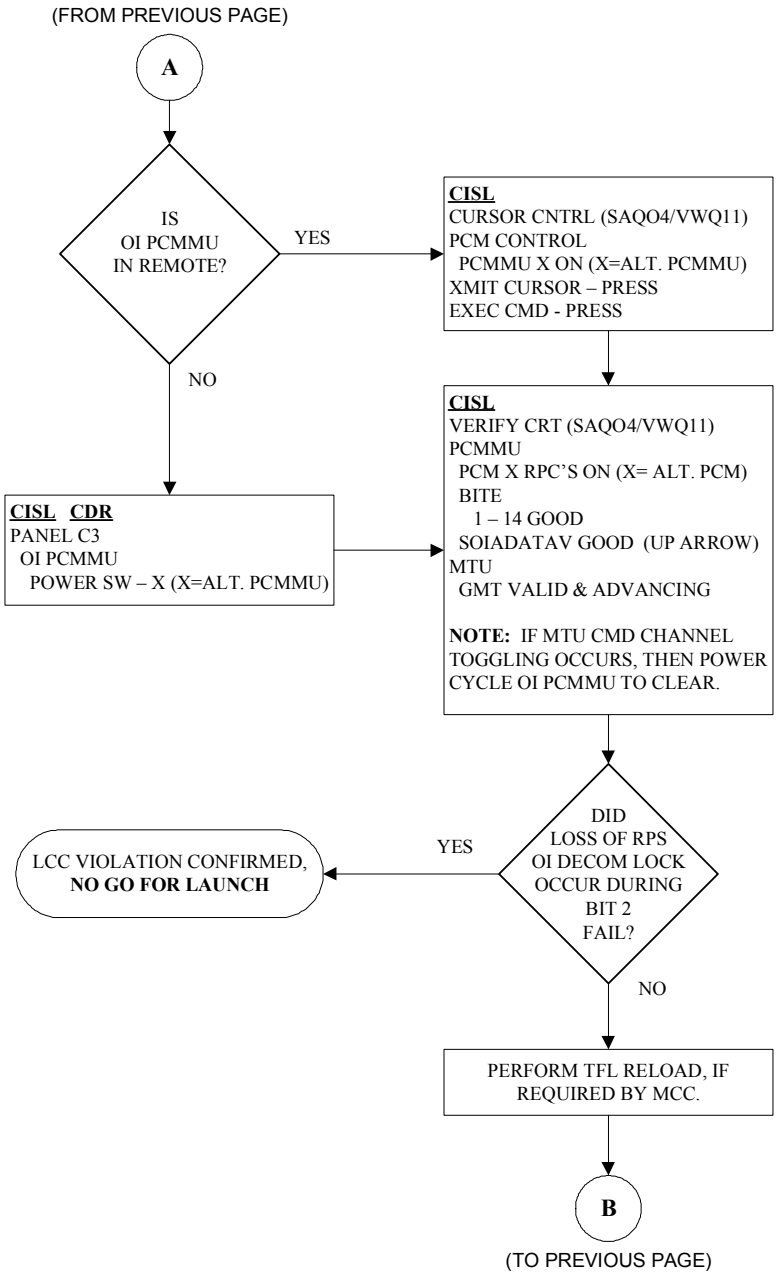
113-2

PCM MTU BITE (SSID INS-01)



09-10-08

INS-01 - PCMMU BITE BIT 2 MTU GOOD (V75X2122D)(Cont.)

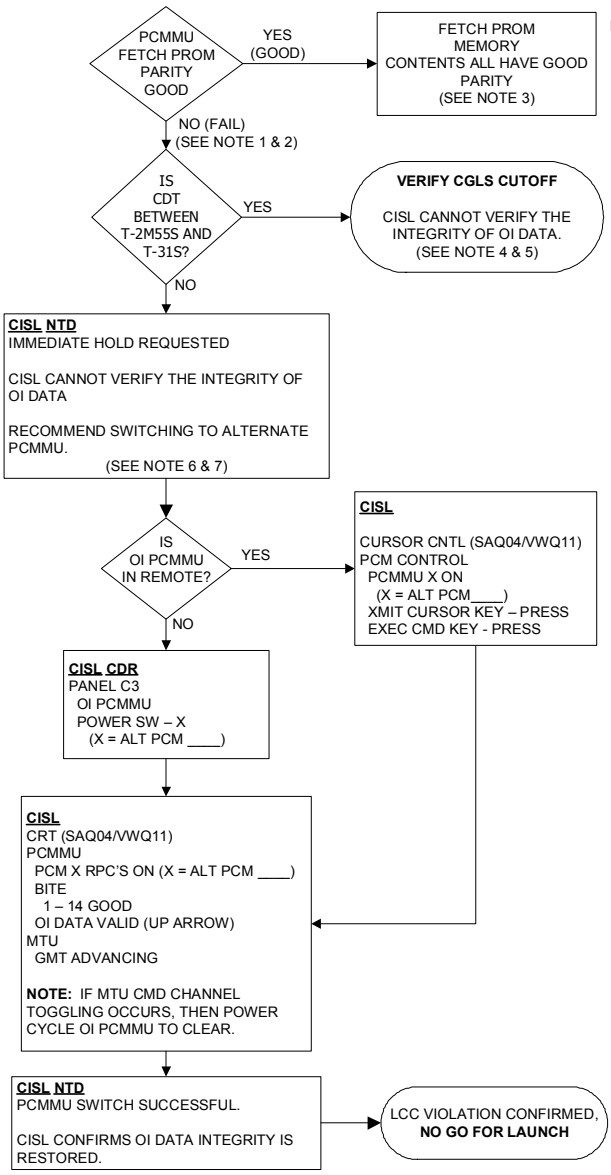


S0007_500-113F-002.2

113-3

Fetch PROM Parity (SSID INS-01)

LCC INS-01 - PCMMU BITE BIT 3 - FETCH PROM PARITY - V75X2123D 09-10-08



NOTES:

1. NO RECOVERY EXISTS FOR THIS FAILURE.
2. POSSIBLE PROBLEMS: PROM MEMORY, PARITY CHECKER LOGIC OR BSR CIRCUIT.
3. BIT 3 CHECKS PARITY OF FETCH PROM MEMORY. FETCH PROM MEMORY IS 44 BITS INCLUDING PARITY. FAILURE INDICATES SOME DATA IS NOT BEING RETRIEVED OR STORED CORRECTLY.
4. VALID GPC DATA IS NEEDED TO CONTROL EXTERNAL TANK CRYO PRESSURIZATION. LOSS OF GPC DATA INTEGRITY MAY CAUSE VIOLATION OF ET RELIEF VALVE OMRS.
5. OI DATA IS ACTIVELY USED IN S/W CONTROL LOOP FOR LO2 AND LH2 TO CONTROL LIQUID LEVEL IN TANKS.
6. PCMMU SWITCH WILL INTERRUPT GPC AND OI DATA UNTIL THE FEPs REACQUIRE LOCK.
7. FOR FAILURES OCCURRING AFTER GLS MAINLINE ACTIVATION, CDT WILL HOLD AUTOMATICALLY.

COMMAND WORD STRUCTURE

BIT INFO	2 - 6 MDM RCVR	7 SP	8 - 11 MODE CNTRL	12 - 15 MDM ADD	16 - 20 CH ADD	21 - 25 NO WORDS
					PROM ADDRESS	NO INST

FETCH PROM STRUCTURE

BIT INFO	1 OI / PDI	2 - 25 COMMAND WORD	26 - 30 NO RESP WDS	31 OI / PDI RAM	32 - 42 RAM ADD	43 PARITY	44 VALI

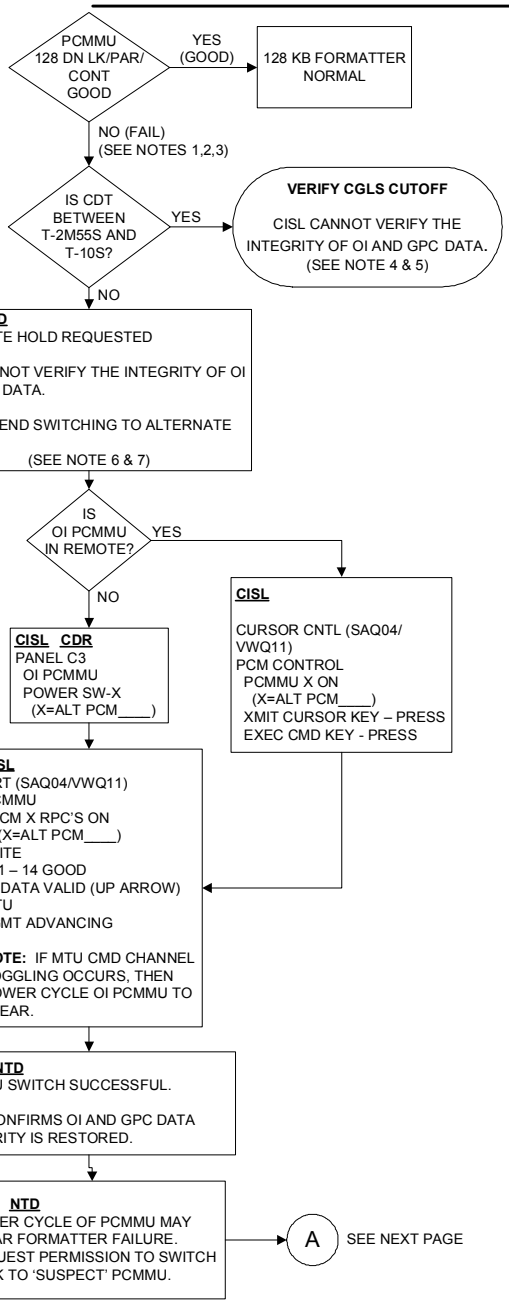
S0007_500-113-F-003

113-4

128KB Formatter (SSID INS-01)

INS-01 - PCMMU BITE BIT 4 - 128 DOWNLINK - V75X2124D
INS-01 - PCMMU BITE BIT 6 - 128 PARITY - V75X2126D
INS-01 - PCMMU BITE BIT 7 - 128 COUNTERS - V75X2127D

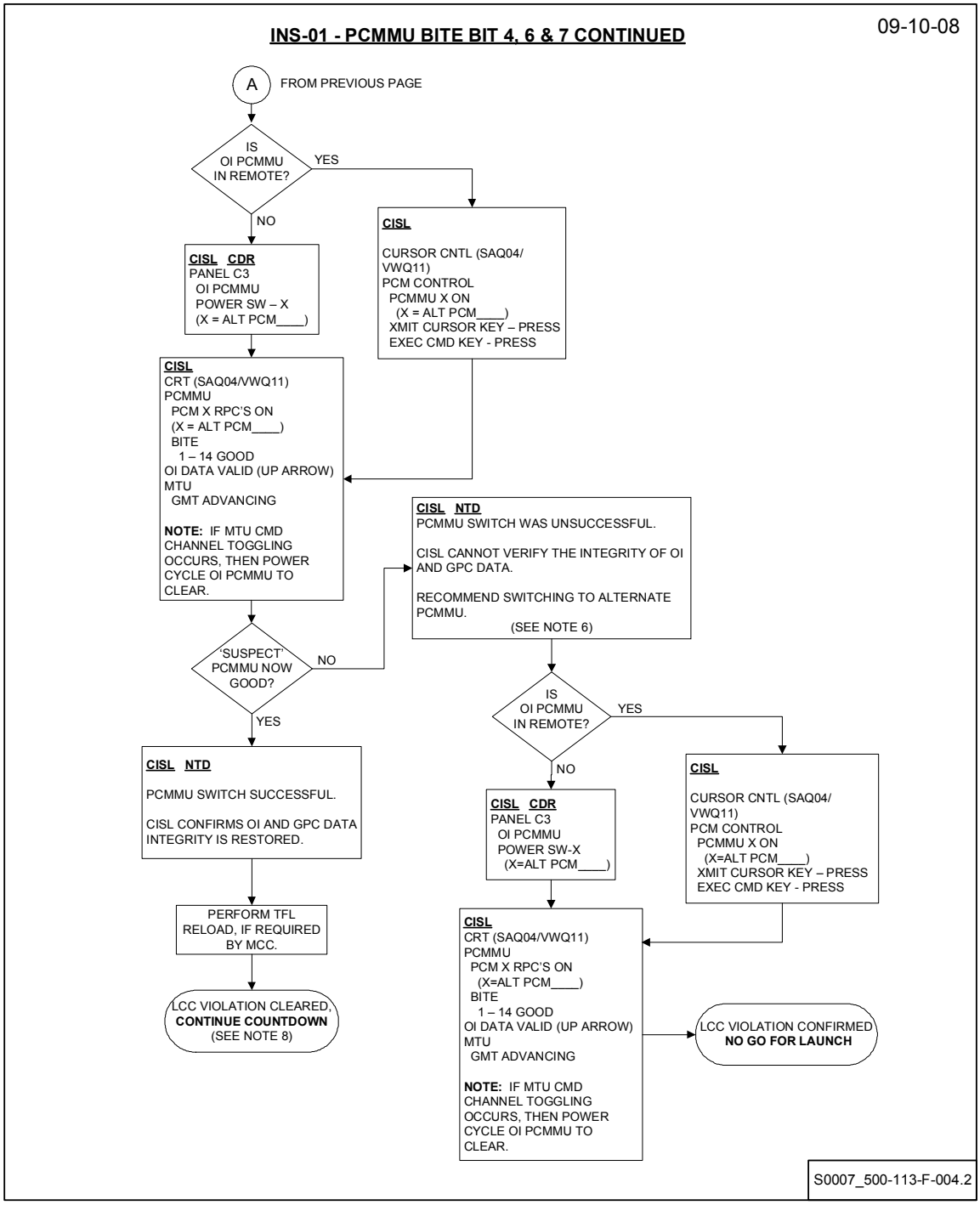
09-10-08



NOTES:

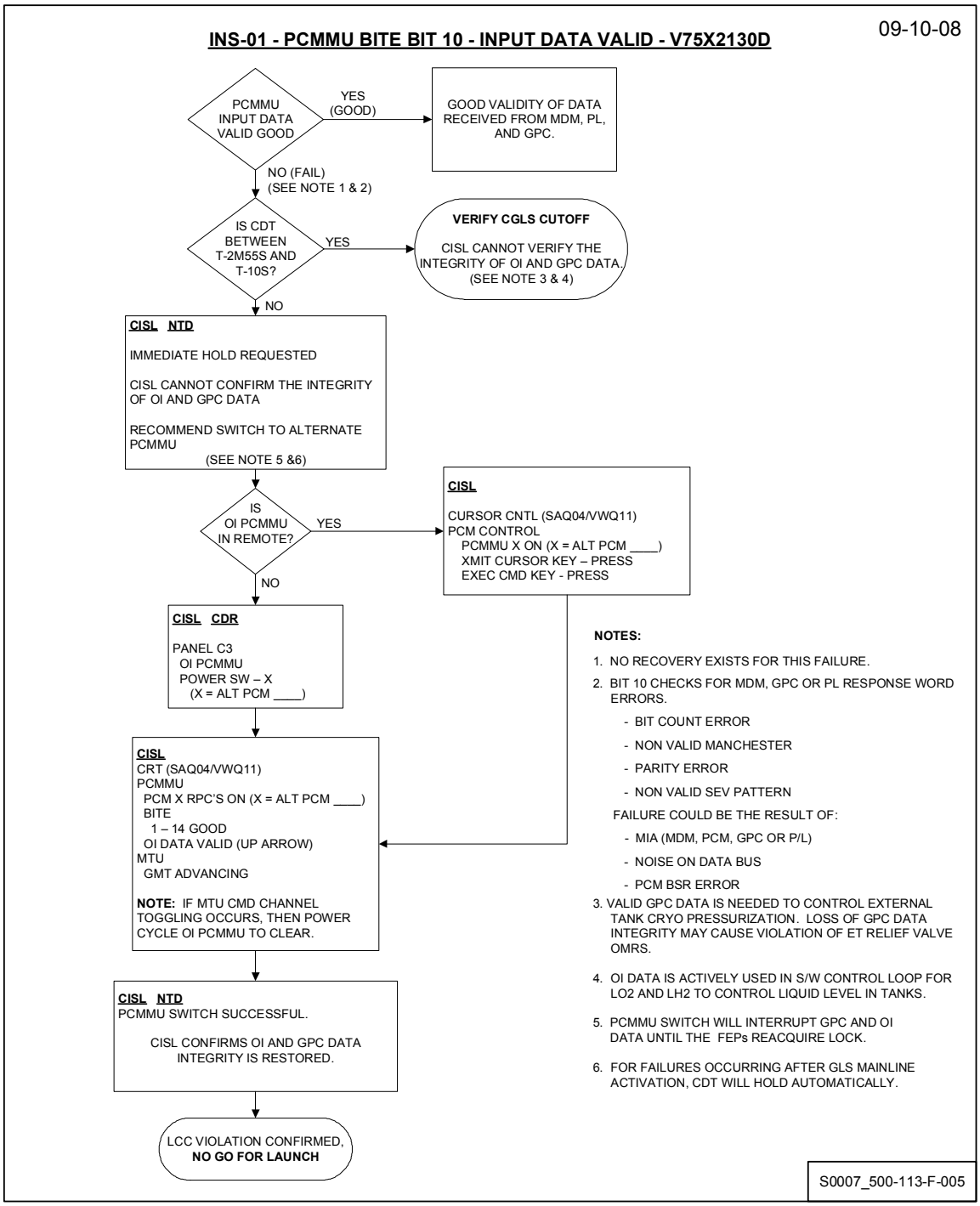
1. BITE BIT 4 VERIFIES THAT THE STATIC WRAP FROM MDM OF1 (V75X4002D) IS "10101010". FAILED INDICATION MAY INDICATE MDM PROBLEM BUT SHOULD SHOW AS MDM BITE OR WRAP FAIL.
2. BITE BIT 6 INDICATES FORMAT PROM (FIXED) / RAM (SOFT) HAS INCORRECT PARITY.
3. BITE BIT 7 INDICATES SAMPLE RATE COUNTER ERROR.
4. VALID GPC DATA IS NEEDED TO CONTROL EXTERNAL TANK CRYO PRESSURIZATION. LOSS OF GPC INTEGRITY MAY CAUSE VIOLATION OF ET RELIEF VALVE OMRS.
5. OI DATA IS ACTIVELY USED IN S/W CONTROL LOOP FOR LO2 AND LH2 TO CONTROL LIQUID LEVEL IN TANKS.
6. PCMMU SWITCH WILL INTERRUPT GPC AND OI DATA UNTIL THE FEPs REACQUIRE LOCK.
7. FOR FAILURES OCCURRING AFTER GLS MAINLINE ACTIVATION, CDT WILL HOLD AUTOMATICALLY.
8. IF PCP IS PERFORMED AT THE T-2M55S HOLD, THEN RE-PERFORM AERO SURFACE AND MPS PROFILES.

S0007_500-113-F-004.1


INS-01 - PCMMU BITE BIT 4, 6 & 7 CONTINUED
09-10-08
A
FROM PREVIOUS PAGE
IS OI PCMMU IN REMOTE?
YES
NO
CISL
CURSOR CNTL (SAQ04/ VWQ11)
PCM CONTROL
PCMMU X ON
(X = ALT PCM____)
XMIT CURSOR KEY – PRESS
EXEC CMD KEY - PRESS
CISL CDR
PANEL C3
OI PCMMU
POWER SW – X
(X = ALT PCM____)
CISL
CRT (SAQ04/VWQ11)
PCMMU
PCM X RPC'S ON
(X = ALT PCM____)
BITE
1 – 14 GOOD
OI DATA VALID (UP ARROW)
MTU
GMT ADVANCING
NOTE: IF MTU CMD CHANNEL TOGGLING OCCURS, THEN POWER CYCLE OI PCMMU TO CLEAR.
CISL NTD
PCMMU SWITCH WAS UNSUCCESSFUL.
CISL CANNOT VERIFY THE INTEGRITY OF OI AND GPC DATA.
RECOMMEND SWITCHING TO ALTERNATE PCMMU.
(SEE NOTE 6)
'SUSPECT' PCMMU NOW GOOD?
NO
YES
CISL NTD
PCMMU SWITCH SUCCESSFUL.
CISL CONFIRMS OI AND GPC DATA INTEGRITY IS RESTORED.
PERFORM TFL RELOAD, IF REQUIRED BY MCC.
LCC VIOLATION CLEARED, CONTINUE COUNTDOWN (SEE NOTE 8)
IS OI PCMMU IN REMOTE?
YES
NO
CISL CDR
PANEL C3
OI PCMMU
POWER SW-X
(X=ALT PCM____)
CISL
CURSOR CNTL (SAQ04/ VWQ11)
PCM CONTROL
PCMMU X ON
(X=ALT PCM____)
XMIT CURSOR KEY – PRESS
EXEC CMD KEY - PRESS
CISL
CRT (SAQ04/VWQ11)
PCMMU
PCM X RPC'S ON
(X=ALT PCM____)
BITE
1 – 14 GOOD
OI DATA VALID (UP ARROW)
MTU
GMT ADVANCING
NOTE: IF MTU CMD CHANNEL TOGGLING OCCURS, THEN POWER CYCLE OI PCMMU TO CLEAR.
LCC VIOLATION CONFIRMED NO GO FOR LAUNCH
S0007_500-113-F-004.2

113-5

Input Data Valid (SSID INS-01)

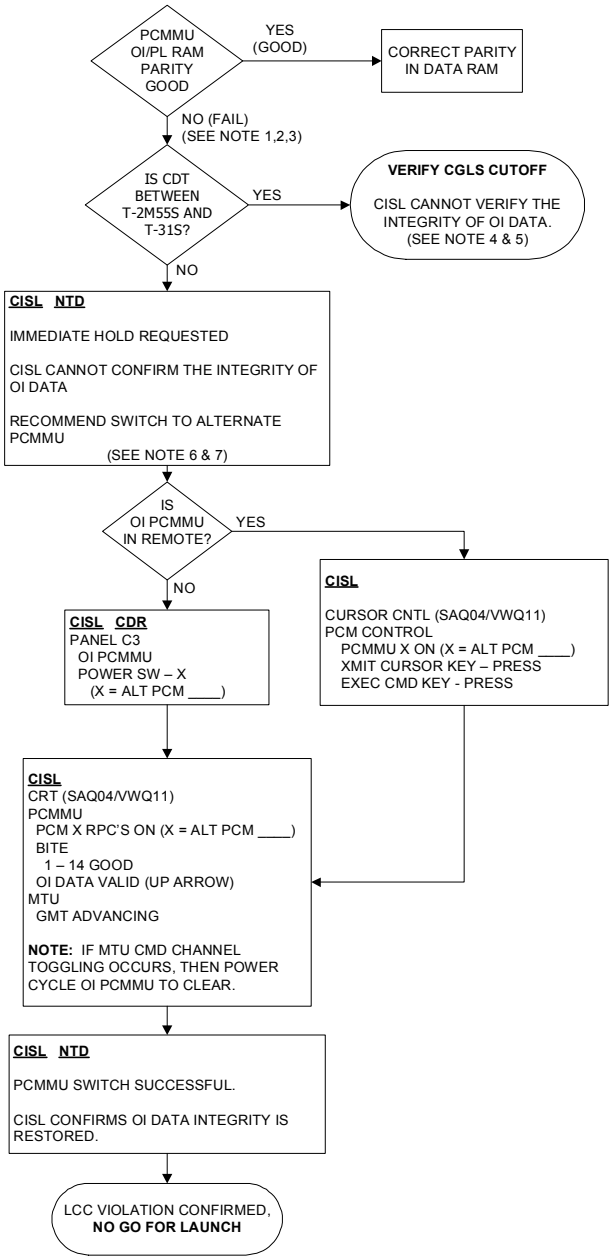


113-6

RAM Parity (SSID INS-01)

INS-01 - PCMMU BITE BIT 11 - OI RAM PARITY - V75X2131D
INS-01 - PCMMU BITE BIT 12 - PL RAM PARITY - V75X2132D

03/23/09



NOTES:

1. NO RECOVERY EXISTS FOR THIS FAILURE.
2. BITS 11 & 12 VERIFY THE DATA READ FROM THE OI AND PL RAM PASS THE PARITY CHECK.

   FAILURE COULD BE THE RESULT OF:

   - PARITY GENERATOR
   - RAM
   - BSR REGISTER
3. BITE BITS WILL FAIL MOMENTARILY WHEN STALE DATA IS BEING ACCESSED FROM THE DATA RAM.

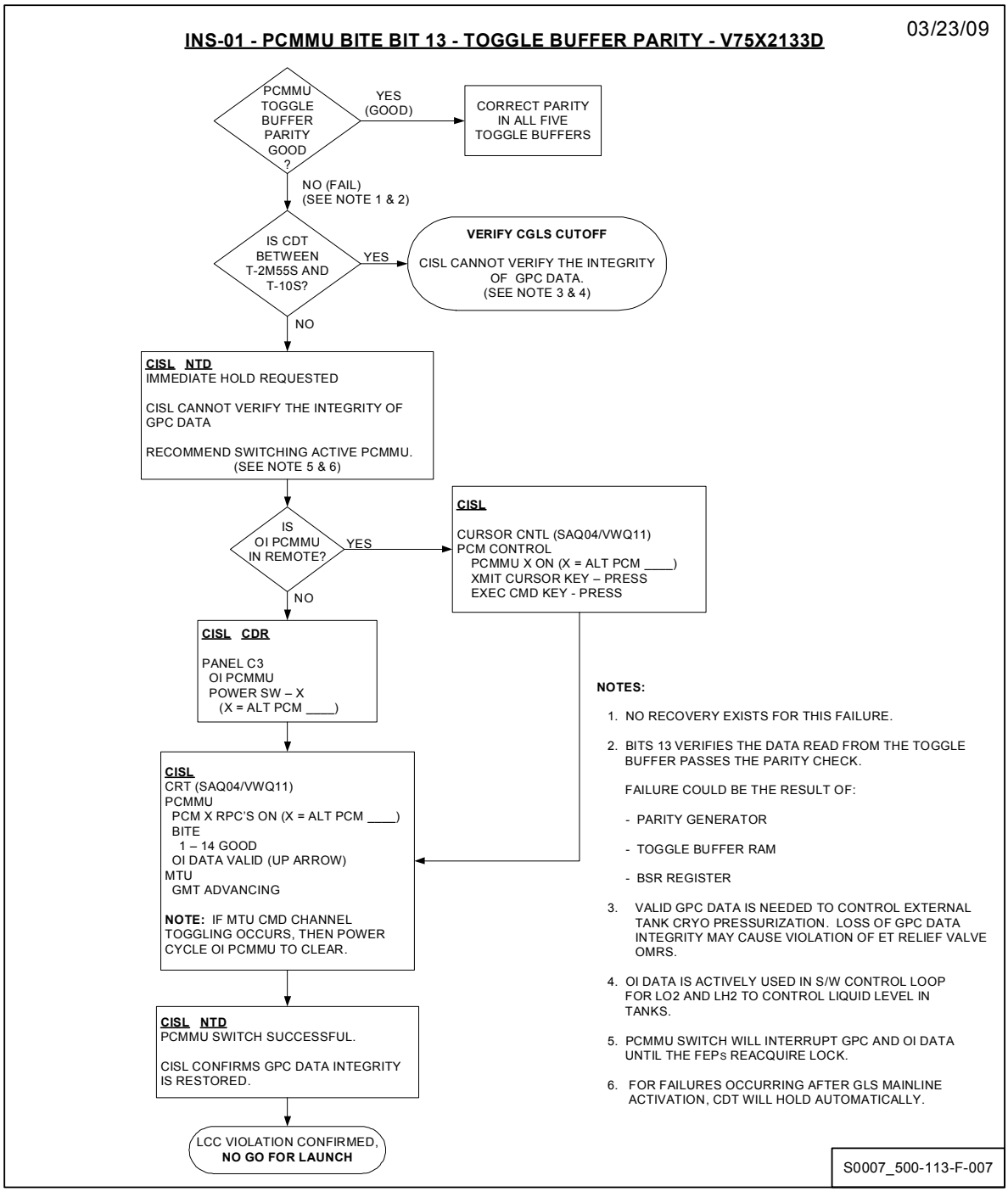
   EXAMPLE:

   - PCMMU READS TO AN ADDRESS THAT IS NOT UPDATED
   - IF SPACELAB IS POWERED DOWN WHEN A SPACELAB FORMAT IS LOADED, THE PCM MAY READ AN ADDRESS THAT IS NOT UPDATED.
4. VALID GPC DATA IS NEEDED TO CONTROL EXTERNAL TANK CRYO PRESSURIZATION. LOSS OF GPC DATA INTEGRITY MAY CAUSE VIOLATION OF ET RELIEF VALVE OMRS.
5. OI DATA IS ACTIVELY USED IN S/W CONTROL LOOP FOR LO2 AND LH2 TO CONTROL LIQUID LEVEL IN TANKS.
6. PCMMU SWITCH WILL INTERRUPT GPC AND OI DATA UNTIL THE FEPs REACQUIRE LOCK.
7. FOR FAILURES OCCURRING AFTER GLS MAINLINE ACTIVATION, CDT WILL HOLD AUTOMATICALLY.

S0007_500-113-F-006

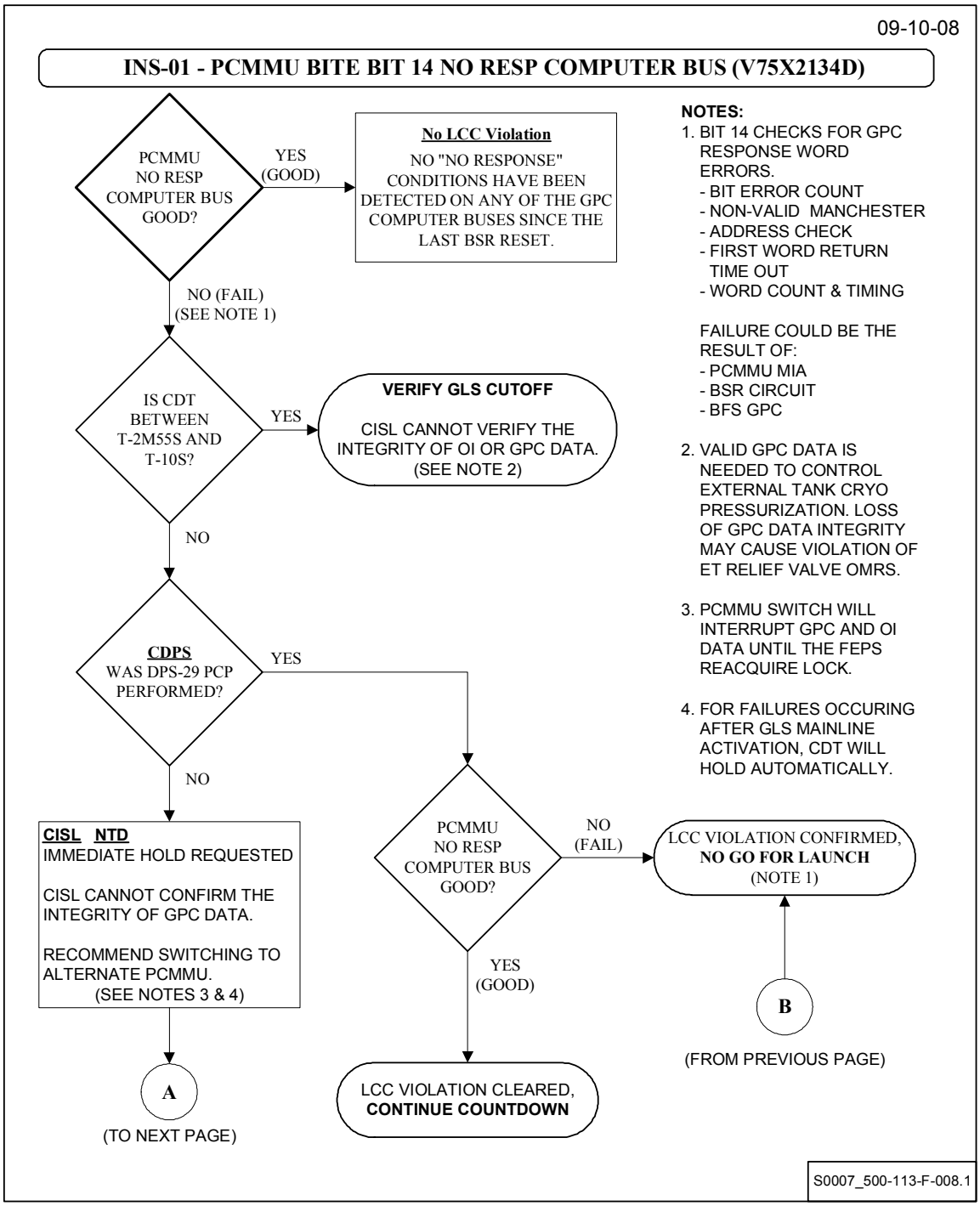
113-7

Toggle Buffer Parity (SSID INS-01)



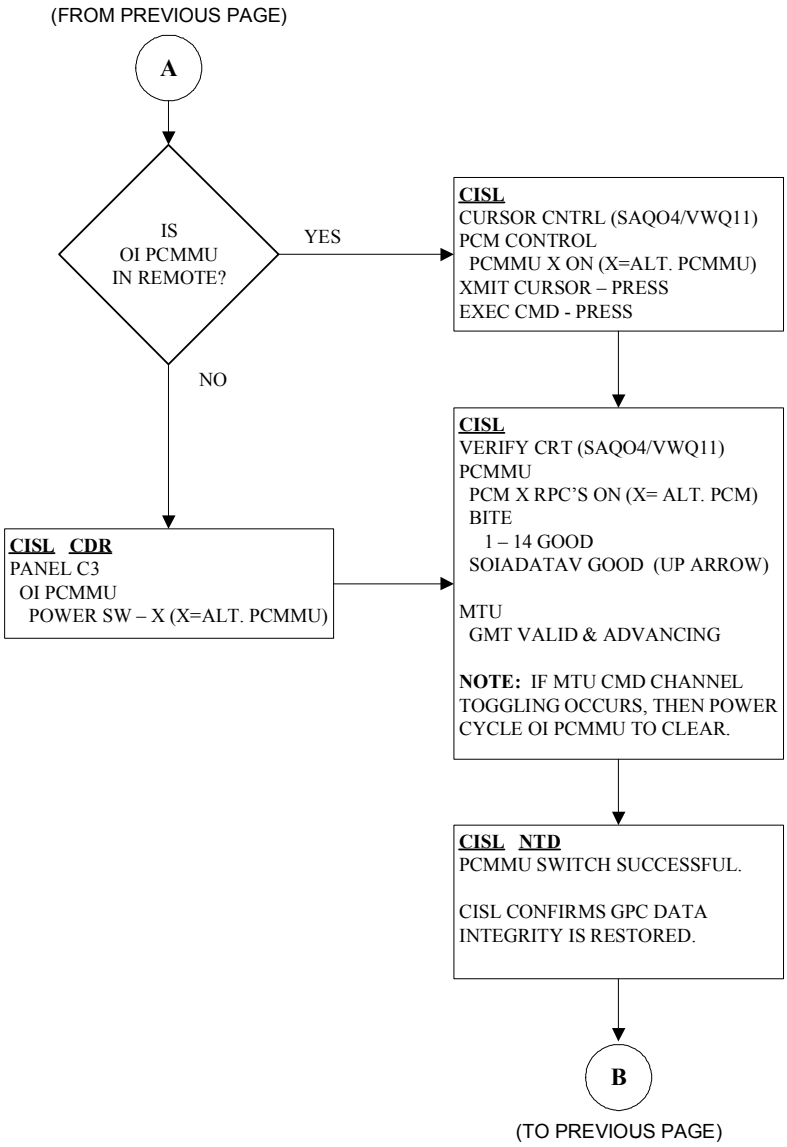
113-8

No Response Computer Bus V75X2134D (SSID INS-01)



09-10-08

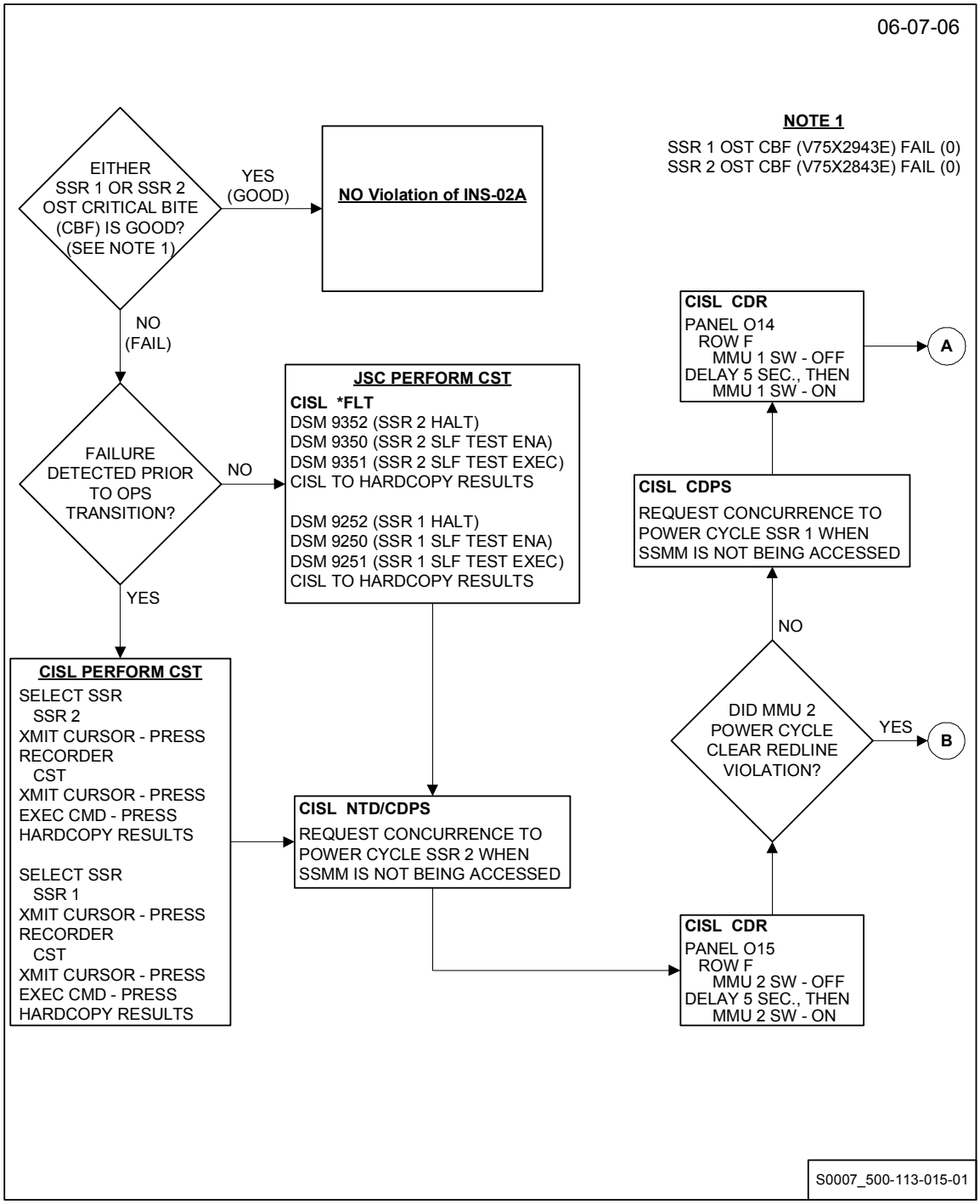
INS-01 - PCMMU BITE BIT 14 NO RESP COMPUTER BUS (V75X2134D) (Cont.)



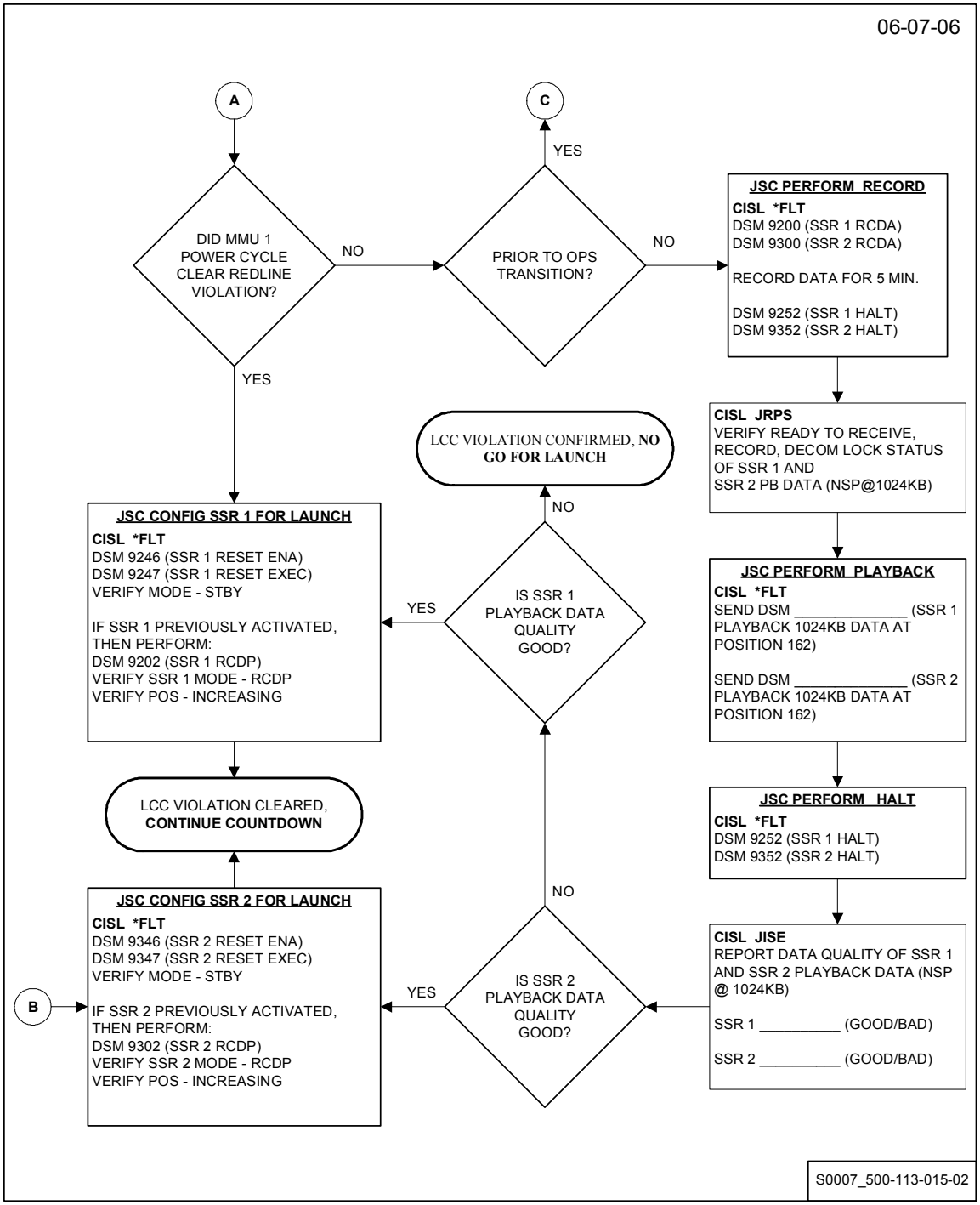
S0007_500-113-F-008.2

113-9

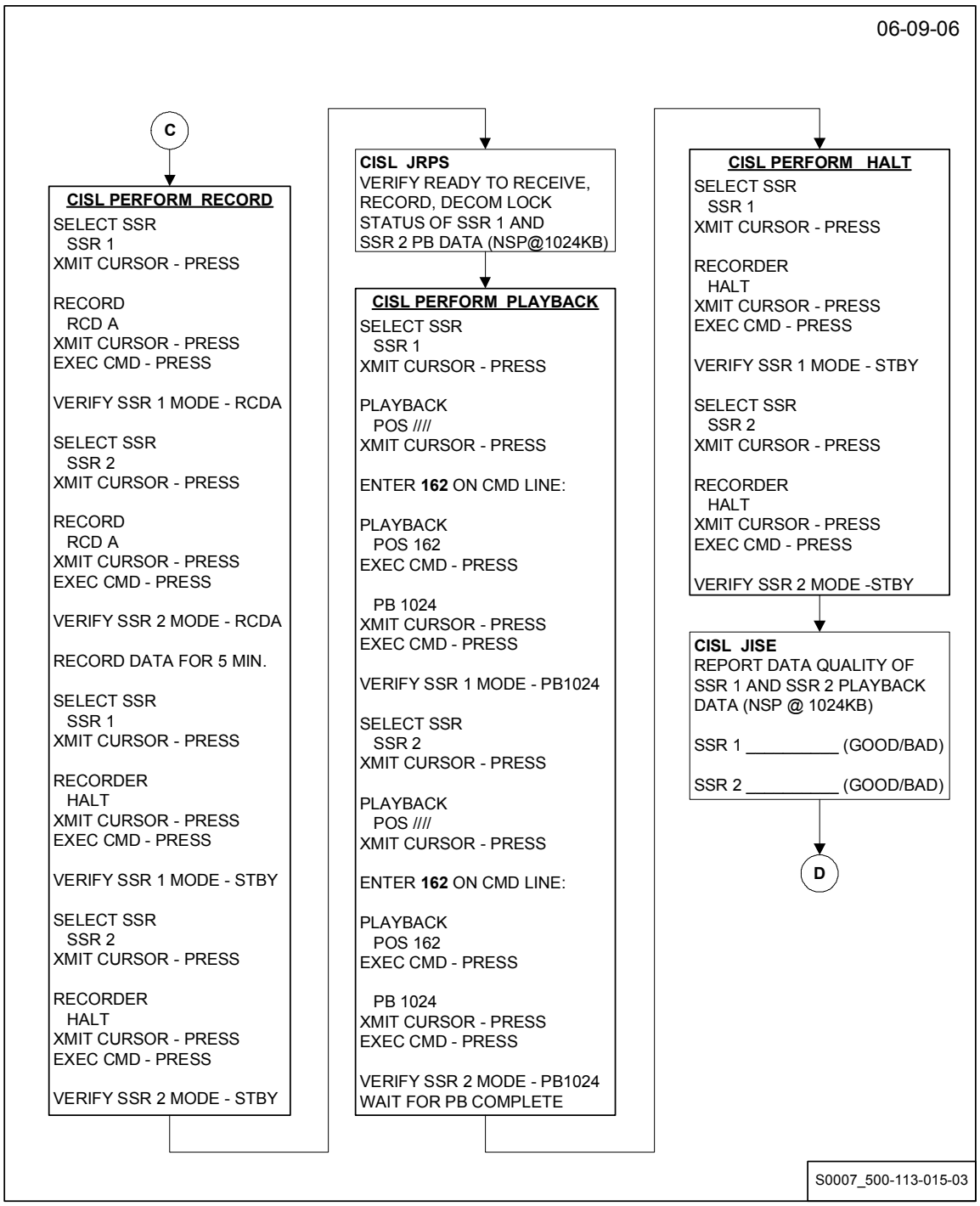
SSR Anomaly (OST Critical BITE Failed) (SSID INS-02A) (Page 1 of 4)



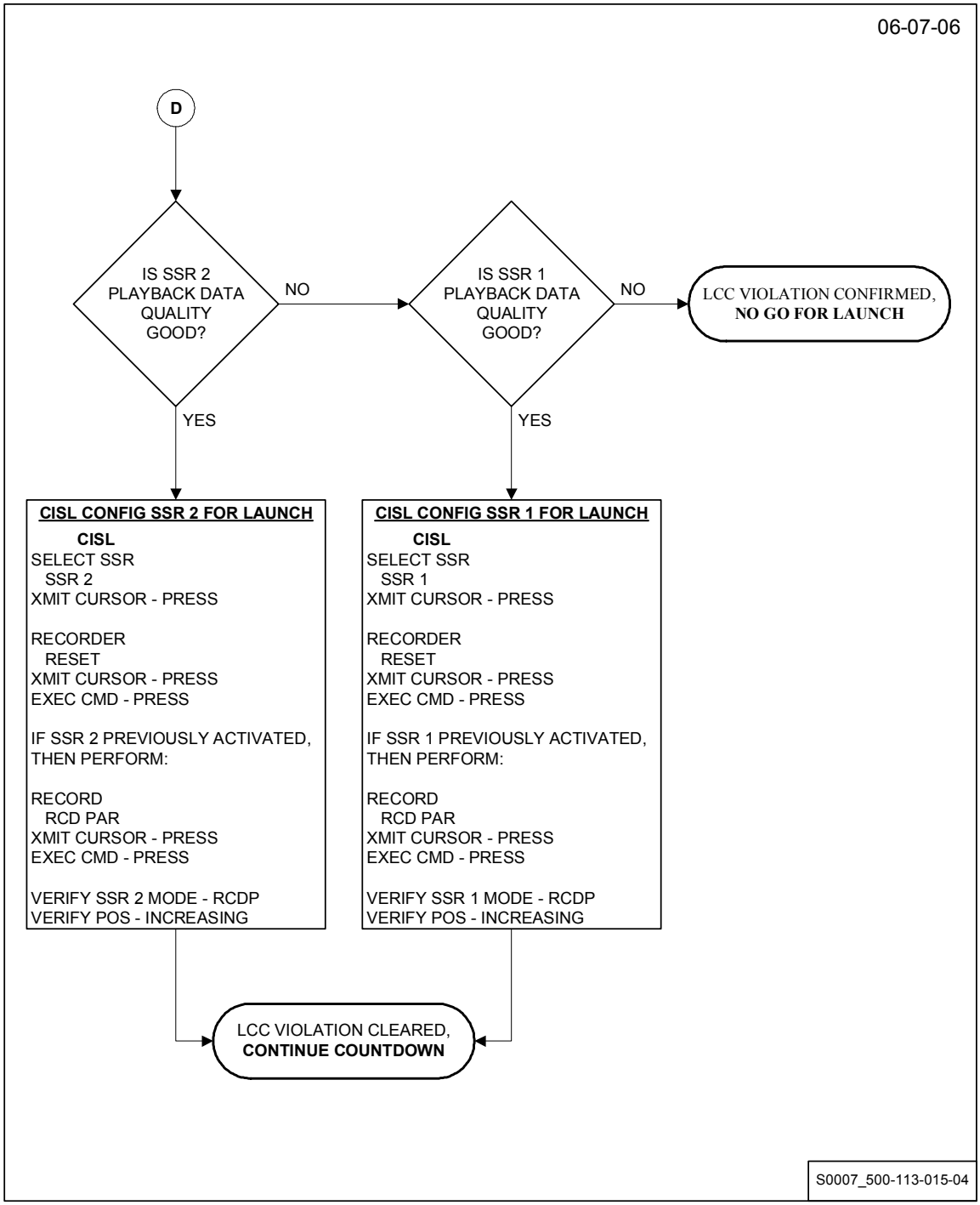
SSR Anomaly (OST Critical BITE Failed) (SSID INS-02A) (Page 2 of 4)



SSR Anomaly (OST Critical BITE Failed) (SSID INS-02A) (Page 3 of 4)

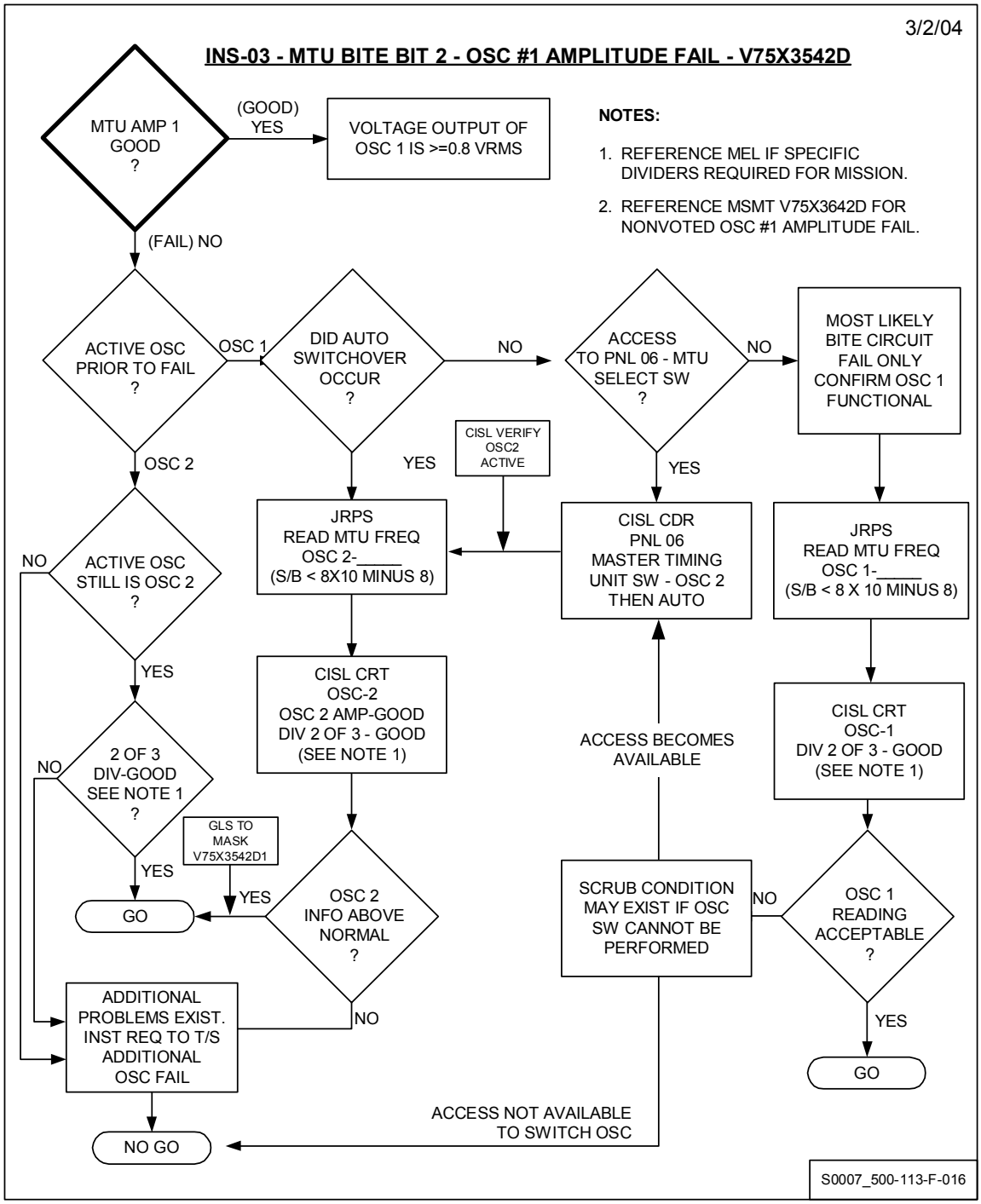


SSR Anomaly (OST Critical BITE Failed) (SSID INS-02A) (Page 4 of 4)



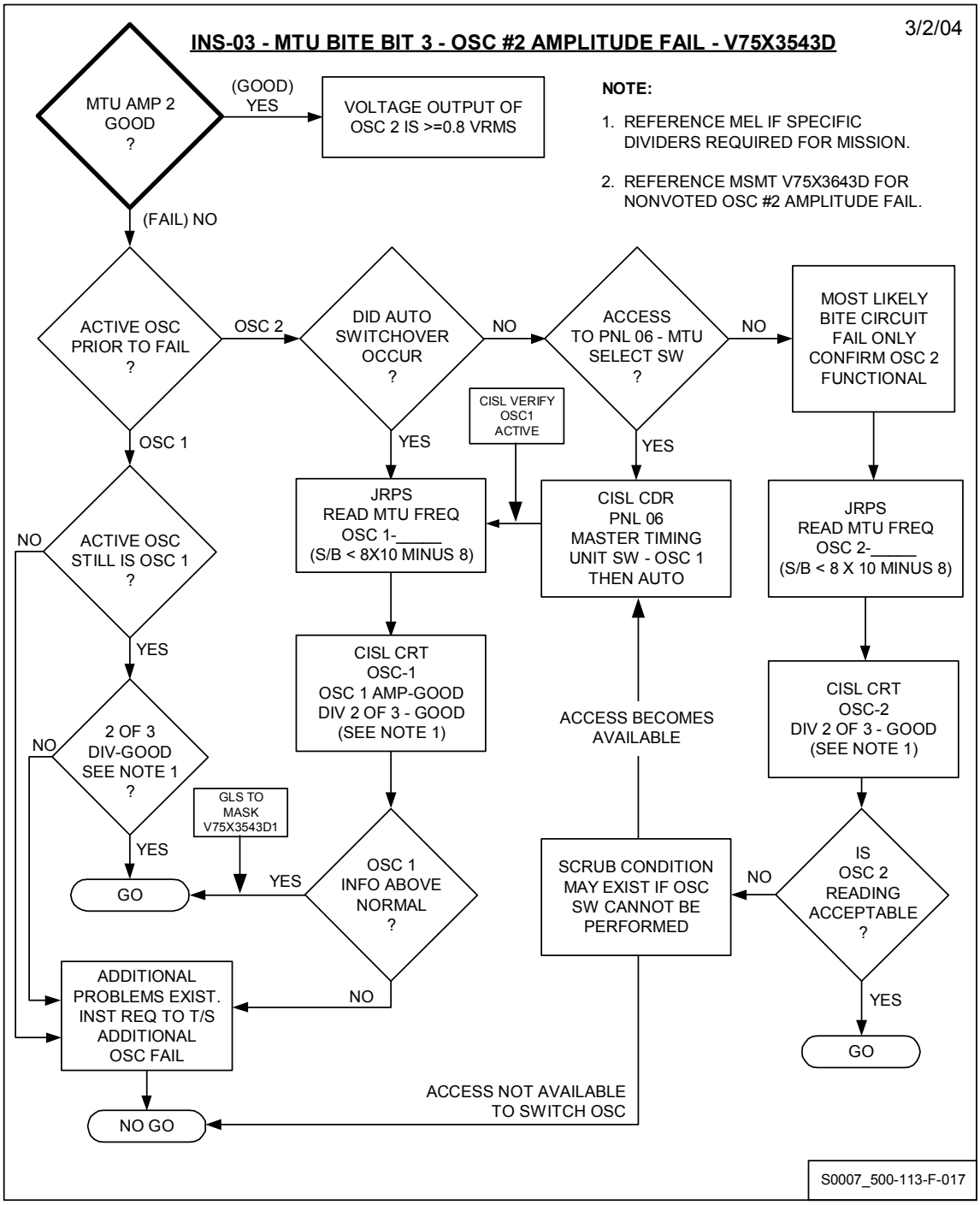
113-10

MTU Amp 1 (SSID INS-03)



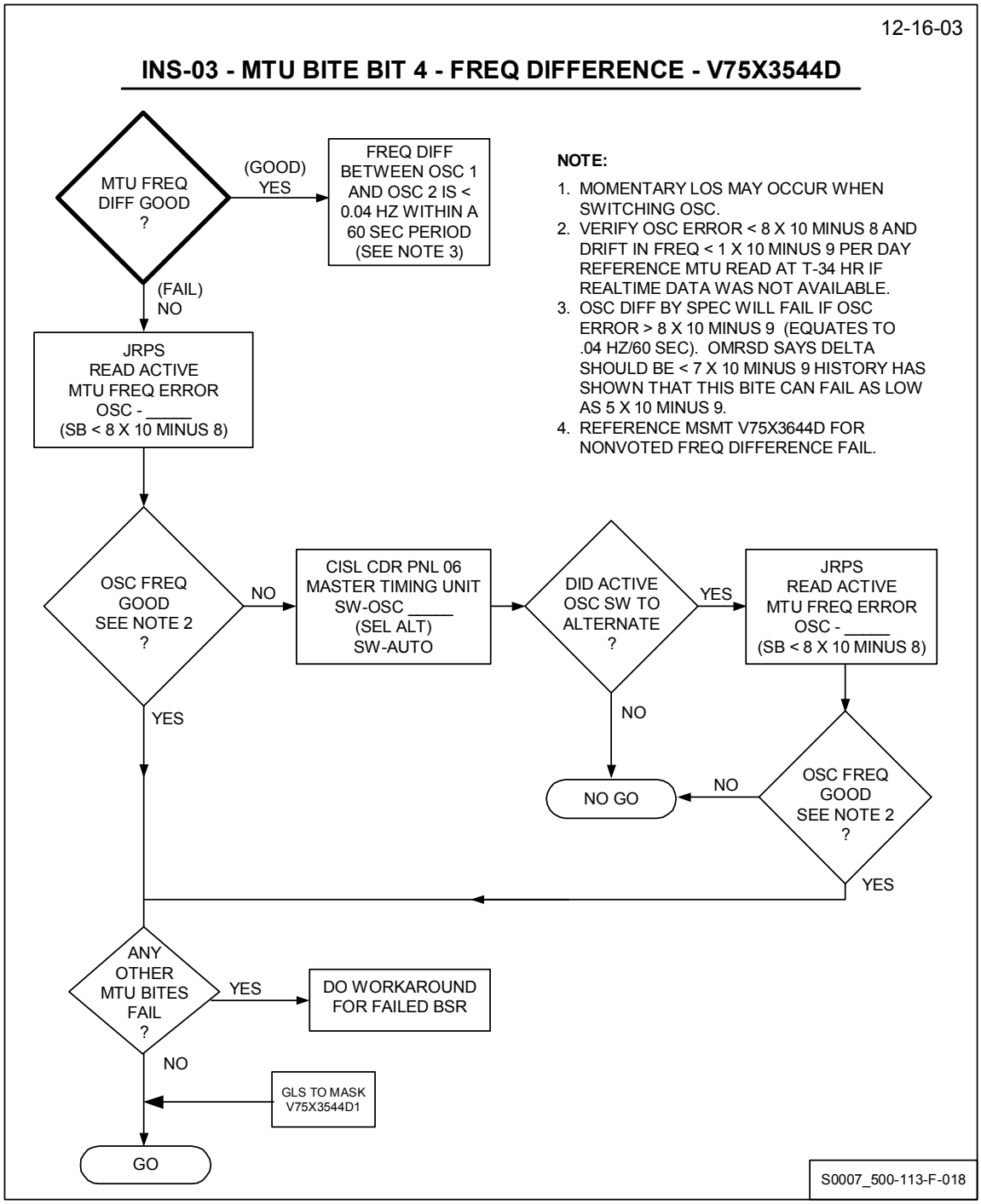
113-11

MTU Amp 2 (SSID INS-03)



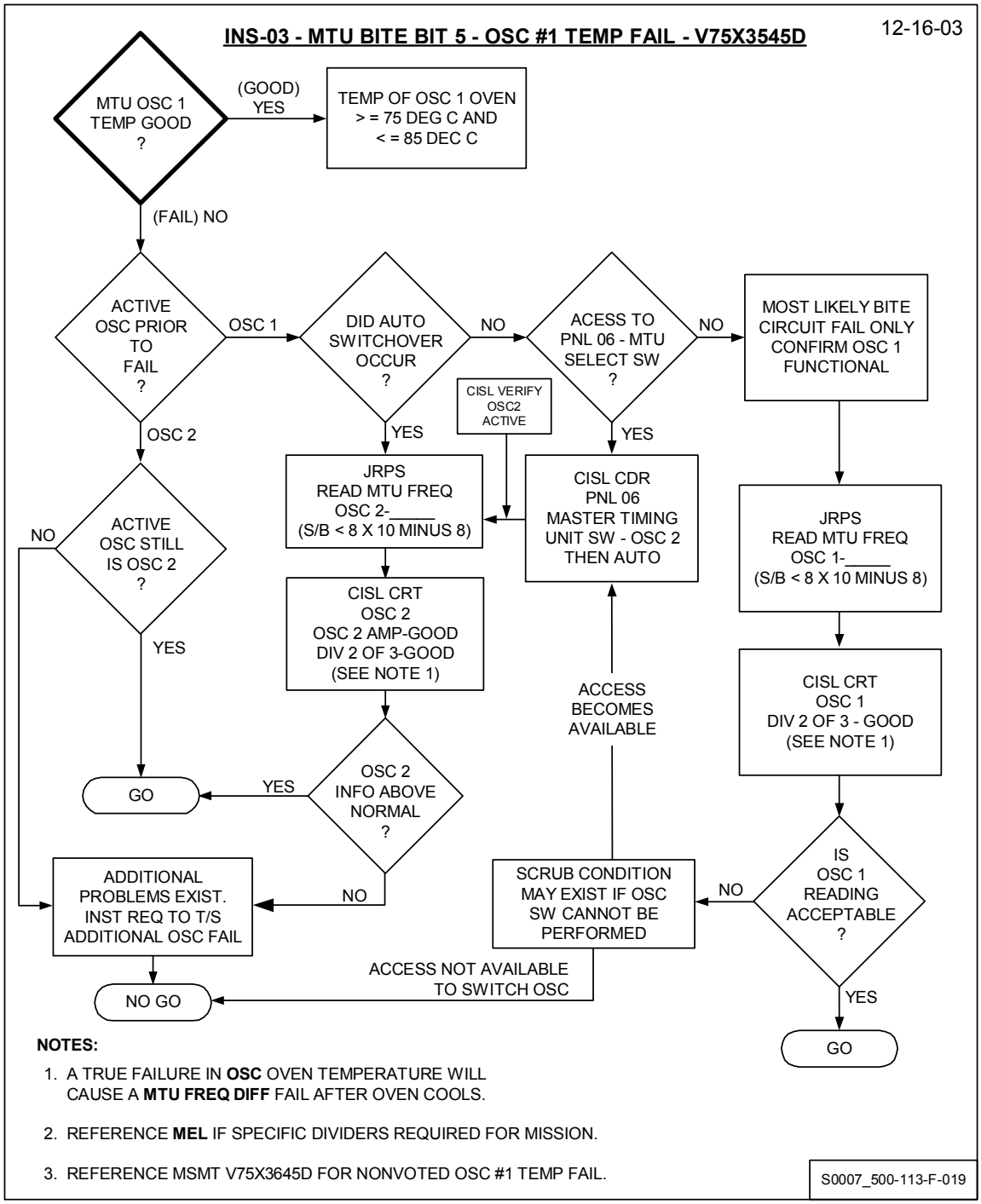
113-12

MTU Frequency Difference (SSID INS-03)



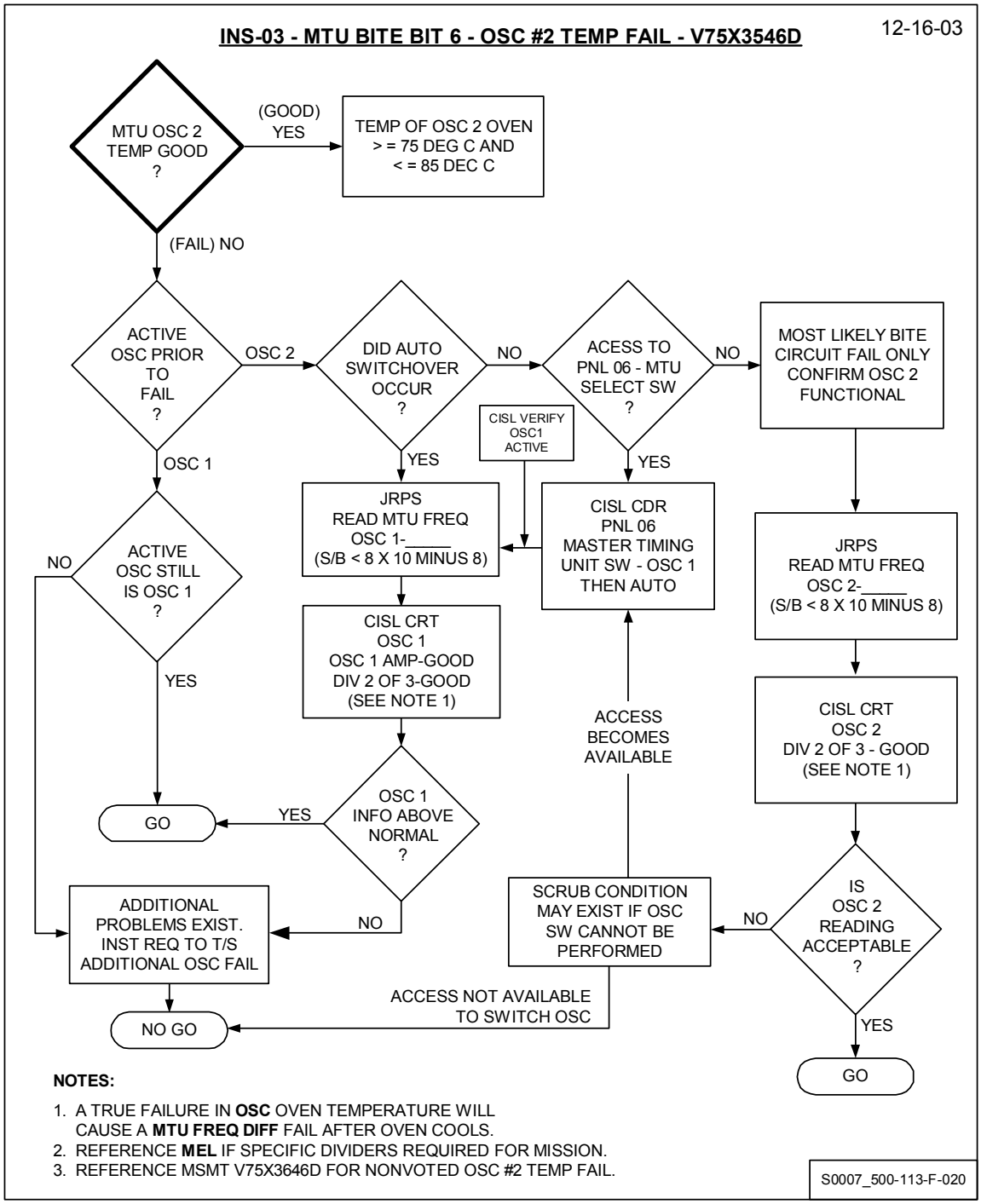
113-13

MTU Temp 1 (SSID INS-03)



113-14

MTU Temp 2 (SSID INS-03)

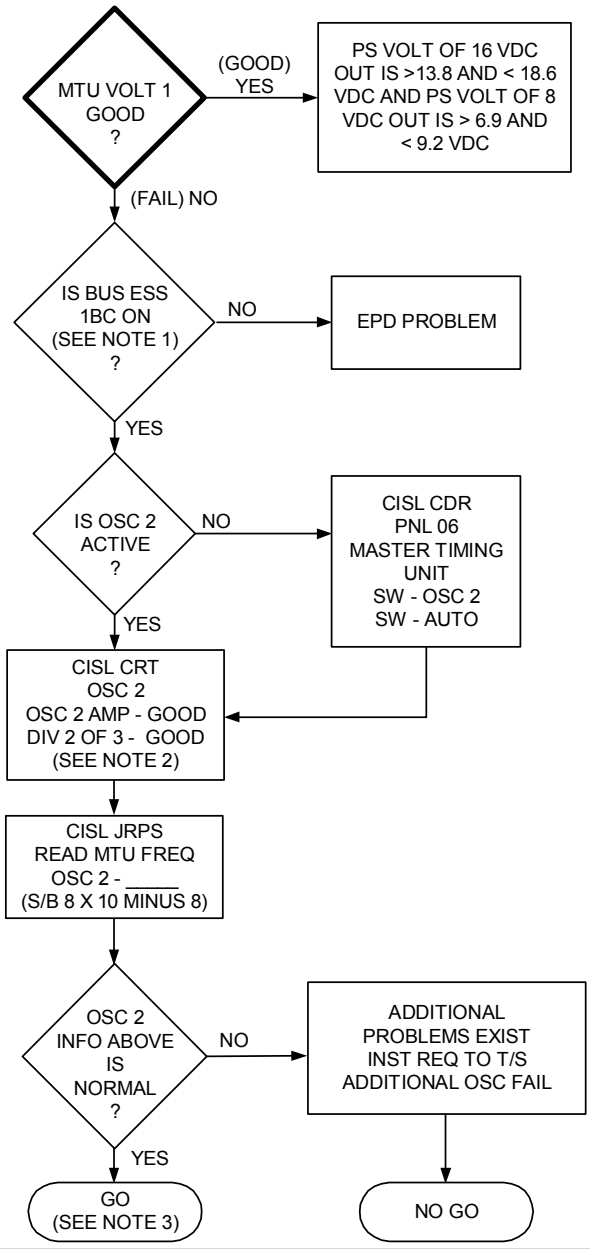


113-15

MTU PS 1 Volt (SSID INS-03)

12-16-03

INS-03 - MTU BITE BIT 7 - POWER SUPPLY 1 VOLT FAIL - V75X3547D



NOTES:

1. ESS BUS 1BC VOLT FD V76V0130A.
2. REFERENCE MEL IS SPECIFIC DIVIDERS REQUIRED FOR MISSION.
3. PS 1 FEEDS OUTER OVEN HEATER TO OSC 1. FAILURE OF OSC 1 TEMP AND FREQ DIFF MAY OCCUR AT LATER POINT.
4. CIRCUIT BREAKER TO MTU PS 1 IS ON PANEL 013/ESS1BC/MTU A CB. BREAKER SHOULD NOT BE RE-ENGAGED UNLESS UNDERSTOOD WHY OPENED.
5. REFERENCE MSMT V75X3647D FOR NONVOTED P/S #1 VOLT FAIL.

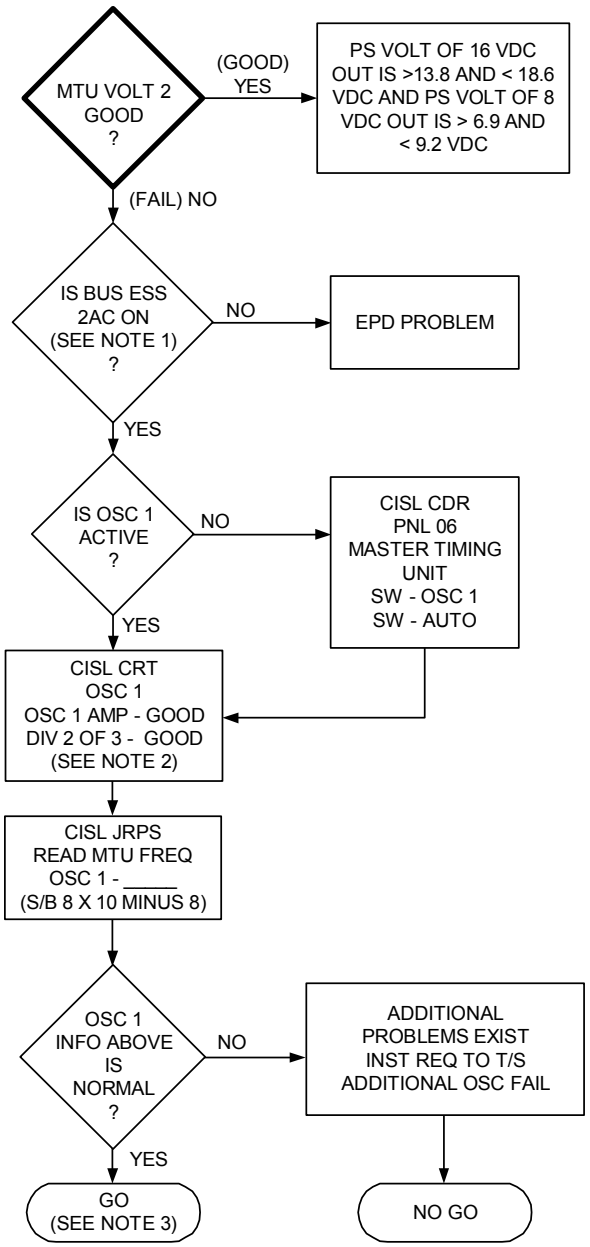
S0007_500-113-F-021

113-16

MTU PS 2 Volt (SSID INS-03)

12-16-03

INS-03 - MTU BITE BIT 8 - POWER SUPPLY 2 VOLT FAIL - V75X3548D



NOTES:

1. ESS BUS 2CA VOLT FD V76V0230A.
2. REFERENCE MEL IF SPECIFIC DIVIDERS REQUIRED FOR MISSION.
3. PS 2 FEEDS OUTER OVEN HEATER TO OSC 2. FAILURE OF OSC 2 TEMP AND FREQ DIFF MAY OCCUR AT LATER POINT.
4. CIRCUIT BREAKER TO MTU PS 2 IS ON PANEL 013/ESS2AC/MTU B CB. BREAKER SHOULD NOT BE RE-ENGAGED UNLESS UNDERSTOOD WHY OPENED.
5. REFERENCE MSMT V75X3648D FOR NONVOTED P/S #2 VOLT FAIL.

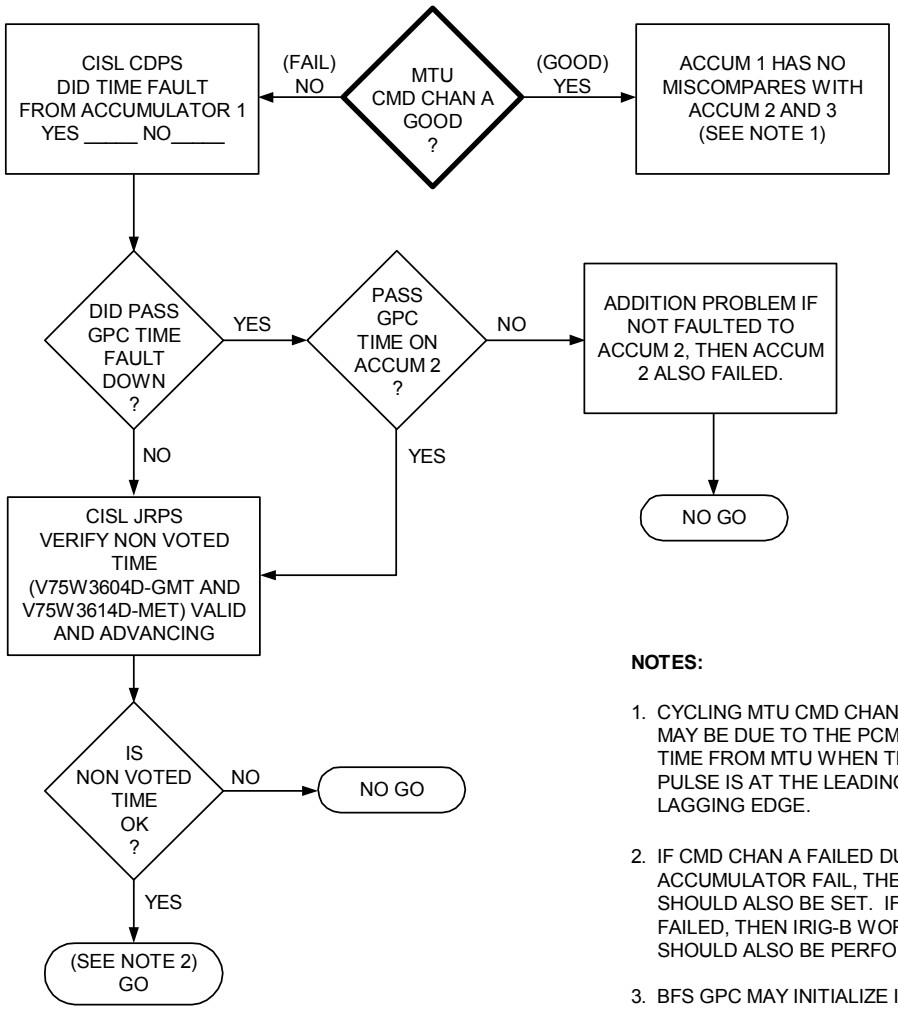
S0007_500-113-F-022

113-17

MTU CMD Channel A (SSID INS-03)

12-16-03

INS-03 - MTU BITE BIT 9 - CMD CHAN A FAIL - V75X3549D



NOTES:

1. CYCLING MTU CMD CHAN FAILURES MAY BE DUE TO THE PCM REQUESTING TIME FROM MTU WHEN THE MTU PULSE IS AT THE LEADING OR LAGGING EDGE.
2. IF CMD CHAN A FAILED DUE TO ACCUMULATOR FAIL, THEN IRIG-B BITE SHOULD ALSO BE SET. IF IRIG-B FAILED, THEN IRIG-B WORKAROUND SHOULD ALSO BE PERFORMED.
3. BFS GPC MAY INITIALIZE IN ANY ACCUMULATOR.
4. REFERENCE MSMT V75X3649D FOR NONVOTED CMD CHAN A FAIL.

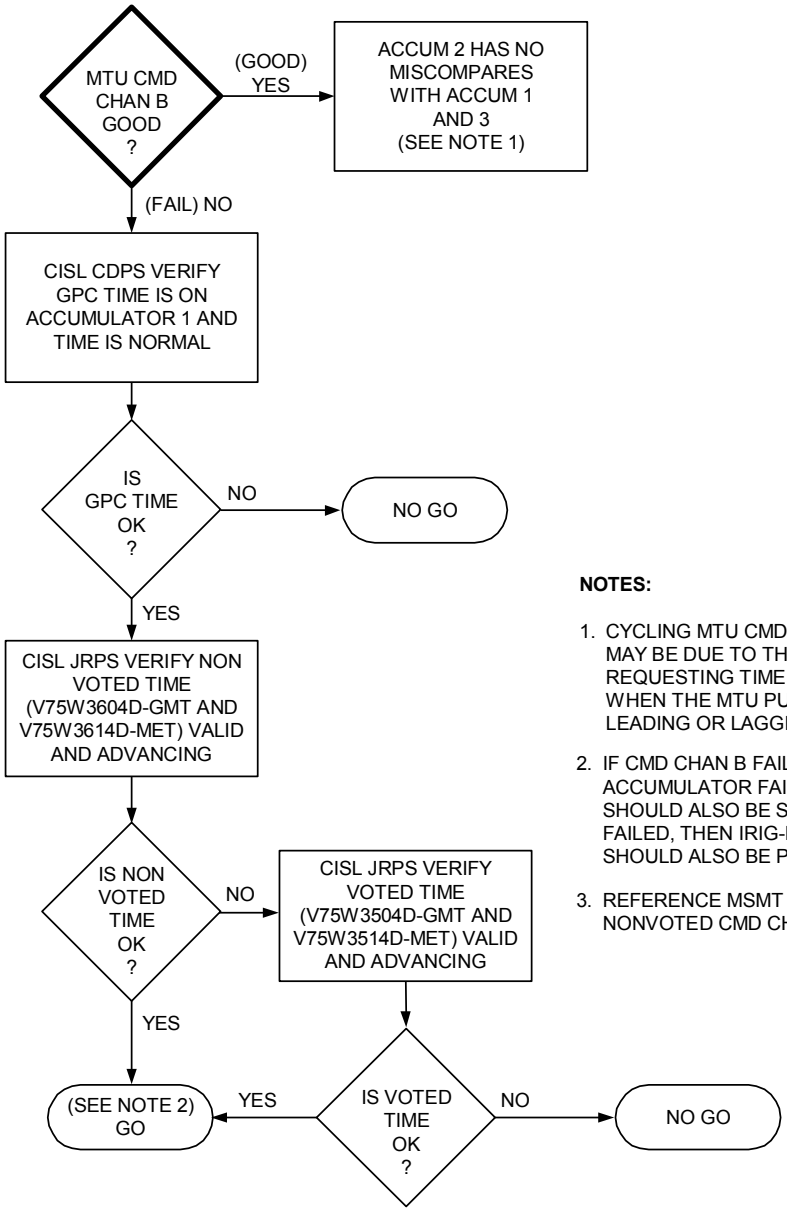
S0007_500-113-F-023

113-18

MTU CMD Channel B (SSID INS-03)

12-16-03

INS-03 - MTU BITE BIT 10 - CMD CHAN B FAIL - V75X3550D



NOTES:

1. CYCLING MTU CMD CHAN FAILURES MAY BE DUE TO THE PCM REQUESTING TIME FROM THE MTU WHEN THE MTU PULSE IS AT THE LEADING OR LAGGING EDGE.
2. IF CMD CHAN B FAILED DUE TO ACCUMULATOR FAIL, THEN IRIG-B BITE SHOULD ALSO BE SET FAILED. IF IRIG-B FAILED, THEN IRIG-B WORKAROUND SHOULD ALSO BE PERFORMED.
3. REFERENCE MSMT V75X3650D FOR NONVOTED CMD CHAN B FAIL.

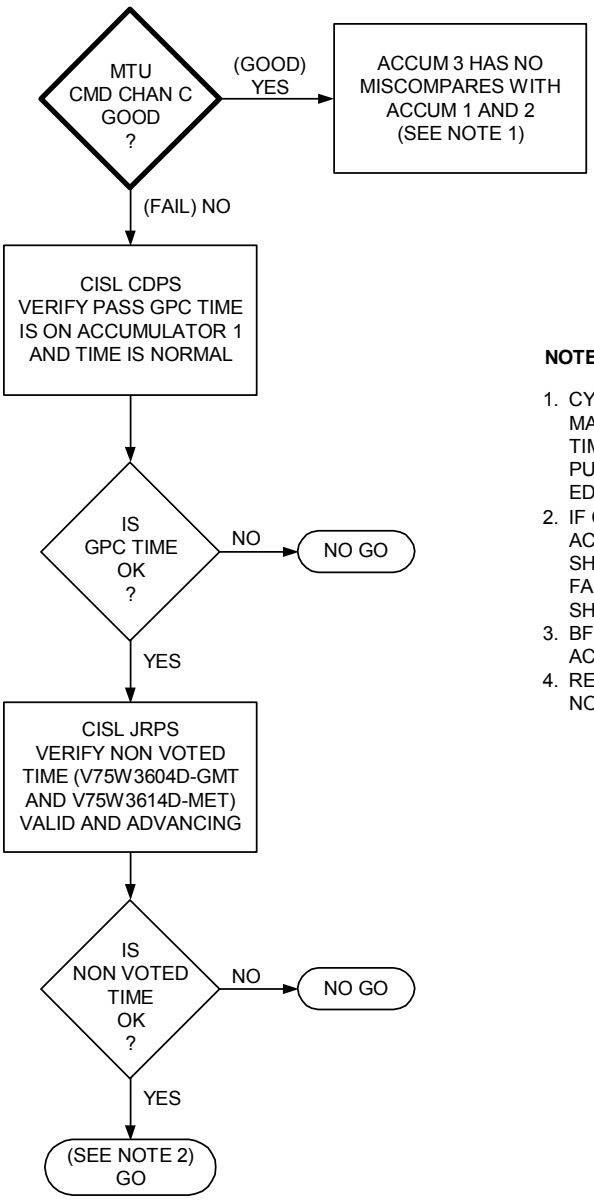
S0007_500-113-F-024

113-19

MTU CMD Channel C (SSID INS-03)

12-16-03

INS-03 - MTU BITE BIT 11 - CMD CHAN C FAIL - V75X3551D



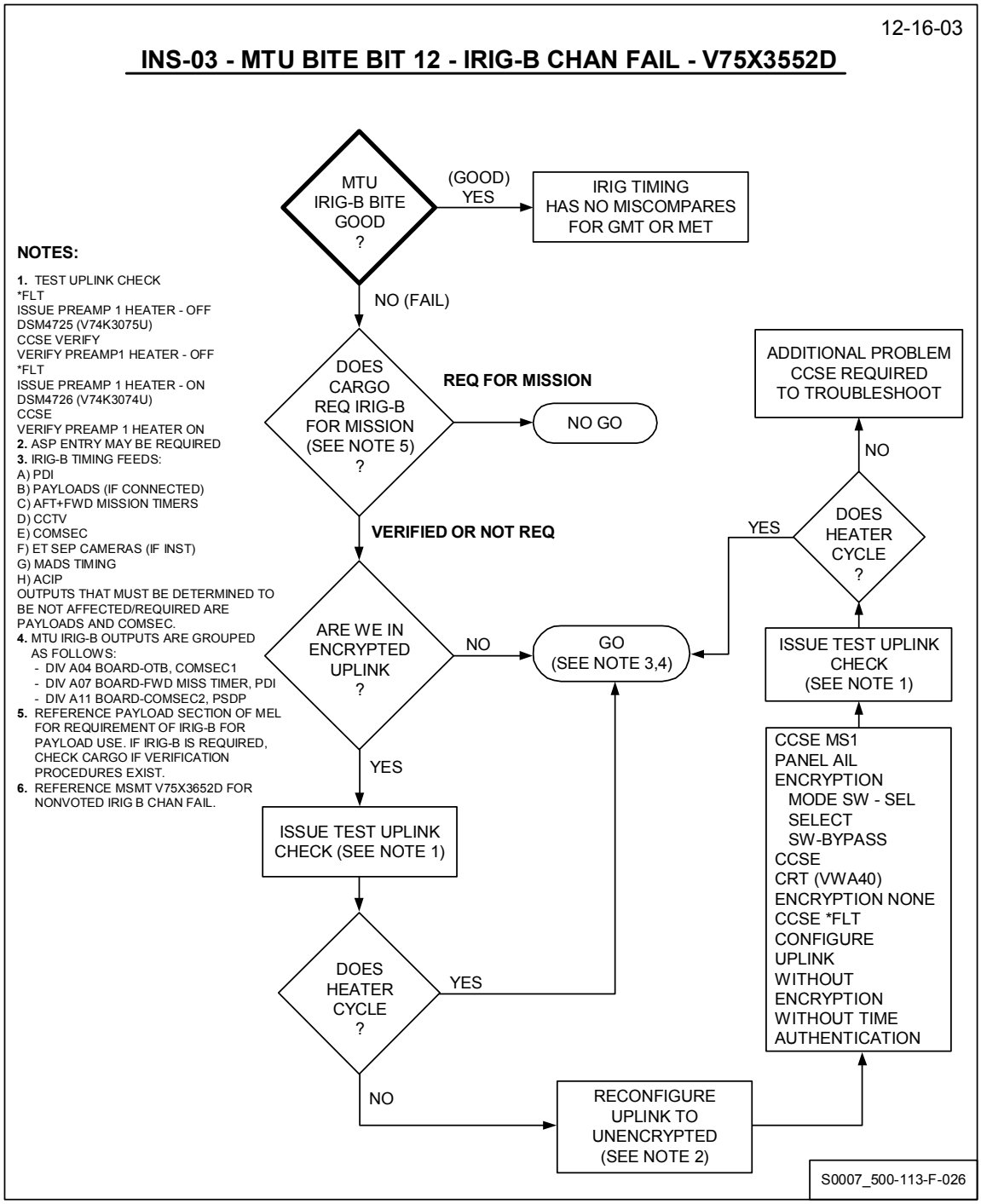
NOTES:

1. CYCLING MTU CMD CHAN FAILURES MAY BE DUE TO THE PCM REQUESTING TIME FROM THE MTU WHEN THE MTU PULSE IS AT THE LEADING OR LAGGING EDGE.
2. IF CMD CHAN C FAILED DUE TO ACCUMULATOR FAIL, THEN IRIG-B BITE SHOULD ALSO BE SET FAILED. IF IRIG-B FAILED, THEN IRIG-B WORKAROUND SHOULD ALSO BE PERFORMED.
3. BFS GPC MAY INITIALIZE TO ANY ACCUMULATOR.
4. REFERENCE MSMT V75X3651D FOR NONVOTED CMD CHAN C FAIL.

S0007_500-113-F-025

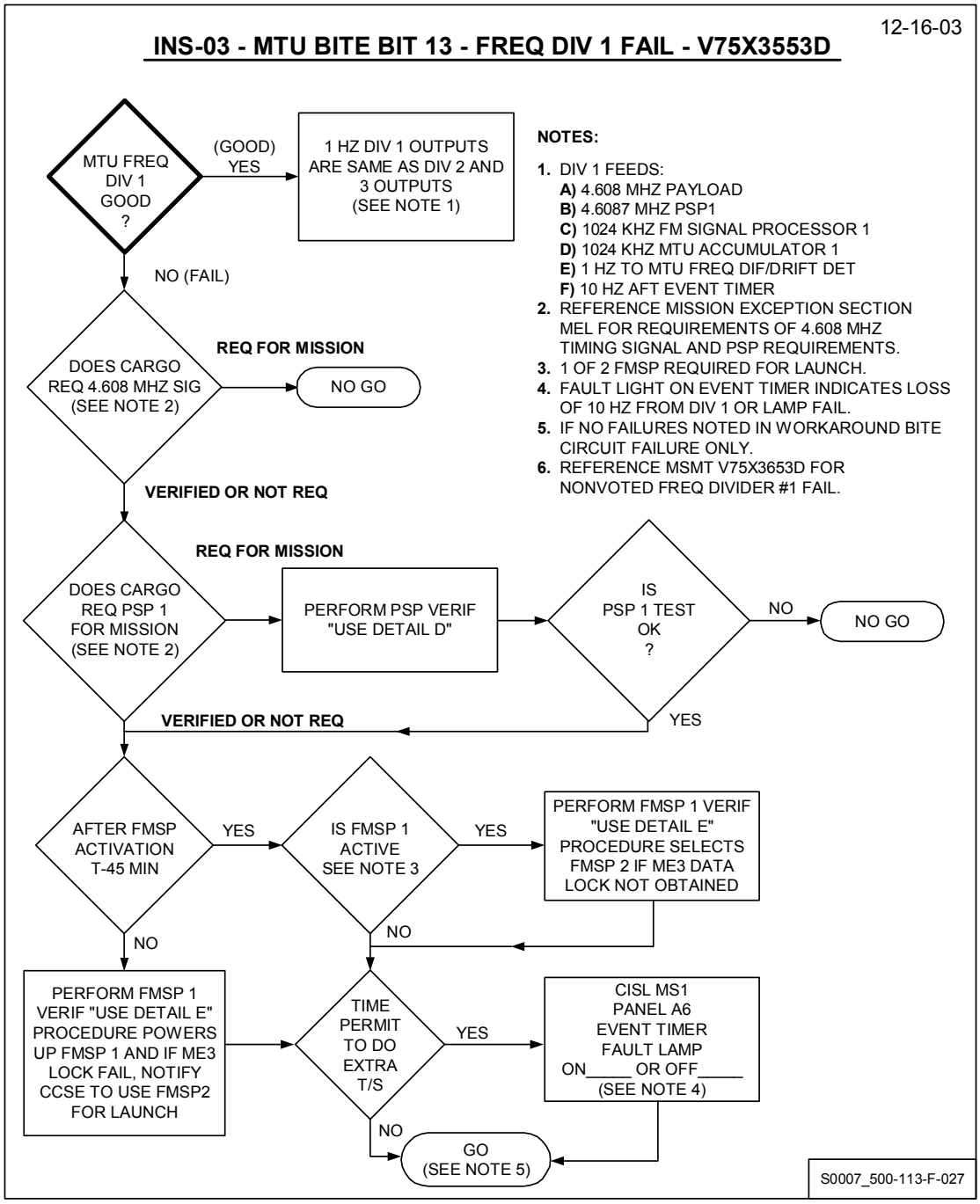
113-20

MTU IRIG-B (SSID INS-03)



113-21

MTU Frequency DIV 1 (SSID INS-03)

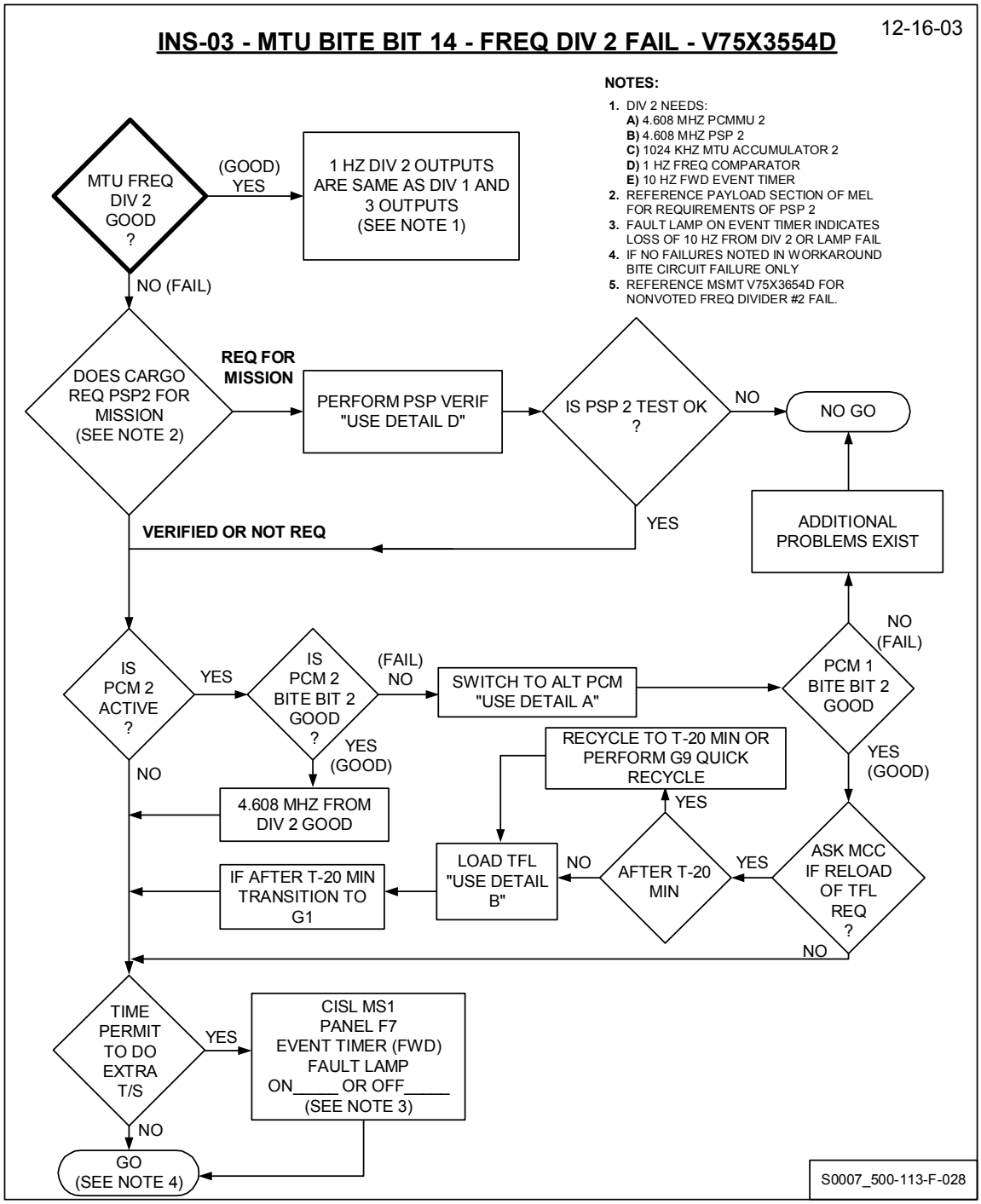


NOTES:

1. DIV 1 FEEDS:
   A) 4.608 MHZ PAYLOAD
   B) 4.6087 MHZ PSP1
   C) 1024 KHZ FM SIGNAL PROCESSOR 1
   D) 1024 KHZ MTU ACCUMULATOR 1
   E) 1 HZ TO MTU FREQ DIF/DRIFT DET
   F) 10 HZ AFT EVENT TIMER
2. REFERENCE MISSION EXCEPTION SECTION MEL FOR REQUIREMENTS OF 4.608 MHZ TIMING SIGNAL AND PSP REQUIREMENTS.
3. 1 OF 2 FMSP REQUIRED FOR LAUNCH.
4. FAULT LIGHT ON EVENT TIMER INDICATES LOSS OF 10 HZ FROM DIV 1 OR LAMP FAIL.
5. IF NO FAILURES NOTED IN WORKAROUND BITE CIRCUIT FAILURE ONLY.
6. REFERENCE MSMT V75X3653D FOR NONVOTED FREQ DIVIDER #1 FAIL.

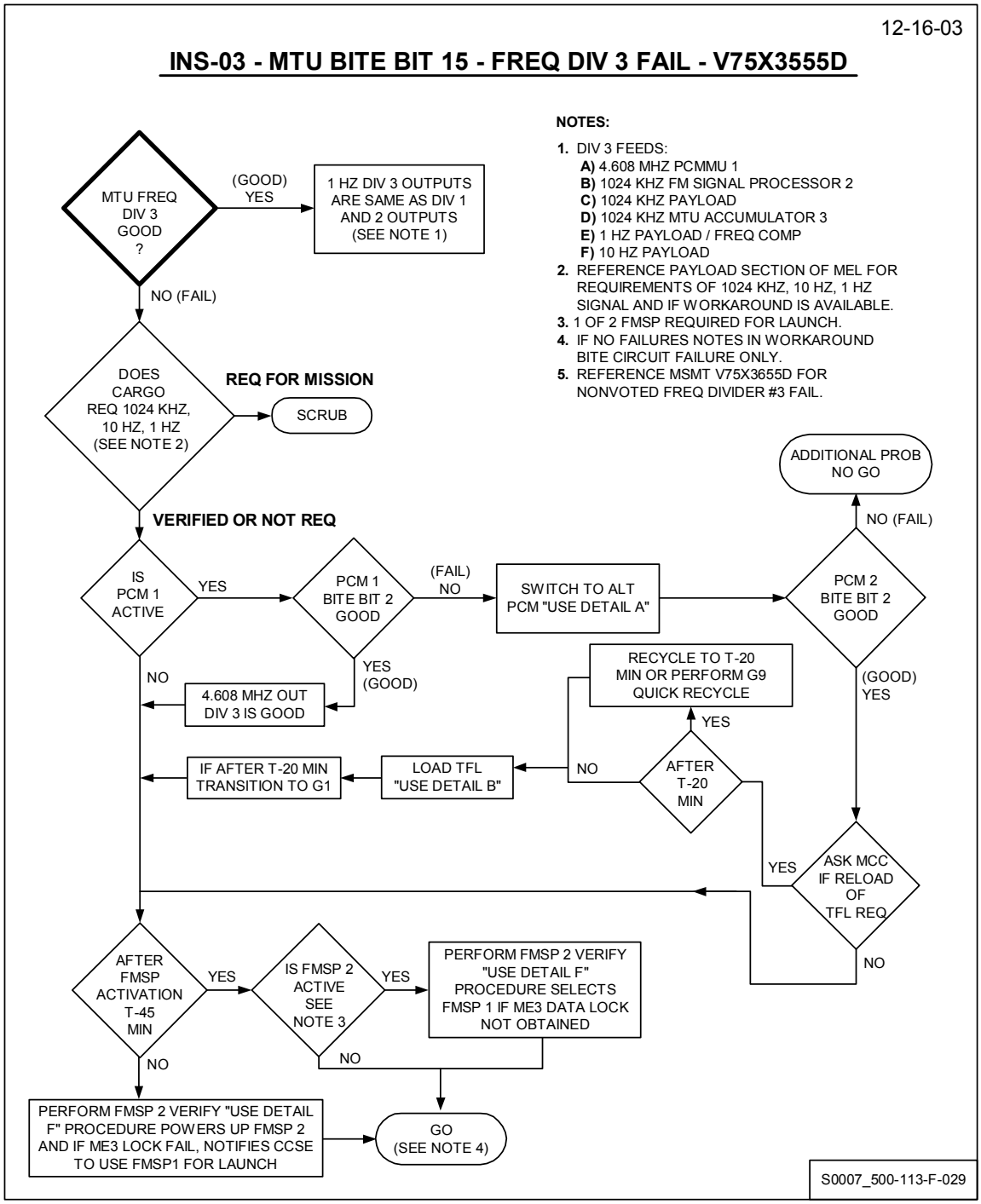
113-22

MTU Frequency DIV 2 (SSID INS-03)



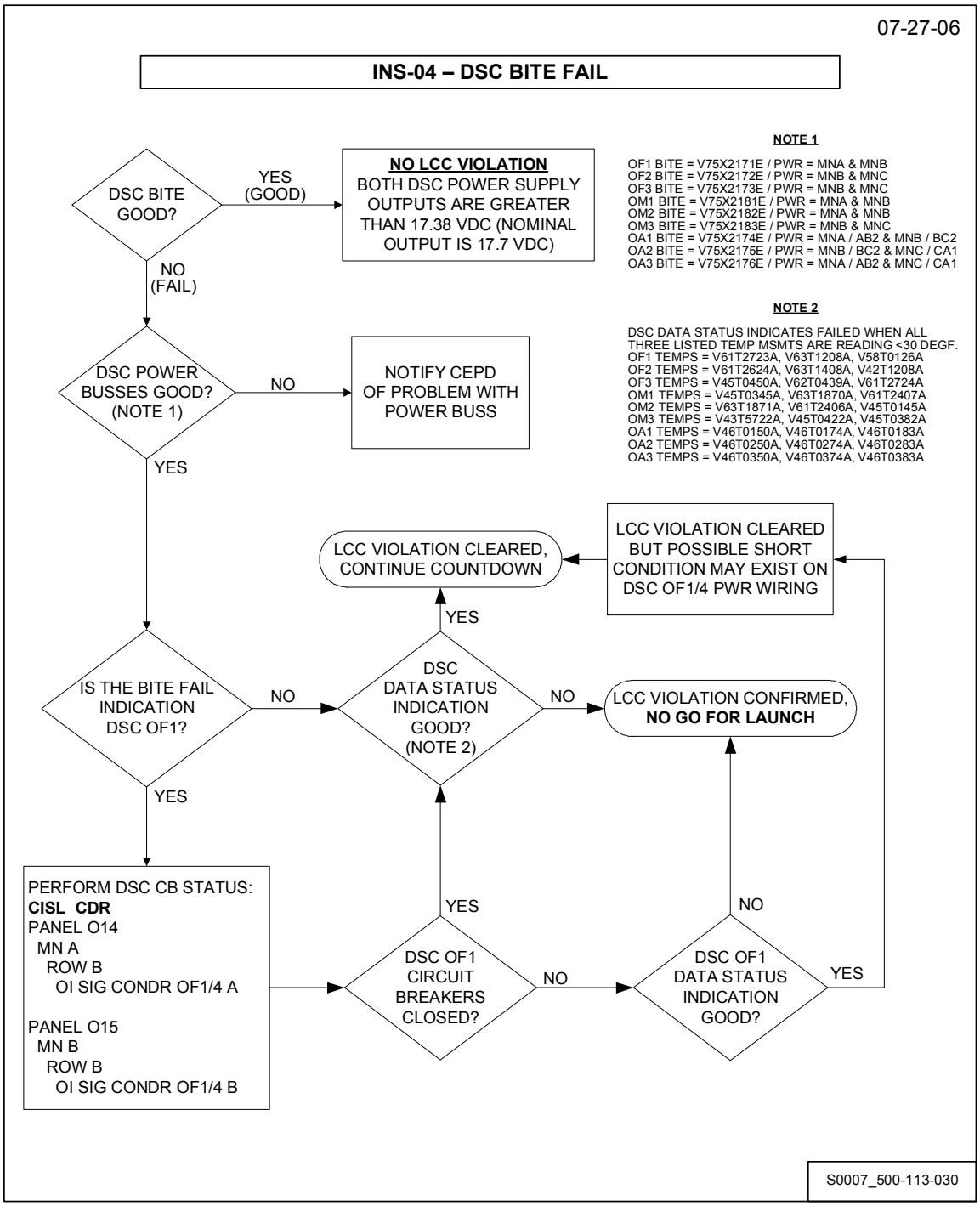
113-23

MTU Frequency DIV 3 (SSID INS-03)



113-24

DSC BITE Fail (SSID INS-04)

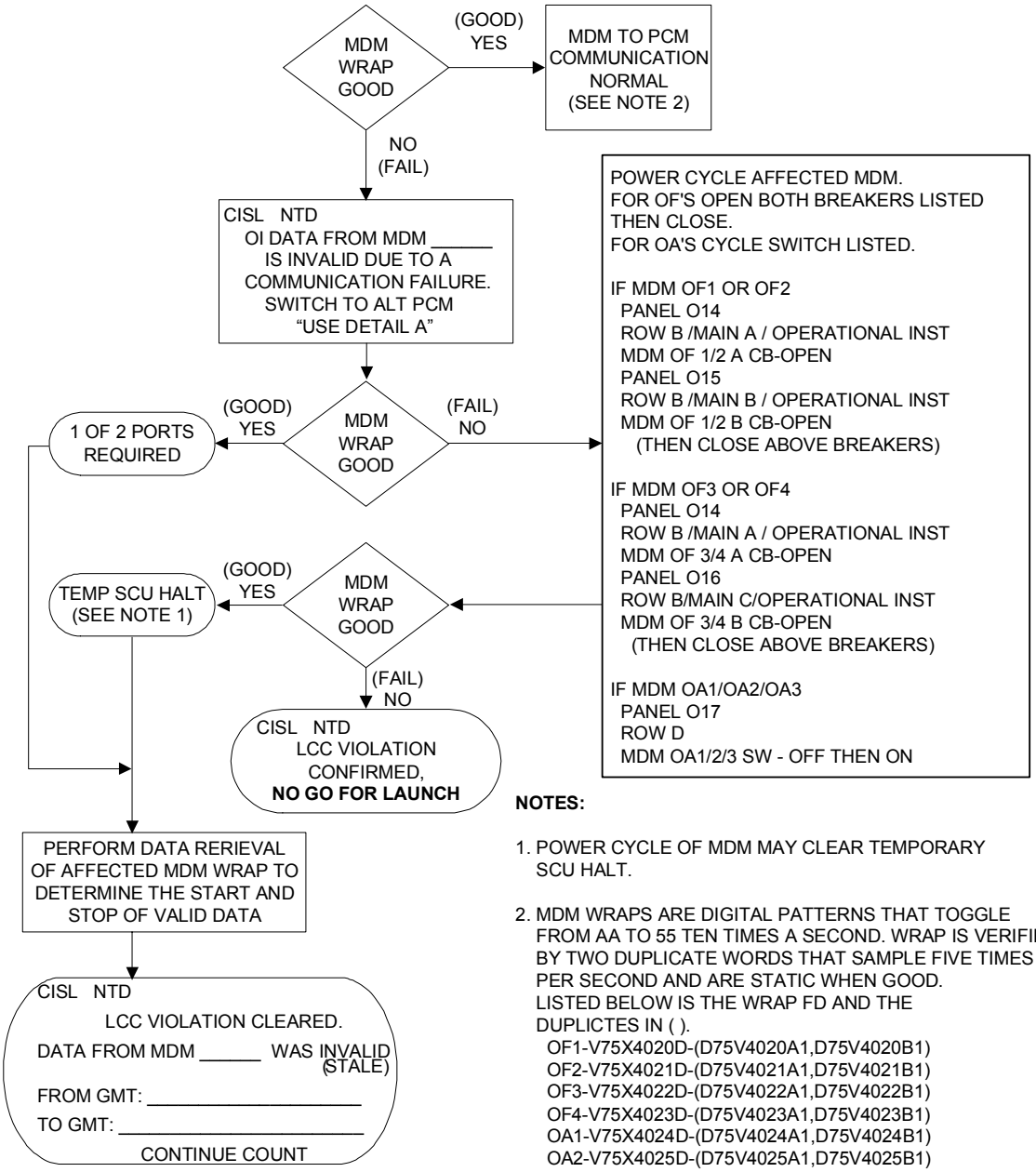


113-25

MDM WRAP Fail (SSID INS-05)

01-16-09

INS-05 MDM WRAP FAIL-OF1,OF2,OF3,OF4,OA1,OA2,OA3



NOTES:

1. POWER CYCLE OF MDM MAY CLEAR TEMPORARY SCU HALT.

2. MDM WRAPS ARE DIGITAL PATTERNS THAT TOGGLE FROM AA TO 55 TEN TIMES A SECOND. WRAP IS VERIFIED BY TWO DUPLICATE WORDS THAT SAMPLE FIVE TIMES PER SECOND AND ARE STATIC WHEN GOOD. LISTED BELOW IS THE WRAP FD AND THE DUPLICTES IN ( ).
   OF1-V75X4020D-(D75V4020A1,D75V4020B1)
   OF2-V75X4021D-(D75V4021A1,D75V4021B1)
   OF3-V75X4022D-(D75V4022A1,D75V4022B1)
   OF4-V75X4023D-(D75V4023A1,D75V4023B1)
   OA1-V75X4024D-(D75V4024A1,D75V4024B1)
   OA2-V75X4025D-(D75V4025A1,D75V4025B1)
   OA3-V75X4026D-(D75V4025A1,D75V4026B1)

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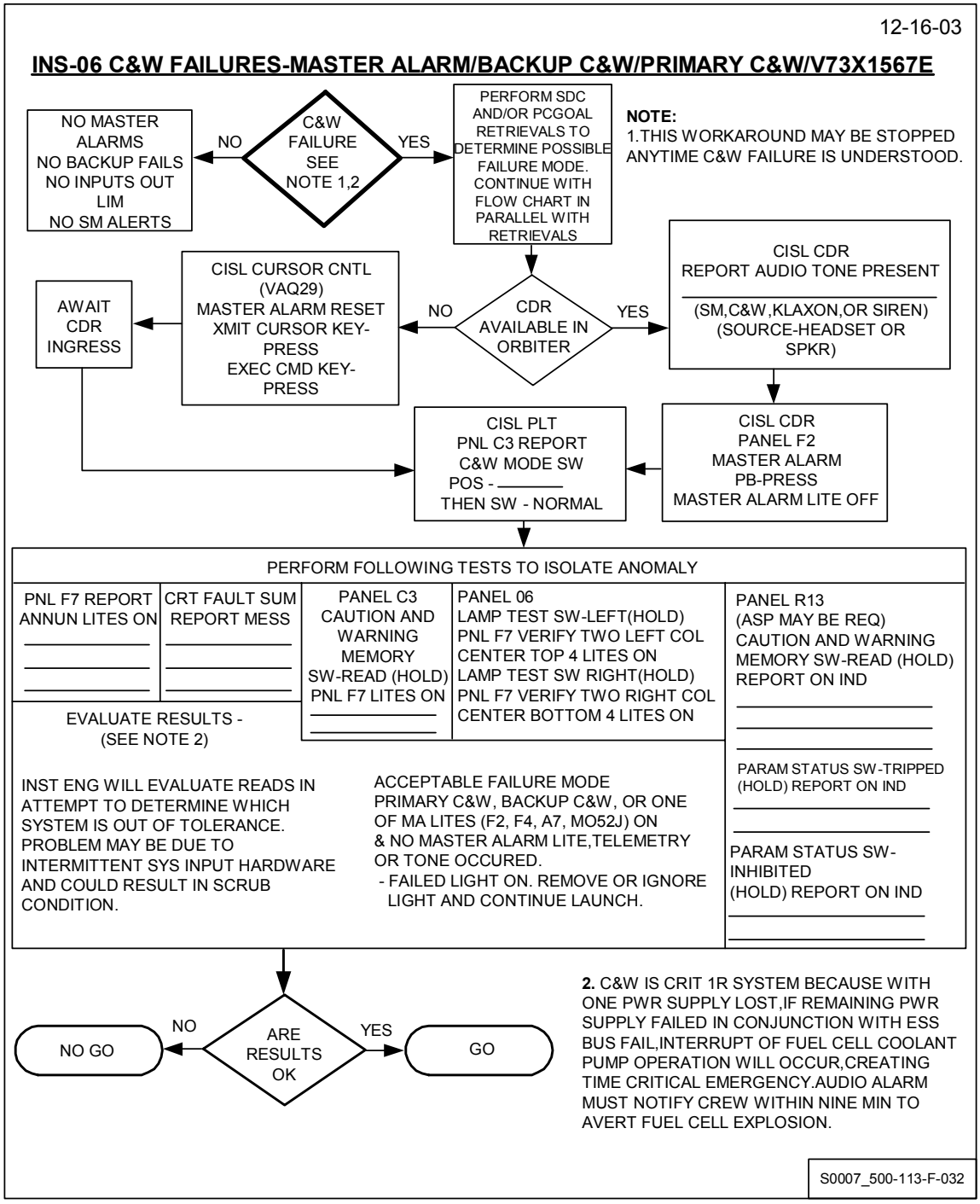
113-26

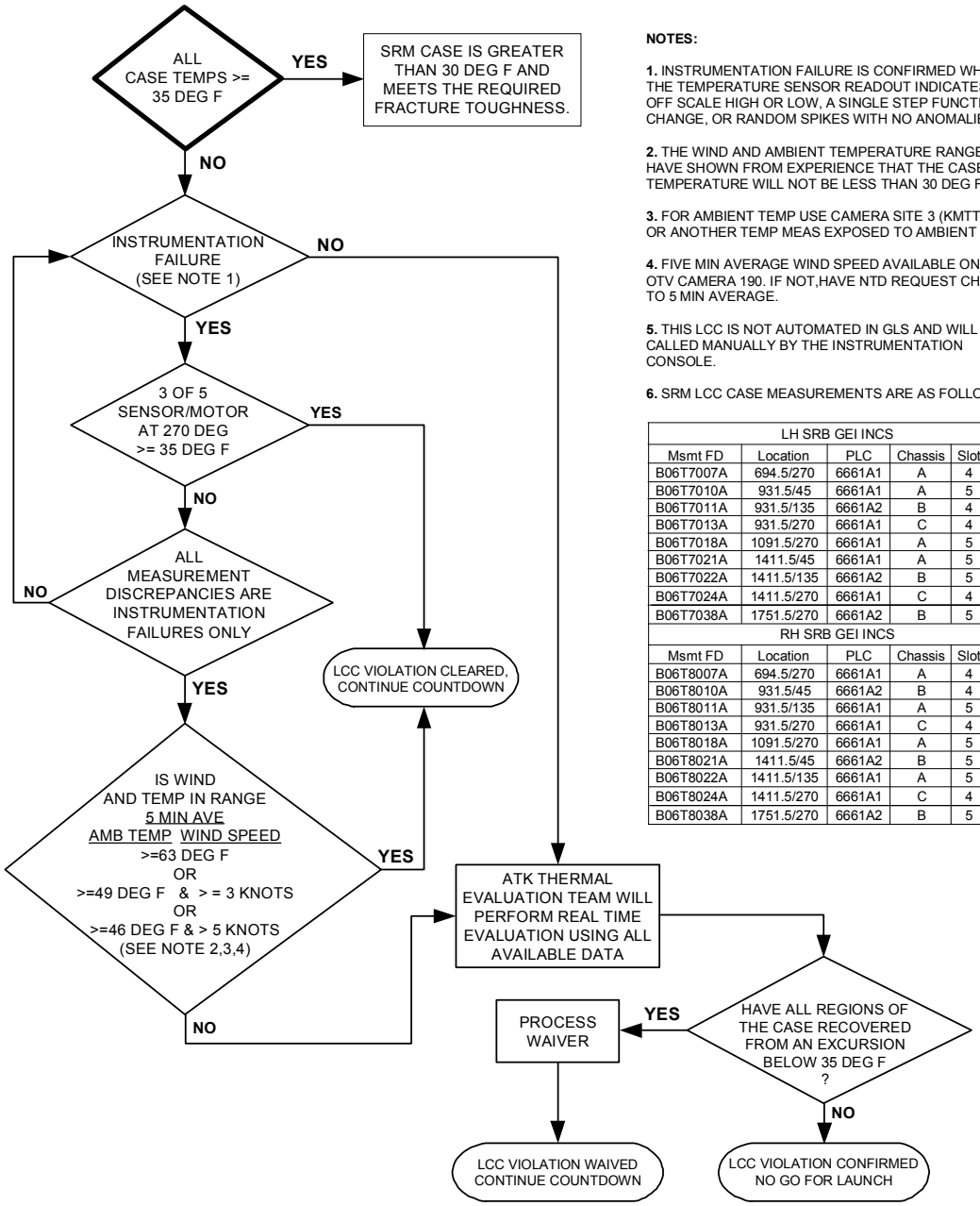
C&W Failure (SSID INS-06)



113-27

SRM Case Acreage Temperature Anomaly (SSID SRM-11)

SRM-11 SRM CASE ACREAGE TEMP ANOMALY 04-17-09



NOTES:

1. INSTRUMENTATION FAILURE IS CONFIRMED WHEN THE TEMPERATURE SENSOR READOUT INDICATES OFF SCALE HIGH OR LOW, A SINGLE STEP FUNCTION CHANGE, OR RANDOM SPIKES WITH NO ANOMALIES.

2. THE WIND AND AMBIENT TEMPERATURE RANGES HAVE SHOWN FROM EXPERIENCE THAT THE CASE TEMPERATURE WILL NOT BE LESS THAN 30 DEG F.

3. FOR AMBIENT TEMP USE CAMERA SITE 3 (KMTTA001A) OR ANOTHER TEMP MEAS EXPOSED TO AMBIENT TEMP.

4. FIVE MIN AVERAGE WIND SPEED AVAILABLE ON OTV CAMERA 190. IF NOT,HAVE NTD REQUEST CHANGE TO 5 MIN AVERAGE.

5. THIS LCC IS NOT AUTOMATED IN GLS AND WILL BE CALLED MANUALLY BY THE INSTRUMENTATION CONSOLE.

6. SRM LCC CASE MEASUREMENTS ARE AS FOLLOWS:

LH SRB GEI INCS					
Msmt FD	Location	PLC	Chassis	Slot	CH
B06T7007A	694.5/270	6661A1	A	4	5
B06T7010A	931.5/45	6661A1	A	5	1
B06T7011A	931.5/135	6661A2	B	4	5
B06T7013A	931.5/270	6661A1	C	4	3
B06T7018A	1091.5/270	6661A1	A	5	3
B06T7021A	1411.5/45	6661A1	A	5	5
B06T7022A	1411.5/135	6661A2	B	5	1
B06T7024A	1411.5/270	6661A1	C	4	5
B06T7038A	1751.5/270	6661A2	B	5	3
RH SRB GEI INCS					
Msmt FD	Location	PLC	Chassis	Slot	CH
B06T8007A	694.5/270	6661A1	A	4	4
B06T8010A	931.5/45	6661A2	B	4	4
B06T8011A	931.5/135	6661A1	A	5	0
B06T8013A	931.5/270	6661A1	C	4	2
B06T8018A	1091.5/270	6661A1	A	5	2
B06T8021A	1411.5/45	6661A2	B	5	0
B06T8022A	1411.5/135	6661A1	A	5	4
B06T8024A	1411.5/270	6661A1	C	4	4
B06T8038A	1751.5/270	6661A2	B	5	2

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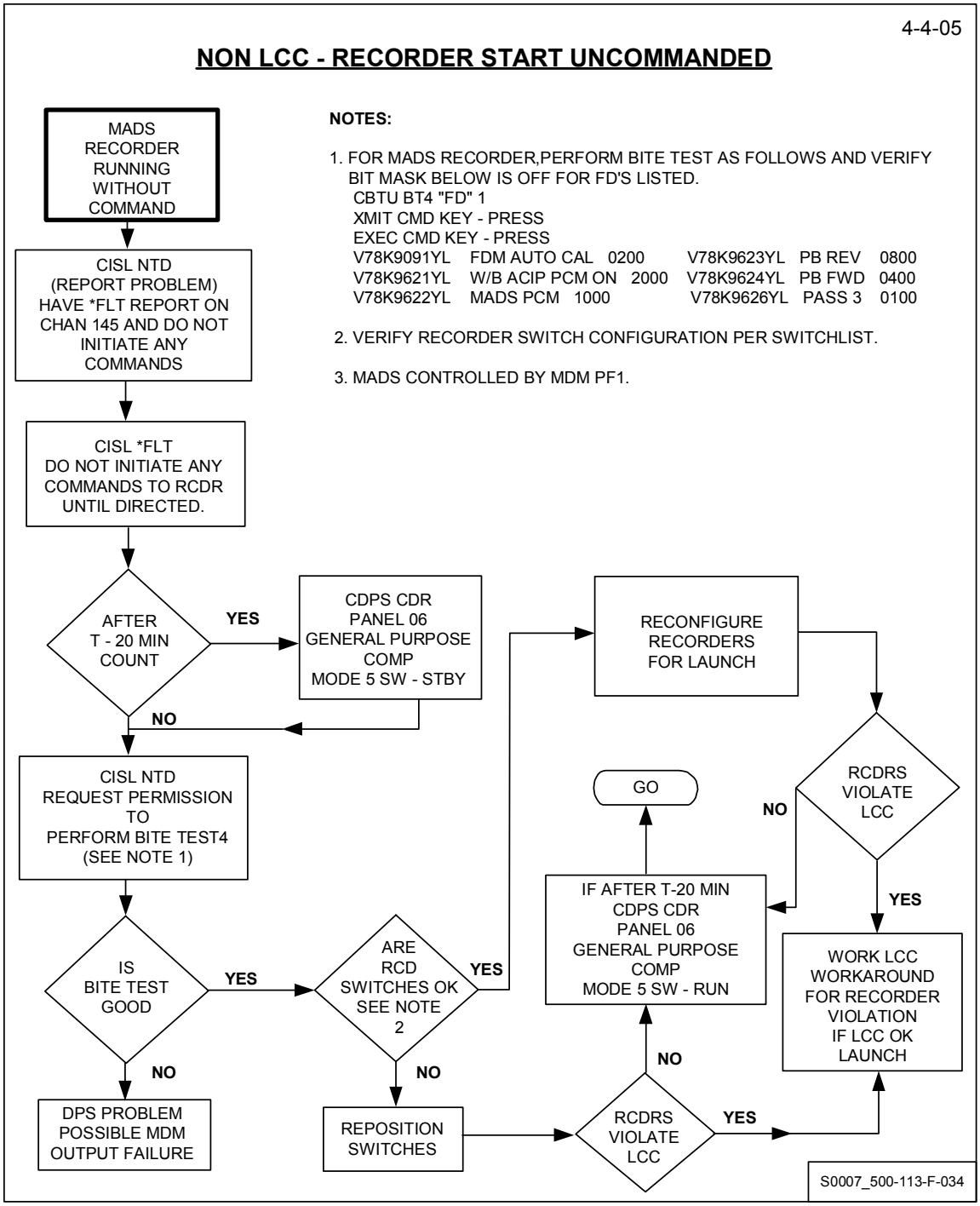
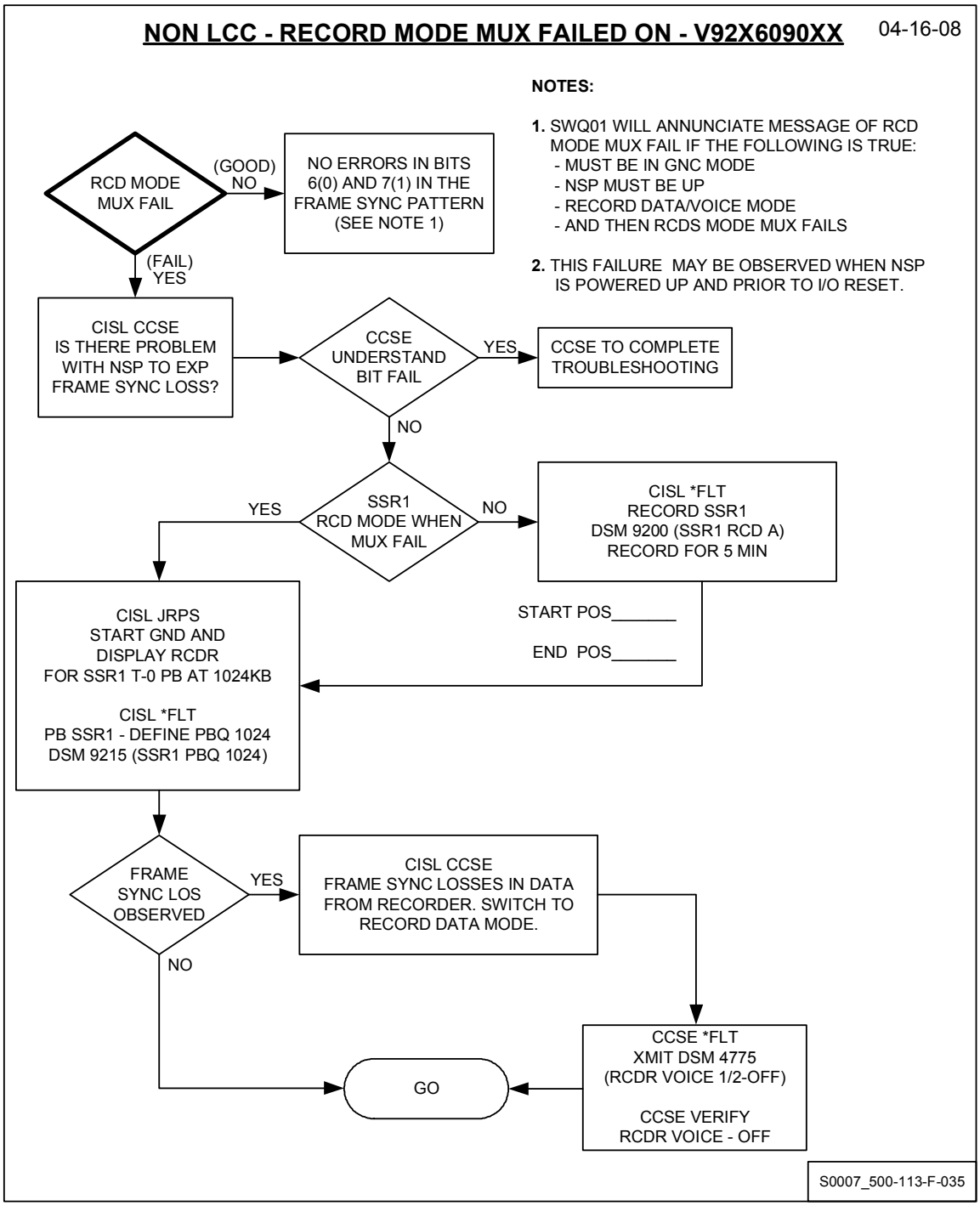
113-28

Non LCC/Recorder Start Uncommanded



113-29

Non LCC/Record Mode MUX Fail

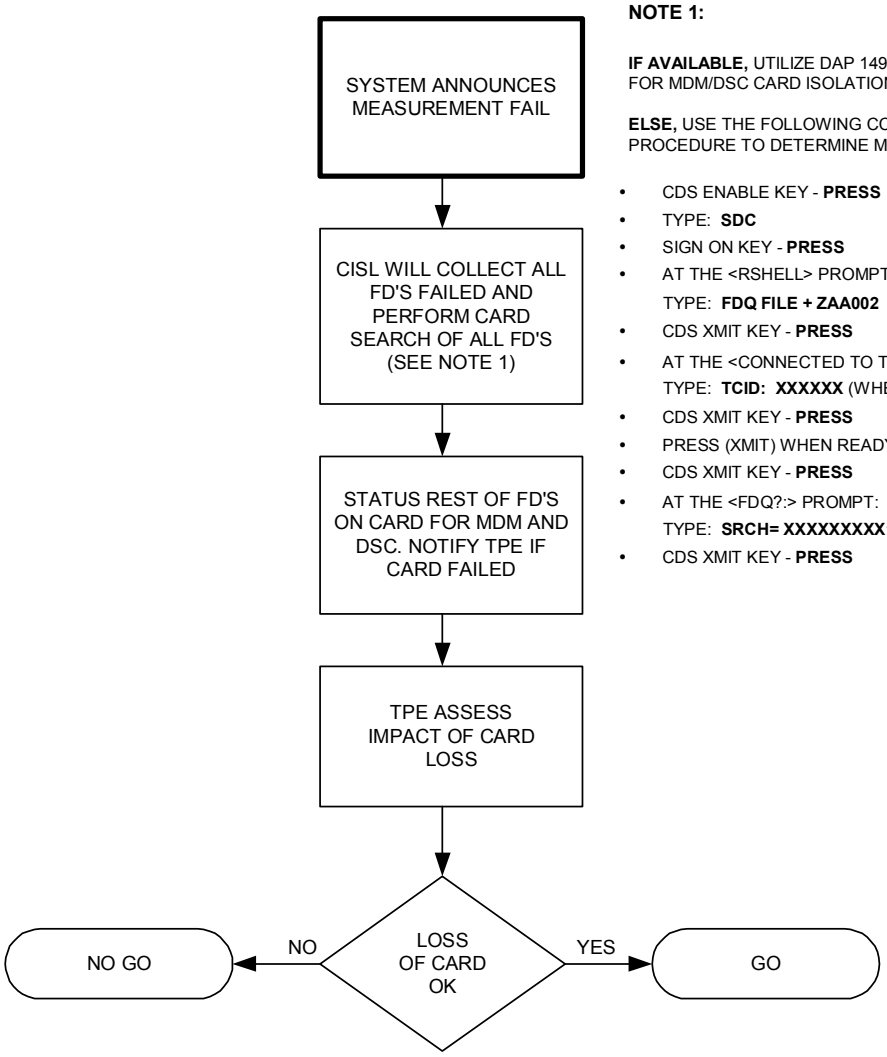


113-30

Non LCC/DSC/MDM Card Fail

03-30-05

NON LCC - DSC/MDM CARD ISOLATION PROCEDURE



NOTE 1:

IF AVAILABLE, UTILIZE DAP 149 RETRIEVALS FOR MDM/DSC CARD ISOLATION.

ELSE, USE THE FOLLOWING CCMS CONSOLE PROCEDURE TO DETERMINE MDM/DSC CARD.

- CDS ENABLE KEY - **PRESS**
- TYPE: **SDC**
- SIGN ON KEY - **PRESS**
- AT THE <RSHELL> PROMPT:
  TYPE: **FDQ FILE + ZAA002**
- CDS XMIT KEY - **PRESS**
- AT THE <CONNECTED TO THE DATABASE> PROMPT:
  TYPE: **TCID: XXXXXX** (WHERE X'S = TCID)
- CDS XMIT KEY - **PRESS**
- PRESS (XMIT) WHEN READY TO CONTINUE.
- CDS XMIT KEY - **PRESS**
- AT THE <FDQ?:> PROMPT:
  TYPE: **SRCH= XXXXXXXXX1** (WHERE X'S = FD#)
- CDS XMIT KEY - **PRESS**

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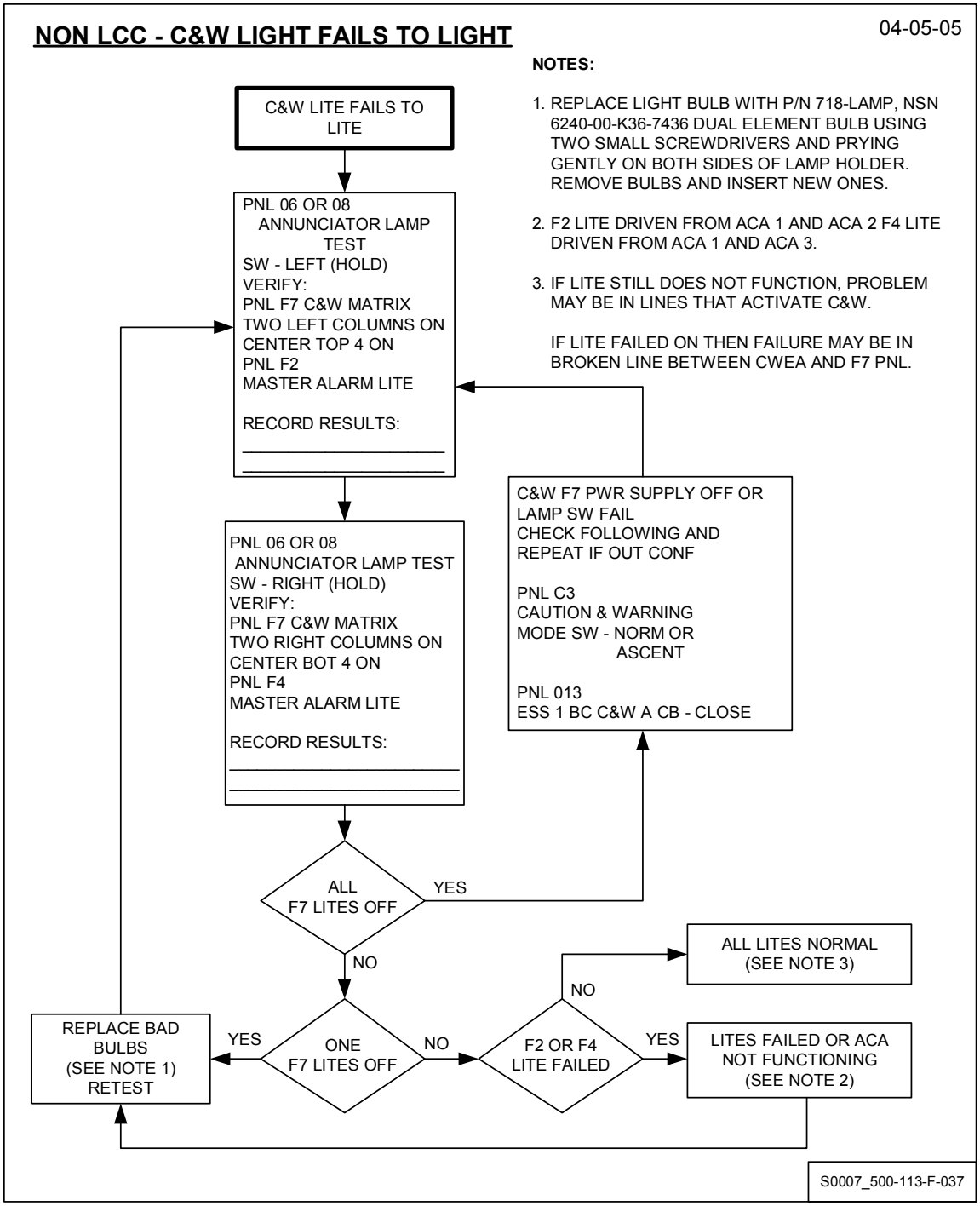
113-31

Non LCC/C&W Light Bulb Fail

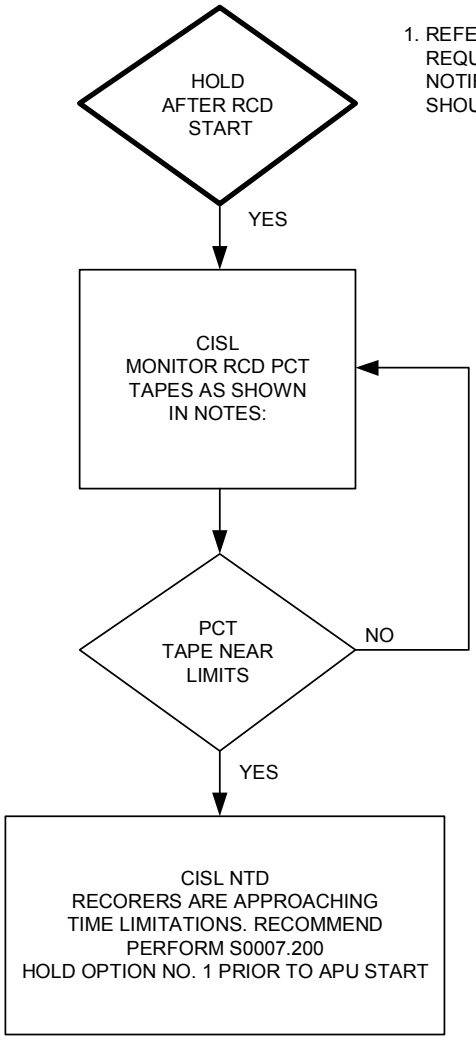


113-32

Non LCC/Recorder Run Time

4-4-05

NON LCC - RECORDER RUN TIME



NOTES:

1. REFERENCED BELOW ARE TABLES OF RECORDER RUN TIME REQUIRED FOR T-0 AND PCT TAPE REQUIRED AT THAT POINT. NOTIFY NTD PRIOR TO REACHING TIMES THAT RECORDER SHOULD BE STOPPED.

MAX PCT TAPE USED

LAUNCH TIME		MADS
T-9	L-15	42
T-9	L-14	43
T-9	L-13	45
T-9	L-12	47
T-9	L-11	48
T-9	L-10	50
T-9	L-9	52
T-8	L-8	53
T-7	L-7	55
T-6	L-6	57
T-5	L-5	58
T-4	L-4	60
T-3	L-3	62
T-2	L-2	63
T-1	L-1	65
T-0	L-0	67

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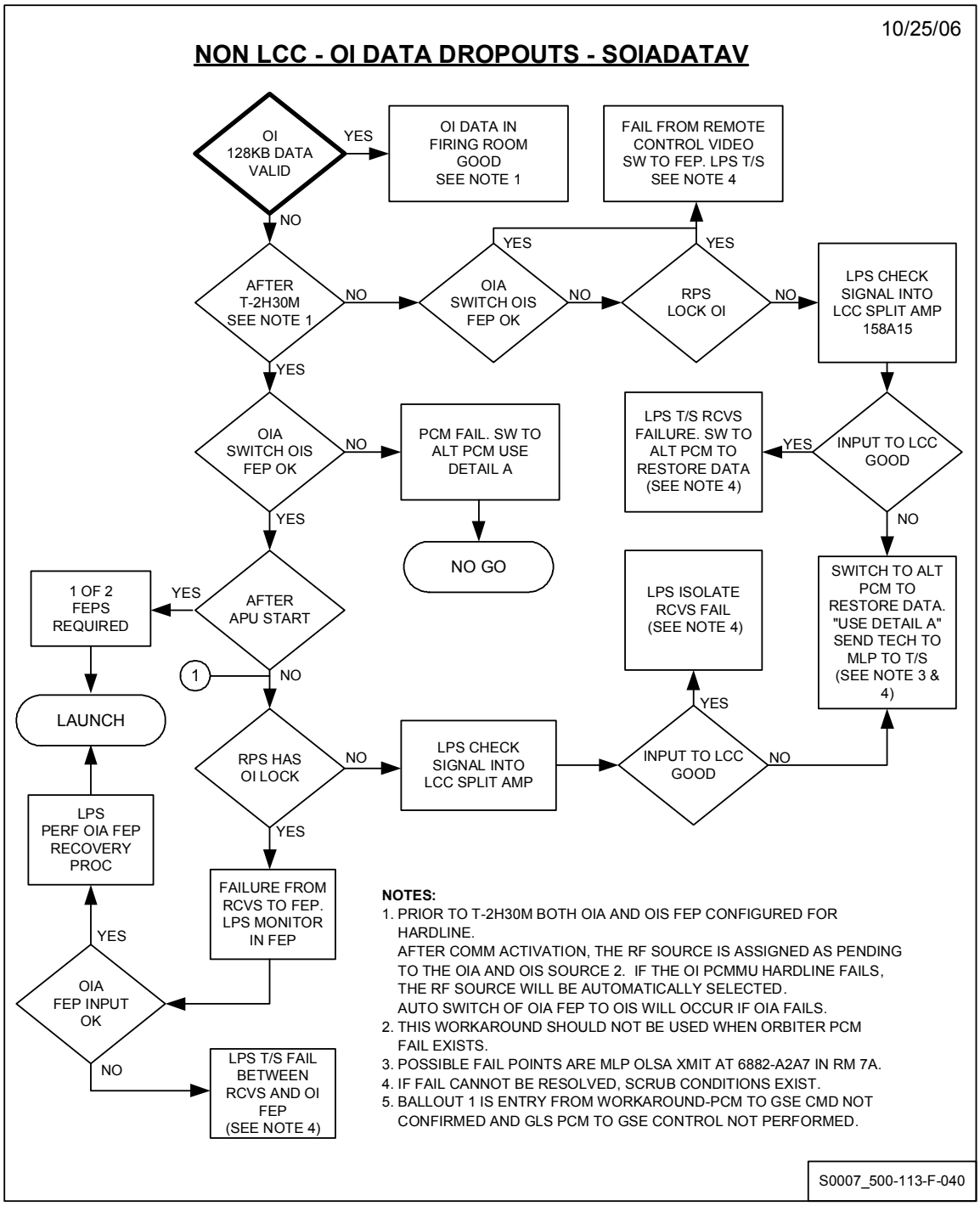
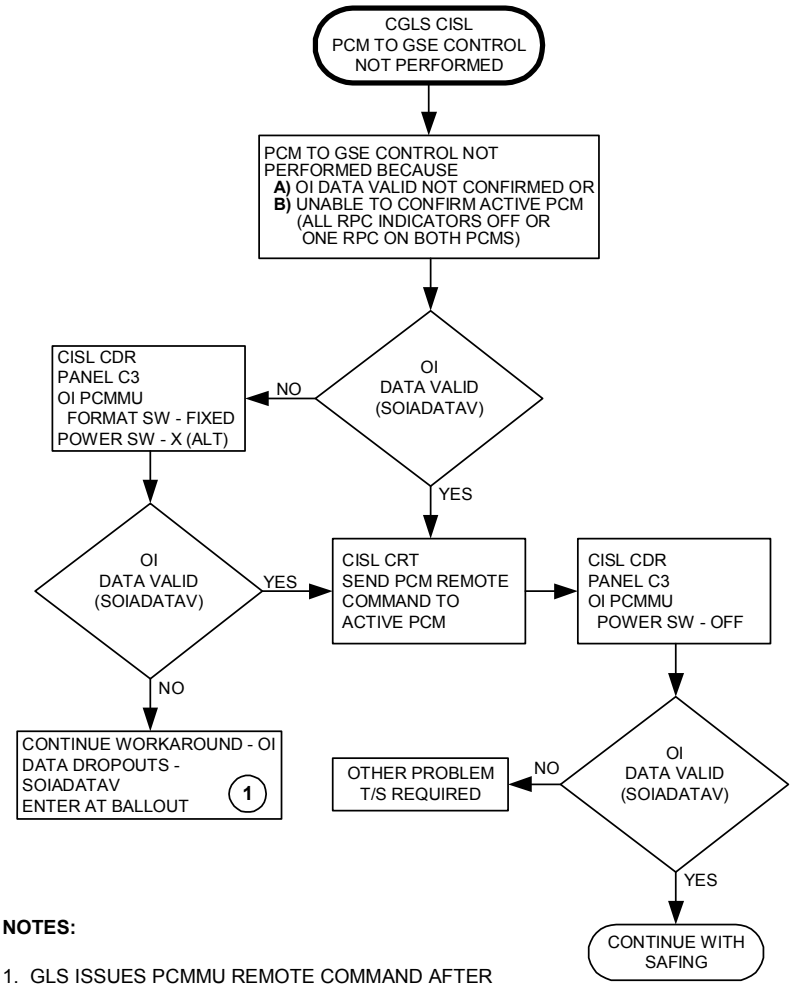
113-33 Non LCC/OI Data Dropout



113-34 Non LCC/GLS PCM to GSE Control Not Performed

04-05-05

NON LCC - GLS PCM TO GSE CNTL NOT PERFORM



NOTES:

1. GLS ISSUES PCMMU REMOTE COMMAND AFTER VERIFYING OI DATA VALID AND ONE OF THE ACTIVE PCMMU RPC'S IS ON AND THE NON-ACTIVE PCMMU RPC'S ARE OFF.
2. AFTER GLS ISSUES PCMMU REMOTE COMMAND OI DATA VALID IS CHECKED.
3. RPC FD'S LISTED:
   PCMMU 1 RPC A - V76X4265E1 PCMMU 2 RPC A - V76X4272E1
   PCMMU 1 RPC C - V76X4267E1 PCMMU 2 RPC B - V76X4274E1

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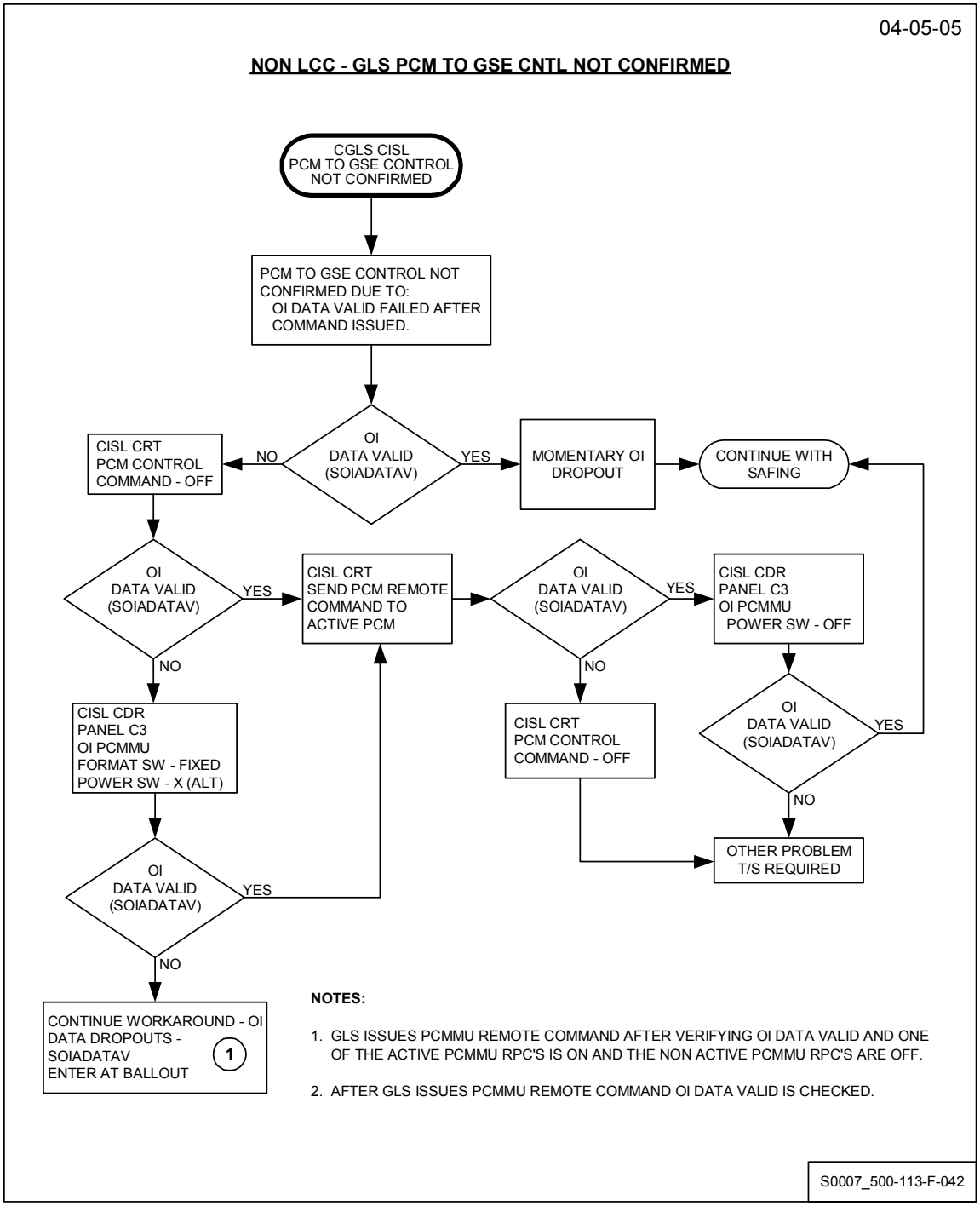
113-35 Non LCC/GLS PCM to GSE Control Not Confirmed



113-36 Instrumentation Detailed Workaround Steps

Detail A - PCM Switch to Alternate PCM

NOTE
If switch to alternate PCM is required, then perform Detail A.

Detail A Not Performed:_____

113-37 CISL NTD

Request permission to switch to alternate PCMMU. PCMMU switching will interrupt GPC and OI data until the FEPs reacquire lock.

NOTE
Erroneous BFS FDA messages may be annunciated at PCMMU switchover.

113-38 CISL

```
IF PCMMU IN REMOTE OPERATION,

THEN

CURSOR CONTROL (SAQ04/VWQ11)
PCM CONTROL
  PCMMU X ON (X = ALT PCM ________)
  XMIT CURSOR KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

113-39 CISL

```
IF PCM IN REMOTE
AND MTU COMMAND CHANNELS TOGGLING,

THEN

CURSOR CONTROL (SAQ04/VWQ11)
PCM CONTROL
   COMMAND OFF
   XMIT CURSOR KEY - PRESS
   EXEC CMD KEY - PRESS

   PCMMU X ON (X = ACTIVE PCM _______)
  XMIT CURSOR KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

113-40 CISL CDR

```
IF PCMMU IN PANEL CONTROL,

THEN

PANEL C3
  OI PCMMU
  POWER SW - X (X = ALT PCM _______)
```

Not Performed:_____

113-41 CISL CDR

```
IF PCM IN PANEL CONTROL
AND MTU COMMAND CHANNELS TOGGLING,

THEN

PANEL C3
   OI PCMMU
   POWER SW - OFF FOR 2 SEC, THEN X
                (X = PREV ACTIVE PCM)
```

Not Performed:_____

NOTE

This powers the PDI "On" and then "Off" in order to clear PCMMU BITE bits 11 and 12.

113-42 CISL CDR

IF PDI POWER WAS OFF AT TIME OF PCMMU SWITCH,

THEN

```
PANEL A1L
P/L DATA INTLVR POWER SW - ON
(DELAY 2 SEC)
P/L DATA INTLVR POWER SW - OFF
```

Not Performed:_____

113-43 CISL

```
CRT (SAQ04/VWQ11)
PCMMU
  PCM X RPC's ON (X = PCM PREV SELECTED _______)
  BITE
    1 - 14 GOOD
  OI DATA VALID (UP ARROW)
MTU
  GMT VALID AND ADVANCING
```

***** End of Detail A - PCM Switch to Alternate PCM *****

Detail B - TFL Reload for Flight

NOTE
If TFL Reload is required, then perform Detail B.

Detail B Not Performed:_____

113-44 CISL CDPS

Perform TFL to PCM using formats listed in OMI S0007.100, Operation 272, DPS Launch Support Configuration.

113-45 CDPS CDR

```
PANEL C2A2
  LEFT CRT SEL SW - 1
```

113-46 CDPS CDR

```
L KYBD
SPEC 62
PRO
```

113-47 CDPS CDR

```
CRT 1
```

VERIFY PCMMU/PL COMM DISPLAY

HDR TFL Activation

NOTE
If HDR TFL required, perform this option.

HDR TFL Activation Not Performed:_____

113-48 CDPS CDR

```
PANEL C3
  OI PCMMU
    FORMAT SW - GPC
```

113-49 CDPS CDR

```
L KYBD
ITEM 3 + ___ (HIGH DATA RATE)
EXEC
ITEM 4
EXEC
```

113-50 CDPS CDR

```
CRT 1
  LOAD 4 CPLT
  (WITHIN 2 MINUTES)
```

113-51 CDPS CDR

```
L KYBD
ITEM 2 (EXECUTE PGM TFL)
EXEC
```

113-52 CISL

```
CRT (SAQ04/SWQ01)
PCMMU
  PCM X RPC'S ON (X = PCM ACTIVATED)
  FORMAT _____ PROG
    BITE
      1 - 14 GOOD
  MDM
    WRAP (ALL) GOOD
  MTU
    GMT ADVANCING
```

***** End of HDR TFL Activation *****

Fixed Format 129 Activation

NOTE

If Fixed Format 129 is required to be activated for continuation of Countdown, then perform this option.

Fixed Format 129 Activation Not Performed:_____

113-53 CDPS CDR

```
L KYBD
ITEM 1 (SELECT FIXED FMT 129)
EXEC
```

113-54 CISL

```
CRT (SAQ04/SWQ01)
PCMMU
  PCM X ON (X = PCM ACTIVATED)
  FORMAT 129 FIXED
  BITE
    1 - 14 GOOD
MDM
  WRAP (ALL) GOOD
MTU
  GMT ADVANCING
```

***** End of Fixed Format 129 Activation *****

LDR TFL Activation

NOTE
If LDR TFL required, then perform this option.

LDR TFL Activation Not Performed:_____

NOTE
BFS will "Auto Load" LDR FMT 102 if BFS Auto Load is enabled during PCMMU Switch.

NOTE
PMU/DL I/O cycle wrap or cyclic overrun GPC error may occur during PCMMU format load.

113-55 CDPS CDR

```
L KYBD
ITEM 3 + ___ (LOW DATA RATE)
EXEC
ITEM 4
EXEC
```

113-56 CDPS CDR

```
CRT 1
  LOAD 4 CPLT
  (WITHIN 2 MINUTES)
```

***** End of LDR TFL Activation *****

113-57 CISL JRPS

Start display recorder for OI LDR MDM wraps.
Verify Decom lock on LDR and format number_____.
Verify GMT advancing.

113-58 CDPS CDR

```
L KYBD
RESUME
```

***** End of Detail B - TFL Reload For Flight *****

Detail C - Reserved

Detail D - PSP Verification

NOTE
If PSP Verification is required, then perform Detail D.

Detail D Not Performed:_____

113-59 **CISL** **NTD**

IF PSP mandatory for Flight
AND Countdown clock past T-20 min.,

THEN request recycle to T-20 min or G9 quick recycle per S0007.500, Operation 111, Option 8 - G9 Quick Recycle for PSP verification. (wait until recycle complete)

Not Performed:_____

113-60 **CDPS** **CDR**

PANEL C2
_____ CRT SELECT SW - _____

PSP Variable D/L Load

NOTE
If GPC Format 60 is not active, then perform this option.

PSP Variable D/L Load Not Performed:_____

113-61 CDPS CDR

```
_____ KYBD
SPEC 1
PRO

CRT _____
DPS UTILITY
```

NOTE
In next step, enter GPC main memory addresses for 5 PSP 1 or PSP 2 status words for PSP being tested. (Refer to S0007.100 Operation 256 - Memory Compare Tape/File Check-in for main memory addresses).

113-62 CDPS CDR

```
_____ KYBD
ITEM 25 + _____ (WD 1 ADDR)
EXEC
ITEM 26 + _____ (WD 2 ADDR)
EXEC
ITEM 27 + _____ (WD 3 ADDR)
EXEC
ITEM 28 + _____ (WD 4 ADDR)
EXEC
ITEM 29 + _____ (WD 5 ADDR)
EXEC
```

113-63 **CCSE**

CONSOLE KYBD (DMON PAGE)

DMON___ V92U5500CX (DL VARIABLE PARAM 1)
XMIT CMD KEY - PRESS
DMON___ V92U5502CX (DL VARIABLE PARAM 2)
XMIT CMD KEY - PRESS
DMON___ V92U5504CX (DL VARIABLE PARAM 3)
XMIT CMD KEY - PRESS
DMON___ V92U5506CX (DL VARIABLE PARAM 4)
XMIT CMD KEY - PRESS
DMON___ V92U5508CX (DL VARIABLE PARAM 5)
XMIT CMD KEY - PRESS

***** End of PSP Variable D/L Load *****

113-64 **CCSE**

CURSOR CNTL (VAA06)
COMMAND PROCESSING
XMIT CURSOR KEY - PRESS

CRT

VERIFY CMD PROCESSING SKELETON DISPLAYED

113-65 **CCSE**

CURSOR CNTL (VAA24)
CMD MODE LDBA
XMIT CURSOR KEY - PRESS

VERIFY LDBA IND ON

TERMINATE AND RETURN
XMIT CURSOR KEY - PRESS

PSP 1 Activation

NOTE
If PSP 1 is being verified, then perform this option.

PSP-1 Activation Not Performed:_____

113-66 CCSE

```
CURSOR CNTL (VAA06)
POWER SELECT - PSP
XMIT CURSOR KEY - PRESS
POWER SYS - 1
XMIT CURSOR KEY - PRESS
P/L UMB CMDS
XMIT CURSOR KEY - PRESS
```

113-67 CCSE

```
CRT (VAA06)
VERIFY

PSP 1 IND ON
INTRG OFF
P/L UMB CMDS IND ON (FMT 60 ONLY)
```

113-68 CDPS CDR

```
_____ KYBD
SPEC 62
PRO
ITEM 6 (PSP1 I/O RESET)
EXEC

CRT_____
PSP1 6*
```

***** End of PSP 1 Activation *****

PSP 2 Activation

NOTE
If PSP 2 is being verified, then perform this option.

PSP 2 Activation Not Performed:_____

113-69 CCSE

```
CURSOR CNTL (VAA06)
POWER SELECT - PSP
XMIT CURSOR KEY - PRESS
POWER SYSTEM - 2
XMIT CURSOR KEY - PRESS
P/L UMB CMDS
XMIT CURSOR KEY - PRESS
```

113-70 CCSE

```
CRT (VAA06)
VERIFY

PSP 2 IND ON
INTRG OFF
P/L UMB CMDS IND ON (FMT 60 ONLY)
```

113-71 CDPS CDR

```
_____ KYBD
SPEC 62
PRO
ITEM 7 (PSP2 I/O RESET)
EXEC

CRT _____
PSP2 7*
```

***** End of PSP 2 Activation *****

113-72 **CDPS CDR**

_____ KYBD
RESUME

113-73 **CCSE**

CRT (DMON PAGE OR VAA06)
VERFIY

V92U5500CX 8984 (PSP STATUS WD 1)
V92U5502CX A829 (PSP STATUS WD 2)
V92U5504CX 0810 (PSP STATUS WD 3)
V92U5506CX FFFF (PSP STATUS WD 4)
V92U5508CX FFFF (PSP STATUS WD 5)

113-74 **CCSE**

CONSOLE KYBD

ENTER: "CPLD PL DATA VIA PSP 1"
XMIT CMD KEY - PRESS

VERIFY PROMPT TO ENTER DATA WORDS

ENTER: ";"
XMIT RESP KEY - PRESS

ENTER "EX"
XMIT RESP KEY - PRESS

VERIFY MESSAGE INDICATION CMD SUCCESSFUL

RECORD FOLLOWING FROM DMON PAGE OR VAA06:

V92U5500CX _____ (PSP STATUS WD 1)
V92U5502CX _____ (PSP STATUS WD 2)
V92U5504CX _____ (PSP STATUS WD 3)
V92U5506CX _____ (PSP STATUS WD 4)
V92U5508CX _____ (PSP STATUS WD 5)

VERIFY STATUS WORDS CHANGED FROM INITIAL CONFIGURATION.

113-75 **CCSE**

```
CONSOLE KYBD
SET V74K2242NL ON (PSP1 T-0 ON)
OR
SET V74K2246NL ON (PSP2 T-0 ON)
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

113-76 **CCSE**

```
CRT (VAA06 OR DMON PAGE)
VERIFY

T-0 IND ON (FMT 60)
OR
V92U5500CX PSP STATUS WD 1
XXXX XXXX XXXX XXX1
```

113-77 **CCSE** **JRPS**

Verify 16 KHz subcarrier on 6LPM1201 (PSP T-0 Umb out, Pad A) or 6LPM3037 (PSP T-0 Umb out, Pad B).

113-78 **CCSE**

```
CONSOLE KYBD
SET V74K2242NL OFF (PSP1 T-0 ON)
OR
SET V74K2246NL OFF (PSP2 T-0 ON)
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

113-79 **CCSE**

```
CRT (VAA06 OR DMON PAGE)
VERIFY

T-0 IND OFF (FMT 60)
OR
V92U5500CX PSP STATUS WD 1
XXXX XXXX XXXX XXX0
```

113-80 **CCSE**

IF PSP NOT REQUIRED FOR PAYLOAD COMMANDING THROUGH LAUNCH,

THEN
CURSOR CNTL (VAA06)
POWER SYSTEM SW - OFF
XMIT CURSOR KEY - PRESS

VERIFY

PSP OFF
INTRG OFF

Not Performed:_____

113-81 **CISL** **NTD**

IF After T-3 Hrs or *FLT requires variable downlist parameters,

THEN have *FLT proceed with transmission of variable downlist parameters.

Not Performed:_____

113-82 **CISL** **NTD**

IF any failures were noted in PSP Verification,

THEN PSP timing cannot be verified.
Recommend scrub.

Not Performed:_____

113-83 **CISL** **NTD**
NTD **CDPS**

IF count is below T-20 min
AND no failures were noted in PSP Verification,

THEN perform transition to G1 per S0007.500 Operation 111, Option 8 - G9 Quick Recycle.

Not Performed:_____

***** End of Detail D - PSP Verification *****

Detail E - FMSP 1 Verification

NOTE
If FMSP 1 Verification is required for MTU Frequency Div 1 Failure, then perform this option.

Detail E Not Performed:_____

113-84 **CISL** **NTD**
NTD **CCSE**
***FLT**

Request COMM and *FLT on T/S CH to verify FM signal processor capable of processing ME3 data to ground.

FMSP 1 Activation

NOTE
If FMSP 1 not active, then perform this option.

FMSP 1 Activation Not Performed:_____

113-85 **CCSE** ***FLT**

XMIT DSM 4780
(S-band FM SYS 1 power - On)

113-86 **CCSE**

```
CRT (VAA19)
FM OI XMTR 1 ON
FM SP SRCE ME DATA
_____ WATTS (RECORD)
```

***** End of FMSP 1 Activation *****

113-87 **CCSE** ***MIL**

Report lock status on 60 Kbs ME3 data.

Lock _____ (Yes/No)

FMSP 1 Deactivation

NOTE
If S-band FM System 1 power no longer required, then perform this option.

FMSP 1 Deactivation Not Performed:_____

113-88 **CCSE** ***FLT**

XMIT DSM 4781
(S-band FM SYS power 1/2 Off)

113-89 **CCSE**

```
CRT (VAA19)
FM SYSTEM OI XMTR OFF
```

***** End of FMSP 1 Deactivation *****

FMSP 2 Activation

NOTE
If Countdown after T-45 min and FMSP 1 showed no lock on ME3 data, then perform this option.

FMSP 2 Activation Not Performed:_____

113-90 **CCSE** ***FLT**

XMIT DSM 4782
(S-band FM SYS 2 power On)

113-91 **CCSE**

```
CRT (VAA19)
FM OI XMTR 2 ON
FM SP SRCE ME DATA
_____ WATTS (RECORD)
```

113-92 **CCSE** ***MIL**

Report lock status on 60 Kbs ME3 data.

Lock _____ (Yes/No)

NOTE
If lock in previous step cannot be obtained, then scrub condition exists since loss of ME3 data.

***** End of FMSP 2 Activation *****

***** End of Detail E - FMSP 1 Verification *****

Detail F - FMSP 2 Verification

NOTE
If FMSP 2 Activation is required for MTU Frequency Div 3 failure, then perform this option.

Detail F Not Performed:_____

113-93 **CISL** **NTD**
NTD **CCSE**
***FLT**

Request COMM and *FLT on T/S CH to verify FM signal processor capable of processing ME3 data to ground.

FMSP 2 Activation

NOTE
If FMSP 2 not active, then perform this option.

FMSP 2 Activation Not Performed:_____

113-94 **CCSE** ***FLT**

XMIT DSM 4782
(S-band FM SYS 2 power - On)

113-95 **CCSE**

```
CRT (VAA19)
FM OI XMTR 2 ON
FM SP SRCE ME DATA
_____ WATTS (RECORD)
```

***** End of FMSP 2 Activation *****

113-96 **CCSE** ***MIL**

Report lock status on 60 Kbs ME3 data.

Lock _____ (Yes/No)

FMSP Deactivation

NOTE
If S-band FM System 2 power no longer required, then perform this option.

FMSP Deactivation Not Performed:_____

113-97 **CCSE** ***FLT**

XMIT DSM 4781
(S-band FM SYS power 1/2 Off)

113-98 **CCSE**

```
CRT (VAA19)
FM SYSTEM OI XMTR OFF
```

***** End of FMSP Deactivation *****

FMSP 1 Activation

NOTE
If Countdown after T-45 min and FMSP 2 showed no lock on ME3 data, then perform this option.

FMSP 1 Activation Not Performed:_____

113-99 **CCSE** ***FLT**

XMIT DSM 4780
(S-band FM SYS 1 power On)

113-100 **CCSE**

```
CRT (VAA19)
FM OI XMTR 1 ON
FM SP SRCE ME DATA
_____ WATTS (RECORD)
```

113-101 **CCSE** ***MIL**

Report lock status on 60 Kbs ME3 data.

Lock _____ (Yes/No)

NOTE
If lock in previous step cannot be obtained, then scrub condition exists since loss of ME3 data.

***** End of FMSP 1 Activation *****

***** End of Detail F - FMSP 2 Verification *****

*** End of Operation **113** ***

OPERATION 114 EPDC

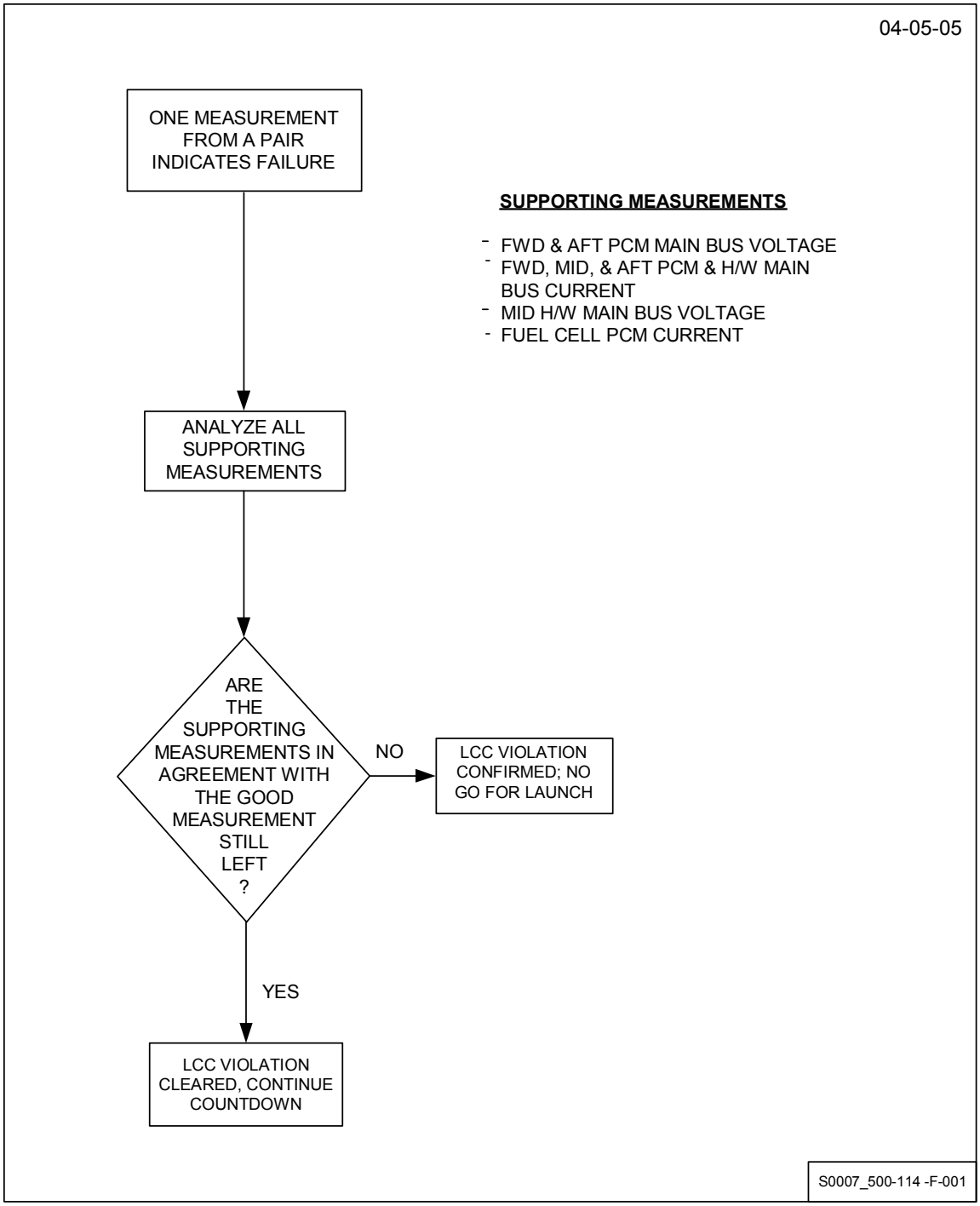
Shop: **EPD**
Cntrl Rm Console: **C10**
OPR: **EPD**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **1.0**

NOTE

This operation contains preplanned contingency procedures for the following SSID's:

EPDC-01	Fuel Cell and Main Bus Voltage Failure
EPDC-02	Control Bus Source Failure
EPDC-03	AC Bus Voltage Failure
EPDC-03	Single Phase AC Bus Inverter Anomaly
EPDC-04	AC Current Measurements Failure
EPDC-06	Essential Bus Source Failure
EPDC-07	Essential Bus Source Failure
EPDC-08	MEC Power Failure
EPDC-09	MEC Preflight BITE Failure
EPDC-10	GSE Main Bus Motor Switch Failure
EPDC-11	Fire Extinguisher Pyro Voltage Failure
EPDC-12	Landing Gear Pyro Voltage Failure
EPDC-14	Drag Chute Deploy Pyro Voltage Failure

Fuel Cell and Main Bus Voltage Failure (SSID EPDC-01)



NOTE

In the next four steps, X represents the following:

1, 2 or 3 for Fuel Cell
A, B or C for Main Bus

Main Bus Volt Failure

114-1 **CEPD**

```
VERIFY (VWC17-ORBITER DC DETAIL 1)

FC X VOLT - 28.3 TO 32.0
FC X AMP  - NONZERO

MN X BUS VOLT-H/W - 28.3 TO 32.0
MN X AFT PCA VOLT - 27.5 TO 32.0
MN X AFT PCM AMP  - NONZERO
MN X AFT H/W AMP  - NONZERO
MN X MID PCM AMP  - NONZERO
MN X MID H/W AMP  - NONZERO
MN X FWD PCA VOLT - 27.5 TO 32.0
MN X FWD PCM AMP  - NONZERO
MN X FWD H/W AMP  - NONZERO
```

114-2 **Conclusions**:

1. **IF** the previous step is verified,

   THEN the Main Bus volt failure is confirmed as instrumentation only and CEPD is Go for Launch.

2. **IF** the previous step is not verified,

   THEN CEPD is No Go for Launch.

Fuel Cell Volt Failure

114-3 **CEPD**

```
VERIFY (VWC17-ORBITER DC DETAIL 1)

FC X AMP - NONZERO

MN X BUS VOLT-PCM - 28.3 TO 32.0
MN X BUS VOLT-H/W - 28.3 TO 32.0
MN X AFT PCA VOLT - 27.5 TO 32.0
MN X AFT PCM AMP  - NONZERO
MN X AFT H/W AMP  - NONZERO
MN X MID PCM AMP  - NONZERO
MN X MID H/W AMP  - NONZERO
MN X FWD PCA VOLT - 27.5 TO 32.0
MN X FWD PCM AMP  - NONZERO
MN X FWD H/W AMP  - NONZERO
```

114-4 **Conclusions:**

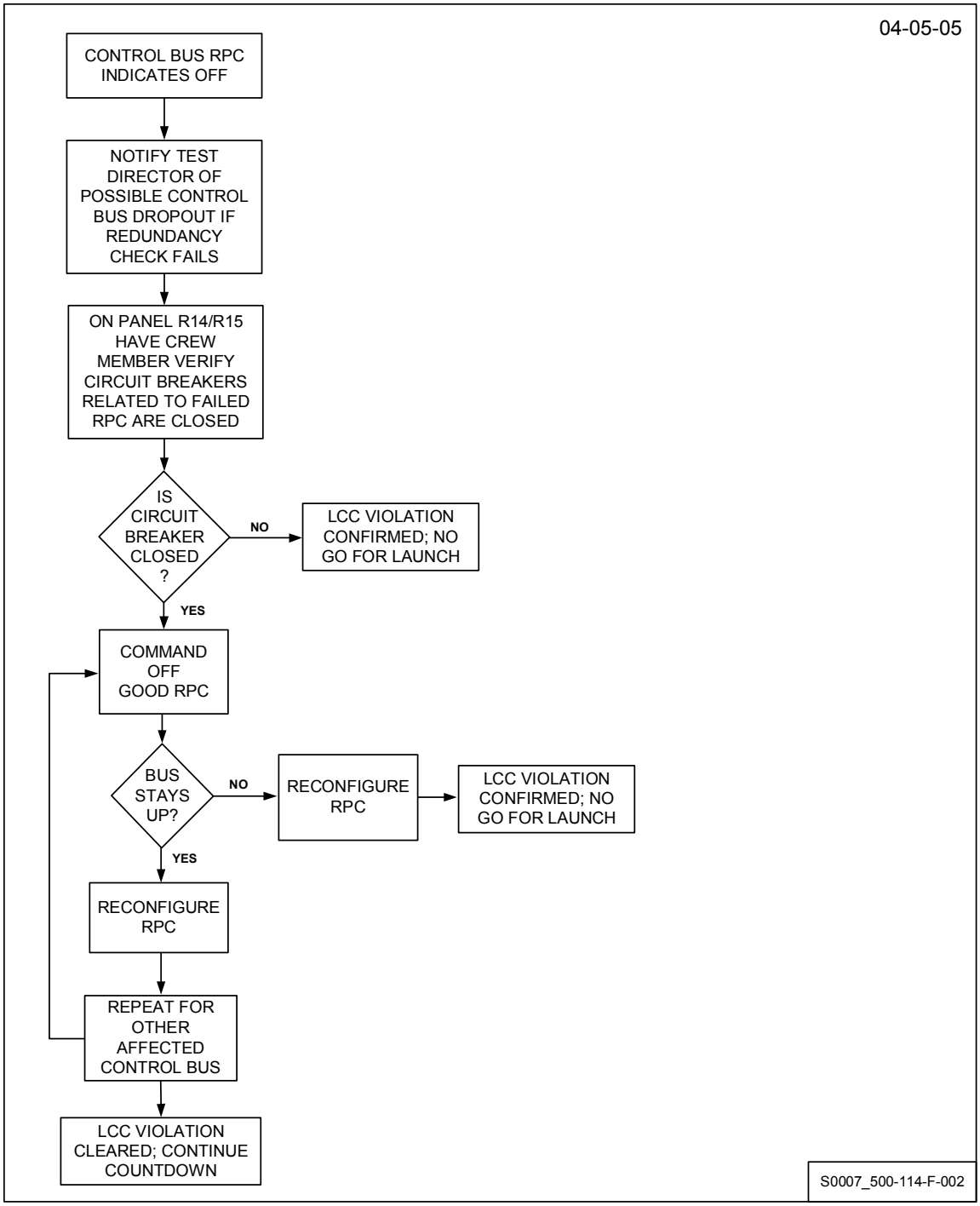
1. **IF** the previous step is verified,

   THEN the fuel cell volt failure is confirmed as instrumentation only and CEPD is Go for Launch.

2. **IF** the previous step is not verified,

   THEN CEPD is No Go for Launch.

Control Bus Source Failure (SSID EPDC-02)



114-5 **CEPD OTC**
OTC NTD

Control Bus dropout is possible if Control Bus redundancy check fails. Request concurrence to proceed.

114-6 **CEPD MS1**

```
PANEL R14/R15 (VERIFY)

MN A
CONTROL BUS BC1/2/3 - CLOSED

MN B
CONTROL BUS CA1/2/3 - CLOSED

MN C
CONTROL BUS AB1/2/3 - CLOSED
```

114-7

Conclusions:

1. **IF** Control Bus circuit breaker associated with failed RPC is Tripped or Open

   THEN CEPD is No Go for Launch.

   CB/RPC associations:

CB	RPC's
BC1/2/3	AB1/BC1, AB2/BC2, AB3/BC3
	BC1/CA1, BC2/CA2, BC3/CA3
CA1/2/3	AB1/CA1, AB2/CA2, AB3/CA3
	BC1/CA1, BC2/CA2, BC3/CA3
AB1/2/3	AB1/CA1, AB2/CA2, AB3/CA3
	AB1/BC1, AB2/BC2, AB3/BC3

2. **IF** all Control Bus circuit breakers are Closed,

   THEN CEPD continue with Control Bus redundancy checks.

114-8 CEPD

IF SO DIRECTED BY PREVIOUS CONCLUSION,

THEN
CURSOR CNTL (VWC18-ORBITER DC DETAIL 2)
(RDNT RPC 1) OFF - PRESS

VERIFY FOR FAILED RPC BOTH CNTL BUS
VOLTS - 26.4 TO 32

(RDNT RPC 1) ON - PRESS
(RDNT RPC 2) OFF - PRESS

VERIFY FOR FAILED RPC BOTH CNTL BUS
VOLTS - 26.4 TO 32

(RDNT RPC 2) ON - PRESS

Failed RPC	Rdnt RPC 1	Rdnt RPC 2
AB1/CA1____	AB1/BC1____	BC1/CA1____
AB1/BC1____	AB1/CA1____	BC1/CA1____
BC1/CA1____	AB1/CA1____	AB1/BC1____
AB2/CA2____	AB2/BC2____	BC2/CA2____
AB2/BC2____	AB2/CA2____	BC2/CA2____
BC2/CA2____	AB2/CA2____	AB2/BC2____
AB3/CA3____	AB3/BC3____	BC3/CA3____
AB3/BC3____	AB3/CA3____	BC3/CA3____
BC3/CA3____	AB3/CA3____	AB3/BC3____

Not Performed:_____

114-9 **Conclusions:**

1. **IF** the previous step is completed successfully,

   THEN Control Bus redundancy is verified for the failed RPC and CEPD is Go for Launch.

2. **IF** the previous step is completed unsuccessfully,

   THEN Control Bus redundancy is not verified for the failed RPC and CEPD is No Go for Launch.

AC Bus Voltage Failure (SSID EPDC-03)

114-10 CEPD PLT

PANEL F9

SELECT AC __ - PH A (AC 1, 2 OR 3)

AC VOLTS METER - _____ (115 TO 120)

SELECT AC __ - PH B (AC 1, 2 OR 3)

AC VOLTS METER - _____ (115 TO 120)

SELECT AC __ - PH C (AC 1, 2 OR 3)

AC VOLTS METER - _____ (115 TO 120)

RETURN SELECTOR TO ORIGINAL POSITION

114-11 CEPD

VERIFY (VWC19-ORBITER AC DETAIL)

VERIFY THE CURRENT MEASUREMENT FOR ANY FAILED AC PHASE PCM VOLT MEASUREMENT IS AVAILABLE:

INV AC __ PH A PCM CURRENT - ____ (0.2-9.6)
INV AC __ PH A PCM CURRENT - ____ (0.2-9.6)
INV AC __ PH A PCM CURRENT - ____ (0.2-9.6)

114-12 CEPD CISL

Verify Primary Caution & Warning did not detect an AC Bus failure (parameters 033, 043, 053, 063, 073, 083)

114-13 Conclusions:

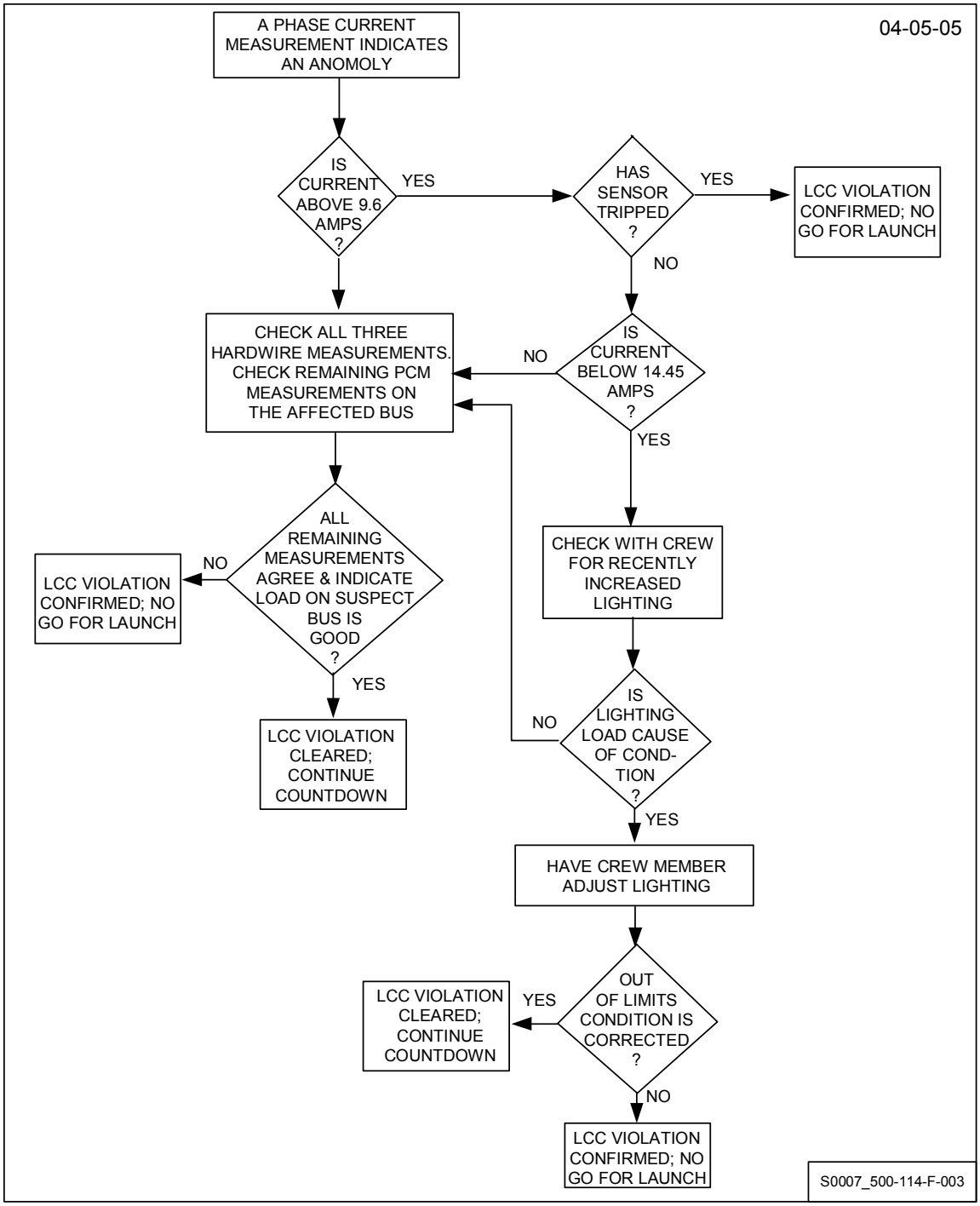
1. **IF** the previous three steps are verified,

   THEN the AC Bus volt failure is confirmed as instrumentation only and CEPD is Go for Launch.

2. **IF** the previous three steps are not verified,

   THEN CEPD is No Go for Launch.

AC Current Measurements Failure (SSID EPDC-04)



114-14 CEPD

VERIFY (VWC19-ORBITER AC DETAIL)

VERIFY REMAINING PHASE PCM AND ALL HW CURRENTS, THE CORRESPONDING PHASE PCM VOLT, AND THE CORRESPONDING BUS SENSOR OVERLOAD INDICATOR FOR FAILED AC PHASE PCM CURRENT MEASUREMENT.

```
INV AC _ PH __ PCM CURRENT - _____ (0.2-9.6)
INV AC _ PH __ PCM CURRENT - _____ (0.2-9.6)
INV AC _ PH A   HW CURRENT - _____ (0.2-9.6)
INV AC _ PH B   HW CURRENT - _____ (0.2-9.6)
INV AC _ PH C   HW CURRENT - _____ (0.2-9.6)

INV AC _ PH __ PCM VOLTAGE - _____ (115-120)

INV AC _ BUS SENSOR - OL (GREEN)
```

114-15 **Conclusions**:

1. **IF** the previous step is verified,

   THEN the AC Bus current failure is confirmed as instrumentation only and CEPD is Go for Launch.

2. **IF** the previous step is verified with only the following exception,

   THEN the AC Bus current failure is confirmed as instrumentation only and CEPD is Go for Launch.

   - Failed current is 14.45 amps or greater and Bus sensor has not tripped

3. **IF** the previous step is verified with only the following exception,

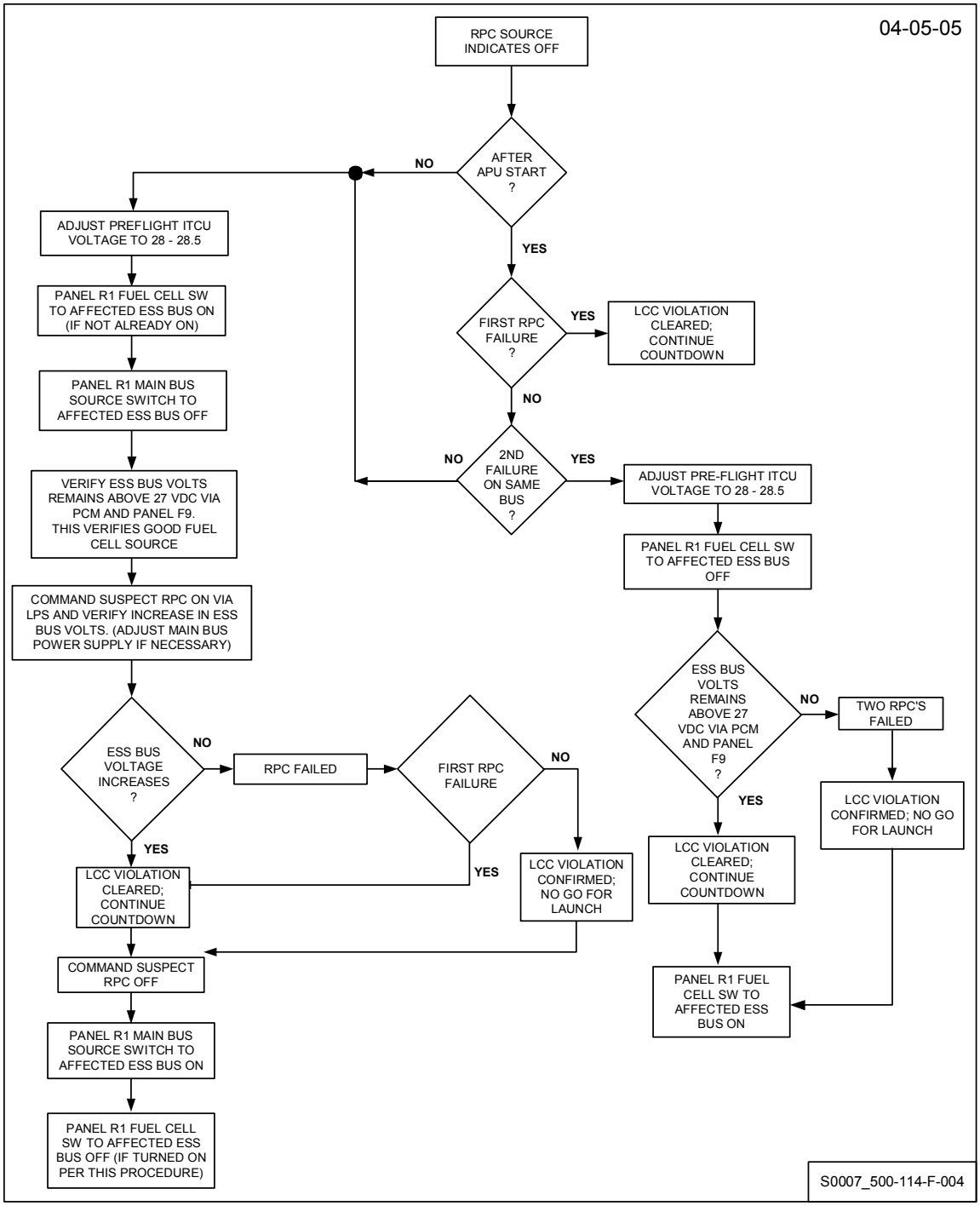
   THEN the AC Bus current failure is confirmed as corrected and CEPD is Go for Launch.

   - Failed current is $9.6 < X < 14.45$
   - Crew recently increased lighting
   - Crew member adjusts lighting and out of tolerance condition is corrected.

4. **IF** the previous step is not verified and none of the previous conclusions apply,

   THEN CEPD is No Go for Launch.

Essential Bus Source Failure (SSID EPDC-06)



Option A

NOTE

Use this option as follows:

Prior to APU start - any time.

After APU start - prior RPC failure exists and second RPC failed indication is on a different Essential Bus.

Option A Not Performed:_____

114-16 **CEPD**

VERIFY/ADJUST (VWC17-ORBITER DC DETAIL 1)

PRE FLT X VOLT - 28 TO 28.5

(X = 1 FOR ESS 1BC, ELSE X = 2)

114-17 **CEPD** **PLT**

PANEL R1 (PERFORM/VERIFY)
ESS BUS SOURCE FCX SW - ON

(X = 1 FOR ESS 1BC)
(X = 2 FOR ESS 2CA)
(X = 3 FOR ESS 3AB)

114-18 **CEPD** **PLT**

PANEL R1
ESS BUS SOURCE MN XXX SW - OFF

(XXX = B/C FOR ESS 1BC)
(XXX = C/A FOR ESS 2CA)
(XXX = A/B FOR ESS 3AB)

114-19 **CEPD**

VERIFY (VWC17-ORBITER DC DETAIL 1)

ESS BUS SOURCE XXX PCM VOLT - ABOVE 27

(XXX = 1BC FOR ESS 1BC)
(XXX = 2CA FOR ESS 2CA)
(XXX = 3AB FOR ESS 3AB)

114-20 **CEPD** **PLT**

PANEL F9

SELECT ESS VOLTS - ___ (1BC, 2CA OR 3AB)

DC VOLTS METER - _____ (27 TO 32)

RETURN SELECTOR TO PREVIOUS POSITION

114-21 **CEPD**

CURSOR CNTL (VWC17-ORBITER DC DETAIL 1)
ESS BUS SOURCE XXX MN X - ON (SUSPECT RPC)

VERIFY (ADJUST MN BUS VOLT IF NECESSARY) ESS BUS SOURCE XXX PCM VOLT INCREASE

(XXX = 1BC, X = B OR C FOR ESS 1BC)
(XXX = 2CA, X = C OR A FOR ESS 2CA)
(XXX = 3AB, X = A OR B FOR ESS 3AB)

114-22 **CEPD**

CURSOR CNTL (VWC17-ORBITER DC DETAIL 1)

ESS BUS SOURCE XXX MN X - OFF (SUSPECT RPC)

(XXX = 1BC, X = B OR C FOR ESS 1BC)
(XXX = 2CA, X = C OR A FOR ESS 2CA)
(XXX = 3AB, X = A OR B FOR ESS 3AB)

114-23 CEPD PLT

PANEL R1

ESS BUS SOURCE MN XXX SW - ON

(XXX = B/C FOR ESS 1BC)
(XXX = C/A FOR ESS 2CA)
(XXX = A/B FOR ESS 3AB)

114-24 CEPD PLT

IF CDT IS PRIOR TO T-8 MIN.

THEN

PANEL R1
ESS BUS SOURCE FCX SW - OFF

(X = 1 FOR ESS 1BC)
(X = 2 FOR ESS 2CA)
(X = 3 FOR ESS 3AB)

Not Performed:_____

***** End of Option A *****

Option B

NOTE

Use this option as follows:

After APU start - prior RPC failure exists and second RPC failed indication is on the same Essential Bus.

Option B Not Performed:_____

114-25 **CEPD**

VERIFY/ADJUST (VWC17-ORBITER DC DETAIL 1)

PRE FLT X VOLT - 28 TO 28.5

(X = 1 FOR ESS 1BC, ELSE X = 2)

114-26 **CEPD** **PLT**

PANEL R1
ESS BUS SOURCE FCX SW - OFF

(X = 1 FOR ESS 1BC)
(X = 2 FOR ESS 2CA)
(X = 3 FOR ESS 3AB)

114-27 **CEPD**

VERIFY (VWC17-ORBITER DC DETAIL 1)

ESS BUS SOURCE XXX PCM VOLT - ABOVE 27

(XXX = 1BC FOR ESS 1BC)
(XXX = 2CA FOR ESS 2CA)
(XXX = 3AB FOR ESS 3AB)

114-28 CEPD PLT

PANEL F9

SELECT ESS VOLTS - ___ (1BC, 2CA OR 3AB)

DC VOLTS METER - _____ (27 TO 32)

RETURN SELECTOR TO PREVIOUS POSITION

114-29 CEPD PLT

PANEL R1
ESS BUS SOURCE FCX SW - ON

(X = 1 FOR ESS 1BC)
(X = 2 FOR ESS 2CA)
(X = 3 FOR ESS 3AB)

***** End of Option B *****

114-30 Conclusions:

Option A

1. **IF** the previous Option A steps are verified,

   THEN the Essential Bus source failure is confirmed as instrumentation only.

   IF there are no previous RPC failures or at most one previous confirmed RPC failure,

   THEN CEPD is Go for Launch.

2. **IF** the previous Option A steps are not verified, specifically, ESS Bus volts do not increase when commanded via LPS,

   THEN the RPC is confirmed failed.

   IF there are no previous confirmed RPC failures,

   THEN CEPD is Go for Launch.

   IF there is a previous confirmed RPC failure,

   THEN CEPD is No Go for Launch.

Option B

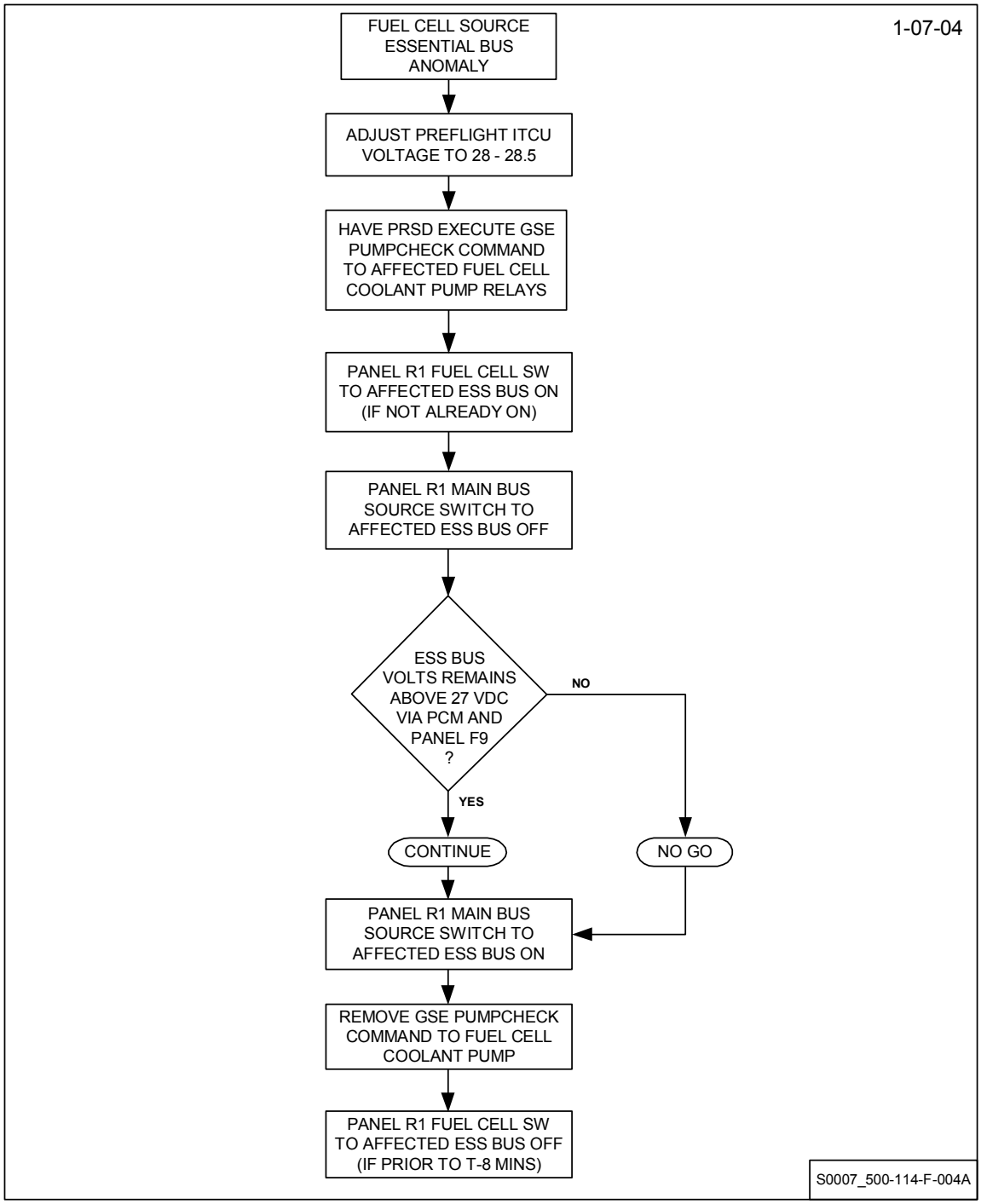
1. **IF** the previous Option B steps are verified,

   THEN Essential Bus source redundancy is confirmed and CEPD is Go for Launch.

2. **IF** the previous Option B steps are not verified,

   THEN a second RPC has failed on the same Essential Bus and CEPD is No Go for Launch.

Essential Bus Source Failure (SSID EPDC-07)



114-31 CEPD

VERIFY/ADJUST (VWC17-ORBITER DC DETAIL 1)

PRE FLT X VOLT - 28 TO 28.5

(X = 1 FOR ESS 1BC, ELSE X = 2)

114-32 CEPD CFCP

PFP (VWR05)
ARM FCX PUMP START (PFPKX) - PRESS
(WHERE X = FUEL CELL 1, 2 OR 3)
EXECUTE (PFPK6) - PRESS

INFORMATION:

FUEL CELL PUMP CHECK COMMAND FD'S
FC1 - V45K1121NL
FC2 - V45K1124NL
FC3 - V45K1127NL

114-33 CEPD PLT

PANEL R1
ESS BUS SOURCE FCX SW - ON

(X = 1 FOR ESS 1BC)
(X = 2 FOR ESS 2CA)
(X = 3 FOR ESS 3AB)

114-34 CEPD PLT

PANEL R1
ESS BUS SOURCE MN XXX SW - OFF

(XXX = B/C FOR ESS 1BC)
(XXX = C/A FOR ESS 2CA)
(XXX = A/B FOR ESS 3AB)

114-35 CEPD

VERIFY (VWC17-ORBITER DC DETAIL 1)

ESS BUS SOURCE XXX PCM VOLT - ABOVE 27

(XXX = 1BC FOR ESS 1BC)
(XXX = 2CA FOR ESS 2CA)
(XXX = 3AB FOR ESS 3AB)

114-36 CEPD PLT

PANEL F9

SELECT ESS VOLTS - ____ (1BC, 2CA OR 3AB)

DC VOLTS METER - _____ (ABOVE 27)

RETURN SELECTOR TO PREVIOUS POSITION

114-37 CEPD PLT

PANEL R1
ESS BUS SOURCE MN XXX SW - ON

(XXX = B/C FOR ESS 1BC)
(XXX = C/A FOR ESS 2CA)
(XXX = A/B FOR ESS 3AB)

114-38 CEPD CFCP

PFP (VWR05)
ARM FC PUMP STOP (PFPK4) - PRESS
EXECUTE (PFPK6) - PRESS

114-39 **CEPD PLT**

IF CDT IS PRIOR TO T-8 MIN,

THEN

PANEL R1
ESS BUS SOURCE FCX SW - OFF

(X = 1 FOR ESS 1BC)
(X = 2 FOR ESS 2CA)
(X = 3 FOR ESS 3AB)

Not Performed:_____

114-40 **Conclusions:**

1. **IF** the previous steps are verified,

   THEN the Essential Bus source failure is confirmed as instrumentation only and CEPD is Go for Launch.

2. **IF** the previous steps are not verified,

   THEN Fuel Cell to Essential Bus source cannot be verified and CEPD is No Go for Launch.

MEC Core "A" Power Failure (SSID EPDC-08)

114-41 **CEPD**

```
CURSOR CNTL (VWC14-MEC NONCRITICAL CMDS)
PREFLT BITE - PRESS

VERIFY FOR MEC BEING TESTED:

WORD 09 BIT    19 = 0
WORD 10 BIT 10,11 = 1
```

114-42 **Conclusions:**

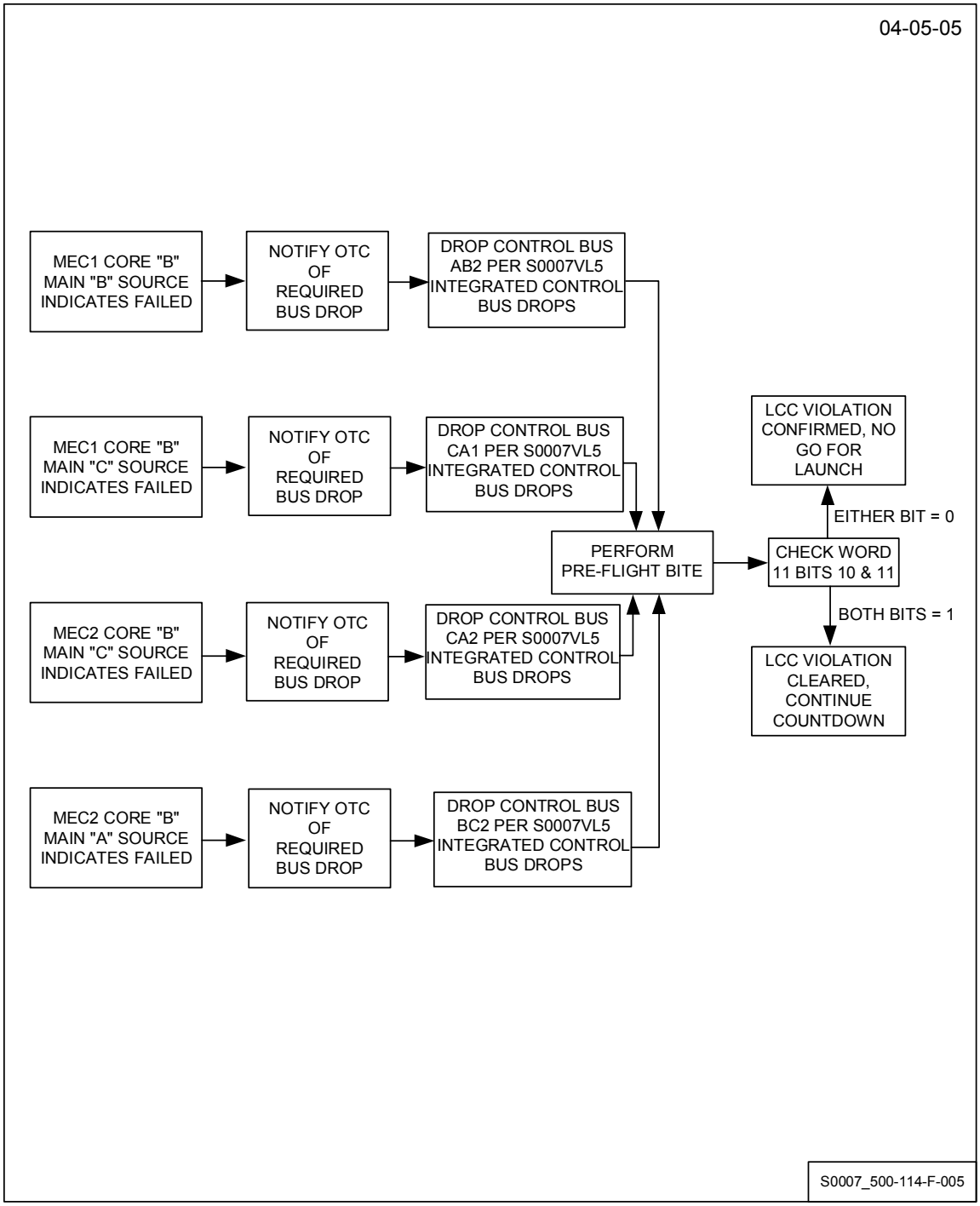
1. **IF** the previous step is verified,

   THEN the MEC power source failure is confirmed as instrumentation only and CEPD is Go for Launch.

2. **IF** the previous step is not verified,

   THEN MEC Core "A" power source cannot be verified and CEPD is No Go for Launch.

MEC Core "B" Power Failure (SSID EPDC-08)



114-43 **CEPD** **OTC**

Request Control Bus ___ be deactivated per OMI S0007.500 - Integrated Control Bus Drops for MEC ___ Core B Power Redundancy Verification.

Bus	MEC
AB2	1 (Core B RPC B)
CA1	1 (Core B RPC C)
BC2	2 (Core B RPC A)
CA2	2 (Core B RPC C)

114-44 **CEPD**

Verify Control Bus ___ powered down

114-45 **CEPD**

```
CURSOR CNTL (VWC14-MEC NONCRITICAL CMDS)
PREFLT BITE - PRESS

VERIFY FOR MEC BEING TESTED:

WORD 11 BIT    09 = 0
WORD 11 BIT 10,11 = 1
```

114-46 **CEPD** **OTC**

Ready for Control Bus ___ reactivation.

114-47 **Conclusions**:

1. **IF** the previous steps are verified,

   THEN the MEC power source failure is confirmed as instrumentation only and CEPD is Go for Launch.

2. **IF** the previous steps are not verified,

   THEN MEC Core B power source redundancy cannot be verified and CEPD is No Go for Launch.

MEC Preflight BITE Failure (SSID EPDC-09)

Option A - MEC Failure

NOTE

Perform Option A if any of the following MEC bits are failed (primarily for single bit or single channel failures):

MEC	
WD 02,03	bit 09-18,23,24
WD 04,05	bit 09-16,18-22
WD 06,07	bit 11,13,15,17,19
WD 09	bit 18,22
WD 10,11	bit 18

Option A Not Performed:_____

114-48 OTC CEPD

Perform OMI V1086.016 MEC preflight BITE LCC preplanned contingency procedures. **Report** completion and results (see conclusions listed after Option B).

***** End of Option A - MEC Failure *****

Option B - EMEC/AMEC Failure

NOTE

Perform Option B if any of the following MEC bits are failed (primarily for single bit or single channel failures):

EMEC/AMEC
WD 04,05 bit 22,23,24

Option B Not Performed:_____

114-49 **CEPD** **OTC**
OTC **NTD**

Request permission to use LDB for MEC critical CMD enable, critical ET RSS safe commands, non-critical ET DFI commands and preflight BITE reads.

114-50 **NTD** **OTC**
OTC **CEPD**
232

Proceed with MEC critical operations on channel 151.

114-51 **CEPD** **CTPE**
151

```
RSYS TRANSFER TO C10

CONSOLE KYBD
C CO (FD) C10
XMIT CMD KEY - PRESS

(FD)
----------
V76K7508BL   (MEC 1 SRB RSS SAFE 1)
V76K7509BL   (MEC 1 SRB RSS SAFE 2)
V76K7608BL   (MEC 2 SRB RSS SAFE 1)
V76K7609BL   (MEC 2 SRB RSS SAFE 2)
```

MEC Critical Command Enable

NOTE
MEC Critical command enable must be performed in G9.

114-52 **CDPS**

```
CONSOLE KYBD
DEUE SPEC 100 PRO
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

114-53 **CDPS**

```
CONSOLE KYBD
DEUE ITEM 25 EXEC
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

114-54 **CDPS**

```
CONSOLE KYBD
DEUE RESUME
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

114-55 **CEPD**

```
CRT (VWC14)
MEC CRITICAL CMDS - ENABLED
```

114-56 **CEPD** **OTC**

MEC critical commands are enabled

***** End of MEC Critical Command Enable *****

EMEC/AMEC WD 04/05 Bit 22, 23, 24 - Skew Timer Start Arm, Fire 1, Fire 2

114-57 **CEPD**

Record failed MEC, word, and bit.

EMEC/AMEC: ____ (1 or 2)

Word: ____ (4 or 5)

Bit: ____ (22, 23 or 24)

114-58 **CEPD**

```
CURSOR CNTL (SAC02/SWC01)
AUTO TEST MENU (MEC/PIC OPTIONS)
XMIT CURSOR KEY - PRESS
```

114-59 **CEPD**

```
CURSOR CNTL (VWC25 - MEC/PIC AUTO TEST MENU)
MEC LCC CONTINGENCY
XMIT CURSOR KEY - PRESS
```

FOLLOW PROGRAM PROMPTS AS THEY APPEAR TO COMPLETION FOR MEC/WORD/BIT ANNOTATED ABOVE. REPORT RESULTS AFTER COMPLETION OF OPTION B.

114-60 **CEPD**

RETURN TO STANDARD CONFIGURATION

RSYS TRANSFER TO C2

```
CONSOLE KYBD
C CO (FD) C2
XMIT CMD KEY - PRESS
```

(FD)

```
V76K7508BL   (MEC 1 SRB RSS SAFE 1)
V76K7509BL   (MEC 1 SRB RSS SAFE 2)
V76K7608BL   (MEC 2 SRB RSS SAFE 1)
V76K7609BL   (MEC 2 SRB RSS SAFE 2)
```

MEC Critical Command Disable

NOTE
MEC Critical command disable must be performed in G9.

114-61 **CDPS**

```
CONSOLE KYBD
DEUE SPEC 100 PRO
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

114-62 **CDPS**

```
CONSOLE KYBD
DEUE ITEM 26 EXEC
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

114-63 **CDPS**

```
CONSOLE KYBD
DEUE RESUME
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

114-64 **CEPD**

```
CRT (VWC14)
MEC CRITICAL CMDS - DISABLED
```

114-65 **CEPD** **OTC**

MEC critical commands are disabled

***** End of MEC Critical Command Disable *****

***** End of Option B - EMEC/AMEC Failure *****

114-66 **CEPD** **OTC**
NTD **232**

Ready to convey test results and Launch recommendation for failed EMEC/AMEC bit(s).

114-67 **Conclusions:**

1. **IF** the previous step is completed successfully,

   THEN a BITE circuit only or single channel failure has been confirmed and CEPD is Go for Launch.

2. **IF** the previous step is completed unsuccessfully,

   THEN a BITE circuit only or single channel failure cannot be confirmed, further evaluation is required - CEPD is No Go for Launch.

3. **IF** any of the following bits are failed,

   THEN further evaluation is required - CEPD is No Go for Launch.

MEC	
WD 06,07	Bit 09

EMEC/AMEC	
WD 04,05	Bit 10-12,14,16
WD 06,07	Bit 17,19

MEC, EMEC/AMEC	
WD 09	Bit 19
WD 10,11	Bit 09-11,14-17,19-24
WD12,13	Bit 09-11,13-17,19-22
WD 14,15	Bit 09,10,13-22
WD 16,17	Bit 09-16

***** End of MEC Preflight BITE Failure *****

GSE Main Bus Motor Switch Failure (SSID EPDC-10)

NOTE
The next two steps are applicable after T-40 sec.

114-68 **CEPD**

VERIFY (VWC17-ORBITER DC DETAIL 1)

MN X ITCU CONTACT - OFF
(X = A, B OR C)

114-69 **Conclusions:**

1. **IF** the previous step is verified,

   THEN the GSE Main Bus motor switch failure is confirmed as instrumentation only and CEPD is Go for Launch.

2. **IF** the previous step is not verified,

   THEN the GSE Main Bus motor switch cannot be verified open and CEPD is No-Go for Launch.

Fire Extinguisher Pyro Voltage Failure (SSID EPDC-11)

114-70 CEPD CDR

```
PANEL L1A1 (REPORT ONLY)

FIRE SUPPRESSION
AV BAY X SW - _____ (SAFE OR ARM)
(X = 1, 2, OR 3)
```

Option A - Fire Suppression AV BAY SW in ARM Position

NOTE
Use this option if the Fire Suppression AV BAY SW was found in the ARM Position.

Option A Not Performed:_____

114-71 CEPD CDR

```
PANEL L1A1

FIRE SUPPRESSION
AV BAY X SW - SAFE
(X = 1, 2, OR 3)
```

114-72 CEPD

RECORD (VWC10-MEC PIC OVERVIEW)

```
LCA FEX X VOLT ______ (0 TO 1.5 IS SAFE)
(X = 1, 2 OR 3)
```

114-73 **CEPD** **CDR**
PLT

```
IF LCA FEX VOLT IS GREATER THAN 1.5,

THEN PERFORM THE FOLLOWING:

PANEL XXX
ROW C
  FIRE SUPPR BAY X CB - OPEN

(XXX = O14, X = 3 FOR FEX 3)
(XXX = O15, X = 1 FOR FEX 1)
(XXX = O16, X = 2 FOR FEX 2)
```

Not Performed:_____

114-74 **Option A Conclusions:**

IF cap volt decreased to 1.5 volts or less after the cockpit switch action and circuit breaker remains closed,

THEN CEPD is Go for Launch.

IF cap volt remains above 1.5 volts after the cockpit action,

THEN CEPD is No Go for Launch.

***** End of Option A - Fire Suppression AV BAY SW in ARM Position *****

Option B - Fire Suppression AV BAY SW in SAFE Position

NOTE
Use this option if the Fire Suppression AV BAY SW was found in the SAFE Position.

Option B Not Performed:_____

114-75 CEPD CECL

```
CONSOLE KYBD

CBTU BT4 V62K081_NL 1

(_ = 0 FOR FEX 1,
     1 FOR FEX 2,
     2 FOR FEX 3)

THE BIT MASK FOR ALL THREE COMMANDS IS X4000.
DECODE THE BT4 RETURN BY PERFORMING A LOGICAL
"AND" WITH THE BIT MASK.

BT4 RESULT & BIT MASK = X_____ (4000 OR 0000)

X4000 INDICATES THE COMMAND IS ON,
X0000 INDICATES THE COMMAND IS OFF.

RECORD AND REPORT RESULT:

LPS CMD: V62K081_NL _______ (ON/OFF)
```

114-76 CEPD CECL

IF LPS CMD IS "ON",

THEN PERFORM DATA RETRIEVALS TO DETERMINE IF LPS CMD WAS INADVERTENTLY ISSUED FROM FIRING ROOM. **RECORD** AND **REPORT** FINDINGS:

LPS CMD ISSUED FROM FIRING ROOM ____(YES) ___(NO)

Not Performed:_____

114-77 CEPD CDR
PLT

IF 1) LPS CMD WAS FOUND "ON", BUT NOT ISSUED FROM THE FIRING ROOM OR
2) LPS CMD WAS FOUND "OFF",

THEN PERFORM THE FOLLOWING:

PANEL XXX
ROW C
FIRE SUPPR BAY X CB - OPEN

(XXX = O14, X = 3 FOR FEX 3)
(XXX = O15, X = 1 FOR FEX 1)
(XXX = O16, X = 2 FOR FEX 2)

Not Performed:_____

114-78 CEPD CECL

IF LPS CMD WAS FOUND "ON" AND HAD BEEN ISSUED FROM THE FIRING ROOM,

THEN PERFORM THE FOLLOWING:

CECL

CONSOLE KYBD

SET V62K081_NL OFF
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

(_ = 0 FOR FEX 1,
1 FOR FEX 2,
2 FOR FEX 3)

CEPD

RECORD (VWC10-MEC PIC OVERVIEW)

LCA FEX X VOLT _____ (0 TO 1.5 TO CLEAR LCC)
(X = 1, 2, OR 3)

Not Performed:_____

114-79 Option B Conclusions:

IF there was in inadvertent command sent and cap volt decreased to 1.5 volts or less after the CECL Console action,

THEN CEPD is Go for Launch.

IF there was no inadvertent command sent,

THEN CEPD is No Go for Launch.

***** End of Option B - Fire Suppression AV BAY SW in SAFE Position *****

Landing Gear Pyro Voltage Failure (SSID EPDC-12)

114-80 **CEPD** **MS1**

```
PANEL R14 (PERFORM)
ROW F
  ESS 1BC
    LDG GEAR ARM/DN RESET CB - CLOSE
```

114-81 **CEPD** **MS1**

```
PANEL A12 (PERFORM)
LDG GEAR ARM/DN RESET SW -RESET/RELEASE
```

114-82 **CEPD** **MS1**

```
PANEL R14 (PERFORM)
ROW F
  ESS 1BC
    LDG GEAR ARM/DN RESET CB - OPEN
```

114-83 **CEPD**

VERIFY (VWC10-MEC PIC OVERVIEW)

```
LCA NLG EXT B/A -   0 TO 1.5
LCA LMG EXT B/A -   0 TO 1.5
LCA RMG EXT B/A -   0 TO 1.5
LCA NLG THR 2/1 -   0 TO 1.5
```

114-84 **Conclusions**:

The previous steps verify power is removed from any prematurely charged landing gear PIC. This procedure is for safing only.
CEPD is No Go for Launch.

Drag Chute Deploy Pyro Voltage Failure (SSID EPDC-14)

114-85 **CEPD** **PLT**

```
PANEL O16 (PERFORM FOR SYS 1 FAILURE)
ROW E
  MN C
    DRAG CHUTE SYS 1 CB - OPEN

PANEL O15 (PERFORM FOR SYS 2 FAILURE)
ROW E
  MN B
    DRAG CHUTE SYS 2 CB - OPEN
```

114-86 **CEPD**

VERIFY (VWC10-MEC PIC OVERVIEW)

```
DRAG CHUTE DPLY SYS 1 - 0 TO 1.5
DRAG CHUTE DPLY SYS 2 - 0 TO 1.5
```

114-87 **Conclusions**:

1. **IF** the previous steps are verified,

   THEN the Orbiter Drag Chute System has been returned to a Safe configuration and CEPD is Go for Launch.

2. **IF** the previous steps are not verified,

   THEN the Orbiter Drag Chute System cannot be verified Safe and CEPD is No Go for Launch.

Single Phase AC Bus Inverter Anomaly

NOTE

The following procedure may be used to manually power down a single phase of an AC Bus in the event of an inverter failure, excessive ripple on an inverter, or at the discretion of the Test Team.

114-88 NTD ALL

AC Bus ___ Phase ___ will be powered down. Systems listed in the Single Phase AC Bus Drop Impacts Matrix in S0007.500, Table 114-1 will be affected.

System details are shown in the appropriate Power Down Option.

A Master alarm will occur.

Single Phase AC Bus Drop Impacts Matrix

Table 114-1	**AC 1**			**AC 2**			**AC 3**		
SYSTEM	Ph A	Ph B	Ph C	Ph A	Ph B	Ph C	Ph A	Ph B	Ph C
CEPD	X	X	X	X	X	X		X	X
CHYD	X	X	X	X	X	X	X	X	X
CECL	X*	X	X	X*	X	X	X*	X	X
CAFM				X			X		
CFCP	X			X	X		X		
CCME**	X	X	X	X	X	X	X	X	X
POWER DOWN OPTION	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**

* Multiple ECL 3-phase power indicators use phase-A as the source for their power indicator.

** CCME Main Engine status override command will be issued for any single phase AC Bus drop.

OPTION A

AC BUS 1 Phase A Power Down

Option A Not Performed:_____

NOTE

If an AC Bus phase is powered down after GLS initialization, CGLS should expect to see various interrupts for measurements monitored by the GLS software. These interrupts should be verified against the expected failures for the AC Bus phase that was powered down and any discrepancies should be reported to the Test Team.

NOTE

The following single phase power users of AC Bus 1 Phase A will be affected:

CEPD Right Instrumentation Panel Lighting
Left and Center Panel Lighting

CHYD Water Spray Boiler Controller 1B

CECL Freon Coolant Loop 1 RAD Bypass Valve B Motor
H2O Loop 2 Bypass Controller
Pump Out Temp
Pump Out Pressure
Pump Delta Pressure
Bypass Valve Position
Accumulator Quantity
C/W trip for Loop 2 H_2O Pump Out Pressure (Param 115)
Panel F7 Annunciator Lite "H_2O Loop" will illuminate
Cabin Air Temp Controller 2
Loop 2 Cabin HX H_2O Inlet Temp

CFCP Fuel Cell 1 PH sensor

114-89 **NTD** **CEPD**
CECL
CCME

Proceed with the power down of AC Bus 1 Phase A.

EPD Report completion.

NOTE
Perform the following two steps if program VAG60 is still active at the ECL console

114-90 **CECL**

```
CURSOR CNTL (VAG 60)

Terminate Program
```

Not Performed:_____

114-91 **CECL**

```
CONSOLE KYBD

SET V61K2866NL OFF
Xmit Cmd Key - PRESS
Exec Cmd Key - PRESS

SET N61IV011E OFF
Xmit Cmd Key - PRESS
Exec Cmd Key - PRESS
```

Not Performed:_____

114-92 **CCME**

```
CURSOR CNTL (VWE01A)

ISSUE ME  1  STATUS OVERRIDE
```

NOTE

Perform the following if the AC Bus sensor switch is not already in the Monitor Position

114-93 CEPD PLT

```
PANEL R1
  AC BUS SNSR 1  SW - OFF for 1 Sec, then MONITOR
```

Not Performed:_____

NOTE

To power down an **individual phase inverter**, only the breaker for that phase should be **CLOSED**, and the remaining 8 breakers should be **OPEN**

114-94 CEPD PLT

```
PANEL R1
  AC CONTR
    Verify all 9 breakers - OPEN

  AC 1
    PH A CB - CLOSED
```

114-95 CEPD PLT

```
PANEL R1
  INV / AC BUS
    1 SW - OFF (Momentary)

    INV / AC BUS 1 TB - OFF
```

114-96 CEPD PLT

```
PANEL R1
  INV PWR
    1 SW - OFF (Momentary)

    INV PWR  1  TB - OFF
```

114-97 CEPD PLT

```
PANEL R1
  AC CONTR
    AC 1
      PH A CB - OPEN

  AC CONTR
    Verify all 9 breakers - OPEN
```

114-98 CEPD NTD

AC Bus 1 Phase A is powered down.

Three Phase Power User Reconfiguration

114-99 NTD ALL

All 3-phase power users of AC Bus 1 are now operating on only two phases.
Systems affected are CECL, CCSE, CFCP, CPLE, CFCS*, COOS, CPVD, and CAFM.

* CFCS power is for AC utility panels only

114-100 CECL CDR

```
PANEL L1
  H2O PUMP
    LOOP 1
      GPC / OFF / ON  SW - ON

    LOOP 2
      GPC / OFF / ON  SW - OFF
```

114-101 CCME PLT

```
PANEL R2
  ENGINE POWER
    CTR AC 1 SW - OFF
    RIGHT AC 1 SW - OFF
```

114-102 NTD CECL

Perform Orbiter Cooling Reconfiguration per S9001.105 for any rotary equipment that is operating on only two phases.

Report Completion

Single Phase Power User Load Isolation

NOTE

The following Single Phase Power User Load Isolation steps are NOT time critical. The steps provide additional isolation via breakers to ensure no voltage is induced by the remaining phases onto the single phase paths identified. Since the reconfiguration is not time critical, the following steps should only be worked by an SCO/ASP with adequate access to breakers on Panel L4 to ensure the correct breakers are opened.

114-103 CECL CDR

```
PANEL L4
ROW K
  AC 1
    H2O CNTLR 2
      PH A CB - OPEN

ROW L
  AC 1
    CABIN T CNTLR 2
      PH A CB - OPEN
```

114-104 CHYD CDR

```
PANEL L4
ROW O
  AC 1
    BLR HYD BYPASS 1B
      PH A CB - OPEN
```

114-105 CEPD CDR

```
PANEL L4
ROW Q
  AC 1
    LIGHTING PANEL
      L/CTR
        PH A CB - OPEN

ROW R
  AC 1
    INST R
      PH A CB - OPEN
```

***** End Of Option A AC Bus 1 Phase A Power Down *****

OPTION B

AC BUS 1 Phase B Power Down

Option B Not Performed:_____

NOTE

If an AC Bus phase is powered down after GLS initialization, CGLS should expect to see various interrupts for measurements monitored by the GLS software. These interrupts should be verified against the expected failures for the AC Bus phase that was powered down and any discrepancies should be reported to the Test Team.

NOTE

The following single phase power users of AC Bus 1 Phase B will be affected:

CEPD Left / Overhead Panel Lighting
Fwd Numeric Panel Lighting

CHYD Hydraulic Quantity Reservoir 1 Indicator

CECL Freon Coolant Loop 2 Rad Bypass Valve B Motor
Cabin Air Signal Conditioner
- Cabin Fan Delta Pressure
- Cabin Humidity
- CO2 Partial Pressure
- C/W trip for Cabin Fan Delta Pressure (Parameter 074)
- Panel F7 Annunciator Lite “AV BAY / CABIN AIR” will illuminate

AV Bay 2 Signal Conditioner
- Loop 1 HX Out Temp
- Loop 2 HX Out Temp
- Fan Delta Pressure
- Air Out Temp

114-106 NTD CEPD
CCME

Proceed with the power down of AC Bus 1 Phase B.

EPD Report completion.

114-107 CCME

CURSOR CNTL (VWE01A)

ISSUE ME 1 STATUS OVERRIDE

> **NOTE**
> Perform the following if the AC Bus sensor switch is not already in the Monitor Position.

114-108 CEPD PLT

PANEL R1
AC BUS SNSR **1** SW - **OFF** for 1 Sec, then **MONITOR**

Not Performed:_____

> **NOTE**
> To power down an **individual phase inverter**, only the breaker for that phase should be **CLOSED**, and the remaining 8 breakers should be **OPEN**

114-109 CEPD PLT

PANEL R1
AC CONTR
Verify all 9 breakers - **OPEN**

AC 1
PH B CB - **CLOSED**

114-110 CEPD PLT

```
PANEL R1
  INV / AC BUS
    1 SW - OFF (Momentary)

    INV / AC BUS  1  TB - OFF
```

114-111 CEPD PLT

```
PANEL R1
  INV PWR
    1 SW - OFF (Momentary)

    INV PWR  1  TB - OFF
```

114-112 CEPD PLT

```
PANEL R1
  AC CONTR
    AC 1
      PH B CB - OPEN

  AC CONTR
    Verify all 9 breakers - OPEN
```

114-113 CEPD NTD

AC Bus 1 Phase B is powered down.

Three Phase Power User Reconfiguration

114-114 NTD ALL

All 3-phase power users of AC Bus 1 are now operating on only two phases.
Systems affected are CECL, CCSE, CFCP, CPLE, CFCS*, COOS, CPVD, and CAFM.

* CFCS power is for AC utility panels only.

114-115 NTD CECL

Perform Orbiter Cooling Reconfiguration per S9001.105 for any rotary equipment that is operating on only two phases.

Report Completion

114-116 CCME PLT

```
PANEL R2
  ENGINE POWER
    CTR AC 1 SW - OFF
    RIGHT AC 1 SW - OFF
```

Single Phase Power User Load Isolation

NOTE

The following Single Phase Power User Load Isolation steps are NOT time critical. The steps provide additional isolation via breakers to ensure no voltage is induced by the remaining phases onto the single phase paths identified. Since the reconfiguration is not time critical, the following steps should only be worked by an SCO/ASP with adequate access to breakers on Panel L4 to ensure the correct breakers are opened.

114-117 CECL CDR

```
PANEL L4
ROW K
  AC 1
    CABIN AIR S/C
      PH B CB - OPEN

ROW L
  AC 1
    AV BAY 2 S/C
      PH B CB - OPEN
```

114-118 CHYD CDR

```
PANEL L4
ROW O
  AC 1
    HYD QTY 1
      PH B CB - OPEN
```

114-119 CEPD CDR

```
PANEL L4
ROW Q
  AC 1
    LIGHTING PANEL
      L OVHD
        PH B CB - OPEN

ROW R
  AC 1
    NUMERIC FWD
      PH B CB - OPEN
```

***** End Of Option B AC Bus 1 Phase B Power Down *****

OPTION C

AC BUS 1 Phase C Power Down

Option C Not Performed:_____

NOTE

If an AC Bus phase is powered down after GLS initialization, CGLS should expect to see various interrupts for measurements monitored by the GLS software. These interrupts should be verified against the expected failures for the AC Bus Phase that was powered down and any discrepancies should be reported to the Test Team.

NOTE

The following single phase power users of AC Bus 1 Phase C will be affected:

CEPD Orbit Station Instrumentation Panel Lighting

CHYD Water Spray Boiler Controller 3A
Hydraulic Actuator Switch Valves (LH X-former)

114-120 NTD CEPD
CCME

Proceed with the power down of AC Bus 1 Phase C.

EPD Report completion.

114-121 CCME

```
CURSOR CNTL (VWE01A)

ISSUE ME  1  STATUS OVERRIDE
```

NOTE

Perform the following if the AC Bus sensor switch is not already in the monitor position

114-122 CEPD PLT

```
PANEL R1
  AC BUS SNSR 1  SW - OFF for 1 Sec, then MONITOR
```

Not Performed:_____

NOTE

To power down an **individual phase inverter**, only the breaker for that phase should be **CLOSED**, and the remaining 8 breakers should be **OPEN**

114-123 CEPD PLT

```
PANEL R1
  AC CONTR
    Verify all 9 breakers  -  OPEN

  AC 1
    PH C CB - CLOSED
```

114-124 CEPD PLT

```
PANEL R1
  INV / AC BUS
   1  SW - OFF (Momentary)

   INV / AC BUS  1  TB - OFF
```

114-125 CEPD PLT

```
PANEL R1
  INV PWR
   1  SW - OFF (Momentary)

   INV PWR  1  TB - OFF
```

114-126 CEPD PLT

```
PANEL R1
  AC CONTR
    AC 1
      PH C CB - OPEN

  AC CONTR
    Verify all 9 breakers  -  OPEN
```

114-127 CEPD NTD

AC Bus 1 Phase C is powered down.

Three Phase Power User Reconfiguration

114-128 NTD ALL

All 3-phase power users of AC Bus 1 are now operating on only two phases.
Systems affected are CFCP, CPLE, CFCS*, CECL, COOS, CPVD, and CAFM.

114-129 CCME PLT

```
PANEL R2
  ENGINE POWER
    CTR AC 1 SW - OFF
    RIGHT AC 1 SW - OFF
```

114-130 NTD CECL

Perform Orbiter Cooling Reconfiguration per S9001.105 for any rotary equipment that is operating on only two phases.

Report Completion

Single Phase Power User Load Isolation

NOTE

The following Single Phase Power User Load Isolation steps are NOT time critical. The steps provide additional isolation via breakers to ensure no voltage is induced by the remaining phases onto the single phase paths identified. Since the reconfiguration is not time critical, the following steps should only be worked by an SCO/ASP with adequate access to breakers on Panel L4 to ensure the correct breakers are opened.

114-131 CHYD CDR

```
PANEL L4
ROW O
  AC 1
    BLR HYD BYPASS 3A
      PH C CB - OPEN
```

114-132 CHYD MS1

```
PANEL MA73C
ROW F
  AC 1
    OPS INST HYD ACTR
      PH C CB - OPEN
```

***** End Of Option C AC Bus 1 Phase C Power Down *****

OPTION D

AC Bus 2 Phase A Power Down

Option D Not Performed:_____

NOTE

If an AC Bus phase is powered down after GLS initialization, CGLS should expect to see various interrupts for measurements monitored by the GLS software. These interrupts should be verified against the expected failures for the AC Bus phase that was powered down and any discrepancies should be reported to the Test Team.

NOTE

The following single phase power users of AC Bus 2 Phase A will be affected:

CEPD Right / Overhead Panel Lighting

CHYD Water Spray Boiler Controller 1A

CECL Freon Coolant Loop 1 Flow Proportioning Valve Control
Cabin Air Temp Controller 1
- Cabin Temp
- Cabin HX Air Out Temp
- Loop 1 Cabin HX H2O Inlet Temp

WCL 1 Pump B Sw Scan

CAFM Landing Gear Proximity Sensor Electronic Box 2

CFCP Fuel Cell 2 PH sensor

114-133 **NTD** **CEPD**
CECL
CCME

Proceed with the power down of AC Bus 2 Phase A.

EPD Report completion.

NOTE
Perform the following two steps if program VAG60 is still active at the ECL console.

114-134 **CECL**

```
CURSOR CNTL (VAG 60)

Terminate Program
```

Not Performed:_____

114-135 **CECL**

```
CONSOLE KYBD

SET V61K2866NL OFF
Xmit Cmd Key - PRESS
Exec Cmd Key - PRESS

SET N61IV011E OFF
Xmit Cmd Key - PRESS
Exec Cmd Key - PRESS
```

Not Performed:_____

114-136 **CCME**

```
CURSOR CNTL (VWE01A)

ISSUE ME  2  STATUS OVERRIDE
```

NOTE

Perform the following if the AC Bus sensor switch is not already in the Monitor Position.

114-137 CEPD PLT

```
PANEL R1
  AC BUS SNSR 2  SW - OFF for 1 Sec, then MONITOR
```

Not Performed:_____

NOTE

To power down an **individual phase inverter**, only the breaker for that phase should be **CLOSED**, and the remaining 8 breakers should be **OPEN**

114-138 CEPD PLT

```
PANEL R1
  AC CONTR
    Verify all 9 breakers  -  OPEN

  AC 2
    PH A CB - CLOSED
```

114-139 CEPD PLT

```
PANEL R1
  INV / AC BUS
    2  SW - OFF (Momentary)

    INV / AC BUS  2  TB - OFF
```

114-140 CEPD PLT

```
PANEL R1
  INV PWR
    2  SW - OFF (Momentary)

    INV PWR  2  TB - OFF
```

114-141 CEPD PLT

```
PANEL R1
  AC CONTR
    AC 2
      PH A CB - OPEN

  AC CONTR
    Verify all 9 breakers  -  OPEN
```

114-142 CEPD NTD

AC Bus 2 Phase A is powered down.

Three Phase Power User Reconfiguration

114-143 NTD ALL

All 3-phase power users of AC Bus 2 are now operating on only two phases.
Systems affected are CECL, CCSE, CFCP, CPLE, COOS, CPVD, and CAFM.

114-144 CCME PLT

```
PANEL R2
  ENGINE POWER
    LEFT AC 2 SW - OFF
    CTR  AC 2 SW - OFF
```

114-145 NTD CECL

Perform Orbiter Cooling Reconfiguration per S9001.105 for any rotary equipment that is operating on only two phases, except for the cabin fan.

Report Completion

NOTE

If the cabin fan is operating on two phases (Cabin Fan B - AC2), it shall remain operating, and the other cabin fan shall remain off to retain redundancy. Cabin fans cannot be started on 2-phases. When the Test Team determines that there is no further reasonable concern for another AC Bus anomaly, Cabin Fan A can be activated and Cabin Fan B powered down.

Single Phase Power User Load Isolation

NOTE

The following Single Phase Power User Load Isolation steps are NOT time critical. The steps provide additional isolation via breakers to ensure no voltage is induced by the remaining phases onto the single phase paths identified. Since the reconfiguration is not time critical, the following steps should only be worked by an SCO/ASP with adequate access to breakers on Panel L4 to ensure the correct breakers are opened.

114-146 CECL CDR

```
PANEL L4
ROW L
  AC 2
    CABIN T CNTLR 1
      PH A CB - OPEN
```

114-147 CHYD CDR

```
PANEL L4
ROW O
  AC 2
    BLR HYD BYPASS 1A
      PH A CB - OPEN
```

114-148 CEPD CDR

```
PANEL L4
ROW Q
  AC 2
    LIGHTING PANEL
      R OVHD
        PH A CB - OPEN
```

114-149 CAFM CDR

```
PANEL L4
ROW P
  AC 2
    LG SNSR 2
      PH A CB - OPEN
```

***** End Of Option D AC Bus 2 Phase A Power Down *****

OPTION E

AC Bus 2 Phase B Power Down

Option E Not Performed:_____

NOTE

If an AC Bus phase is powered down after GLS initialization, CGLS should expect to see various interrupts for measurements monitored by the GLS software. These interrupts should be verified against the expected failures for the AC Bus phase that was powered down and any discrepancies should be reported to the Test Team.

NOTE

The following single phase power users of AC Bus 2 Phase B will be affected:

CEPD Right Panel Lighting
Overhead Instrumentation Panel Lighting

CHYD Hydraulic Quantity Reservoir 2 Indicator

CECL Freon Coolant Loop 1 RAD Bypass Valve A Motor
Freon Coolant Loop Signal Conditioner 1A
- FCL 1 Payload Flow
- FCL 1 Pump Inlet Pressure
- FCL 1 Interchanger Inlet Temp
- FCL 2 Accumulator Quantity
- FCL 2 Interchanger Flow
- C/W trip for FCL 2 Interchanger Flow (Param 116)
- Panel F7 Annunciator Lite “FREON LOOP” will illuminate

AV Bay 3 Signal Conditioner
- Loop 1 HX Out Temp
- Loop 2 HX Out Temp
- Fan Delta Pressure
- Air Out Temp

CFCP Fuel Cell Common PH sensor

114-150 NTD CEPD
CCME

Proceed with the power down of AC Bus 2 Phase B.

EPD Report completion.

114-151 CCME

```
CURSOR CNTL (VWE01A)

ISSUE ME  2  STATUS OVERRIDE
```

> **NOTE**
> Perform the following if the AC Bus sensor switch is not already in the Monitor Position.

114-152 CEPD PLT

```
PANEL R1
  AC BUS SNSR 2  SW - OFF for 1 Sec, then MONITOR
```

Not Performed:_____

> **NOTE**
> To power down an **individual phase inverter**, only the breaker for that phase should be **CLOSED**, and the remaining 8 breakers should be **OPEN**

114-153 CEPD PLT

```
PANEL R1
  AC CONTR
    Verify all 9 breakers  -  OPEN

    AC 2
      PH B CB - CLOSED
```

114-154 CEPD PLT

```
PANEL R1
  INV / AC BUS
    2  SW - OFF (Momentary)

    INV / AC BUS  2  TB - OFF
```

114-155 CEPD PLT

```
PANEL R1
  INV PWR
    2  SW - OFF (Momentary)

    INV PWR  2  TB - OFF
```

114-156 CEPD PLT

```
PANEL R1
  AC CONTR
    AC 2
      PH B CB - OPEN

  AC CONTR
    Verify all 9 breakers  -  OPEN
```

114-157 CEPD NTD

AC Bus 2 Phase B is powered down.

Three Phase Power User Reconfiguration

114-158 NTD ALL

All 3-phase power users of AC Bus 2 are now operating on only two phases.
Systems affected are CECL, CCSE, CFCP, CPLE, COOS, CPVD, and CAFM.

114-159 CECL PLT

```
PANEL O17
ROW C
  SIGNAL CONDITIONER
    FREON
      A SW - AC 3
```

114-160 CCME PLT

```
PANEL R2
  ENGINE POWER
    LEFT AC 2 SW - OFF
    CTR  AC 2 SW - OFF
```

114-161 NTD CECL

Perform Orbiter Cooling Reconfiguration per S9001.105 for any rotary equipment that is operating on only two phases, except for the cabin fan.

Report Completion

NOTE

If the cabin fan is operating on two phases (Cabin Fan B - AC2), it shall remain operating, and the other cabin fan shall remain off to retain redundancy. Cabin fans cannot be started on 2-phases. When the Test Team determines that there is no further reasonable concern for another AC Bus anomaly, Cabin Fan A can be activated and Cabin Fan B powered down.

Single Phase Power User Load Isolation

NOTE

The following Single Phase Power User Load Isolation steps are NOT time critical. The steps provide additional isolation via breakers to ensure no voltage is induced by the remaining phases onto the single phase paths identified. Since the reconfiguration is not time critical, the following steps should only be worked by an SCO/ASP with adequate access to breakers on Panel L4 to ensure the correct breakers are opened.

114-162 CECL CDR

```
PANEL L4
ROW L
  AC 2
    AV BAY 3 S/C
      PH B CB - OPEN
```

114-163 CHYD CDR

```
PANEL L4
ROW O
  AC 2
    HYD QTY 2
      PH B CB - OPEN
```

114-164 CEPD CDR

```
PANEL L4
ROW Q
  AC 2
    LIGHTING PANEL
      R
        PH B CB - OPEN

ROW R
  AC 2
    INST OVHD
      PH B CB - OPEN
```

***** End Of Option E AC Bus 2 Phase B Power Down *****

OPTION F

AC Bus 2 Phase C Power Down

Option F Not Performed:_____

NOTE

If an AC Bus phase is powered down after GLS initialization, CGLS should expect to see various interrupts for measurements monitored by the GLS software. These interrupts should be verified against the expected failures for the AC Bus phase that was powered down and any discrepancies should be reported to the Test Team.

NOTE

The following single phase power users of AC Bus 1 Phase A will be affected:

CEPD Orbit Station Numeric Lighting

CHYD Water Spray Boiler Controller 2B
Hydraulic Actuator Switch Valves (RH X-former)

CECL Freon Coolant Loop 1 RAD Isolation Valve Motor 1
Freon Coolant Loop 2 RAD Isolation Valve Motor 1

114-165 NTD CEPD
CCME

Proceed with the power down of AC Bus 2 phase C.

EPD Report completion.

114-166 CCME

CURSOR CNTL (VWE01A)

ISSUE ME 2 STATUS OVERRIDE

> **NOTE**
> Perform the following if the AC Bus sensor switch is not already in the Monitor Position.

114-167 CEPD PLT

PANEL R1
AC BUS SNSR **2** SW - **OFF** for 1 Sec, then **MONITOR**

Not Performed:_____

> **NOTE**
> To power down an **individual phase inverter**, only the breaker for that phase should be **CLOSED**, and the remaining 8 breakers should be **OPEN.**

114-168 CEPD PLT

PANEL R1
AC CONTR
Verify all 9 breakers - **OPEN**

AC 2
PH C CB - **CLOSED**

114-169 CEPD PLT

```
PANEL R1
  INV / AC BUS
    2  SW - OFF (Momentary)

    INV / AC BUS  2  TB - OFF
```

114-170 CEPD PLT

```
PANEL R1
  INV PWR
    2  SW - OFF (Momentary)

    INV PWR  2  TB - OFF
```

114-171 CEPD PLT

```
PANEL R1
  AC CONTR
    AC 2
      PH C CB - OPEN

  AC CONTR
    Verify all 9 breakers  -  OPEN
```

114-172 CEPD NTD

AC Bus 2 Phase C is powered down.

Three Phase Power User Reconfiguration

114-173 NTD ALL

All 3-phase power users of AC Bus 2 are now operating on only two phases.
Systems affected are CECL, CCSE, CFCP, CPLE, COOS, CPVD, and CAFM.

114-174 CCME PLT

```
PANEL R2
  ENGINE POWER
    LEFT AC 2 SW - OFF
    CTR  AC 2 SW - OFF
```

114-175 NTD CECL

Perform Orbiter Cooling Reconfiguration per S9001.105 for any rotary equipment that is operating on only two phases, except for the cabin fan.

Report Completion

NOTE
If the cabin fan is operating on two phases (Cabin Fan B - AC2), it shall remain operating, and the other cabin fan shall remain off to retain redundancy. Cabin fans cannot be started on 2-phases. When the Test Team determines that there is no further reasonable concern for another AC Bus anomaly, Cabin Fan A can be activated and Cabin Fan B powered down.

Single Phase Power User Load Isolation

NOTE

The following Single Phase Power User Load Isolation steps are NOT time critical. The steps provide additional isolation via breakers to ensure no voltage is induced by the remaining phases onto the single phase paths identified. Since the reconfiguration is not time critical, the following steps should only be worked by an SCO/ASP with adequate access to breakers on Panel L4 to ensure the correct breakers are opened.

114-176 CHYD CDR

```
PANEL L4
ROW O
  AC 2
    BLR HYD BYPASS 2B
      PH C CB - OPEN
```

114-177 CHYD MS1

```
PANEL MA73C
ROW F
  AC 2
    OPS INST HYD ACTR
      PH C CB - OPEN
```

***** End Of Option F AC Bus 2 Phase C Power Down *****

OPTION G

AC Bus 3 Phase A Power Down

Option G Not Performed:_____

NOTE

If an AC Bus phase is powered down after GLS initialization, CGLS should expect to see various interrupts for measurements monitored by the GLS software. These interrupts should be verified against the expected failures for the AC Bus phase that was powered down and any discrepancies should be reported to the Test Team.

NOTE

The following single phase power users of AC Bus 3 Phase A will be affected:

CEPD COAS Lighting

CHYD Water Spray Boiler Controller 2A

CECL Freon Coolant Loop 2 Flow Proportioning Valve Control
H2O Loop 1 Bypass Controller
- Pump Out Temp
- Pump Out Pressure
- Pump Delta Pressure
- Bypass Valve Position
- Accumulator Quantity

Humidity Separator Signal Conditioner

CAFM Landing Gear Proximity Sensor Electronic Box 1

CFCP Fuel Cell 3 PH sensor

114-178 NTD CEPD
CECL
CCME

Proceed with the power down of AC Bus 3 phase A.

EPD Report completion.

NOTE
Perform the following two steps if program VAG60 is still active at the ECL console.

114-179 CECL

```
CURSOR CNTL (VAG 60)

Terminate Program
```

Not Performed:_____

114-180 CECL

```
CONSOLE KYBD

SET V61K2866NL OFF
Xmit Cmd Key - PRESS
Exec Cmd Key - PRESS

SET N61IV011E OFF
Xmit Cmd Key - PRESS
Exec Cmd Key - PRESS
```

Not Performed:_____

114-181 CCME

```
CURSOR CNTL (VWE01A)

ISSUE ME  3  STATUS OVERRIDE
```

NOTE

Perform the following if the AC Bus sensor switch is not already in the Monitor Position.

114-182 CEPD PLT

```
PANEL R1
  AC BUS SNSR 3  SW - OFF for 1 Sec, then MONITOR
```

Not Performed:_____

NOTE

To power down an **individual phase inverter**, only the breaker for that phase should be **CLOSED**, and the remaining 8 breakers should be **OPEN.**

114-183 CEPD PLT

```
PANEL R1
  AC CONTR
    Verify all 9 breakers  -  OPEN

    AC 3
      PH A CB - CLOSED
```

114-184 CEPD PLT

```
PANEL R1
  INV / AC BUS
    3  SW - OFF (Momentary)

    INV / AC BUS  3  TB - OFF
```

114-185 CEPD PLT

```
PANEL R1
  INV PWR
    3  SW - OFF (Momentary)

    INV PWR  3  TB - OFF
```

114-186 CEPD PLT

```
PANEL R1
  AC CONTR
     AC 3
       PH A CB - OPEN

  AC CONTR
    Verify all 9 breakers  -  OPEN
```

114-187 CEPD NTD

AC Bus 3 Phase A is powered down.

Three Phase Power User Reconfiguration

114-188 NTD ALL

All 3-phase power users of AC Bus 3 are now operating on only two phases.
Systems affected are CECL, CCSE, CFCP, CPLE, CFCS*, COOS, CPVD, and CAFM.

* CFCS power is for AC utility panels only.

114-189 CECL CDR

```
PANEL L4
ROW F
  AC 1
    H2O LOOP PUMP 1A / 2
      PH A CB - CLOSE
      PH B CB - CLOSE
      PH C CB - CLOSE
```

114-190 CECL

```
CURSOR CNTL (VAG 59, PG-B)

H2O LOOP 2
  SEC BLOCK
  XMIT CURSOR KEY - PRESS

VERIFY HOLLOW BLOCK
```

114-191 CECL CDR

```
PANEL L1
  H2O PUMP
    LOOP 2
      GPC / OFF / ON SW - GPC
```

114-192 CCME PLT

```
PANEL R2
  ENGINE POWER
    RIGHT AC 3 SW - OFF
    LEFT AC 3 SW - OFF
```

114-193 NTD CECL

Perform Orbiter Cooling Reconfiguration per S9001.105 for any rotary equipment that is operating on only two phases, except for the cabin fan.

Report Completion

NOTE

If the cabin fan is operating on two phases (Cabin Fan A - AC3), it shall remain operating, and the other cabin fan shall remain off to retain redundancy. Cabin fans cannot be started on 2-phases. When the Test Team determines that there is no further reasonable concern for another AC Bus anomaly, Cabin Fan B can be activated and Cabin Fan A powered down.

Single Phase Power User Load Isolation

NOTE

The following Single Phase Power User Load Isolation steps are NOT time critical. The steps provide additional isolation via breakers to ensure no voltage is induced by the remaining phases onto the single phase paths identified. Since the reconfiguration is not time critical, the following steps should only be worked by an SCO/ASP with adequate access to breakers on Panel L4 to ensure the correct breakers are opened.

114-194 CECL CDR

```
PANEL L4
ROW L
  AC 3
    H2O CNTLR 1
      PH A CB - OPEN
```

114-195 CHYD CDR

```
PANEL L4
ROW O
  AC 3
    BLR HYD BYPASS 2A
      PH A CB - OPEN
```

114-196 CAFM CDR

```
PANEL L4
ROW P
  AC 3
    LG SNSR 1
      PH A CB - OPEN
```

***** End Of Option G AC Bus 3 Phase A Power Down *****

OPTION H

AC Bus 3 Phase B Power Down

Option H Not Performed:_____

NOTE

If an AC Bus phase is powered down after GLS initialization, CGLS should expect to see various interrupts for measurements monitored by the GLS software. These interrupts should be verified against the expected failures for the AC Bus phase that was powered down and any discrepancies should be reported to the Test Team.

NOTE

The following single phase power users of AC Bus 3 Phase B will be affected:

CEPD Left / Center Instrumentation Panel Lighting
Mission Station Panel Lighting

CHYD Hydraulic Quantity Reservoir 3 Indicator

CECL Freon Coolant Loop 2 RAD Bypass Valve A Motor
Freon Coolant Loop Signal Conditioner 1B
FCL 2 Payload Flow
FCL 2 Pump Inlet Pressure
FCL 1 Accumulator Quantity
FCL 1 Interchanger Flow
C/W for FCL 1 Interchanger Flow (Param 106) will trip
Panel F7 Annunciator Lite “FREON LOOP” will illuminate
Av Bay 1 Signal Conditioner
Loop 1 HX Out Temp
Loop 2 HX Out Temp
Fan Delta Pressure
Air Out Temp
IMU Fan Signal Conditioner

114-197 NTD CEPD
CCME

Proceed with the power down of AC Bus 3 Phase B.

EPD Report completion.

114-198 CCME

```
CURSOR CNTL (VWE01A)

ISSUE ME  3  STATUS OVERRIDE
```

> **NOTE**
> Perform the following if the AC Bus sensor switch is not already in the Monitor Position.

114-199 CEPD PLT

```
PANEL R1
  AC BUS SNSR 3  SW - OFF for 1 Sec, then MONITOR
```

Not Performed:_____

> **NOTE**
> To power down an **individual phase inverter**, only the breaker for that phase should be **CLOSED**, and the remaining 8 breakers should be **OPEN.**

114-200 CEPD PLT

```
PANEL R1
  AC CONTR
    Verify all 9 breakers  -  OPEN

    AC 3
      PH B CB - CLOSED
```

114-201 CEPD PLT

```
PANEL R1
  INV / AC BUS
    3  SW - OFF (Momentary)

    INV / AC BUS  3  TB - OFF
```

114-202 CEPD PLT

```
PANEL R1
  INV PWR
    3  SW - OFF (Momentary)

    INV PWR  3  TB - OFF
```

114-203 CEPD PLT

```
PANEL R1
  AC CONTR
    AC 3
      PH B CB - OPEN

  AC CONTR
    Verify all 9 breakers  -  OPEN
```

114-204 CEPD NTD

AC Bus 3 Phase B is powered down.

Three Phase Power User Reconfiguration

114-205 NTD ALL

All 3-phase power users of AC Bus 3 are now operating on only two phases.
Systems affected are CECL, CCSE, CFCP, CPLE, CFCS*, COOS, CPVD, and CAFM.

* CFCS power is for AC utility panels only.

114-206 CECL PLT

```
PANEL O17
ROW C
  SIGNAL CONDITIONER
    FREON
      B SW - AC 2
```

114-207 CCME PLT

```
PANEL R2
  ENGINE POWER
    RIGHT AC 3 SW - OFF
    LEFT AC 3 SW - OFF
```

114-208 NTD CECL

Perform Orbiter Cooling Reconfiguration per S9001.105 for any rotary equipment that is operating on only two phases, except for the cabin fan.

Report Completion

NOTE

If the cabin fan is operating on two phases (Cabin Fan A - AC3), it shall remain operating, and the other cabin fan shall remain off to retain redundancy. Cabin fans cannot be started on 2-phases. When the Test Team determines that there is no further reasonable concern for another AC Bus anomaly, Cabin Fan B can be activated and Cabin Fan A powered down.

Single Phase Power User Load Isolation

NOTE

The following Single Phase Power User Load Isolation steps are NOT time critical. The steps provide additional isolation via breakers to ensure no voltage is induced by the remaining phases onto the single phase paths identified. Since the reconfiguration is not time critical, the following steps should only be worked by an SCO/ASP with adequate access to breakers on Panel L4 to ensure the correct breakers are opened.

114-209 CECL CDR

```
PANEL L4
ROW L
  AC 3
    AV BAY 1 S/C
      PH B CB - OPEN
```

114-210 CHYD CDR

```
PANEL L4
ROW O
  AC 3
    HYD QTY 3
      PH B CB – OPEN
```

114-211 CEPD CDR

```
PANEL L4
ROW R
  AC 3
    INST L/CTR
      PH B CB - OPEN
```

***** End Of Option H AC Bus 3 Phase B Power Down *****

OPTION I

AC Bus 3 Phase C Power Down

Option I Not Performed:_____

NOTE

If an AC Bus phase is powered down after GLS initialization, CGLS should expect to see various interrupts for measurements monitored by the GLS software. These interrupts should be verified against the expected failures for the AC Bus phase that was powered down and any discrepancies should be reported to the Test Team.

NOTE

The following single phase power users of AC Bus 3 Phase C will be affected:

CEPD Aft Orbit Station Panel Lighting

CHYD Water Spray Boiler Controller 3B

CECL Freon Coolant Loop 1 Rad Isolation Valve Motor 2
Freon Coolant Loop 2 Rad Isolation Valve Motor 2

114-212 NTD CEPD
CCME

Proceed with the power down of AC Bus 3 Phase C.

EPD Report completion.

114-213 CCME

```
CURSOR CNTL (VWE01A)

ISSUE ME  3  STATUS OVERRIDE
```

> **NOTE**
> Perform the following if the AC Bus sensor switch is not already in the Monitor Position.

114-214 CEPD PLT

```
PANEL R1
  AC BUS SNSR 3  SW - OFF for 1 Sec, then MONITOR
```

Not Performed:_____

> **NOTE**
> To power down an **individual phase inverter**, only the breaker for that phase should be **CLOSED**, and the remaining 8 breakers should be **OPEN.**

114-215 CEPD PLT

```
PANEL R1
  AC CONTR
    Verify all 9 breakers  -  OPEN

    AC 3
      PH C CB - CLOSED
```

114-216 CEPD PLT

```
PANEL R1
  INV / AC BUS
    3  SW - OFF (Momentary)

    INV / AC BUS  3  TB - OFF
```

114-217 CEPD PLT

```
PANEL R1
  INV PWR
    3  SW - OFF (Momentary)

    INV PWR  3  TB - OFF
```

114-218 CEPD PLT

```
PANEL R1
  AC CONTR
    AC 3
      PH C CB - OPEN

  AC CONTR
    Verify all 9 breakers  -  OPEN
```

114-219 CEPD NTD

AC Bus 3 Phase C is powered down.

Three Phase Power User Reconfiguration

114-220 NTD ALL

All 3-phase power users of AC Bus 3 are now operating on only two phases.
Systems affected are CECL, CCSE, CFCP, CPLE, CFCS*, COOS, CPVD, and CAFM.

* CFCS power is for AC utility panels only.

114-221 CCME PLT

```
PANEL R2
  ENGINE POWER
    RIGHT AC 3 SW - OFF
    LEFT AC 3 SW - OFF
```

114-222 NTD CECL

Perform Orbiter Cooling Reconfiguration per S9001.105 for any rotary equipment that is operating on only two phases, except for the cabin fan.

Report Completion

NOTE

If the cabin fan is operating on two phases (Cabin Fan A - AC3), it shall remain operating, and the other cabin fan shall remain off to retain redundancy. Cabin fans cannot be started on 2-phases. When the Test Team determines that there is no further reasonable concern for another AC Bus anomaly, Cabin Fan B can be activated and Cabin Fan A powered down.

Single Phase Power User Load Isolation

NOTE

The following Single Phase Power User Load Isolation steps are NOT time critical. The steps provide additional isolation via breakers to ensure no voltage is induced by the remaining phases onto the single phase paths identified. Since the reconfiguration is not time critical, the following steps should only be worked by an SCO/ASP with adequate access to breakers on Panel L4 to ensure the correct breakers are opened.

114-223 CHYD CDR

```
PANEL L4
ROW O
  AC 3
    BLR HYD BYPASS 3B
      PH C CB - OPEN
```

***** End Of Option I AC Bus 3 Phase C Power Down *****

*** End of Operation **114** ***

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OPERATION 115 GNC

Shop: **EFC**
Cntrl Rm Console: **C11**
OPR: **EFC**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **1.0**

FWD RHC Command Anomaly (SSID GNC-01)

NOTE

RHC RM failures will be annunciated to the ground by measurements:

V72X4575X1 - Left RHC Failure
V72X4570X1 - Right RHC Failure

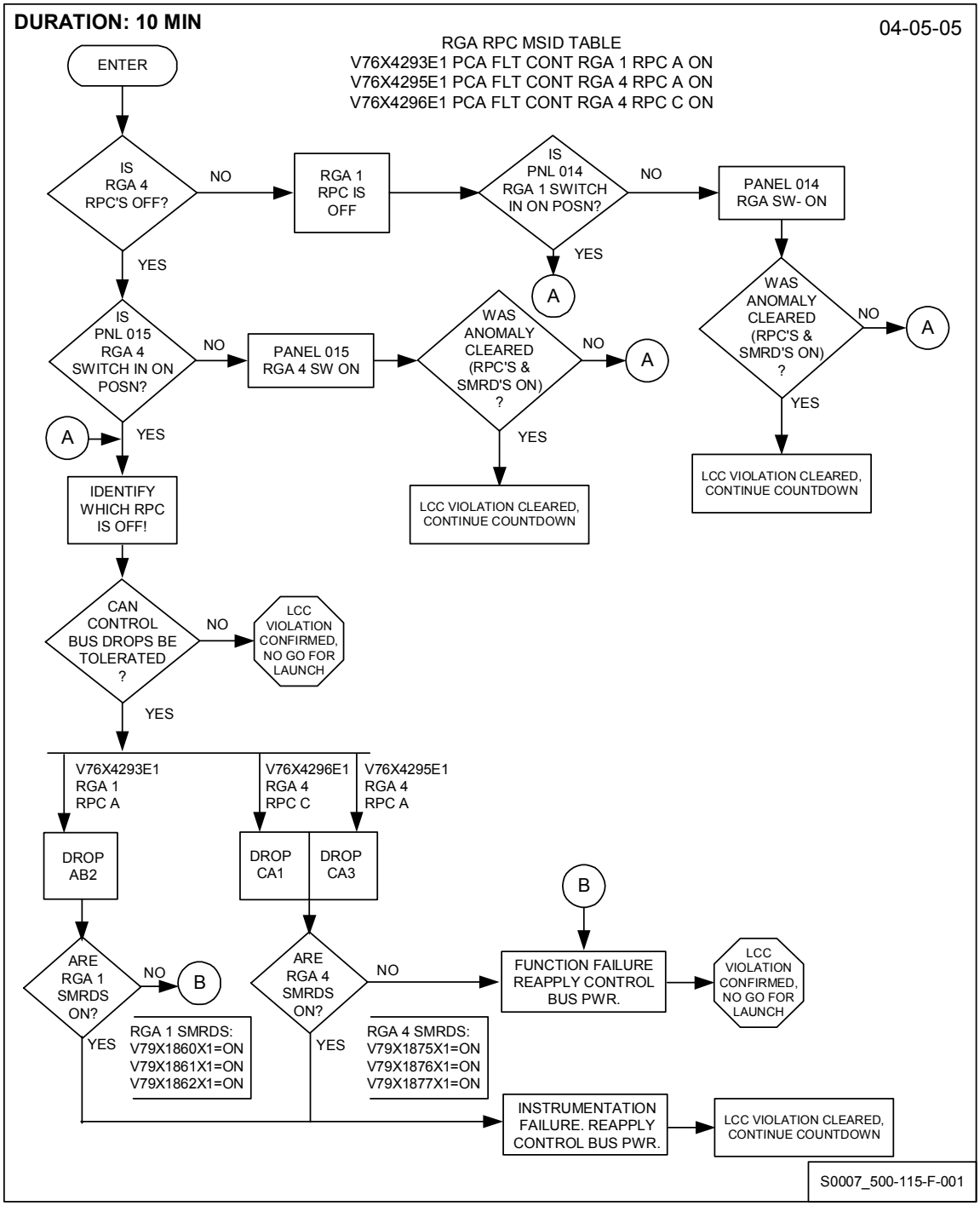
And annunciated onboard by Fault Summary message "RHC L" or "RHC R."
Reference LCC SSID FSUM-08, avionic Fault Summary messages.

The RHC RM status will not be displayed to SPEC 18, GNC SYS SUMM 1 when in OPS 1. This is documented by DR 104639, RHC status not displayed in OPS 1.

No fix was implemented for SPEC 18. User note added only.

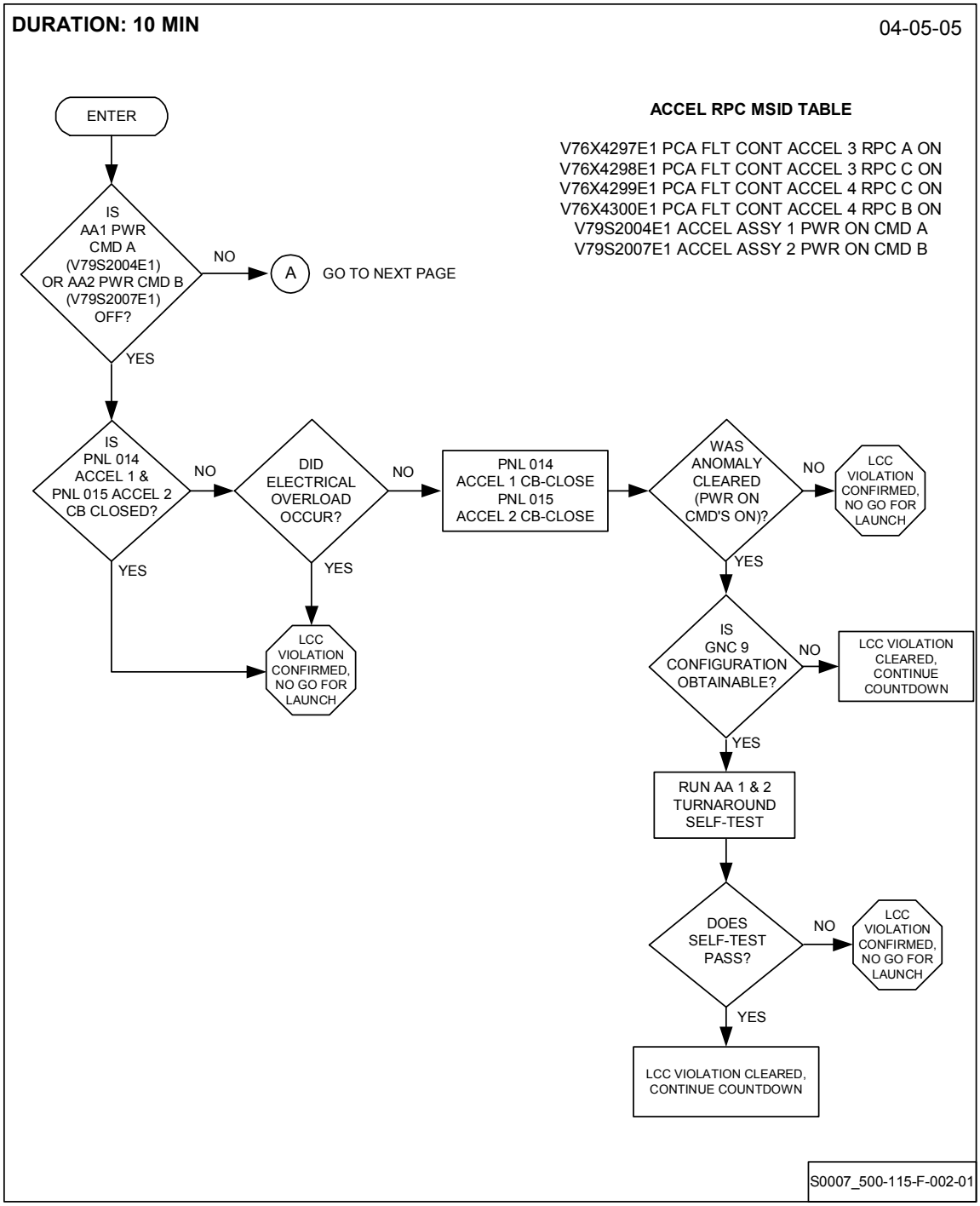
115-1

Orbiter Rate Gyro Power Anomaly (SSID GNC-08)

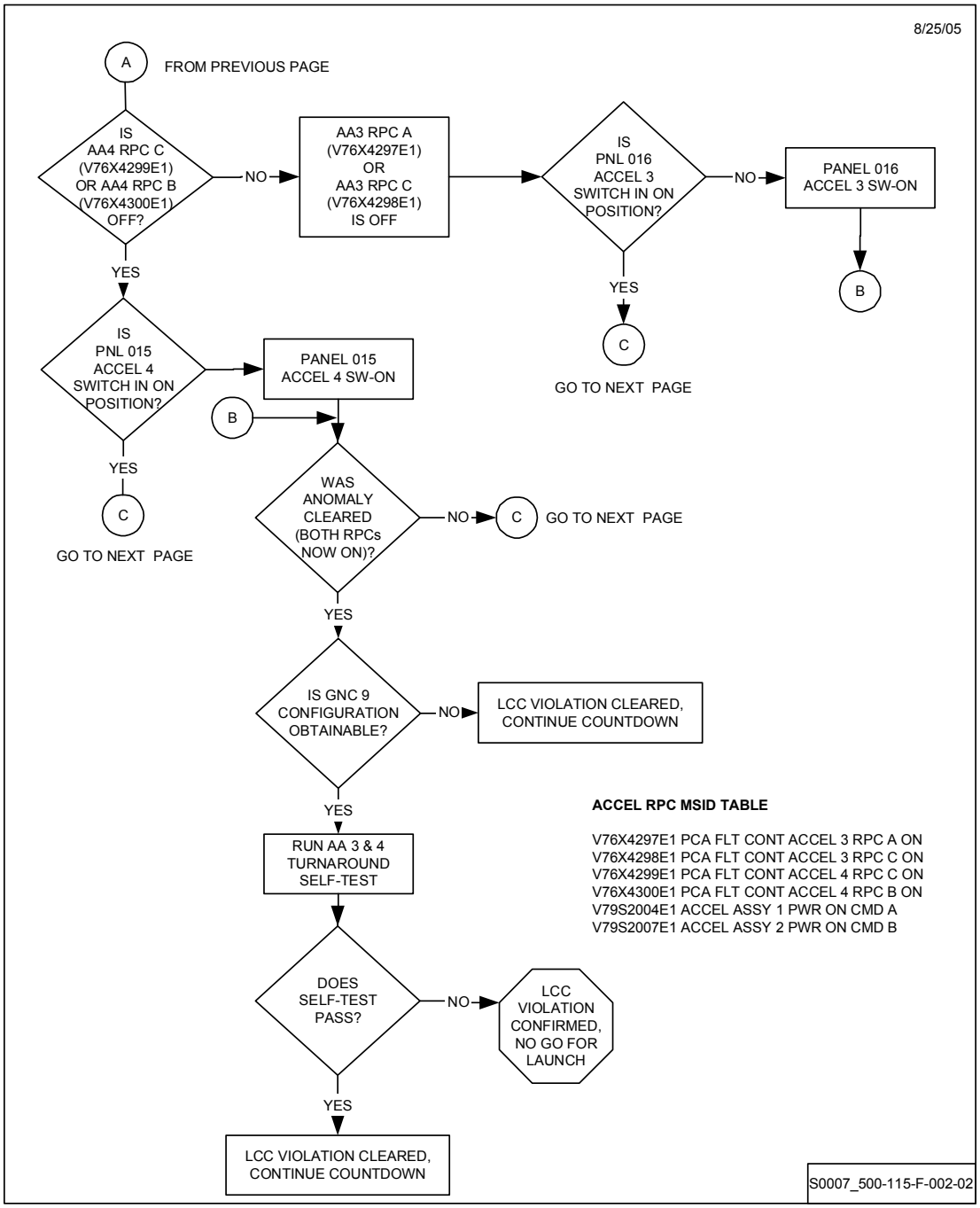


115-2

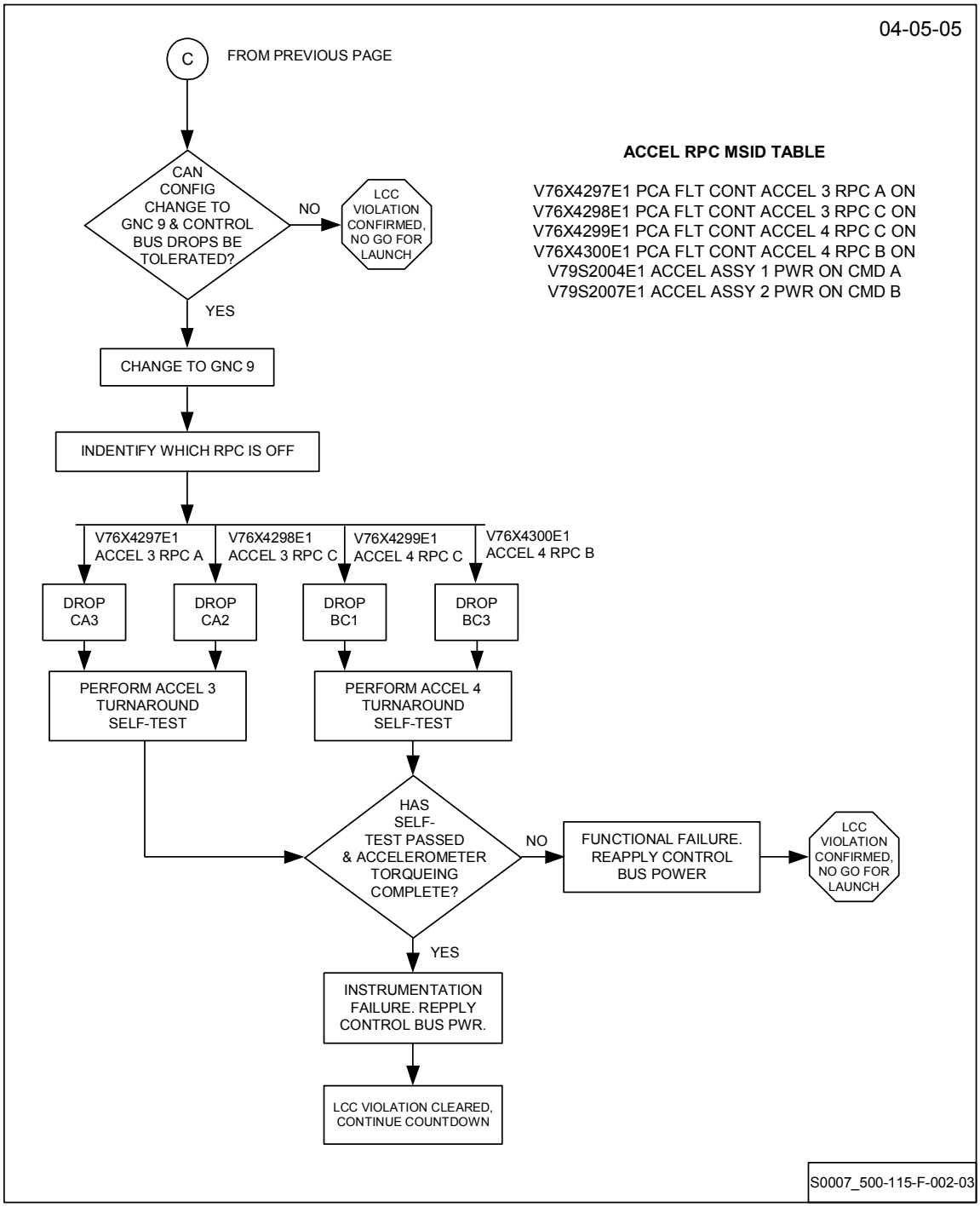
Accelerometer Power Anomaly (SSID GNC-09) (Page 1 of 3)



Accelerometer Power Anomaly (SSID GNC-09) (Page 2 of 3)

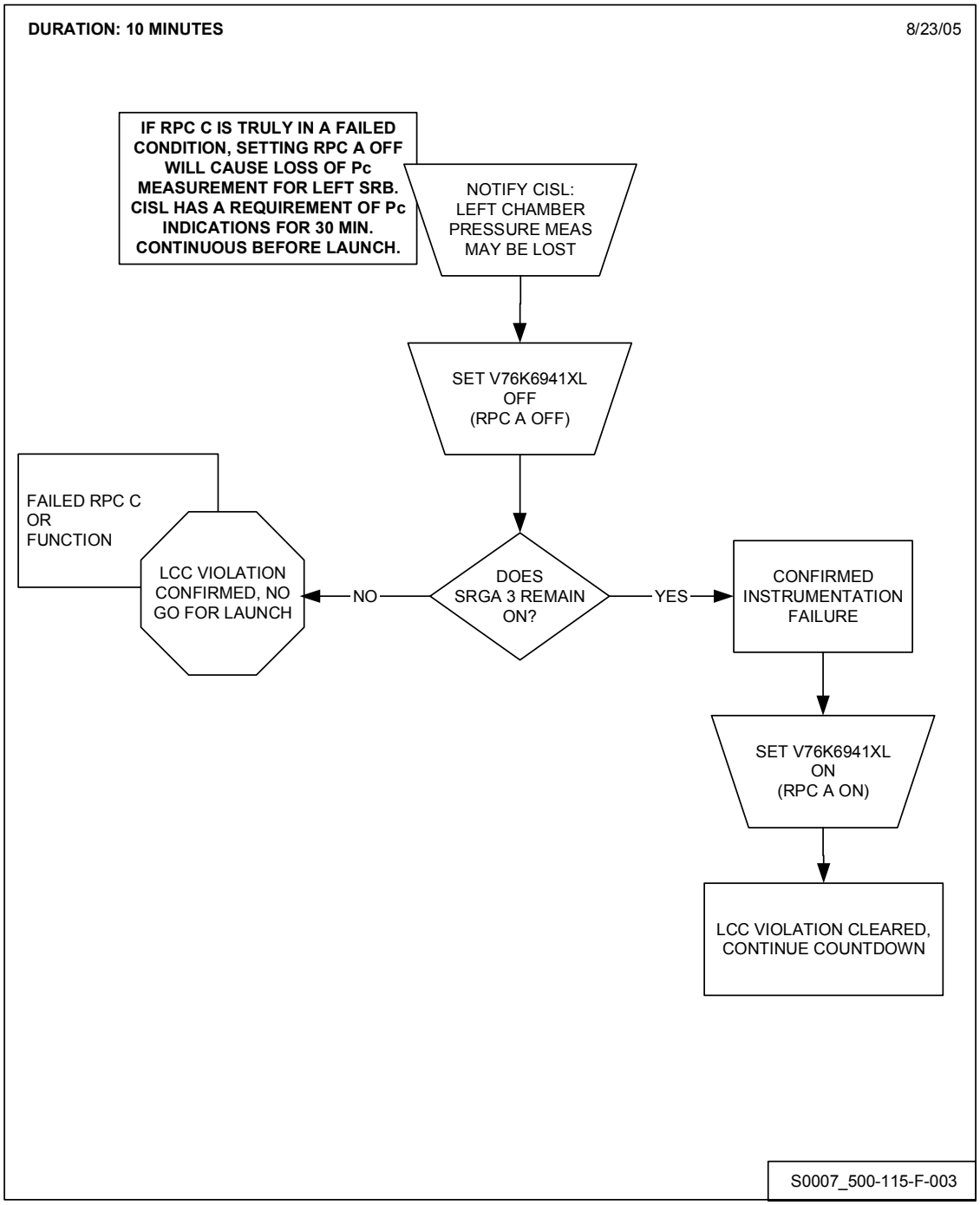


Accelerometer Power Anomaly (SSID GNC-09) (Page 3 of 3)



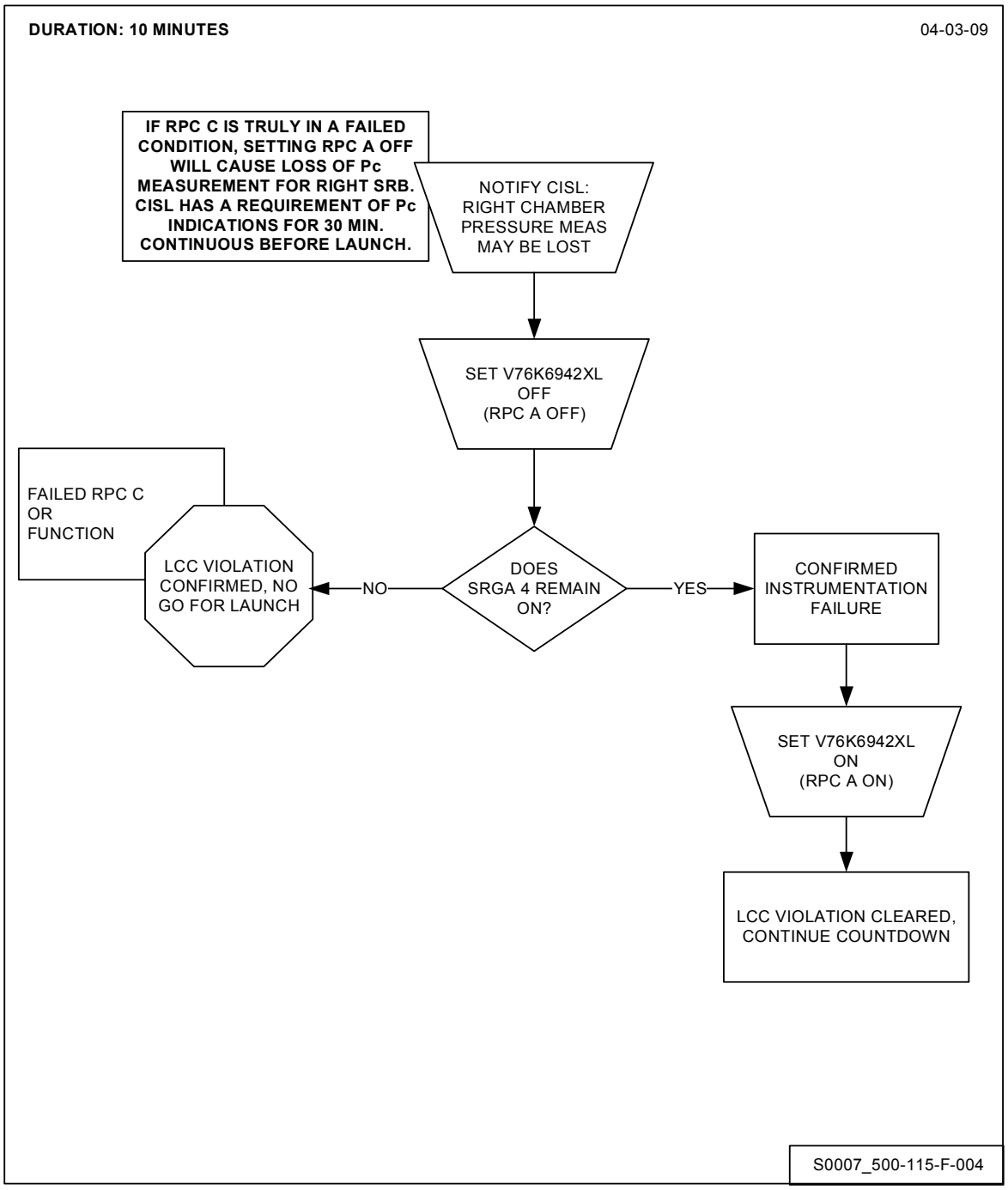
SRB Bus C Power (SSID GNC-10)

115-3 Loss of V76X4393E1 Left SRB Bus C RPC C (SSID GNC-10) (Page 1 of 4)



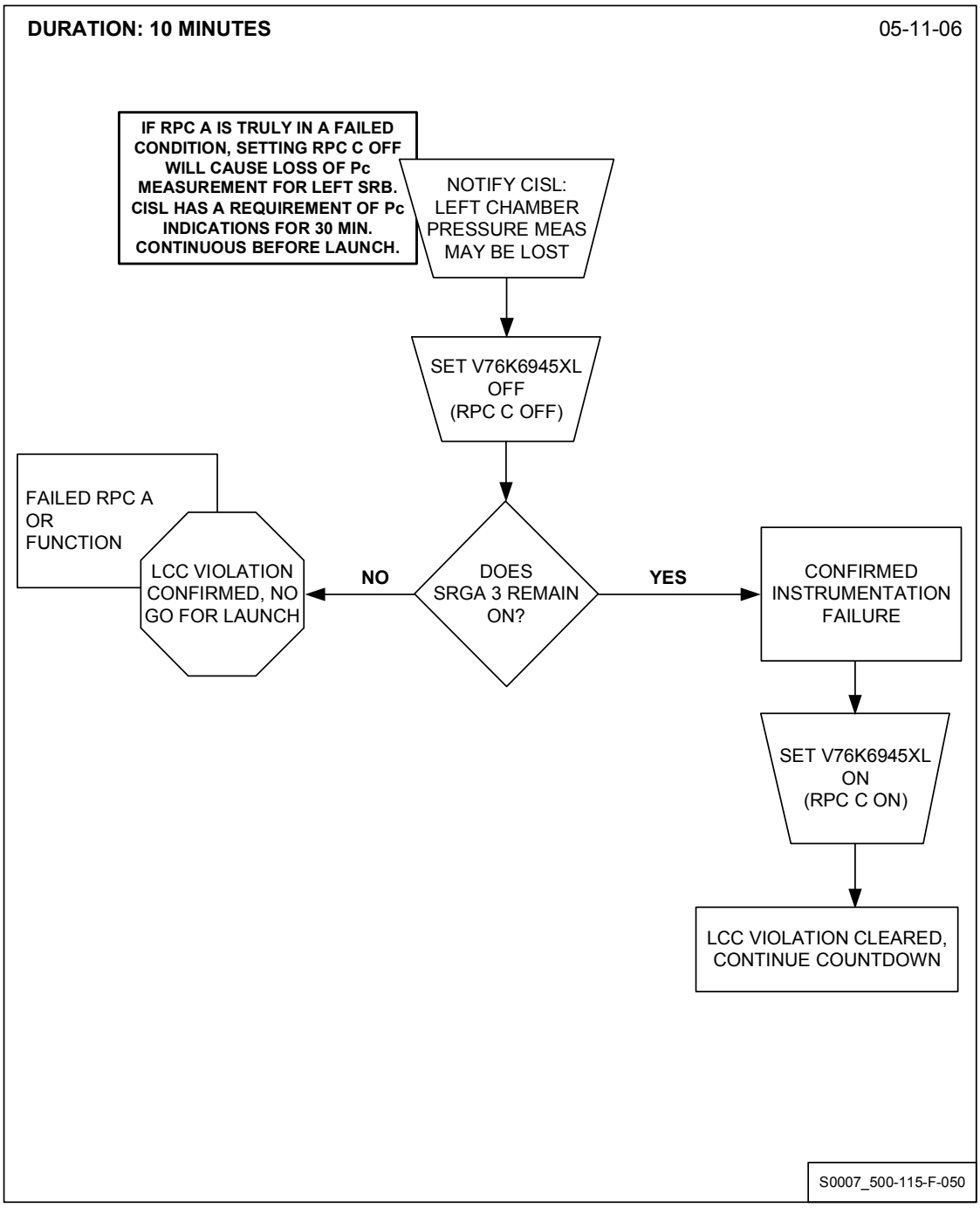
115-4

Loss of V76X4394E1 Right SRB Bus C RPC C (SSID GNC-10) (Page 2 of 4)



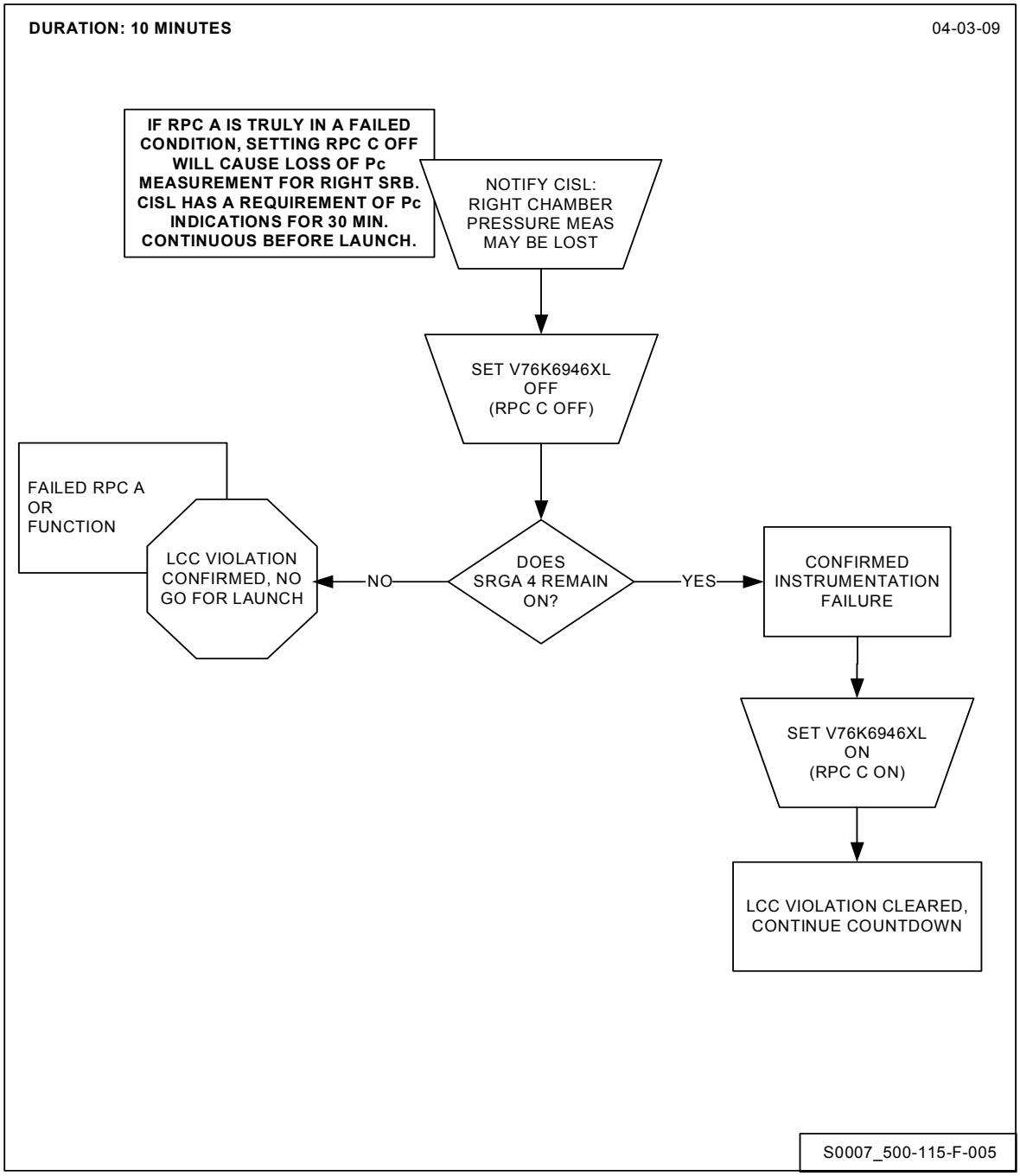
115-5

Loss of V76X4399E1 Left SRB Bus C RPC A (SSID GNC-10) (Page 3 of 4)



115-6

Loss of V76X4390E1 Right SRB Bus C RPC A (SSID GNC-10) (Page 4 of 4)



Orbiter Rate Gyro Fail (SSID GNC-12)

NOTE

Duration: 15 minutes

The Redundancy Management (RM) status of the Orbiter RGAs will be represented on SPEC 53 (in OPS1) per the following:

"*" - RM deselected unit

"M" - COMM fault or missing data

Blank display - nominal

Reference SPEC 53 below.

```
XXX/053/                    CONTROLS            XX X DDD/HH:MM:SS
                                                     DDD/HH:MM:SS

SEC ACT CK                AERO PORT STAT          SSME PORT STAT
                                  1 2 3 4                  1 2 3 4
 CH1        1X                L OB 1 S S S S        L P   S S S S
    2       2X                  IB 2  S S S S         Y    S S S S
    3       3X                R IB 3  S S S S       C P   S S S S
    4       4X                 OB 4  S S S S         Y    S S S S
START       5X                RUD 5  S S S S        R P   S S S S
STOP        6X              SPD BRK 6  S S S S       Y    S S S S

NEG STIM                          ACT/CH
 ENA 7X                   8 BYPASS     XX
                          9 RESET      XX

LRU          AA          RGA          SURF FDBK
             DES         DES            DES
 1          10X  S      14X   S        18X   S
 2          11X  S      15X   S        19X   S
 3          12X  S      16X   S        20X   S
 4          13X  S      17X   S        21X   S
                                                    (XX)
```

NOTE
Perform the following two steps to reselect a deselected RGA.

115-7

_____ KYBD (L OR R)

SPEC 053 PRO

CRT _____ (1, 2, OR 3)

VERIFY "CONTROLS" DISPLAY

Not Performed:_____

NOTE
Perform next step for specific RGA per the following:

Item No.	
14	RGA 1
15	RGA 2
16	RGA 3
17	RGA 4

115-8

_____ KYBD (L OR R)

ITEM _____ EXEC (RGA RESELECT)

CRT _____ (1, 2, OR 3)

VERIFY RGA _____ DISPLAY BLANK

Not Performed:_____

Accelerometer Fail (SSID GNC-13)

NOTE

Duration: 15 minutes

The Redundancy Management (RM) status of the AAs will be represented on SPEC 53 (in OPS 1) per the following:

"*" - RM deselect unit

"M" - COMM fault or missing data

Blank display - nominal

Reference SPEC 53 below.

XXX/053/ CONTROLS XX X DDD/HH:MM:SS
DDD/HH:MM:SS

SEC ACT CK		AERO PORT STAT		SSME PORT STAT	
			1 2 3 4		1 2 3 4
CH1	1X	L OB 1	S S S S	L P	S S S S
2	2X	IB 2	S S S S	Y	S S S S
3	3X	R IB 3	S S S S	C P	S S S S
4	4X	OB 4	S S S S	Y	S S S S
START	5X	RUD 5	S S S S	R P	S S S S
STOP	6X	SPD BRK 6	S S S S	Y	S S S S

NEG STIM		ACT/CH
ENA 7X	8 BYPASS	XX
	9 RESET	XX

LRU	AA DES	RGA DES	SURF FDBK DES
1	10X S	14X S	18X S
2	11X S	15X S	19X S
3	12X S	16X S	20X S
4	13X S	17X S	21X S

(XX)

NOTE

Perform the following two steps to reselect a deselected Accelerometer Assembly (AA).

115-9

_____ KYBD (L OR R)

SPEC 053 PRO

CRT _____ (1, 2, OR 3)

VERIFY "CONTROLS" DISPLAY

Not Performed:_____

NOTE

Perform the next step for specific AA per the following:

Item No.	
10	AA1
11	AA2
12	AA3
13	AA4

115-10

_____ KYBD (L OR R)

ITEM _____ EXEC (AA RESELECT)

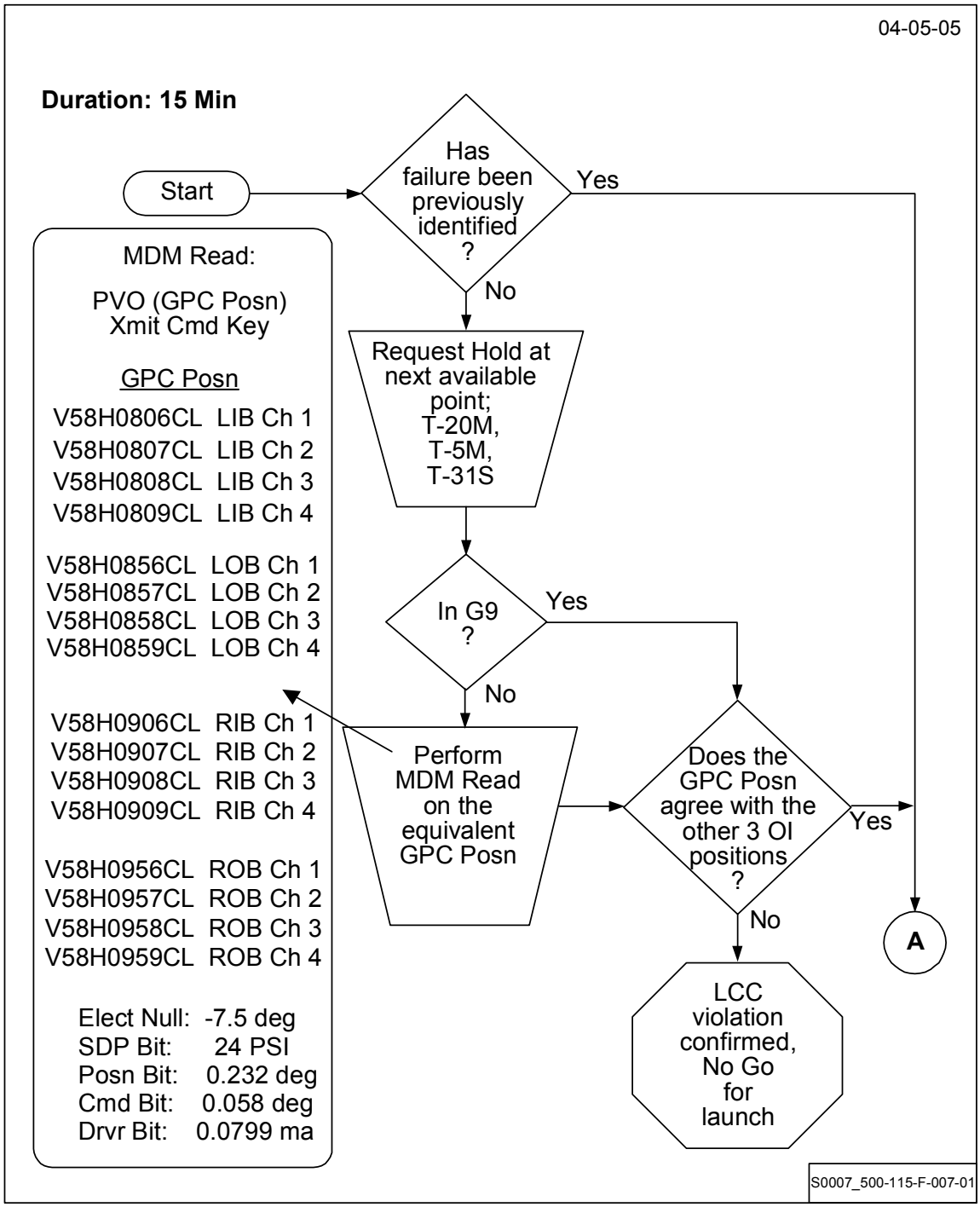
CRT _____ (1, 2, OR 3)

VERIFY AA _____ DISPLAY BLANK

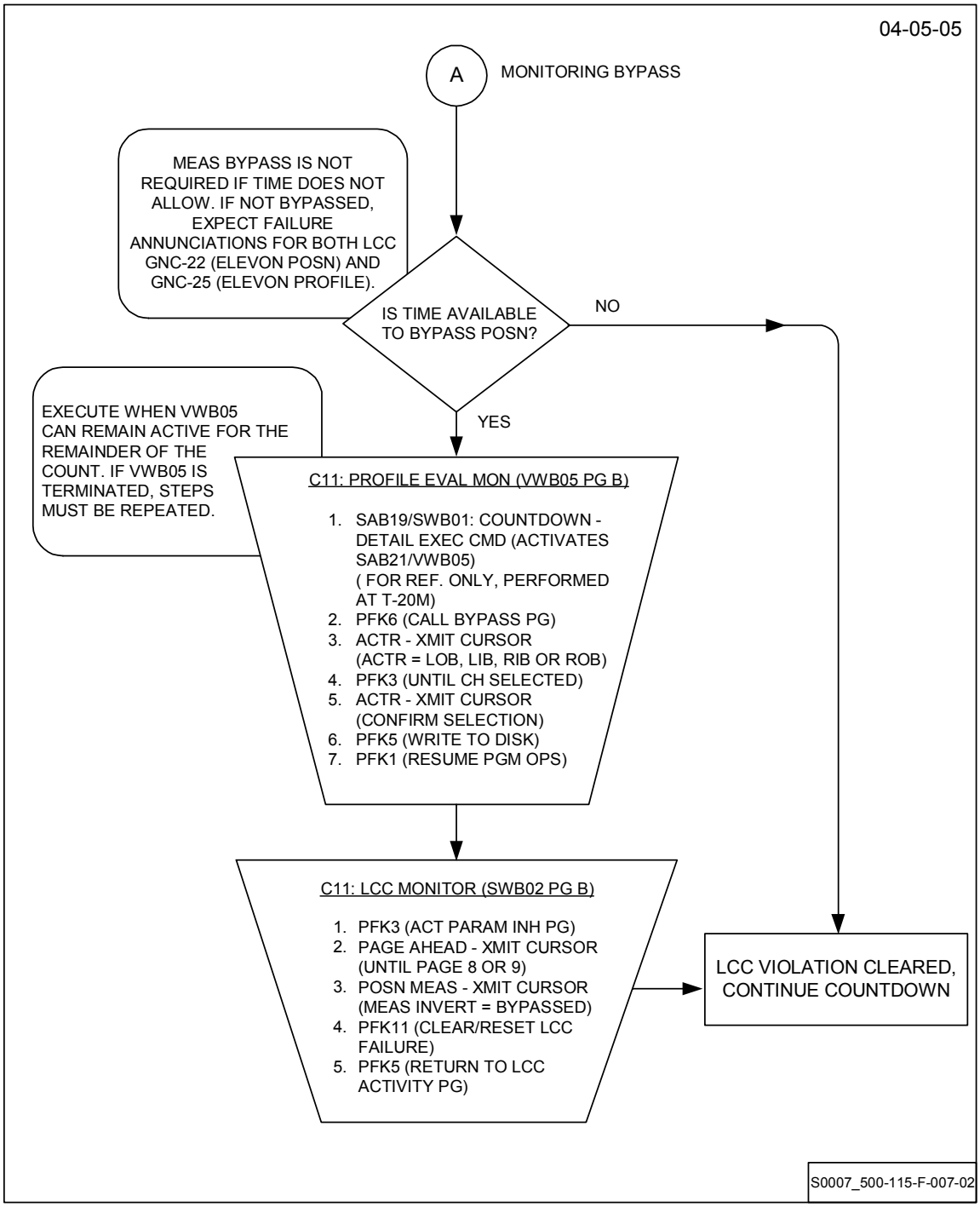
Not Performed:_____

115-11

Elevon Actuator Position Anomaly (SSID GNC-22) (Page 1 of 2)

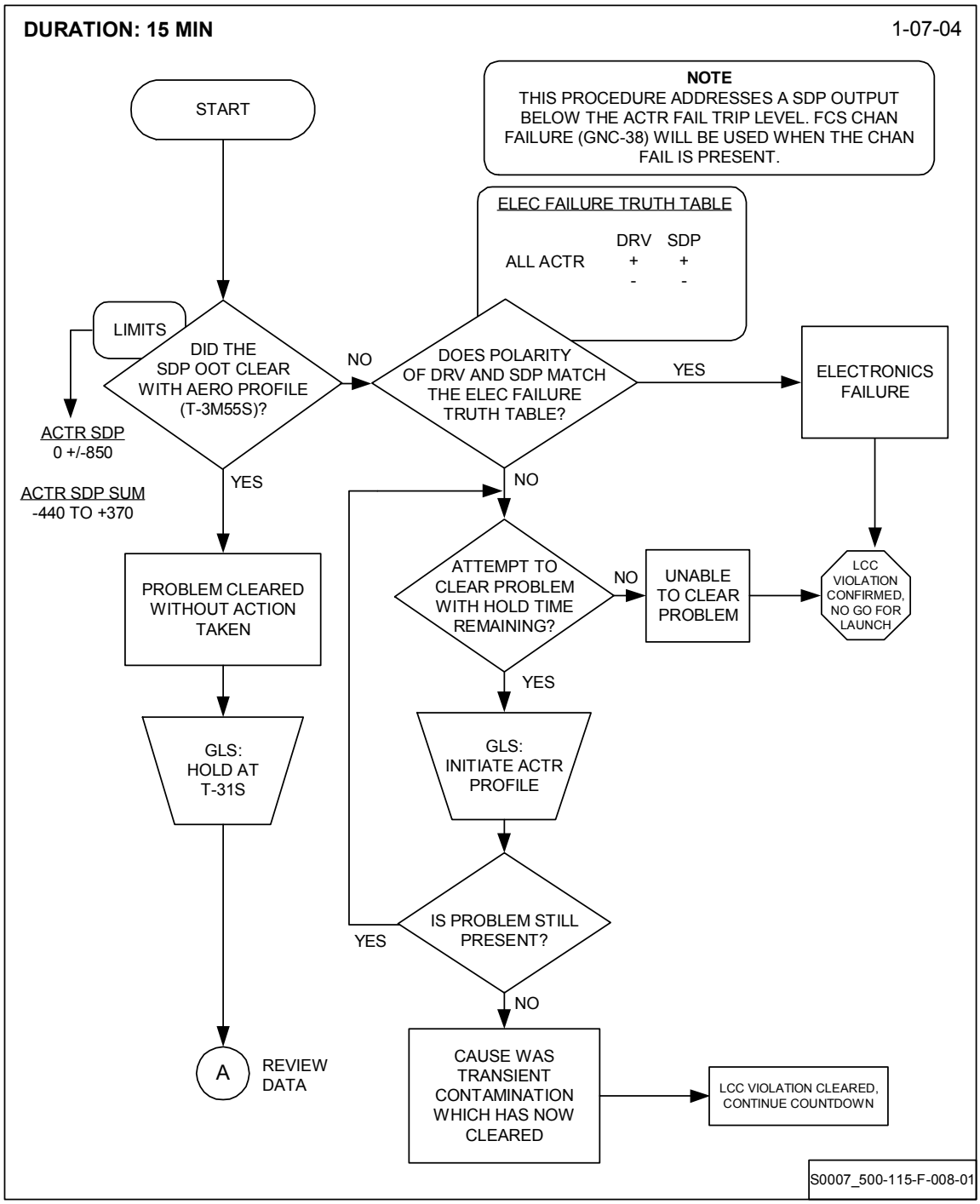


Elevon Actuator Position Anomaly (SSID GNC-22) (Page 2 of 2)



115-12

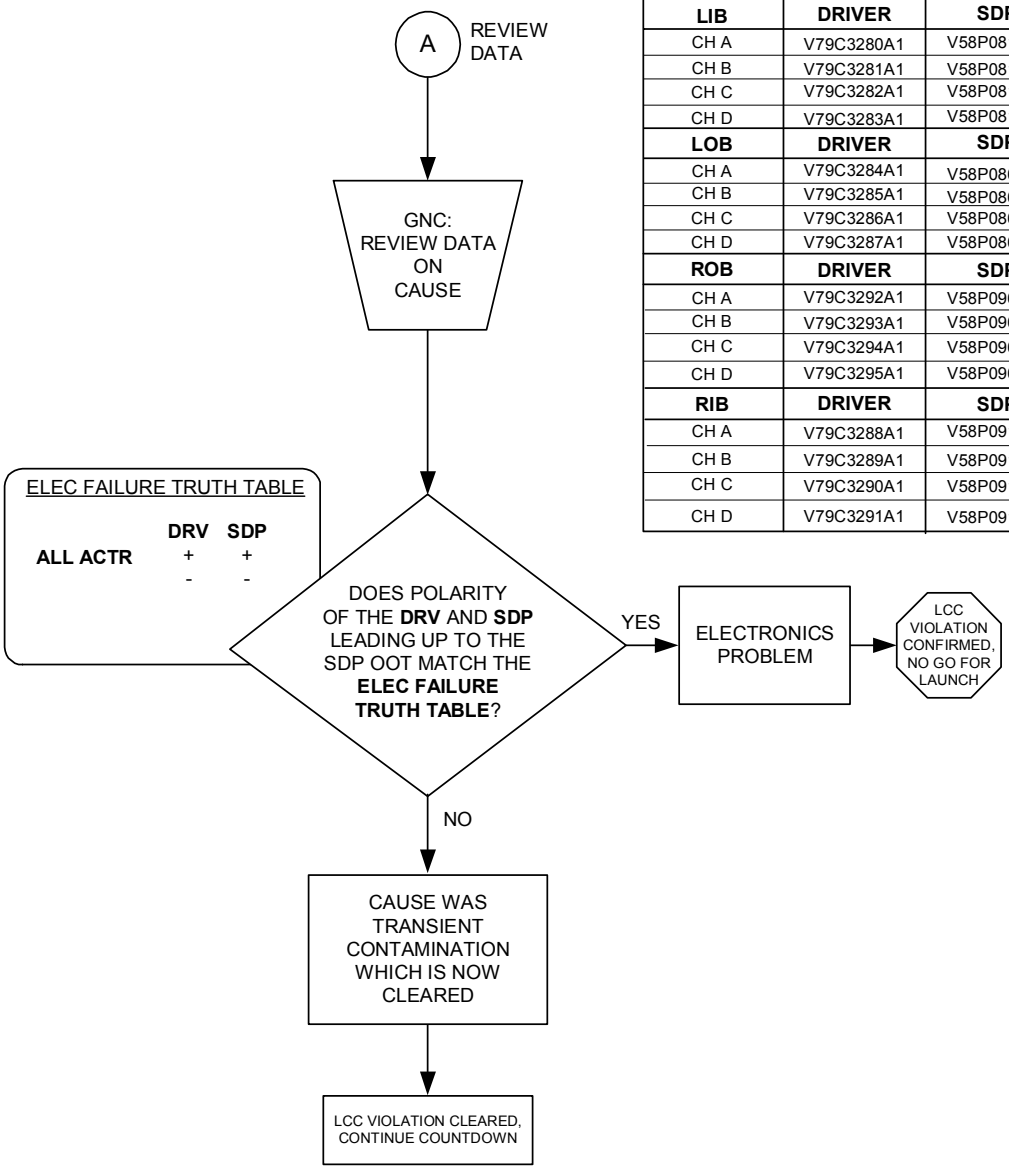
Elevon Secondary Delta Pressure Anomaly (SSID GNC-24) (Page 1 of 2)



Elevon Secondary Delta Pressure Anomaly (SSID GNC-24) (Page 2 of 2)

04-05-05

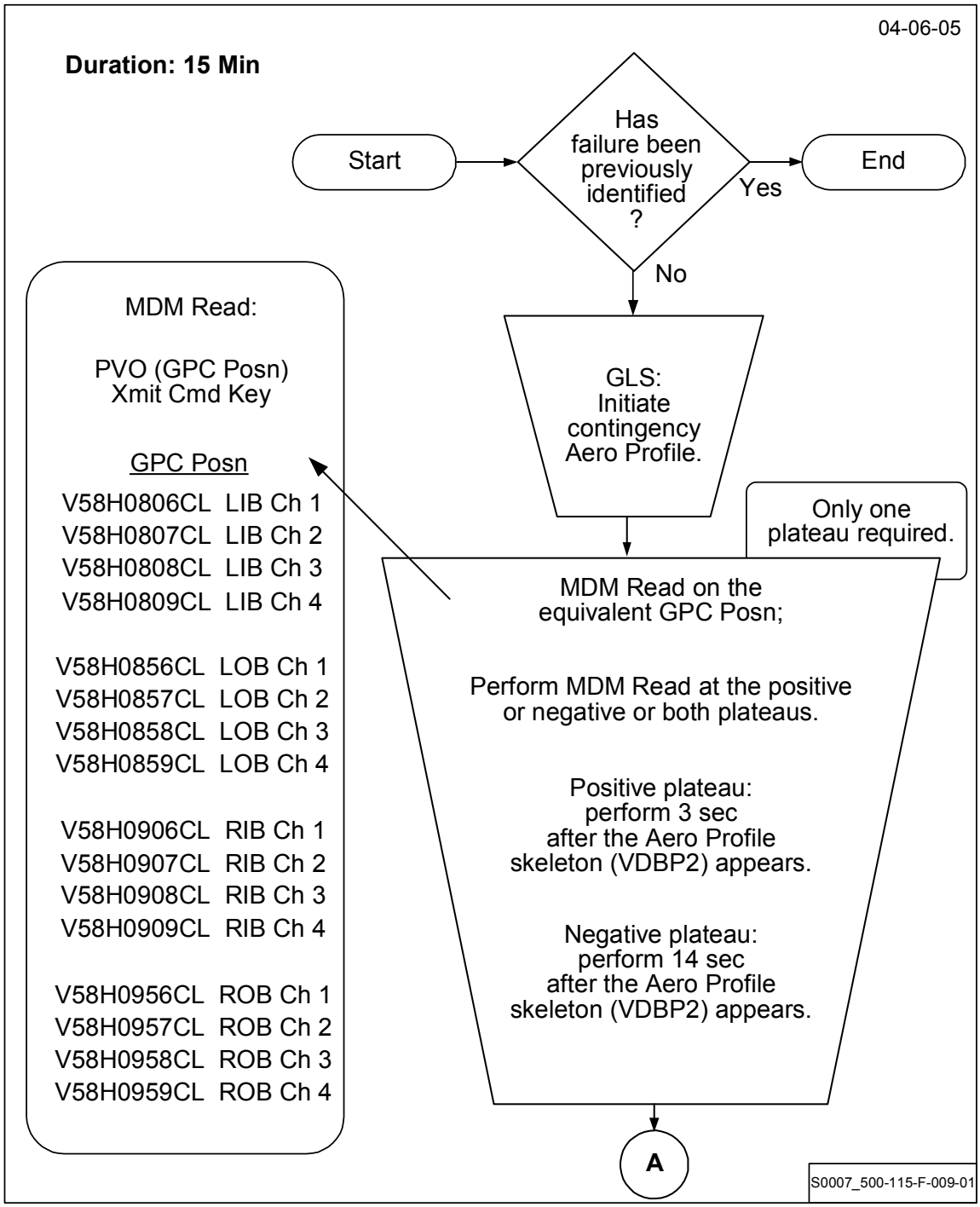
ELEVONS		
LIB	**DRIVER**	**SDP**
CH A	V79C3280A1	V58P0812A1
CH B	V79C3281A1	V58P0813A1
CH C	V79C3282A1	V58P0814A1
CH D	V79C3283A1	V58P0815A1
LOB	**DRIVER**	**SDP**
CH A	V79C3284A1	V58P0862A1
CH B	V79C3285A1	V58P0863A1
CH C	V79C3286A1	V58P0864A1
CH D	V79C3287A1	V58P0865A1
ROB	**DRIVER**	**SDP**
CH A	V79C3292A1	V58P0962A1
CH B	V79C3293A1	V58P0963A1
CH C	V79C3294A1	V58P0964A1
CH D	V79C3295A1	V58P0965A1
RIB	**DRIVER**	**SDP**
CH A	V79C3288A1	V58P0912A1
CH B	V79C3289A1	V58P0913A1
CH C	V79C3290A1	V58P0914A1
CH D	V79C3291A1	V58P0915A1



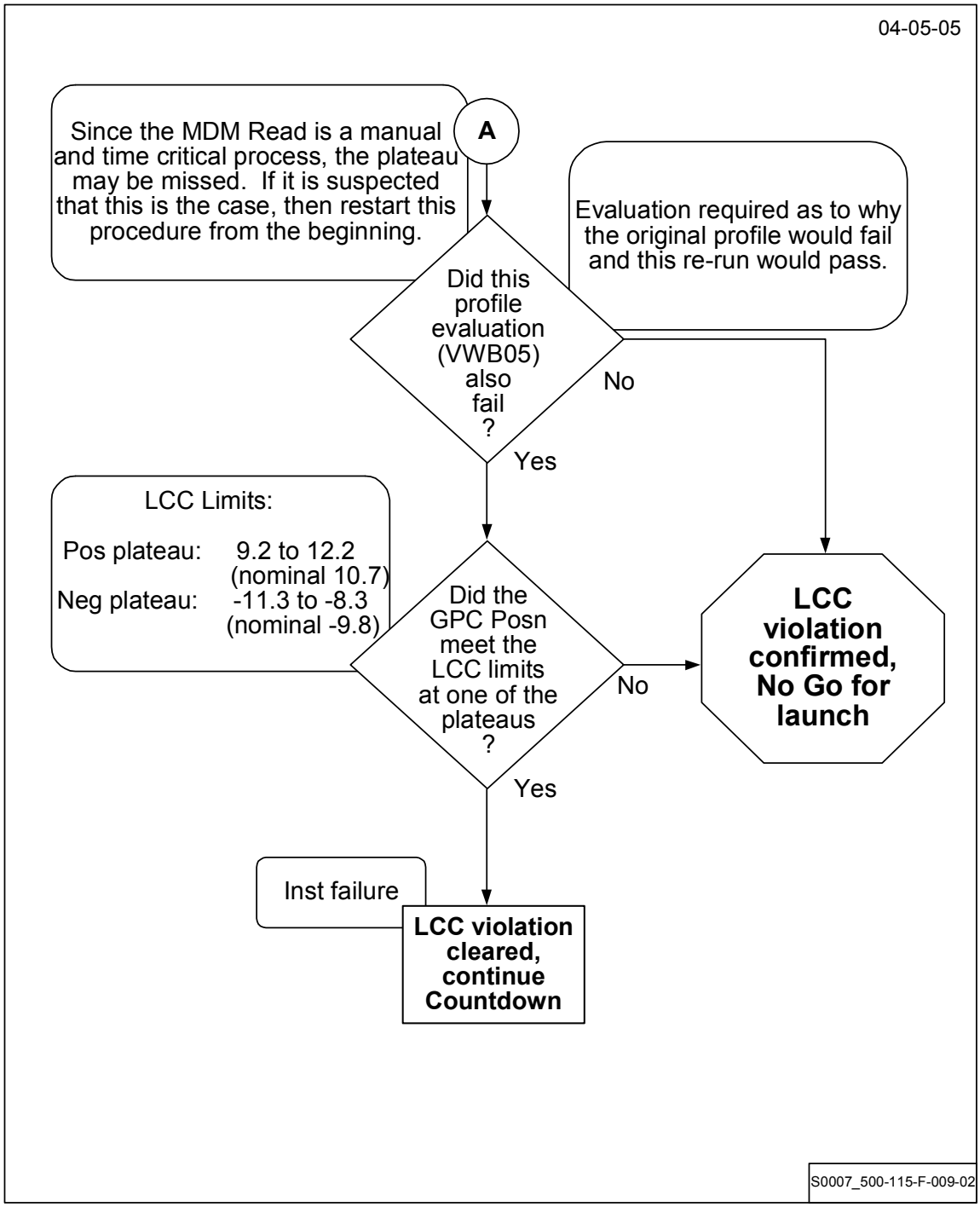
S0007_500-115-F-008-02

115-13

Elevon Aerosurface Profile Anomaly (SSID GNC-25) (Page 1 of 2)

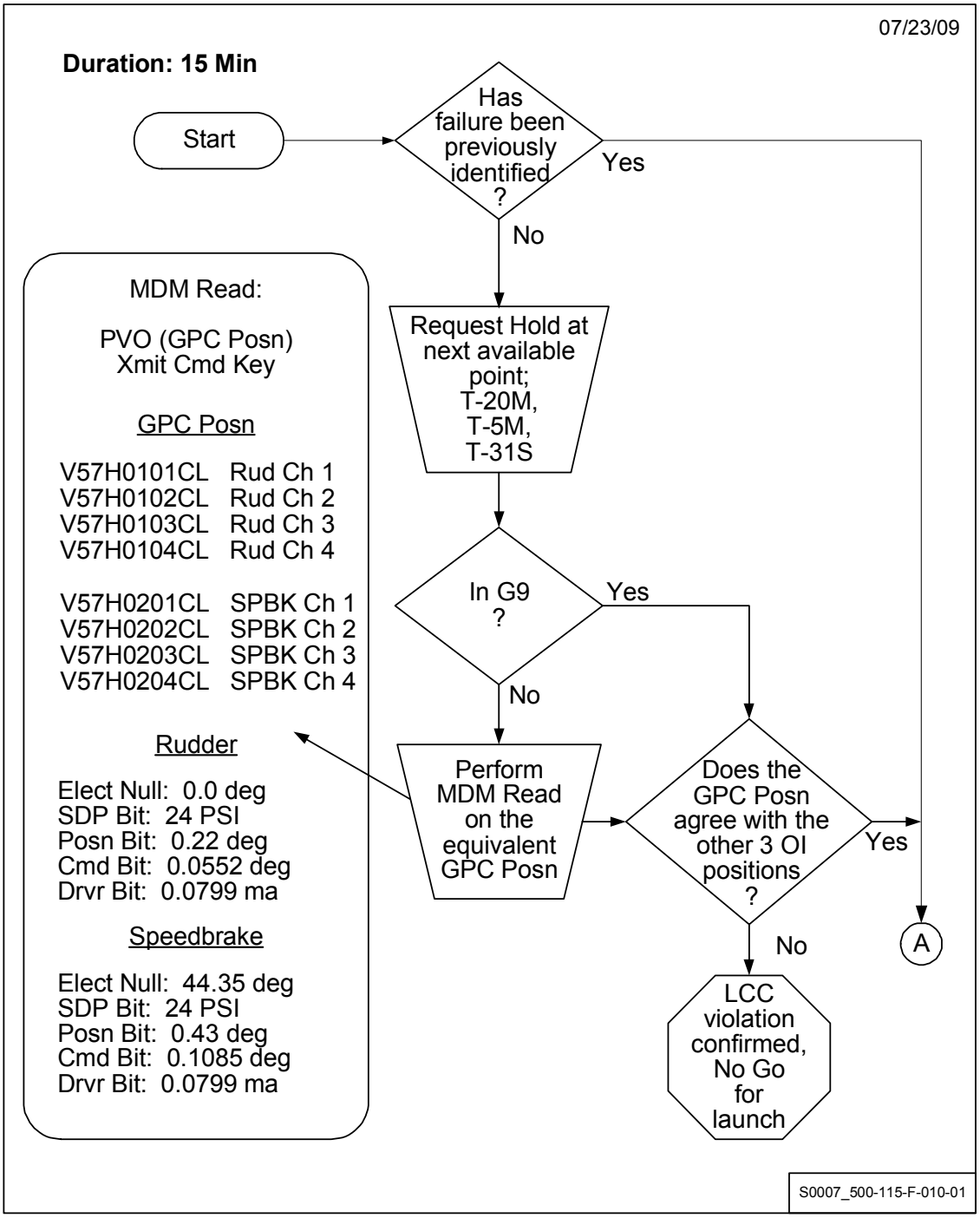


Elevon Aerosurface Profile Anomaly (SSID GNC-25) (Page 2 of 2)

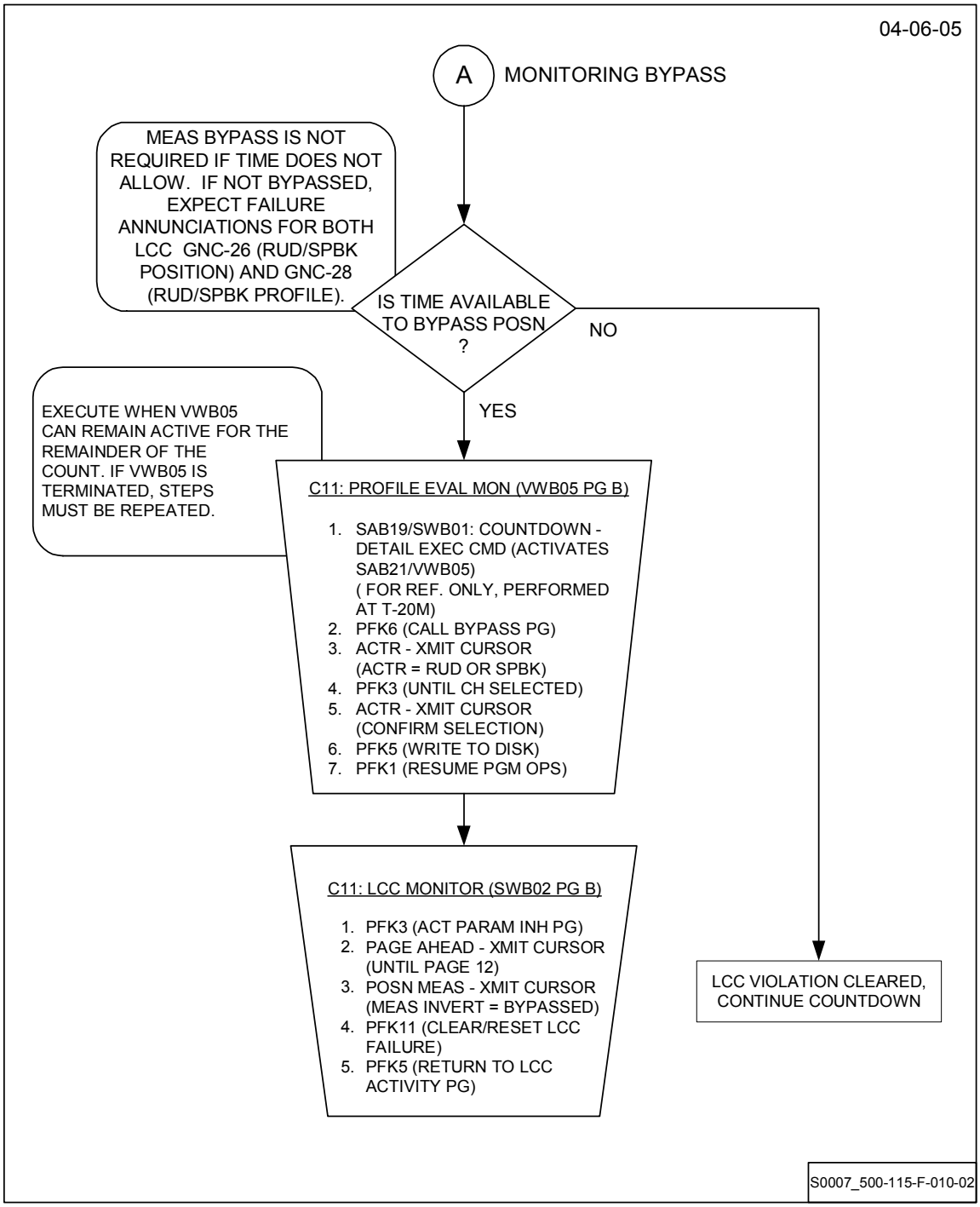


115-14

Rudder/Speedbrake Position Anomaly (SSID GNC-26) (Page 1 of 2)

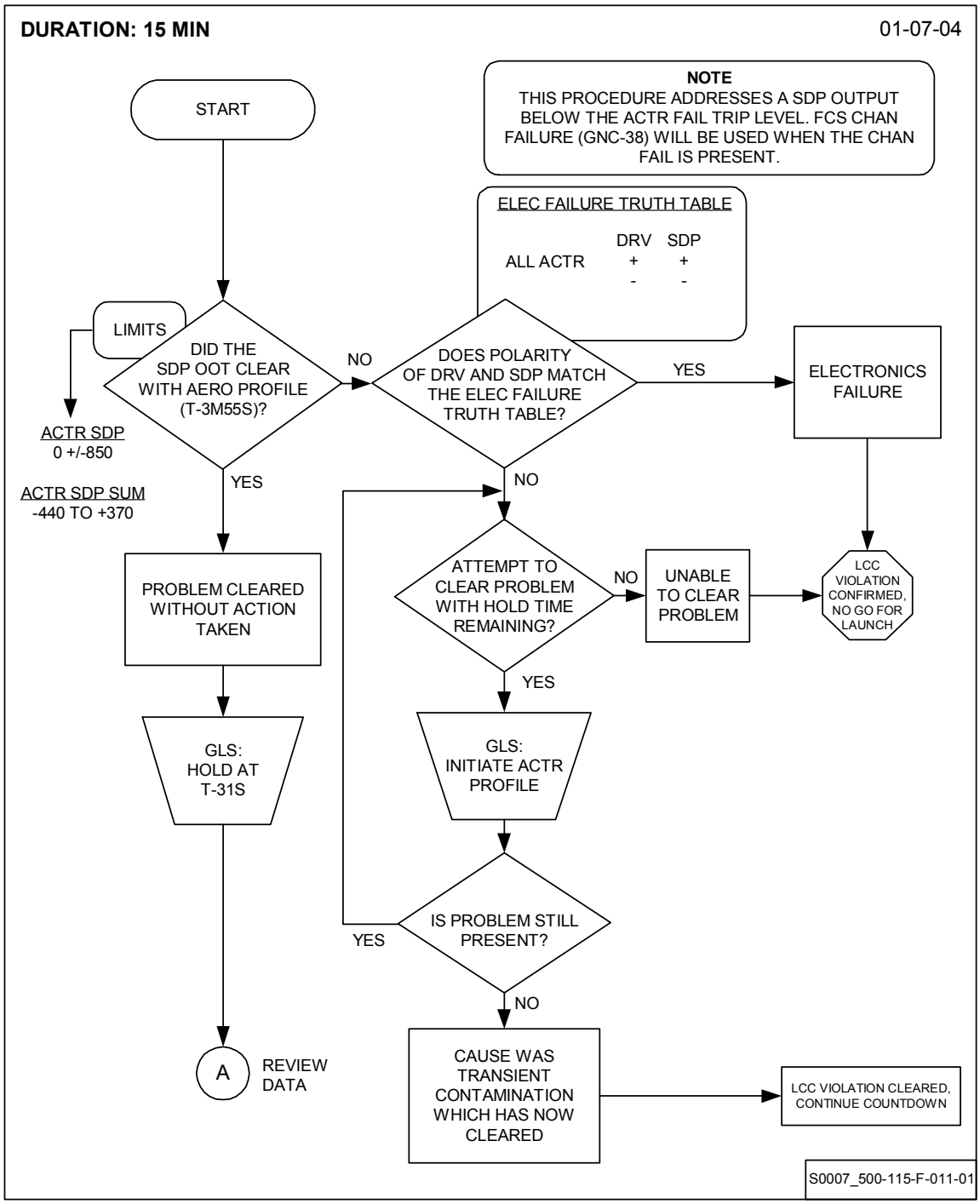


Rudder/Speedbrake Position Anomaly (SSID GNC-26) (Page 2 of 2)

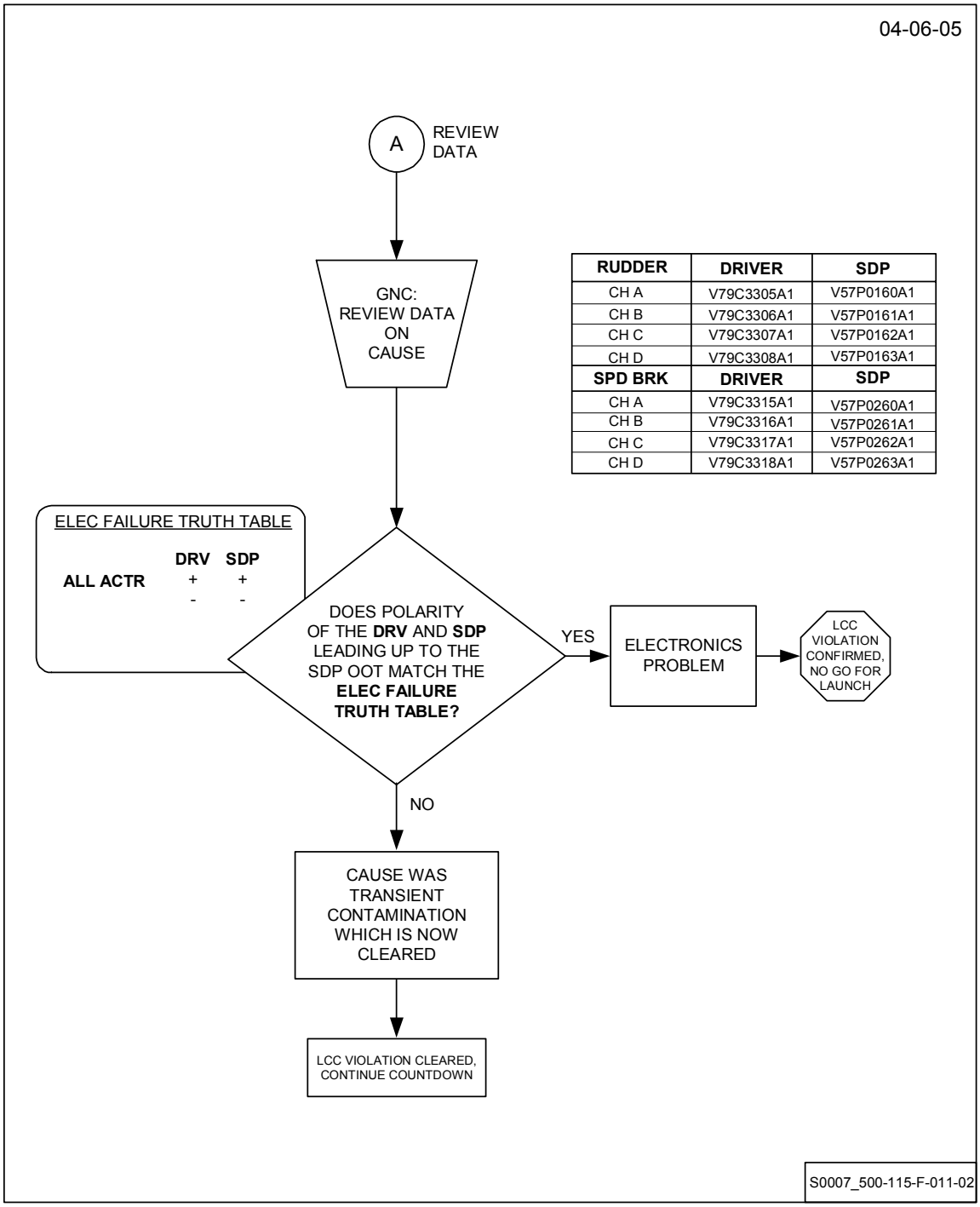


115-15

Rudder/Speedbrake Secondary Delta Pressure Anomaly (SSID GNC-27) (Page 1 of 2)



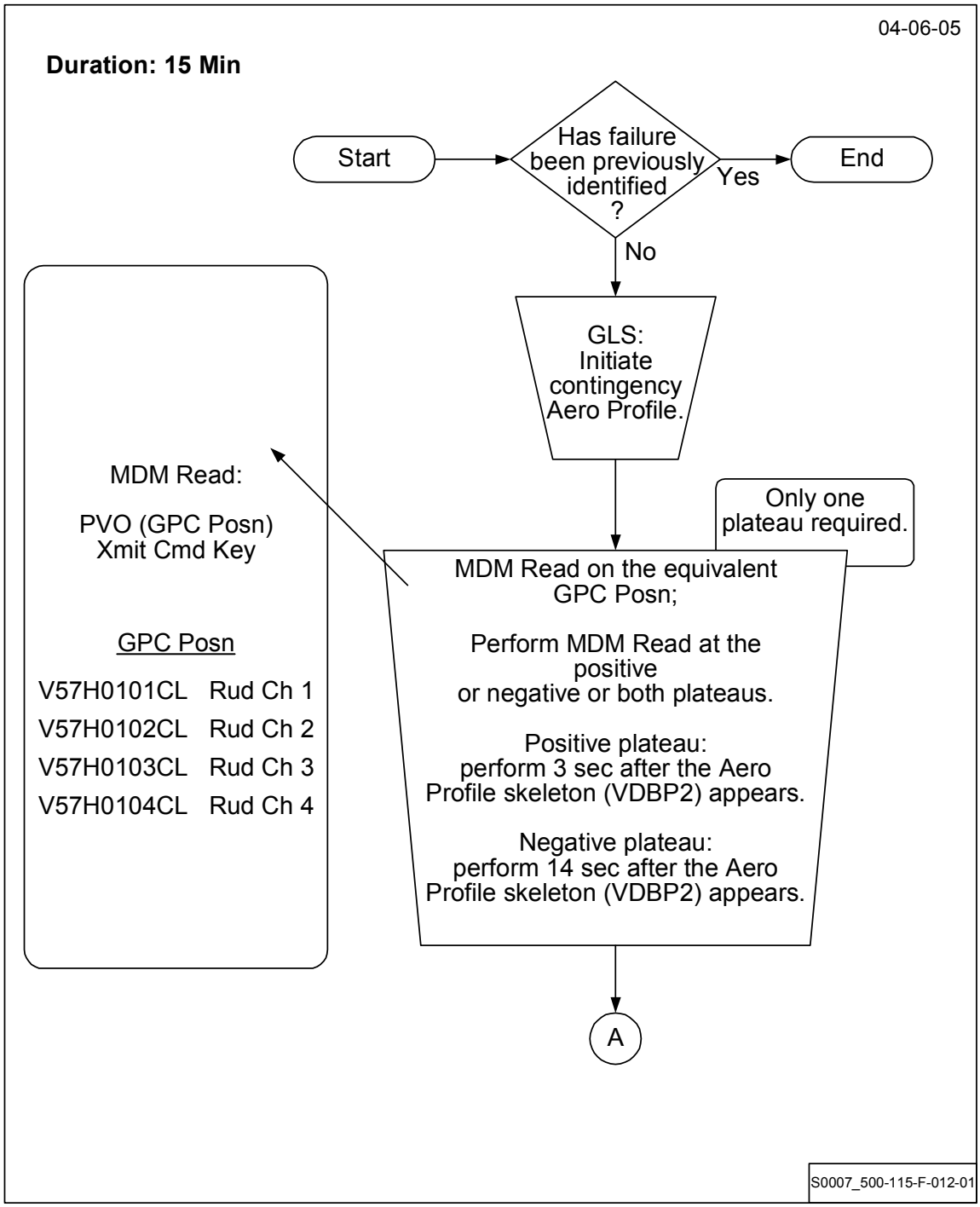
Rudder/Speedbrake Secondary Delta Pressure Anomaly (SSID GNC-27) (Page 2 of 2)



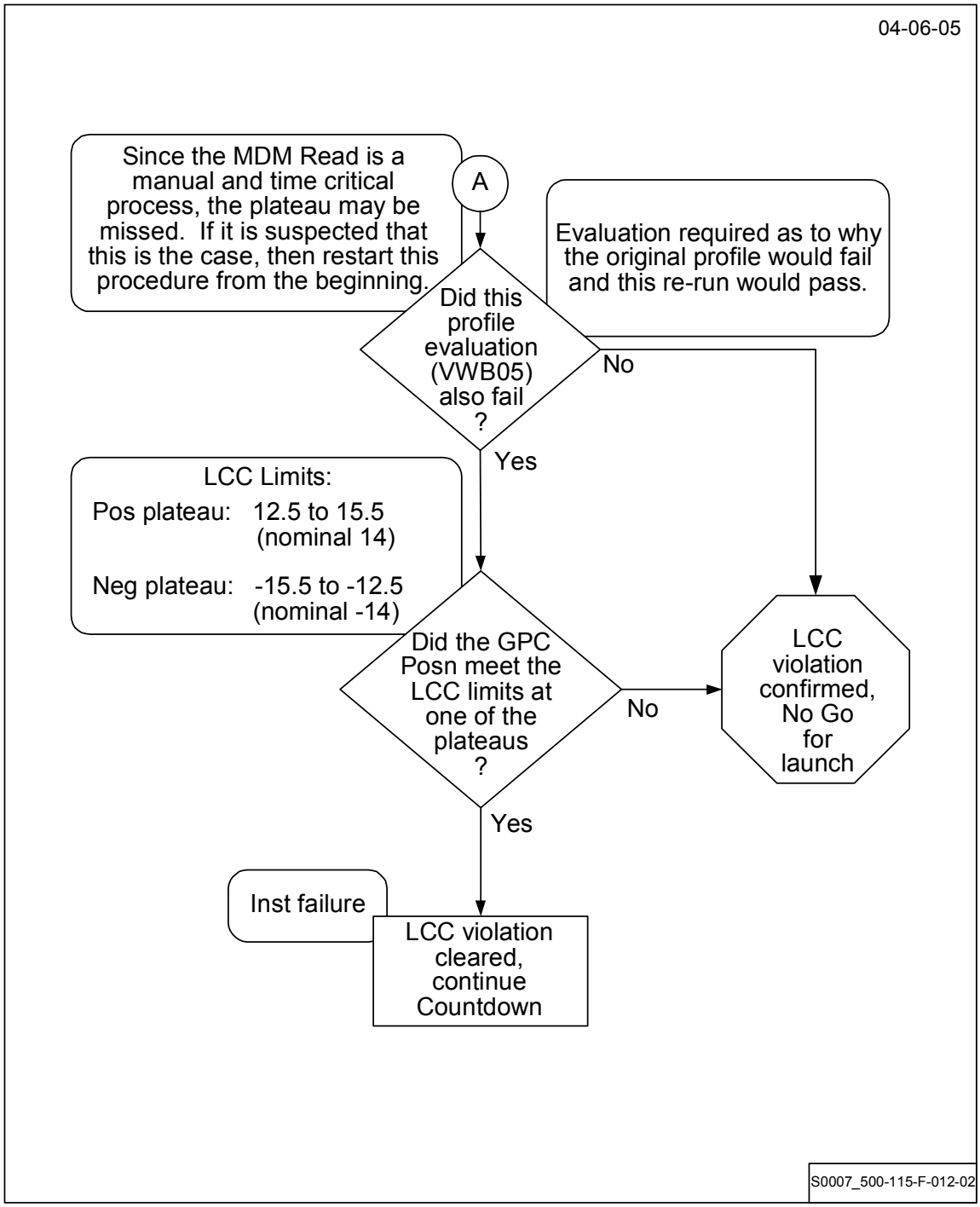
RUDDER	DRIVER	SDP
CH A	V79C3305A1	V57P0160A1
CH B	V79C3306A1	V57P0161A1
CH C	V79C3307A1	V57P0162A1
CH D	V79C3308A1	V57P0163A1
SPD BRK	**DRIVER**	**SDP**
CH A	V79C3315A1	V57P0260A1
CH B	V79C3316A1	V57P0261A1
CH C	V79C3317A1	V57P0262A1
CH D	V79C3318A1	V57P0263A1

115-16

Rudder Aerosurface Profile Anomaly (SSID GNC-28) (Page 1 of 2)

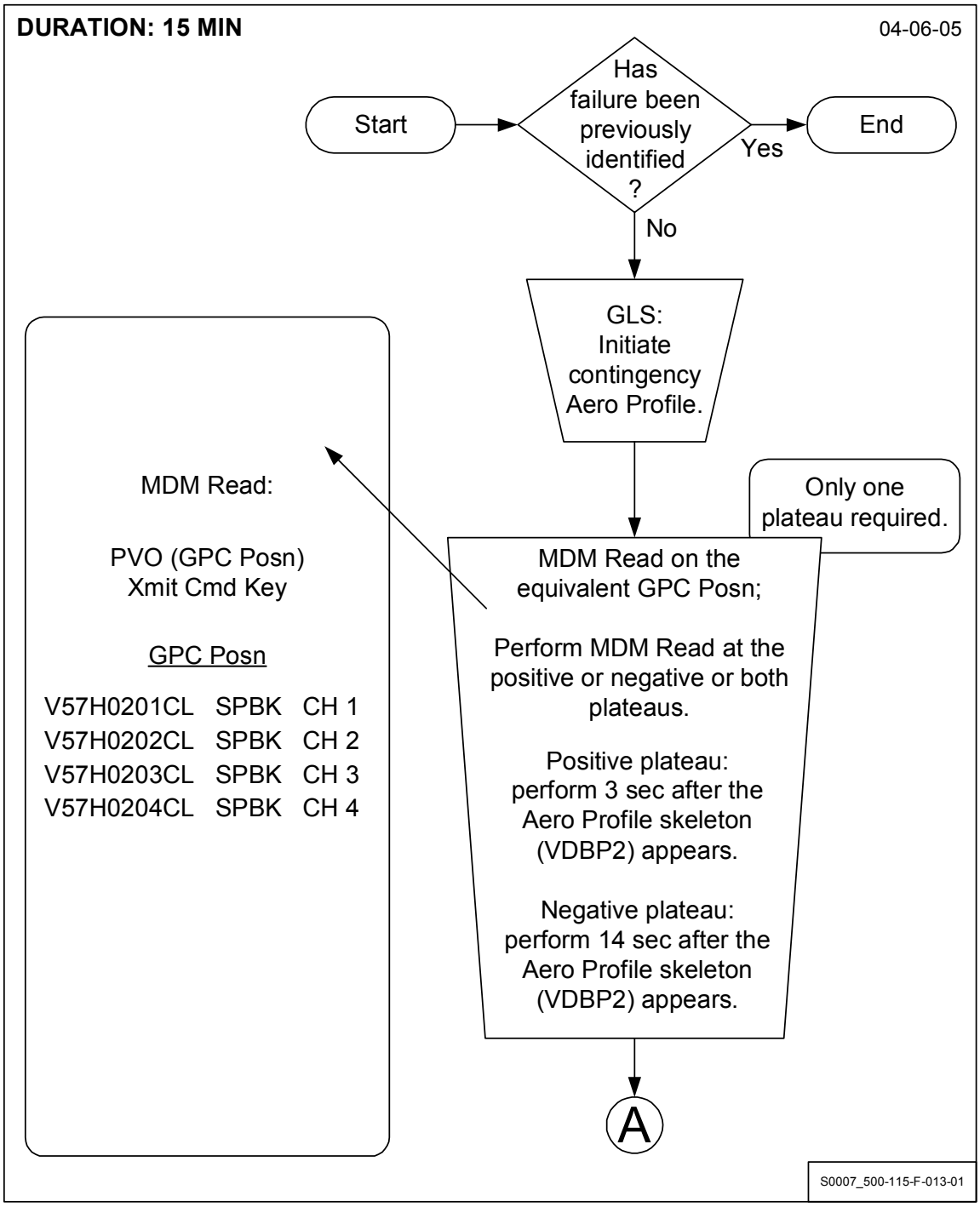


Rudder Aerosurface Profile Anomaly (SSID GNC-28) (Page 2 of 2)

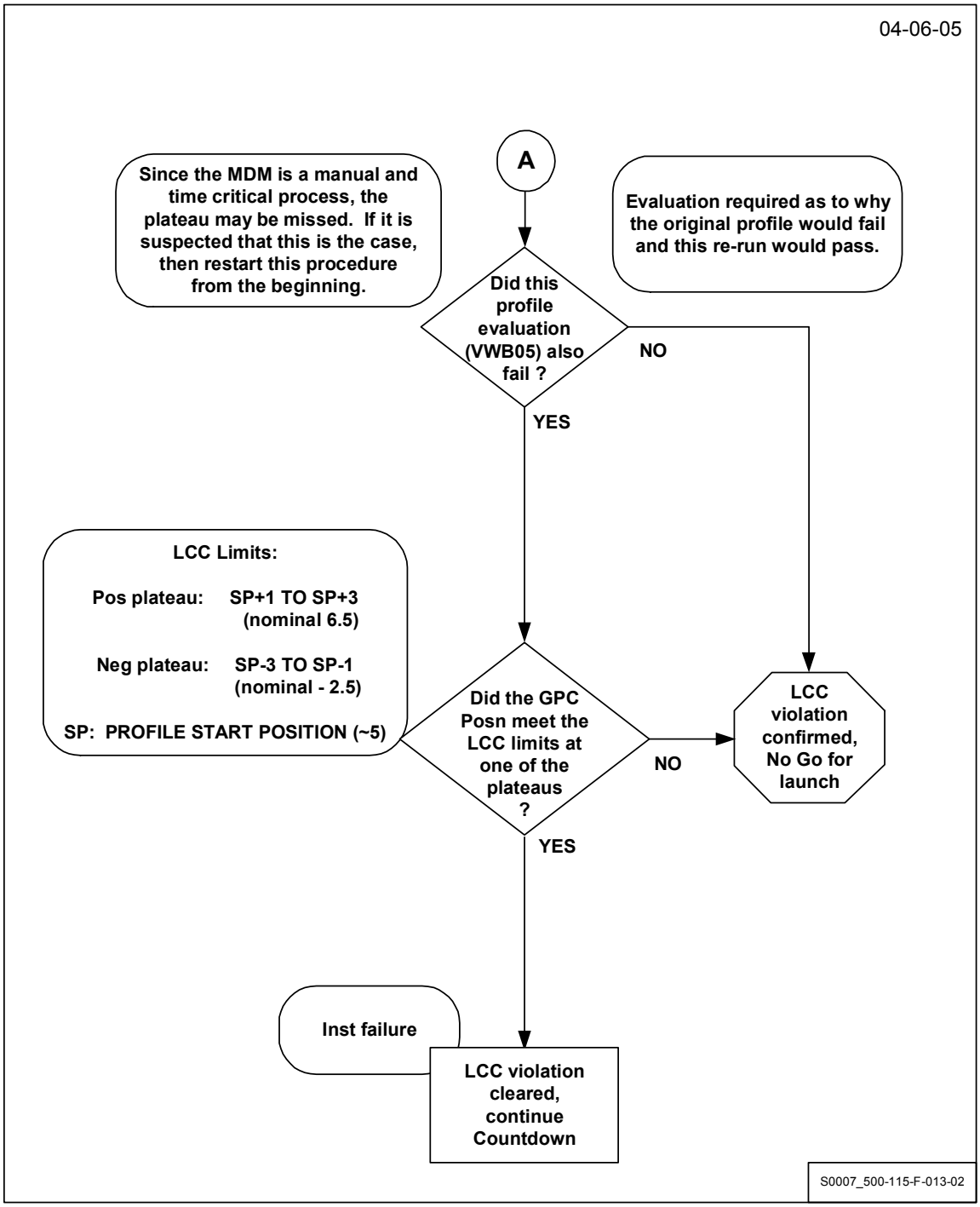


115-17

Speedbrake Aerosurface Profile Anomaly (SSID GNC-28) (Page 1 of 2)



Speedbrake Aerosurface Profile Anomaly (SSID GNC-28) (Page 2 of 2)



115-18

Orbiter ASA Power Anomaly (SSID GNC-32)

04-06-05

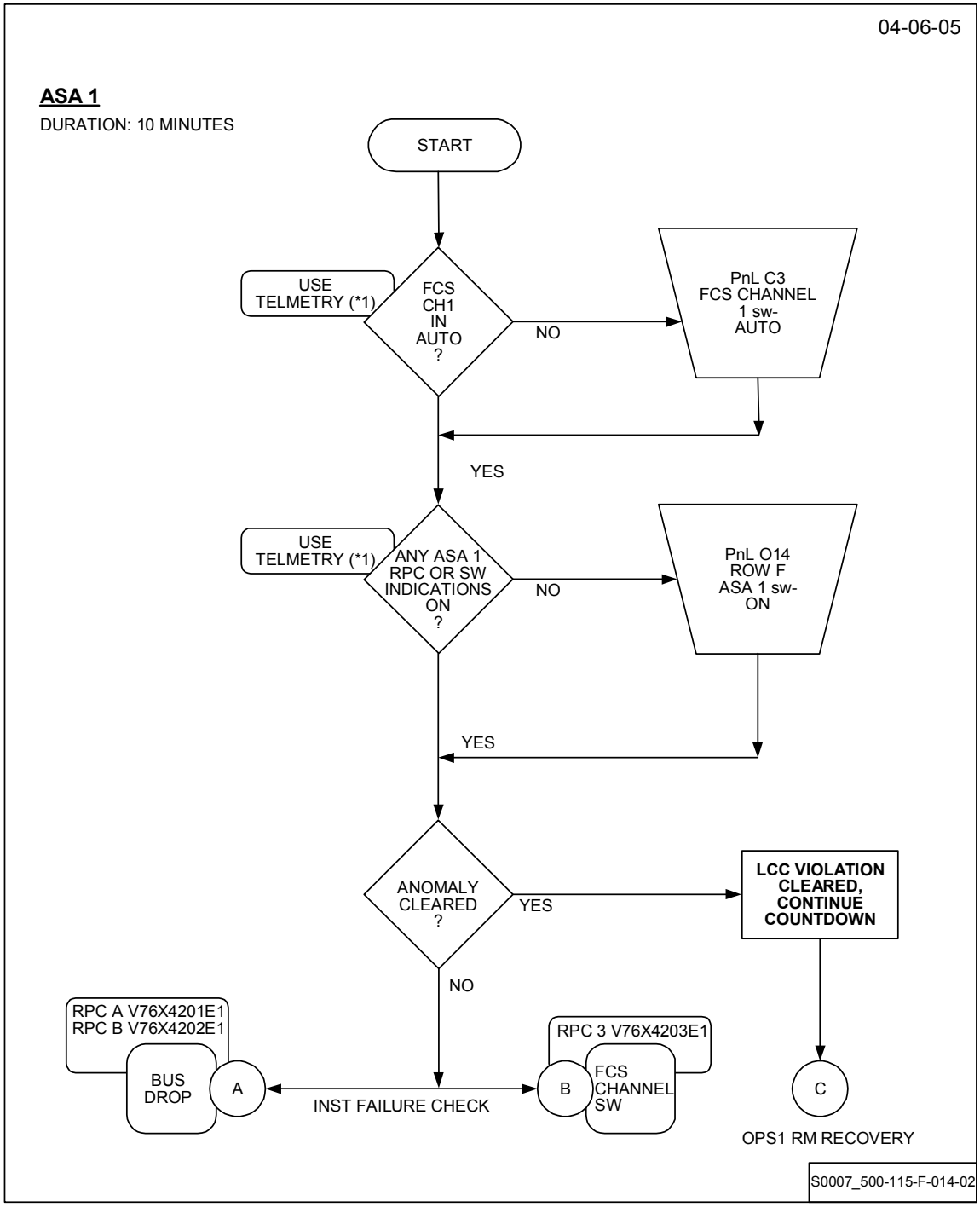
ASA RPC ASSOCIATIONS

	RPC **A** V76X4201E1	RPC **B** V76X4202E1	RPC **3** V76X4203E1
ASA 1	**BC1** (DROP)	**AB1** (DROP)	FCS CHANNEL **1** Sw (CYCLE)
ASA 2	RPC **B** V76X4204E1: **CA3** (DROP)	RPC **C** V76X4205E1: **BC2** (DROP)	RPC **3** V76X4206E1: FCS CHANNEL **2** Sw (CYCLE)
ASA 3	RPC **A** V76X4208E1: **CA1** (DROP)	RPC **C** V76X4207E1: **AB2** (DROP)	RPC **3** V76X4209E1: FCS CHANNEL **3** Sw (CYCLE)
ASA 4	RPC **A** V76X4211E1: **CA2** (DROP)	RPC **C** V76X4210E1: **AB3** (DROP)	

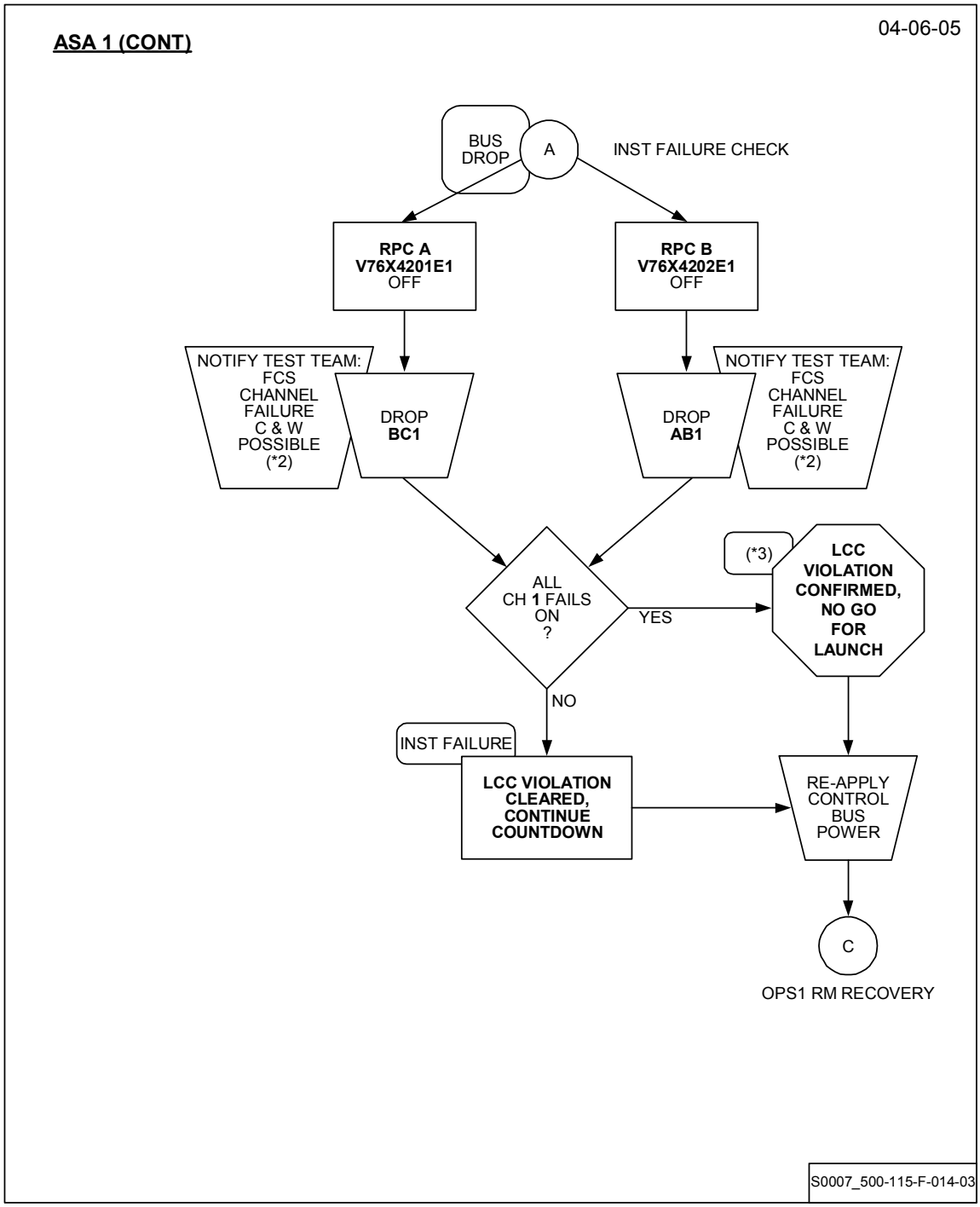
S0007_500-115-F-014-01

115-19

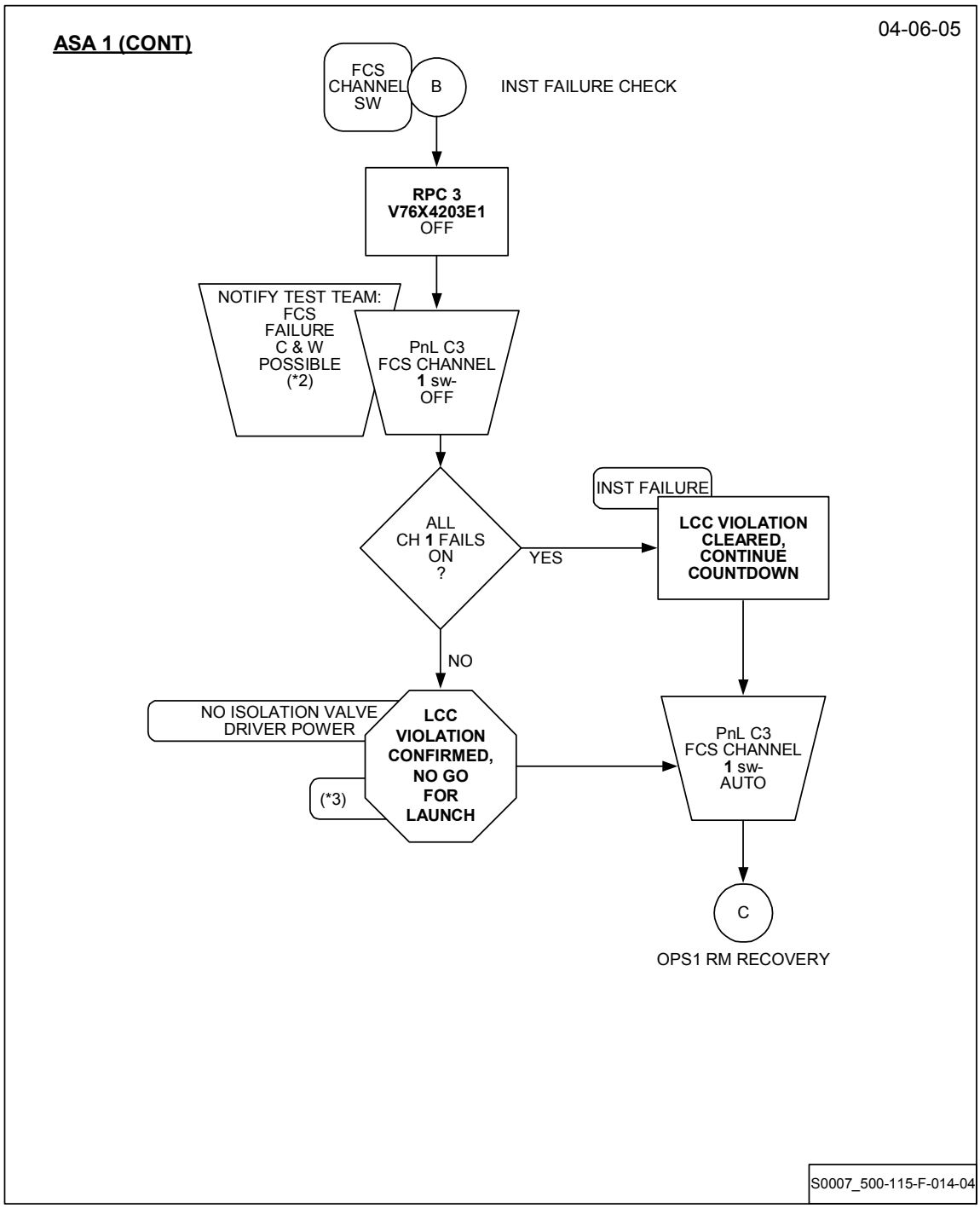
Orbiter ASA 1 Power Anomaly (SSID GNC-32) (Page 1 of 3)



Orbiter ASA 1 Power Anomaly (SSID GNC-32) (Page 2 of 3)

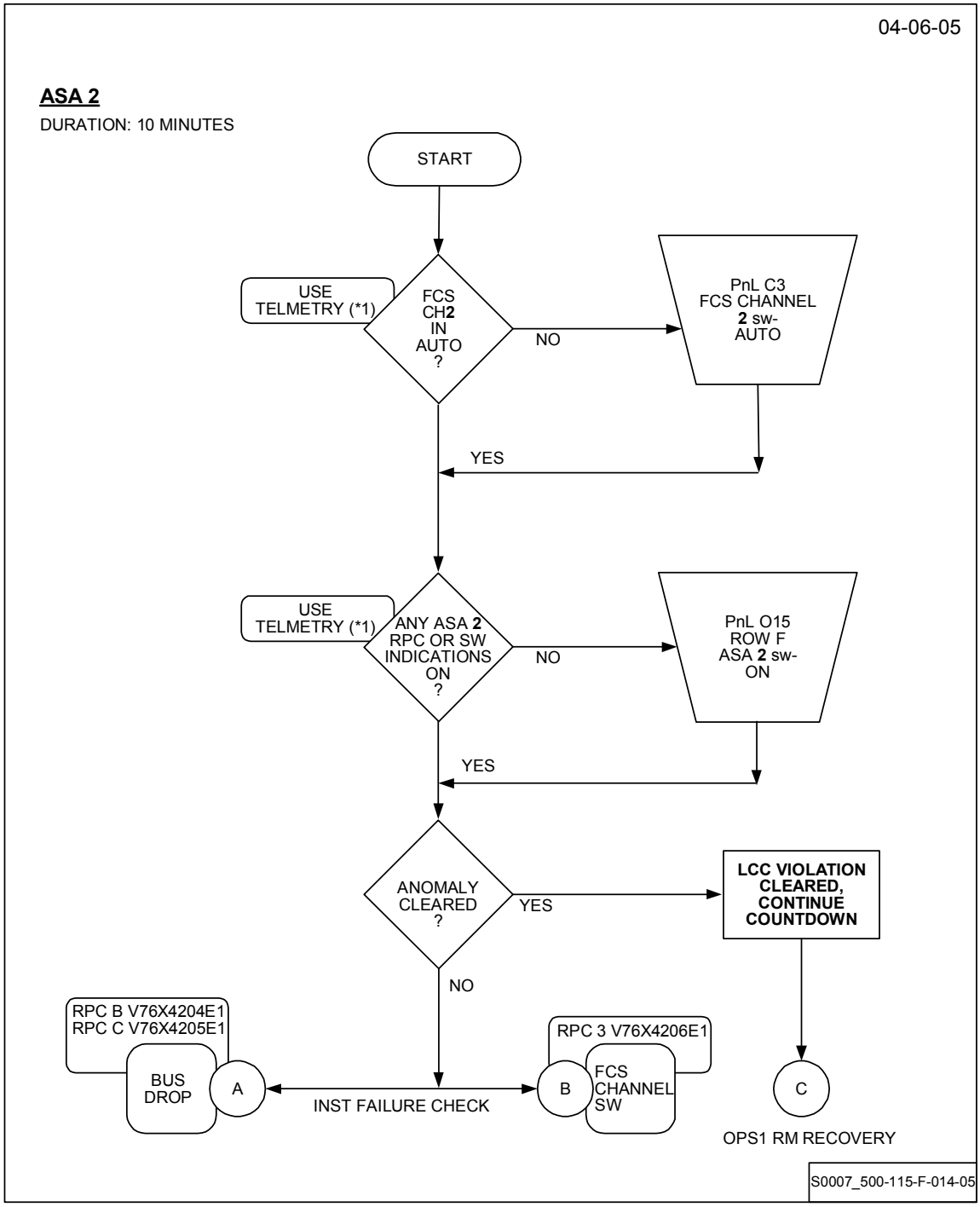


Orbiter ASA 1 Power Anomaly (SSID GNC-32) (Page 3 of 3)

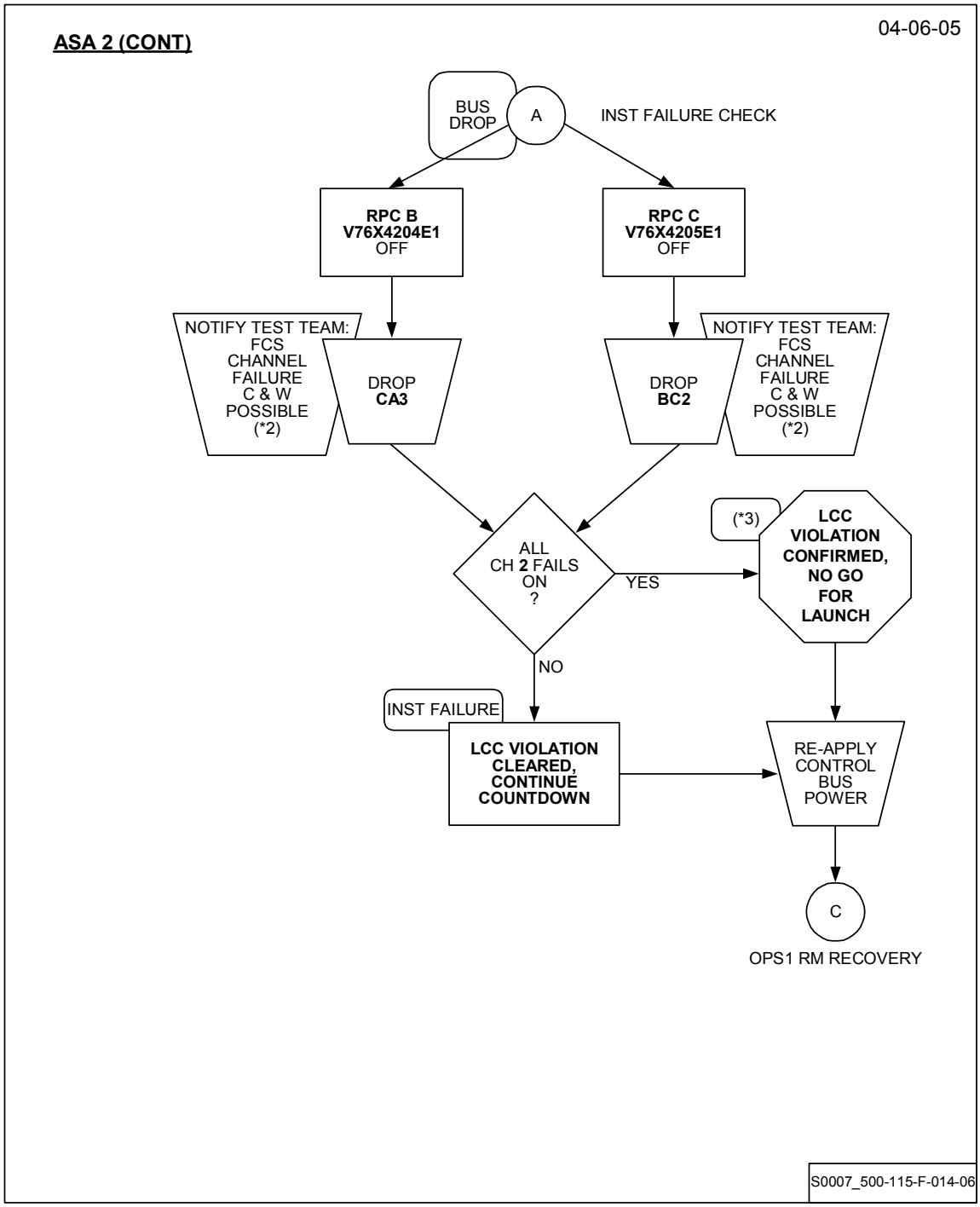


115-20

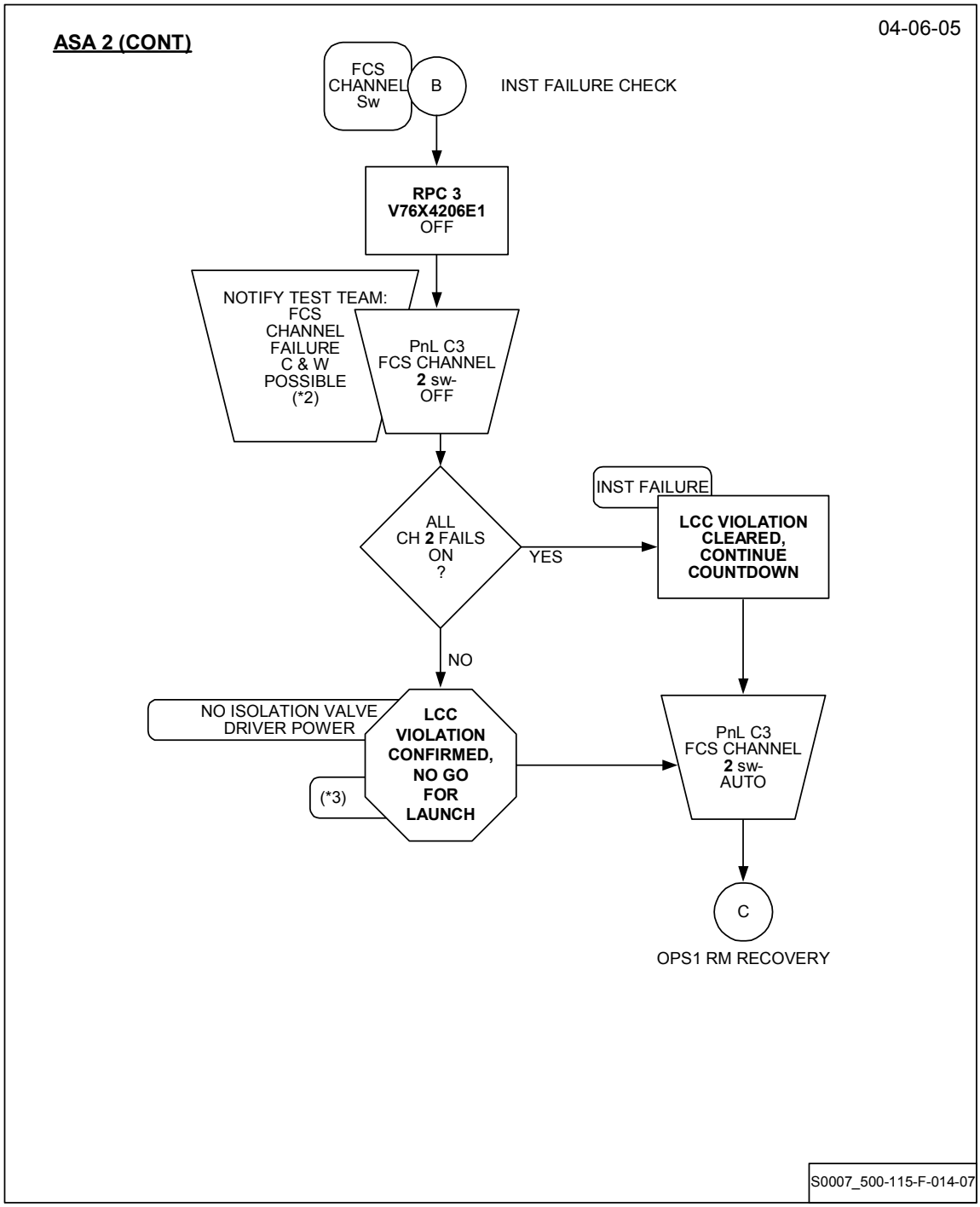
Orbiter ASA 2 Power Anomaly (SSID GNC-32) (Page 1 of 3)



Orbiter ASA 2 Power Anomaly (SSID GNC-32) (Page 2 of 3)

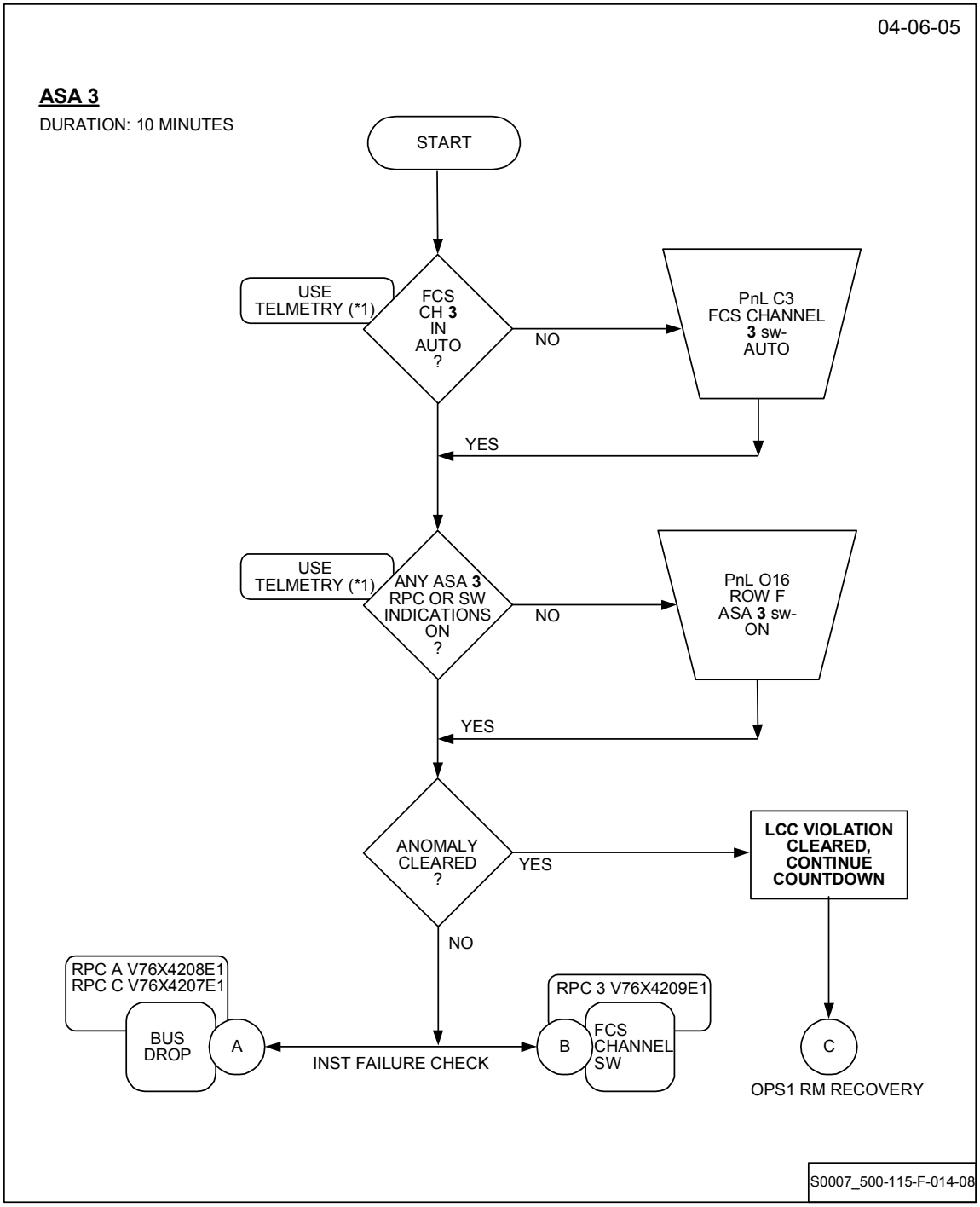


Orbiter ASA 2 Power Anomaly (SSID GNC-32) (Page 3 of 3)

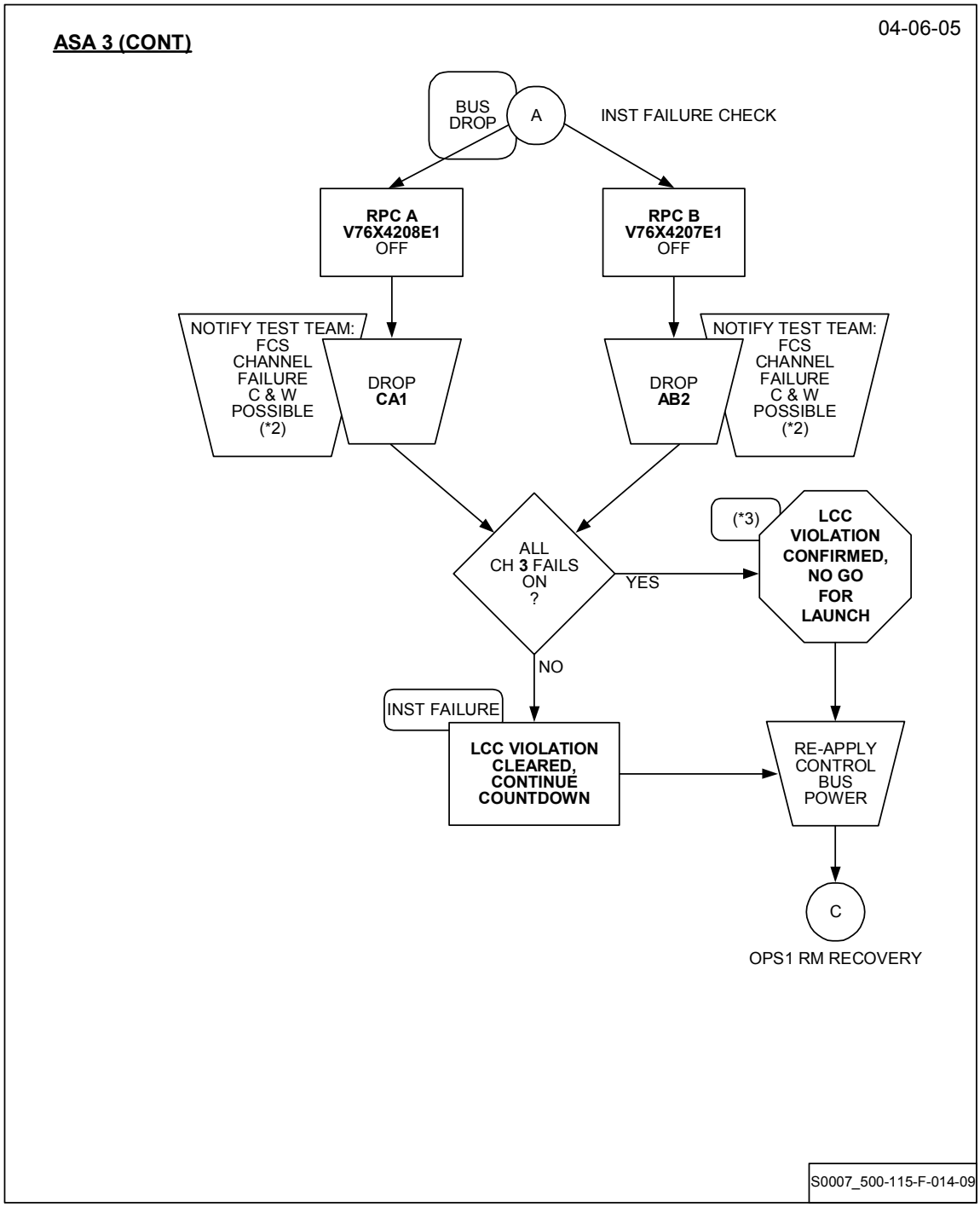


115-21

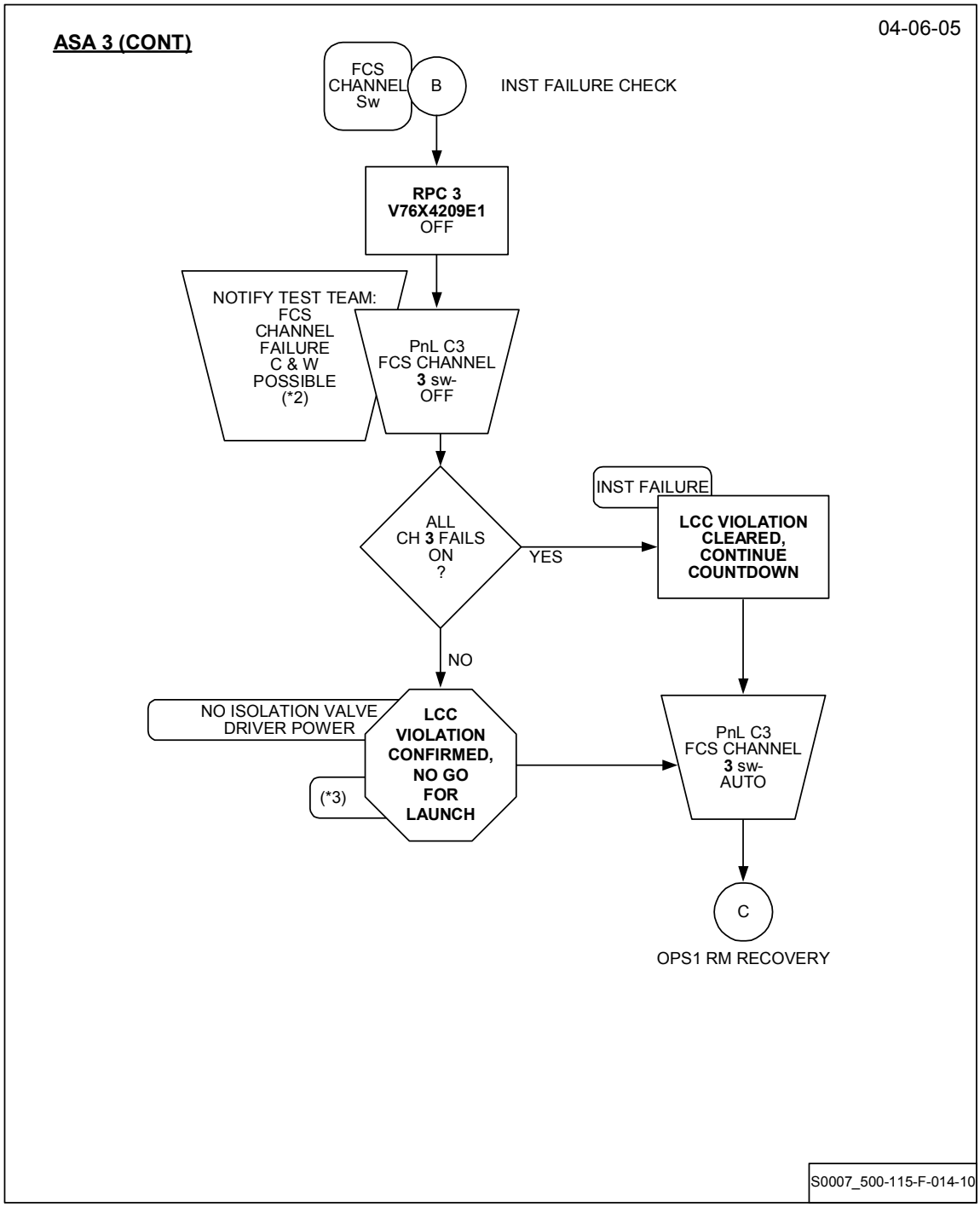
Orbiter ASA 3 Power Anomaly (SSID GNC-32) (Page 1 of 3)



Orbiter ASA 3 Power Anomaly (SSID GNC-32) (Page 2 of 3)

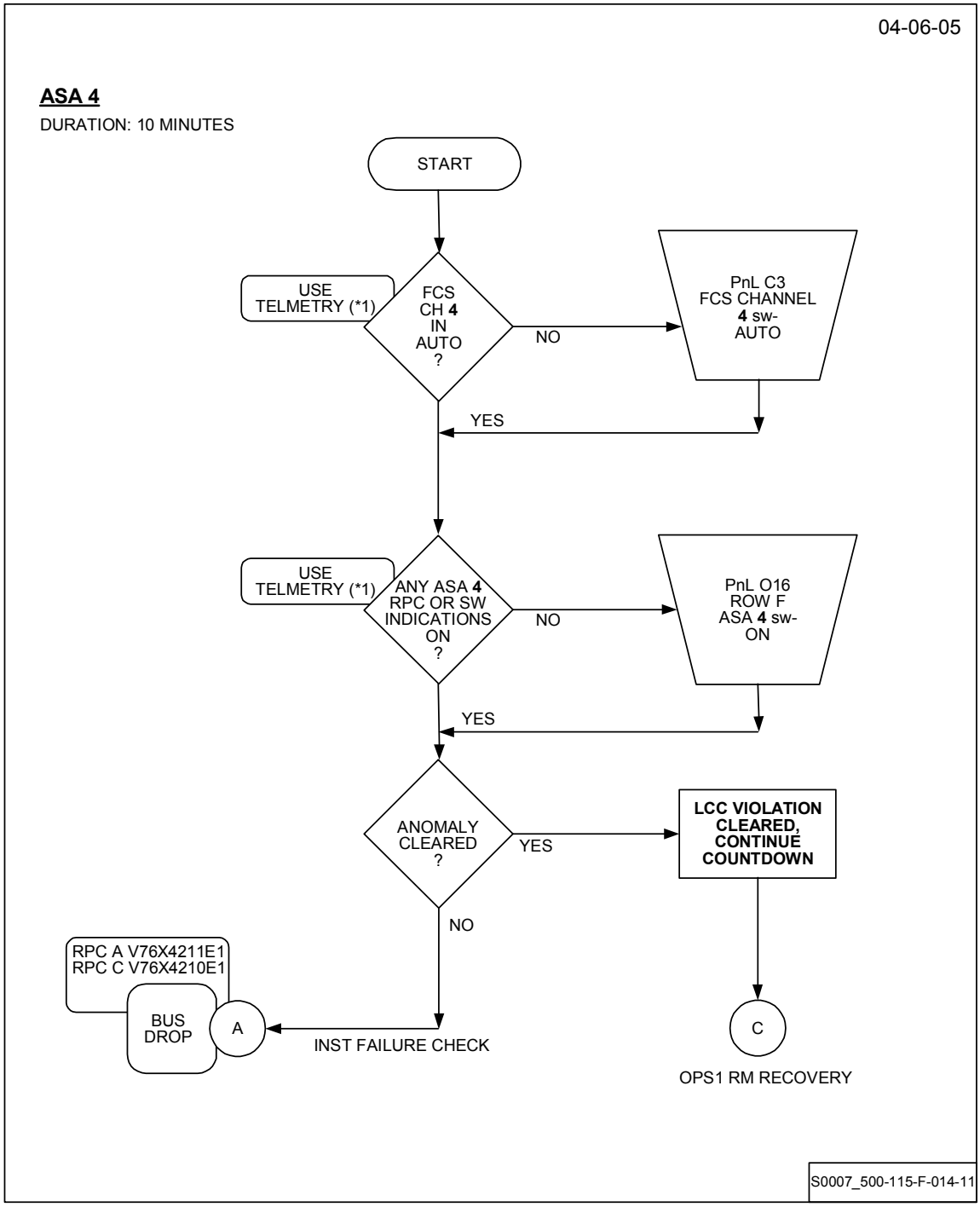


Orbiter ASA 3 Power Anomaly (SSID GNC-32) (Page 3 of 3)

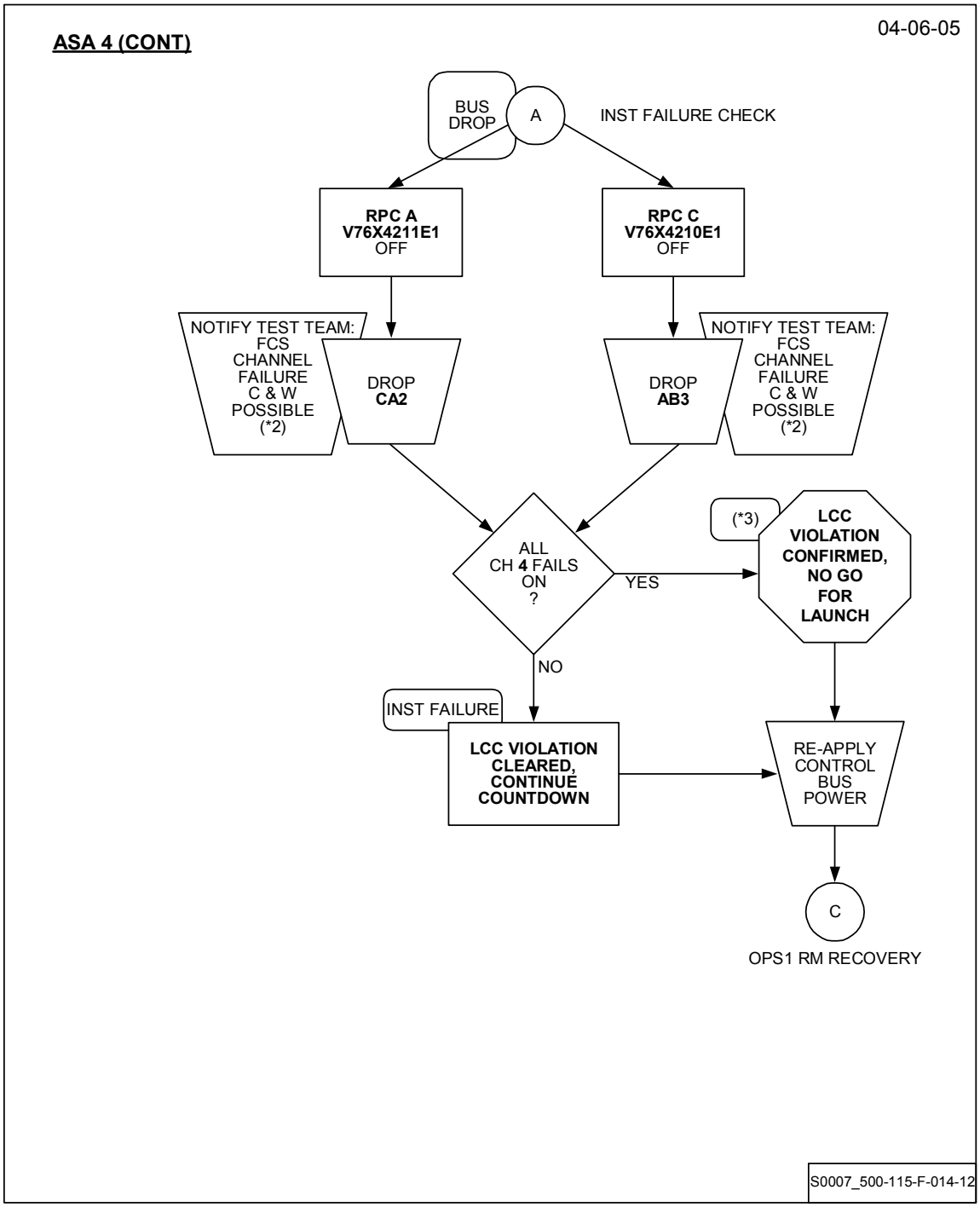


115-22

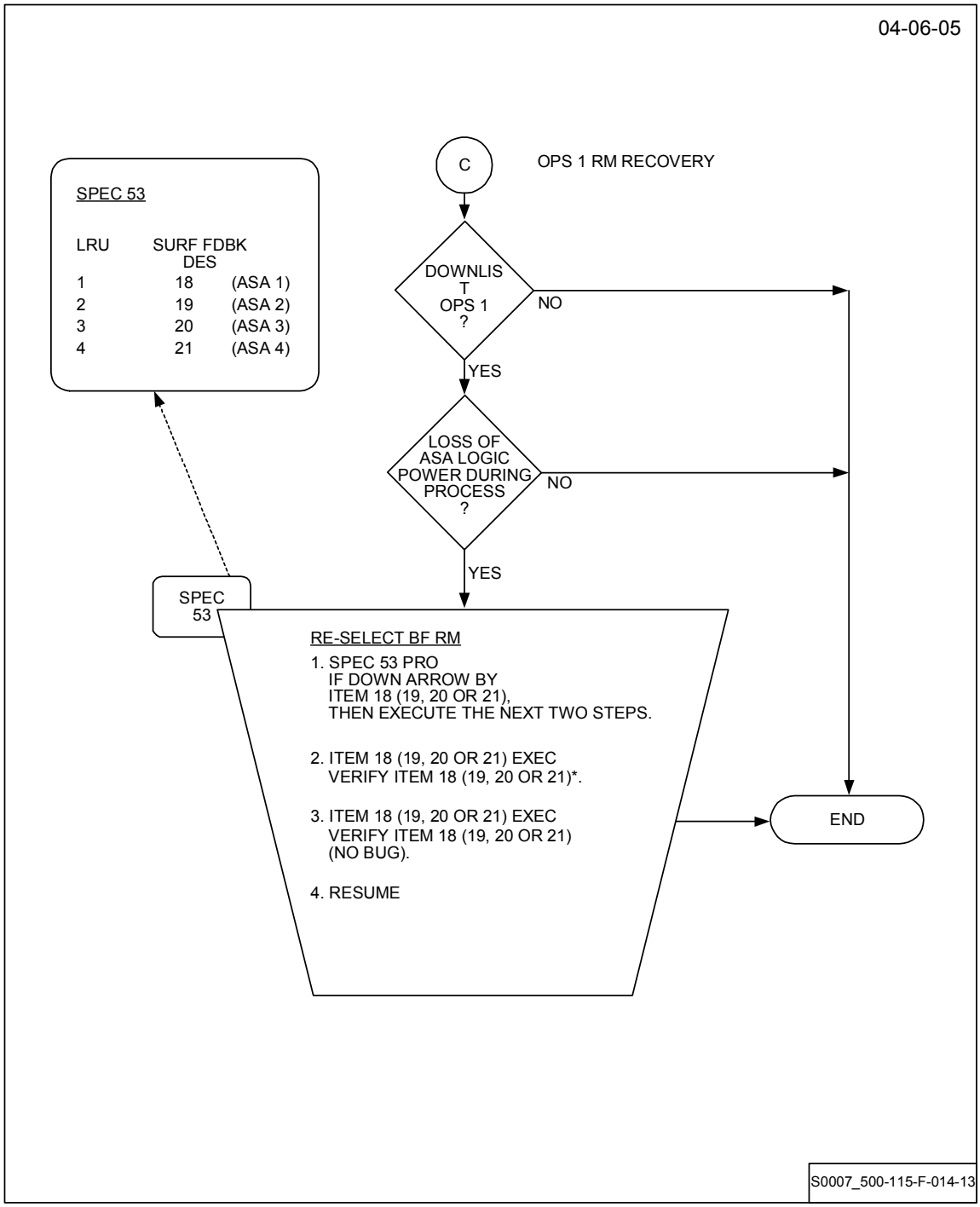
Orbiter ASA 4 Power Anomaly (SSID GNC-32) (Page 1 of 3)



Orbiter ASA 4 Power Anomaly (SSID GNC-32) (Page 2 of 3)



Orbiter ASA 4 Power Anomaly (SSID GNC-32) (Page 3 of 3)



Orbiter ASA Power Anomaly (SSID GNC-32)

04-06-05

Notes:

*1. There is adequate redundancy and telemetry to determine the position of the FCS Channel and ASA switches. Therefore, it is not required to query the flight crew for the respective positions. The switch re-position will only be requested when all indications reveal the ASA switch is OFF or when the FCS Channel switch indicates in OFF or OVERRIDE.

Rationale:
This addresses an inadvertent switch re-position and would be a highly visible occurrence. No other switch induced anomalies are deemed likely and are not addressed at this point in the procedure.

*2. Actuator channel fails may result during the performance of this procedure. If in OPS1, the FCS Channel Failure Caution and Warning and the Master alarm will occur.

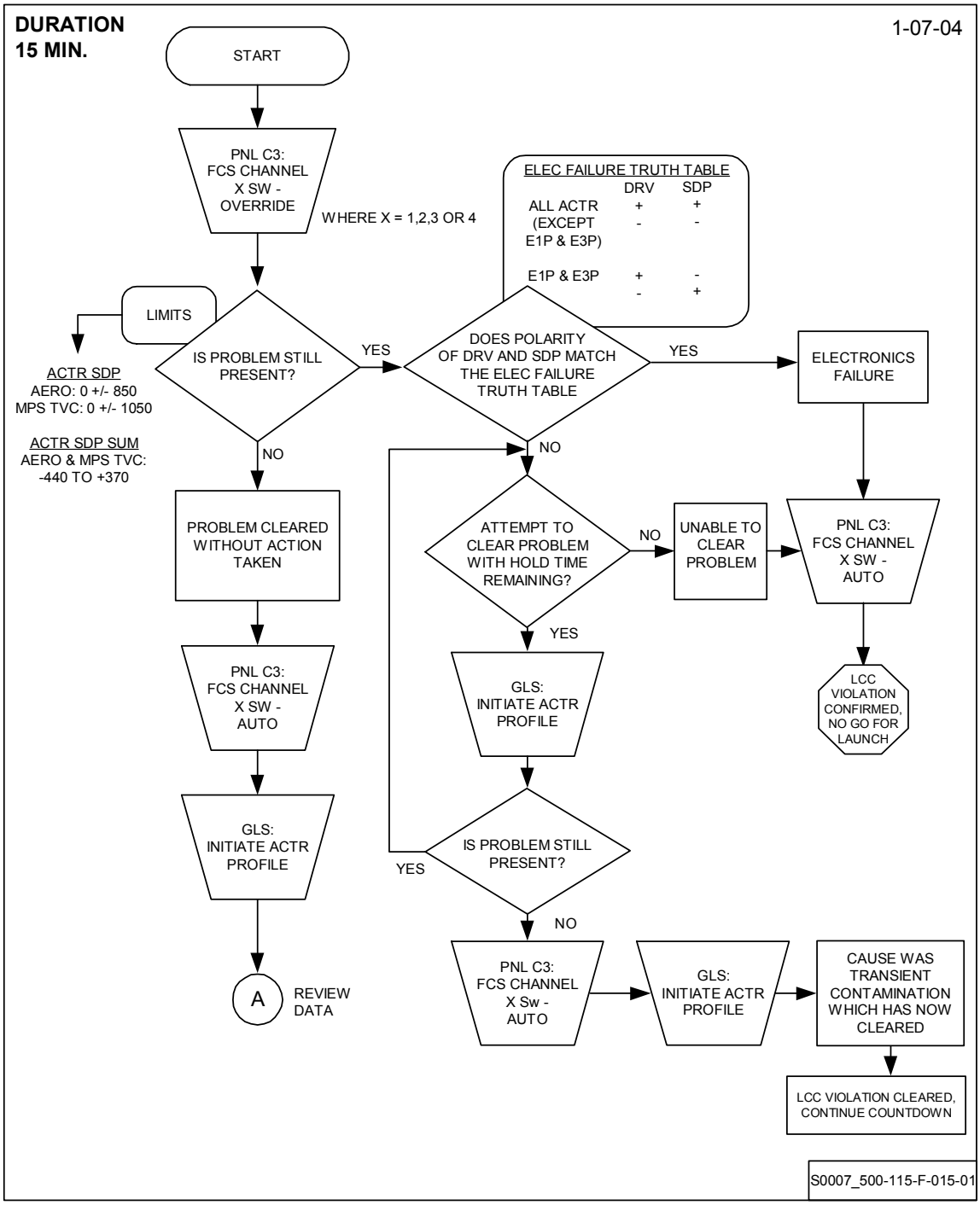
*3. Actuator channel fails may result during the performance of this procedure. If in OPS1, the FCS Channel Failure Caution and Warning and the Master alarm will occur.

Rationale:
The possibility that these switches can be "teased" with less than all contacts is deemed as an unlikely event.
As a very low probability event, this has been only addressed as a possibility of "last resorts" that could be performed outside of this procedure. In the event that power is recovered, clearance for launch is not guaranteed and must be evaluated at that time.

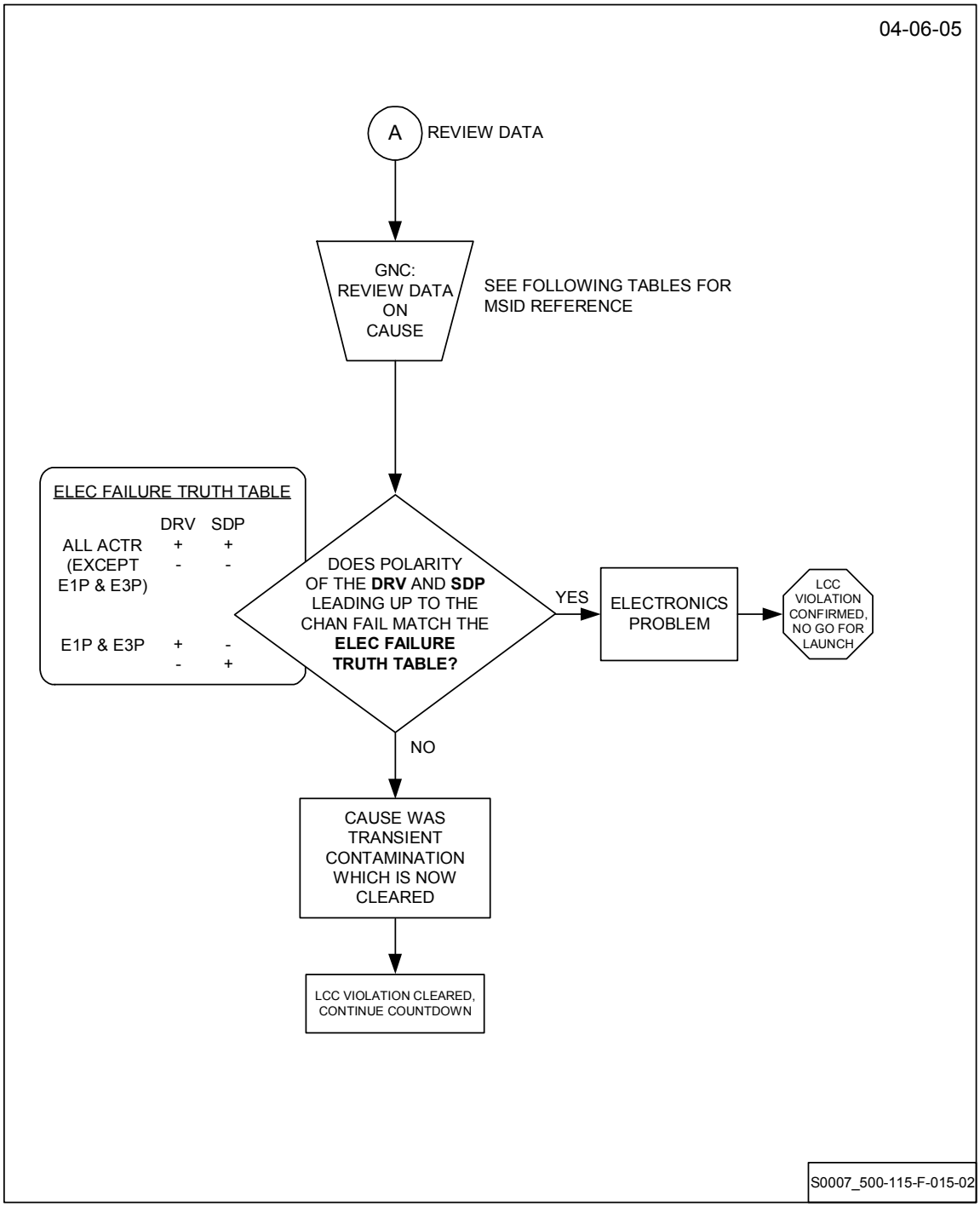
S0007_500-115-F-014-14

115-23

FCS Channel Failure (SSID GNC-38) (Page 1 of 2)



FCS Channel Failure (SSID GNC-38) (Page 2 of 2)



115-24

Aero Surface MSID Ref (SSID GNC-38)

04-06-05

AEROSURFACE ACTUATOR MSID'S (GNC-38)				
LIB	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X3260X1	V79C3280A1	V58P0812A1	V58H0802A1
CH B	V79X3261X1	V79C3281A1	V58P0813A1	V58H0803A1
CH C	V79X3262X1	V79C3282A1	V58P0814A1	V58H0804A1
CH D	V79X3263X1	V79C3283A1	V58P0815A1	V58H0805A1
LOB	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X3265X1	V79C3284A1	V58P0862A1	V58H0852A1
CH B	V79X3266X1	V79C3285A1	V58P0863A1	V58H0853A1
CH C	V79X3267X1	V79C3286A1	V58P0864A1	V58H0854A1
CH D	V79X3268X1	V79C3287A1	V58P0865A1	V58H0855A1
RIB	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X3270X1	V79C3288A1	V58P0912A1	V58H0902A1
CH B	V79X3271X1	V79C3289A1	V58P0913A1	V58H0903A1
CH C	V79X3272X1	V79C3290A1	V58P0914A1	V58H0904A1
CH D	V79X3273X1	V79C3291A1	V58P0915A1	V58H0905A1
ROB	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X3275X1	V79C3292A1	V58P0962A1	V58H0952A1
CH B	V79X3276X1	V79C3293A1	V58P0963A1	V58H0953A1
CH C	V79X3277X1	V79C3294A1	V58P0964A1	V58H0954A1
CH D	V79X3278X1	V79C3295A1	V58P0965A1	V58H0955A1
RUDDER	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X3331X1	V79C3305A1	V57P0160A1	V57H0150A1
CH B	V79X3332X1	V79C3306A1	V57P0161A1	V57H0151A1
CH C	V79X3333X1	V79C3307A1	V57P0162A1	V57H0152A1
CH D	V79X3334X1	V79C3308A1	V57P0163A1	V57H0153A1
SPD BRK	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X3336X1	V79C3315A1	V57P0260A1	V57H0250A1
CH B	V79X3337X1	V79C3316A1	V57P0261A1	V57H0251A1
CH C	V79X3338X1	V79C3317A1	V57P0262A1	V57H0252A1
CH D	V79X3339X1	V79C3318A1	V57P0263A1	V57H0253A1

* POSN DATA IS OPTIONAL FOR LCC VERIFICATION OF TRANSIENT CONTAMINATION (GNC-38)

EXAMPLE SDC RETRIEVAL LINE INPUT

LC SB049C1MM, V79X3336X1, V79C3315A1, V57P0260A1; 142200.000, 142220.000, 052796

S0007_500-115-F-016

115-25

MPS TVC MSID Ref (SSID GNC-38)

04-06-05

MAIN ENGINE ACTUATOR MSID'S (GNC-38)				
1P	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X1170X1	V79H2150A1	V58P1181A1	V58H1100A1
CH B	V79X1173X1	V79H2153A1	V58P1182A1	V58H1100A1
CH C	V79X1176X1	V79H2156A1	V58P1183A1	V58H1100A1
CH D	V79X1178X1	V79H2159A1	V58P1184A1	V58H1100A1
1Y	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X1171X1	V79H2151A1	V58P1186A1	V58H1150A1
CH B	V79X1174X1	V79H2154A1	V58P1187A1	V58H1150A1
CH C	V79X1177X1	V79H2157A1	V58P1188A1	V58H1150A1
CH D	V79X1179X1	V79H2160A1	V58P1189A1	V58H1150A1
2P	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X1270X1	V79H2165A1	V58P1281A1	V58H1200A1
CH B	V79X1273X1	V79H2168A1	V58P1282A1	V58H1200A1
CH C	V79X1276X1	V79H2171A1	V58P1283A1	V58H1200A1
CH D	V79X1278X1	V79H2174A1	V58P1284A1	V58H1200A1
2Y	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X1271X1	V79H2166A1	V58P1286A1	V58H1250A1
CH B	V79X1274X1	V79H2169A1	V58P1287A1	V58H1250A1
CH C	V79X1277X1	V79H2172A1	V58P1288A1	V58H1250A1
CH D	V79X1279X1	V79H2175A1	V58P1289A1	V58H1250A1
3P	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X1370X1	V79H2180A1	V58P1381A1	V58H1300A1
CH B	V79X1373X1	V79H2183A1	V58P1382A1	V58H1300A1
CH C	V79X1376X1	V79H2186A1	V58P1383A1	V58H1300A1
CH D	V79X1378X1	V79H2189A1	V58P1384A1	V58H1300A1
3Y	**FAIL**	**DRIVER**	**SDP**	**POSN***
CH A	V79X1371X1	V79H2181A1	V58P1386A1	V58H1350A1
CH B	V79X1374X1	V79H2184A1	V58P1387A1	V58H1350A1
CH C	V79X1377X1	V79H2187A1	V58P1388A1	V58H1350A1
CH D	V79X1379X1	V79H2190A1	V58P1389A1	V58H1350A1

* POSN DATA IS OPTIONAL FOR LCC VERIFICATION OF TRANSIENT CONTAMINATION (GNC-38)

EXAMPLE SDC RETRIEVAL LINE INPUT

LC SB049C1MM, V79X137X1, V79H2181A1, V58P1386A1; 142200.000, 142220.000, 052796

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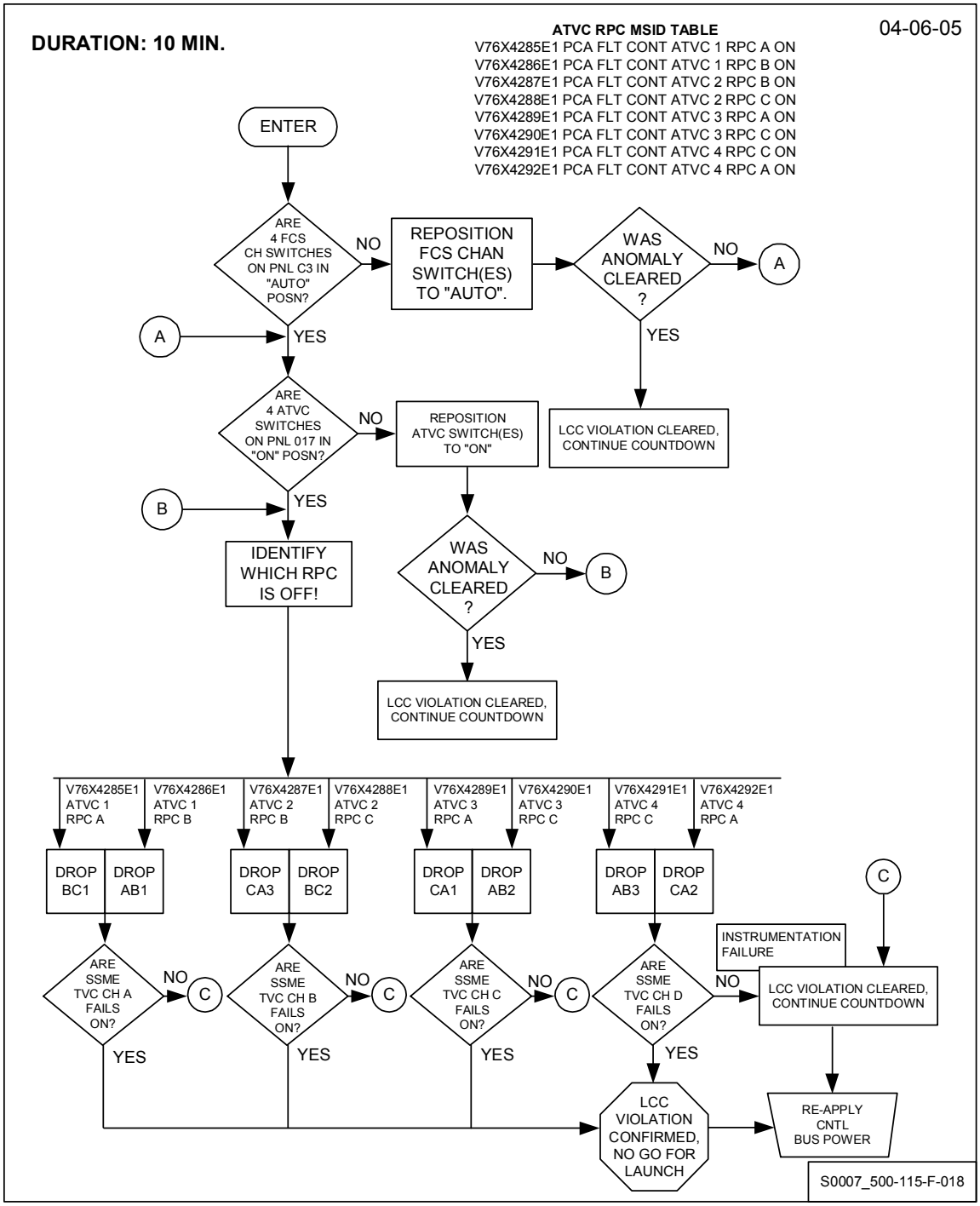
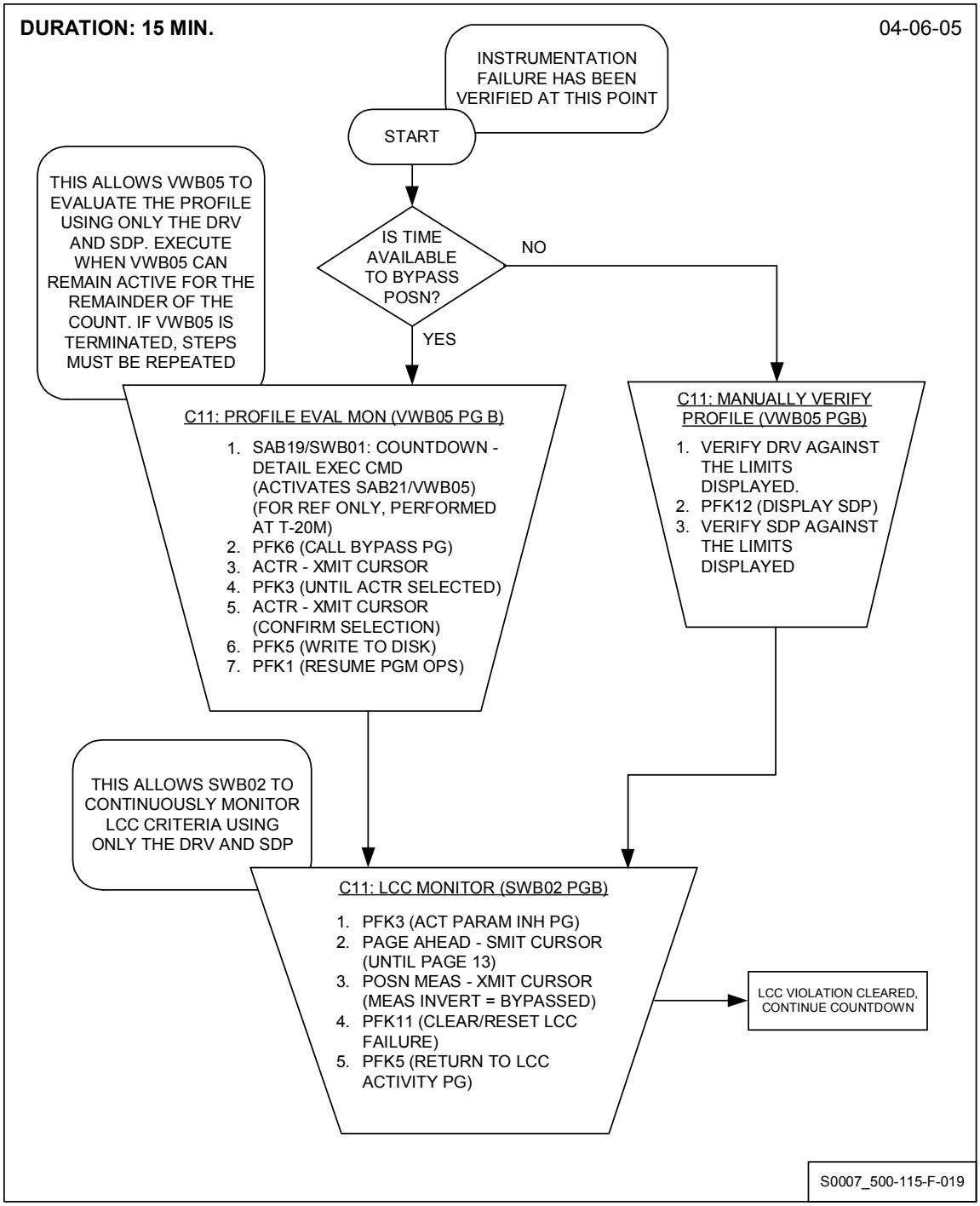
115-26

Orbiter ATVC Power Anomaly (SSID GNC-39)



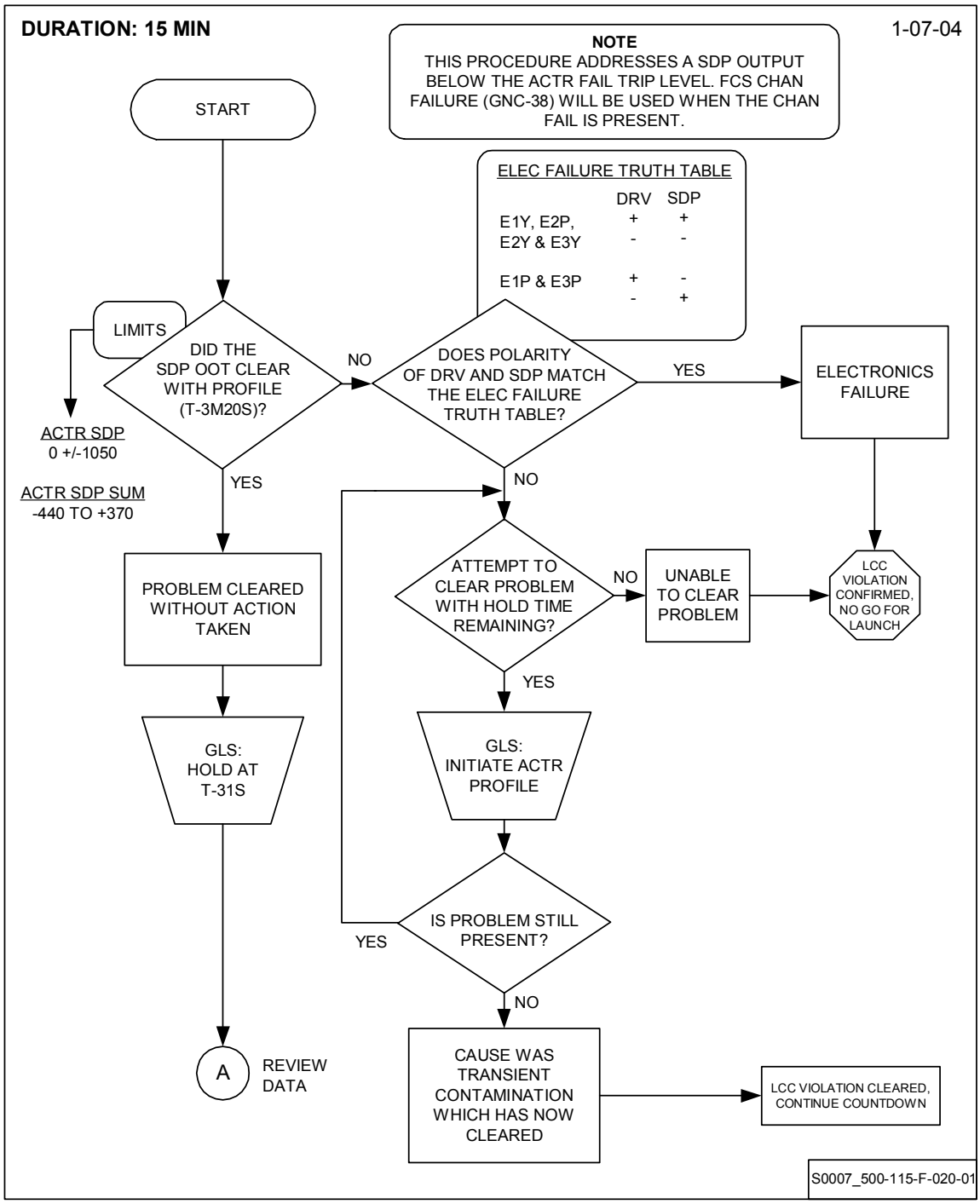
115-27

MPS TVC Actuator Position Anomaly (SSID GNC-40)

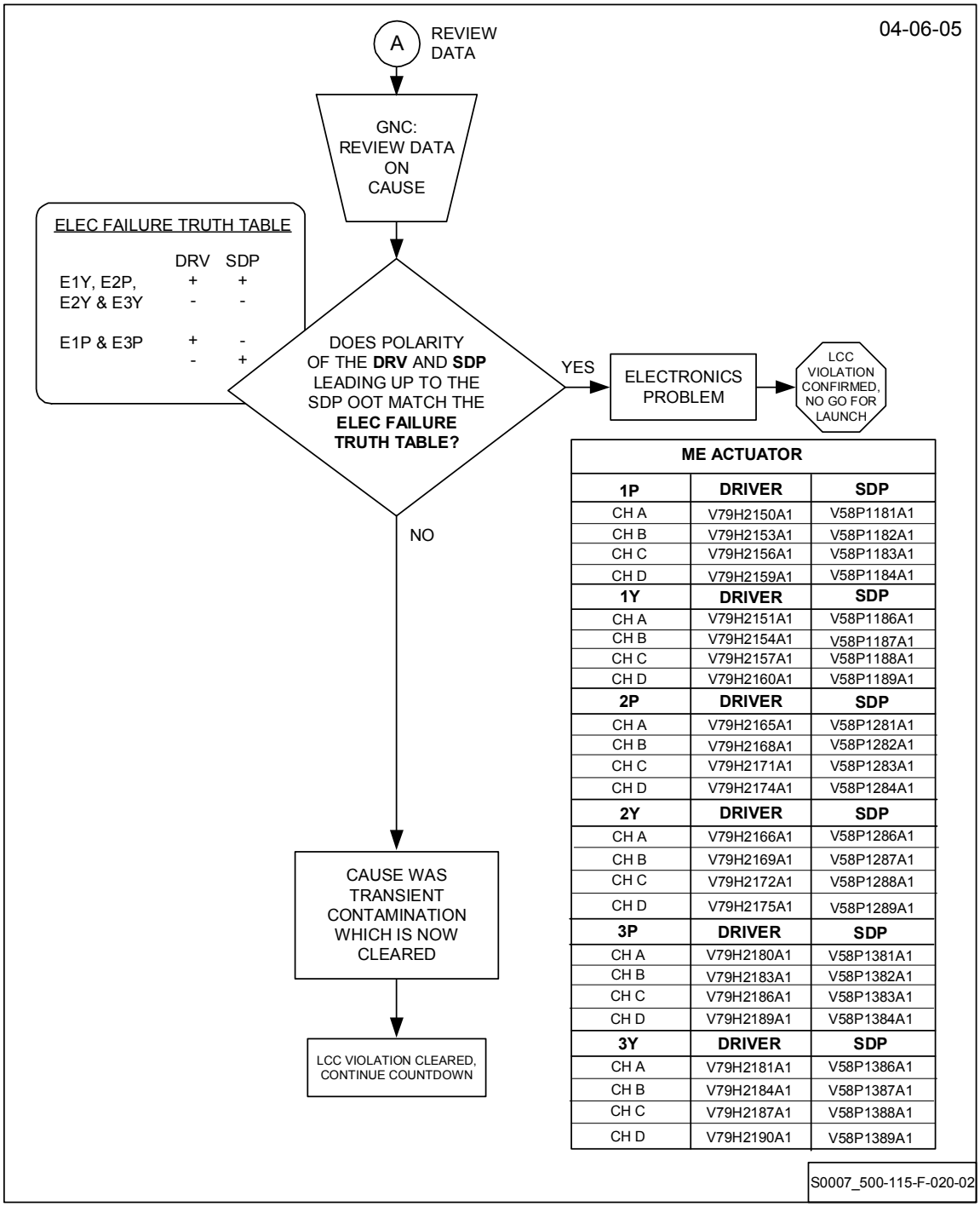


115-28

MPS TVC Secondary Delta Pressure Anomaly (SSID GNC-41) (Page 1 of 2)



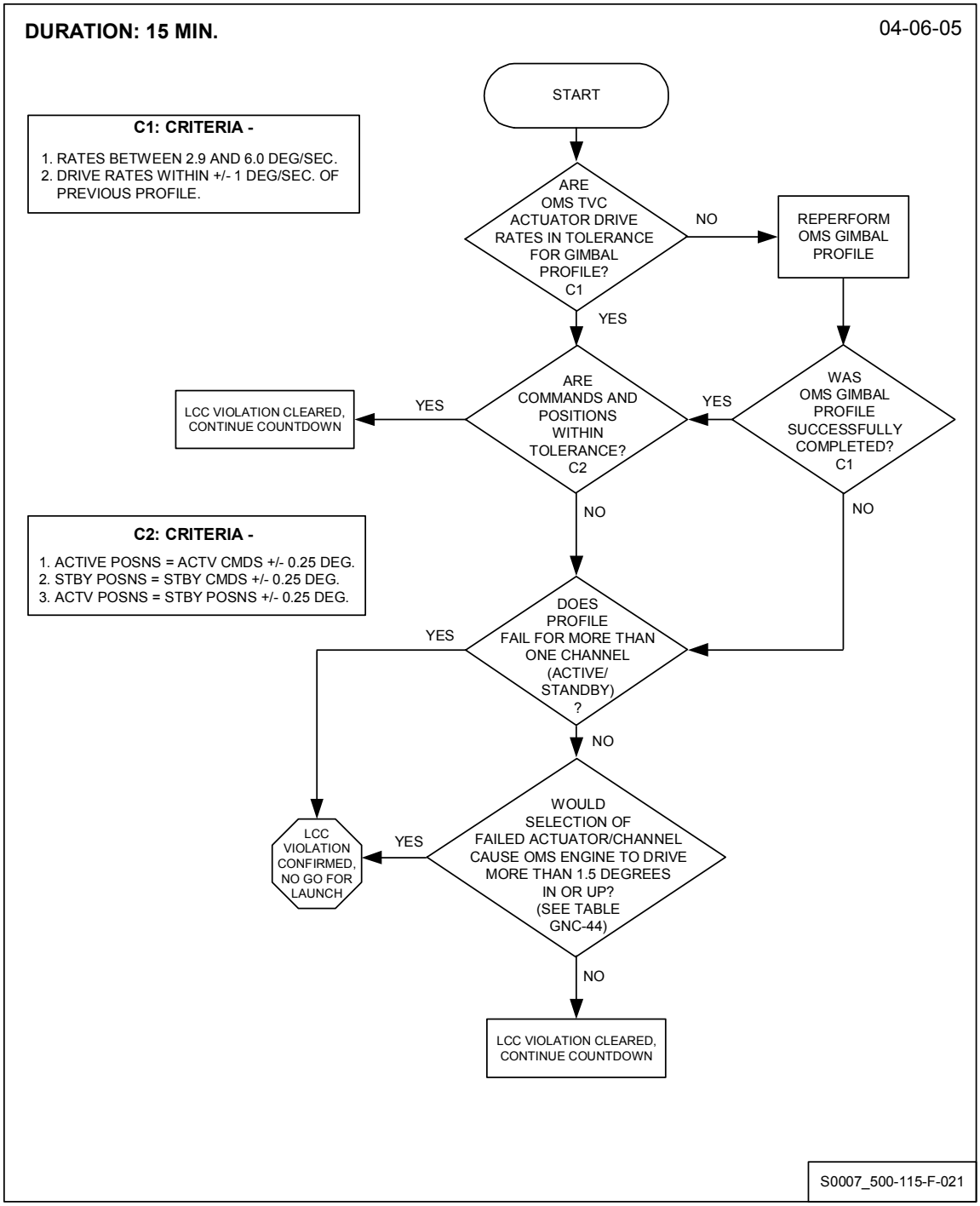
MPS TVC Secondary Delta Pressure Anomaly (SSID GNC-41) (Page 2 of 2)



ME ACTUATOR		
1P	**DRIVER**	**SDP**
CH A	V79H2150A1	V58P1181A1
CH B	V79H2153A1	V58P1182A1
CH C	V79H2156A1	V58P1183A1
CH D	V79H2159A1	V58P1184A1
1Y	**DRIVER**	**SDP**
CH A	V79H2151A1	V58P1186A1
CH B	V79H2154A1	V58P1187A1
CH C	V79H2157A1	V58P1188A1
CH D	V79H2160A1	V58P1189A1
2P	**DRIVER**	**SDP**
CH A	V79H2165A1	V58P1281A1
CH B	V79H2168A1	V58P1282A1
CH C	V79H2171A1	V58P1283A1
CH D	V79H2174A1	V58P1284A1
2Y	**DRIVER**	**SDP**
CH A	V79H2166A1	V58P1286A1
CH B	V79H2169A1	V58P1287A1
CH C	V79H2172A1	V58P1288A1
CH D	V79H2175A1	V58P1289A1
3P	**DRIVER**	**SDP**
CH A	V79H2180A1	V58P1381A1
CH B	V79H2183A1	V58P1382A1
CH C	V79H2186A1	V58P1383A1
CH D	V79H2189A1	V58P1384A1
3Y	**DRIVER**	**SDP**
CH A	V79H2181A1	V58P1386A1
CH B	V79H2184A1	V58P1387A1
CH C	V79H2187A1	V58P1388A1
CH D	V79H2190A1	V58P1389A1

115-29

OMS Gimbal Profile Anomaly (SSID GNC-44)



115-30

MSID Table (SSID GNC-44)

04-06-05

LEFT OMS		RIGHT OMS	
FD	NOMENCLATURE	FD	NOMENCLATURE
V43H2500C1	L ACTIVE PITCH POSN	V43H2550C1	R ACTIVE PITCH POSN
V43H2502C1	L ACTIVE YAW POSN	V43H2552C1	R ACTIVE YAW POSN
V43H2504C1	L STBY PITCH POSN	V43H2554C1	R STBY PITCH POSN
V43H2506C1	L STBY YAW POSN	V43H2556C1	R STBY YAW POSN
V43K1016C1	L ACTIVE PITCH CMD	V43K2016C1	R ACTIVE PITCH CMD
V43K1018C1	L ACTIVE YAW CMD	V43K2018C1	R ACTIVE YAW CMD
V43K1017C1	L STBY PITCH CMD	V43K2017C1	R STBY PITCH CMD
V43K1019C1	L STBY YAW CMD	V43K2019C1	R STBY YAW CMD
V43K1020X1	L ACTR SELECT ACTIVE-1 (ENABLE)	V43K2020X1	R ACTR SELECT ACTIVE-1 (ENABLE)
V43K1021X1	L ACTR SELECT ACTIVE-2 (ENABLE)	V43K2021X1	R ACTR SELECT ACTIVE-2 (ENABLE)
V43K1023X1	L ACTR SELECT STBY-1 (ENABLE)	V43K2023X1	R ACTR SELECT STBY-1 (ENABLE)
V43K1024X1	L ACTR SELECT STBY-2 (ENABLE)	V43K2024X1	R ACTR SELECT STBY-2 (ENABLE)

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RCS Jet Chamber Pressure Indication Anomaly (SSID GNC-45)

NOTE

Following steps may be implemented at Flight Controls System Engineer direction as required by LCC. Following steps must be performed in OPS Mode 101 and per SPEC 23. SPEC 23 additionally provides RM visibility and is displayed below.

```
XXXX/023/                          RCS                XX X  DDD/HH:MM:SS
                                                             DDD/HH:MM:SS
RCS FWD 1X                PRI     JET        OMS PRESS ENA
        L   2X            4 FAIL  LIM X        L OMS 5X      OMS>RCS QTY
        R   3X                                 R OMS 6X        L XX.XXS
                                                 OFF 7X        R XX.XXS

 JET     FAIL    DES     JET     PTY                          OXID     FUEL
                 INH     DES
 -----   ------  -----   -----   -----      ----------------  --------  --------
 XXX     XXX     8X      9X      X          HE            P   XXXXS    XXXXS
   XX    XXX     10X     11X     X          ---------------------------------------------
Y XX     XXX     12X     13X     X          PRPLT TK P        XXXS     XXXS
   XX    XXX     14X     15X     X                  T         XXXS     XXXS
 ---------------------------------------------------            QTY      XXXS     XXXS
 XXU     XXX     16X     17X     X          ---------------------------------------------
   XU    XXX     18X     19X     X          MANF P    1       XXXS     XXXS
Z XU     XXX     20X     21X     X                    2       XXXS     XXXS
 ---------------------------------------------------                    3       XXXS     XXXS
XXX      XXX     22X     23X     X                    4       XXXS     XXXS
   XD    XXX     24X     25X     X          ---------------------------------------------
   2D    XXX     26X     27X     X          MANF VLVS   STAT      OVRD
   XD    XXX     28X     29X     X                     --------  --------
 ---------------------------------------------------                    1       XXS       40
  XXX    XXX     30X     31X     X                    2       XXS       41
X  XX    XXX     32X     33X     X                    3       XXS       42
   XX    XXX     34X     35X     X                    4       XXS       43
 ---------------------------------------------------                    5       XXS       44
  X5X    XXX     36X     37X     X          ---------------------------------------------
V  5X    XXX     38X     39X     X          XFEED     P       XXS      XXXS
                                            ---------------------------------------------
                                            JET RESET 45
                                                                  (XX)
```

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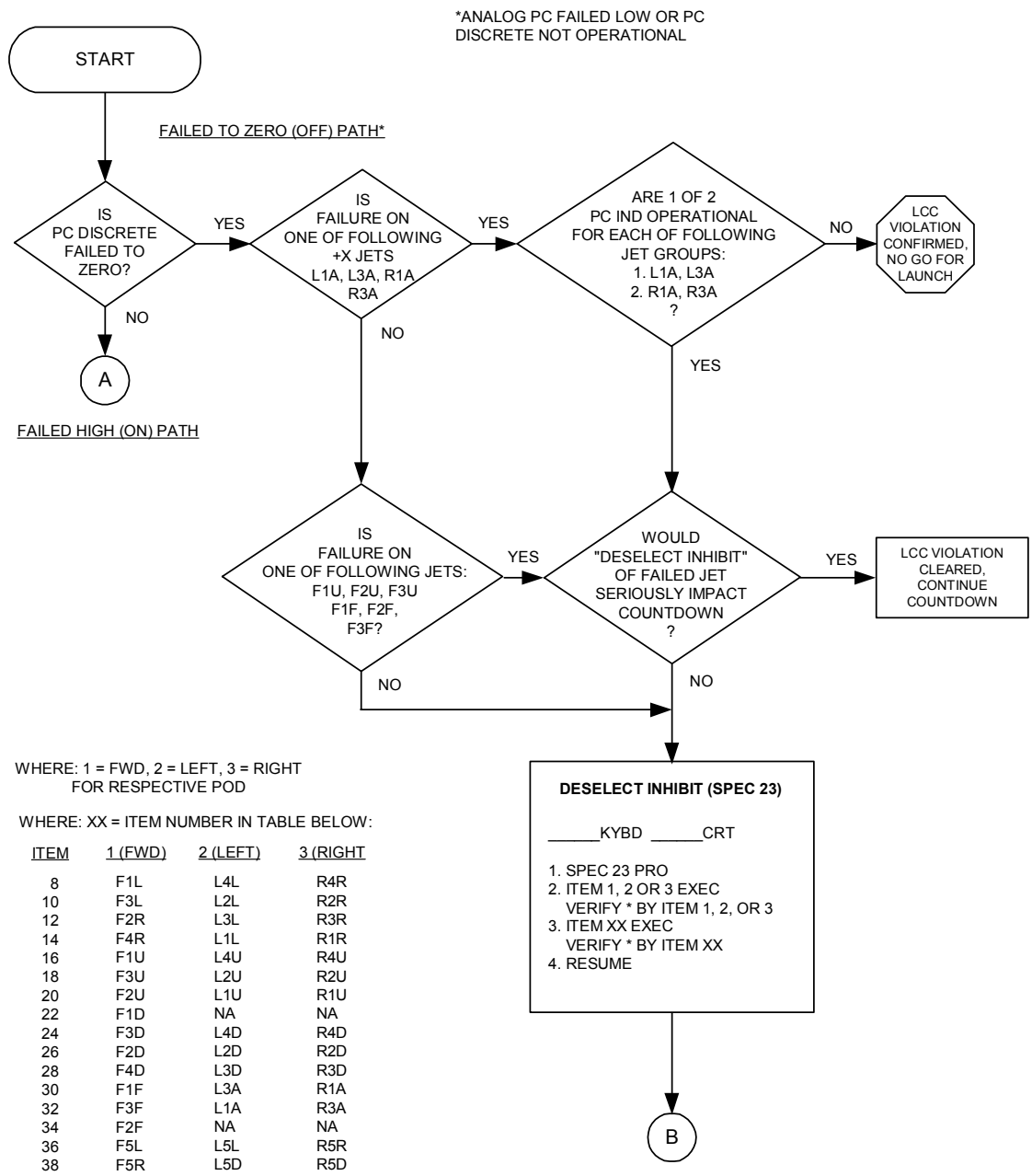
RCS Jet Chamber Pressure Indication Anomaly (SSID GNC-45) (Page 1 of 3)

DURATION: 20 MIN. 04-06-05



WHERE: 1 = FWD, 2 = LEFT, 3 = RIGHT FOR RESPECTIVE POD

WHERE: XX = ITEM NUMBER IN TABLE BELOW:

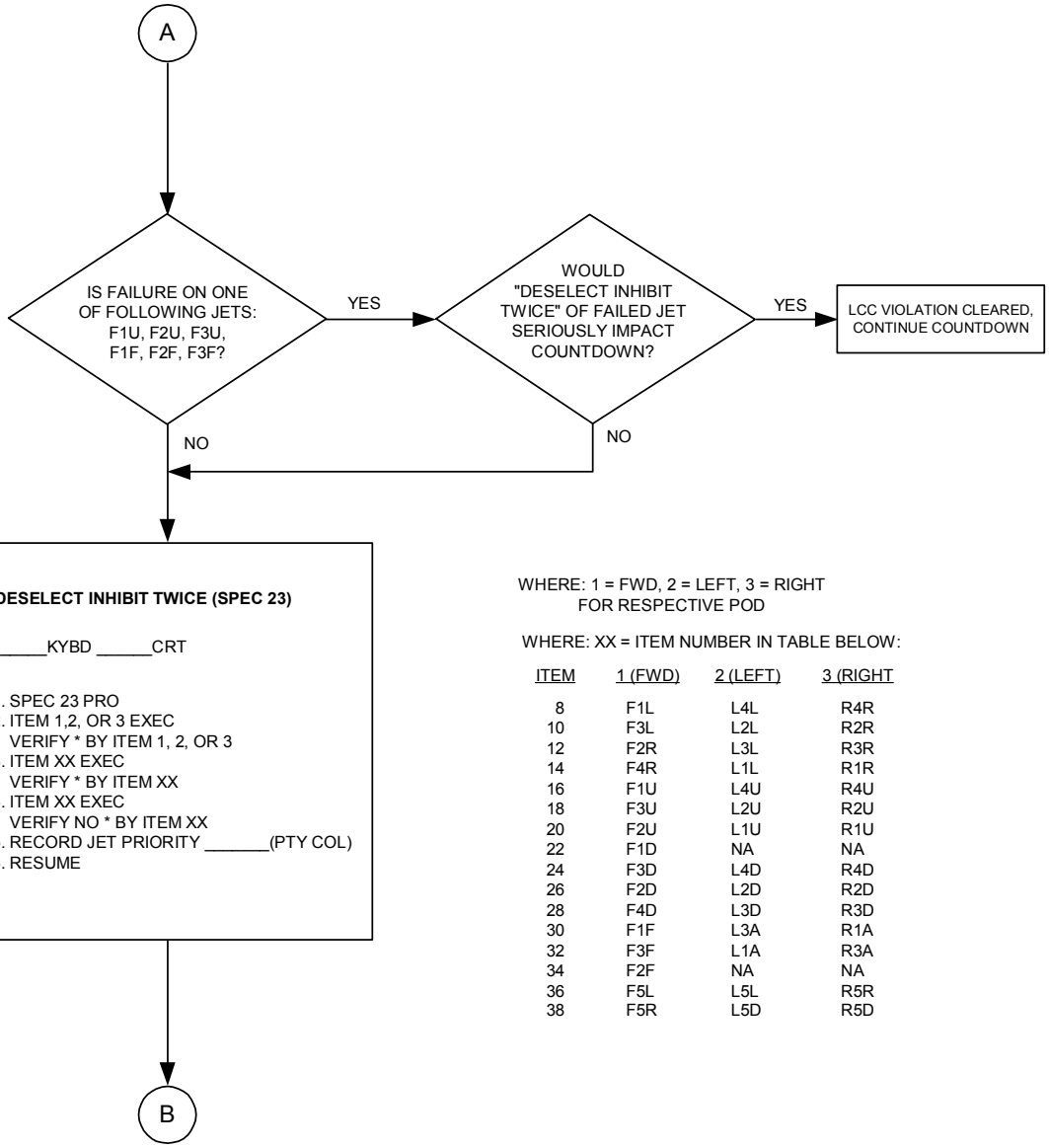
ITEM	1 (FWD)	2 (LEFT)	3 (RIGHT
8	F1L	L4L	R4R
10	F3L	L2L	R2R
12	F2R	L3L	R3R
14	F4R	L1L	R1R
16	F1U	L4U	R4U
18	F3U	L2U	R2U
20	F2U	L1U	R1U
22	F1D	NA	NA
24	F3D	L4D	R4D
26	F2D	L2D	R2D
28	F4D	L3D	R3D
30	F1F	L3A	R1A
32	F3F	L1A	R3A
34	F2F	NA	NA
36	F5L	L5L	R5R
38	F5R	L5D	R5D

RCS Jet Chamber Pressure Indication Anomaly (SSID GNC-45) (Page 2 of 3)

04-06-05

FAILED HIGH (ON) PATH*

*ANALOG PC OR PC DISCRETE FAILED HIGH



DESELECT INHIBIT TWICE (SPEC 23)

_____KYBD _____CRT

1. SPEC 23 PRO
2. ITEM 1,2, OR 3 EXEC
   VERIFY * BY ITEM 1, 2, OR 3
3. ITEM XX EXEC
   VERIFY * BY ITEM XX
4. ITEM XX EXEC
   VERIFY NO * BY ITEM XX
5. RECORD JET PRIORITY _____(PTY COL)
6. RESUME

WHERE: 1 = FWD, 2 = LEFT, 3 = RIGHT FOR RESPECTIVE POD

WHERE: XX = ITEM NUMBER IN TABLE BELOW:

ITEM	1 (FWD)	2 (LEFT)	3 (RIGHT
8	F1L	L4L	R4R
10	F3L	L2L	R2R
12	F2R	L3L	R3R
14	F4R	L1L	R1R
16	F1U	L4U	R4U
18	F3U	L2U	R2U
20	F2U	L1U	R1U
22	F1D	NA	NA
24	F3D	L4D	R4D
26	F2D	L2D	R2D
28	F4D	L3D	R3D
30	F1F	L3A	R1A
32	F3F	L1A	R3A
34	F2F	NA	NA
36	F5L	L5L	R5R
38	F5R	L5D	R5D

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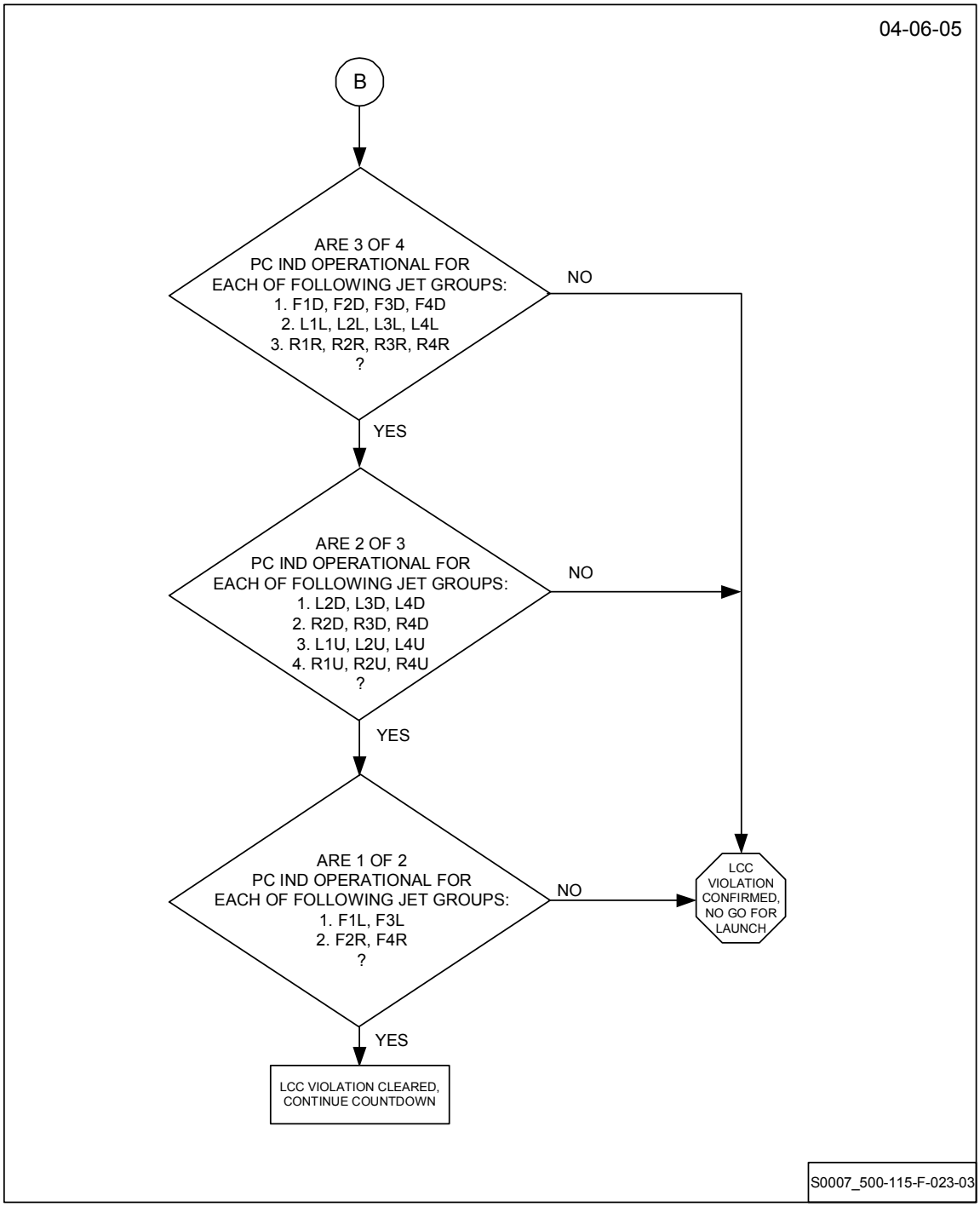
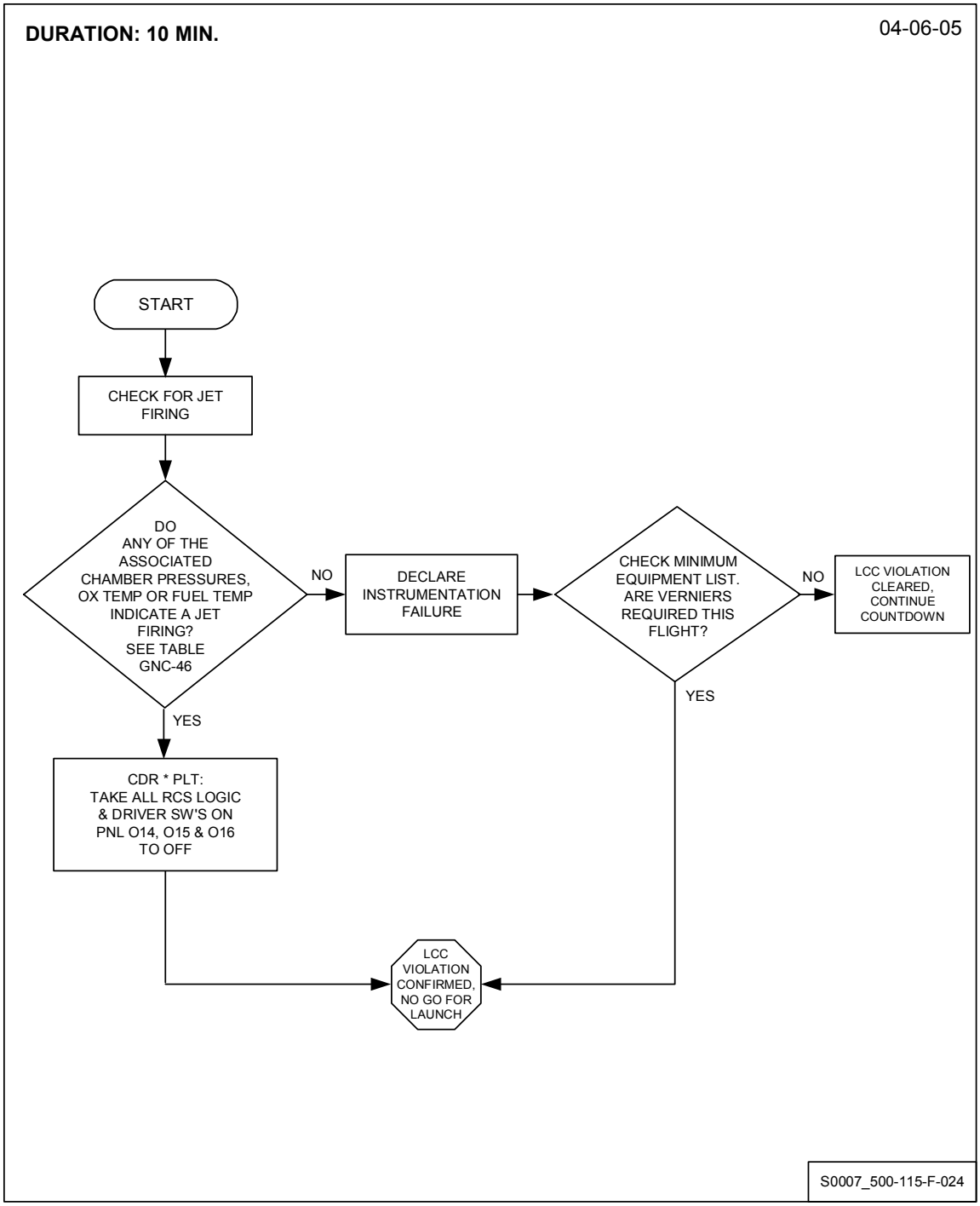
RCS Jet Chamber Pressure Indication Anomaly (SSID GNC-45) (Page 3 of 3)



115-32

RCS Vernier Driver Out Failure (SSID GNC-46)



115-33

MSID Table (SSID GNC-46)

04-06-05

TABLE (GNC-46)

JET	DRV OUT (*1)	CHAM PRESS IND (*1)	CHAM PRESS ANA	OXI TEMP (*2)	FUEL TEMP (*2)
F5L	V79X2615X1	V79X2715X1	V42P1555A1	V42T1529C1	V42T1530C1
F5R	V79X2616X1	V79X2716X1	V42P1556A1	V42T1531C1	V42T1532C1
L5D	V79X2629X1	V79X2729X1	V42P2553A1	V42T2525C1	V42T2526C1
L5L	V79X2630X1	V79X2730X1	V42P2554A1	V42T2527C1	V42T2528C1
R5R	V79X2643X1	V79X2743X1	V42P3554A1	V42T3527C1	V42T3528C1
R5D	V79X2644X1	V79X2744X1	V42P3553A1	V42T3525C1	V42T3526C1

NOTES

*1: DOWNLIST IS ONLY AVAILABLE IN THE POSSIBLE LCD FORMATS OF 21 AND 42.

*2: DOWNLIST IS ONLY AVAILABLE IN THE POSSIBLE LCD FORMATS OF 42, 44, 53 AND 60.

NORMAL JETS ARE AVAILABLE IN FORMAT 21 IN ADDITION TO 42, 44, 53 AND 60.

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115-34

RCS Vernier Logic RPC Failure (SSID GNC-47)

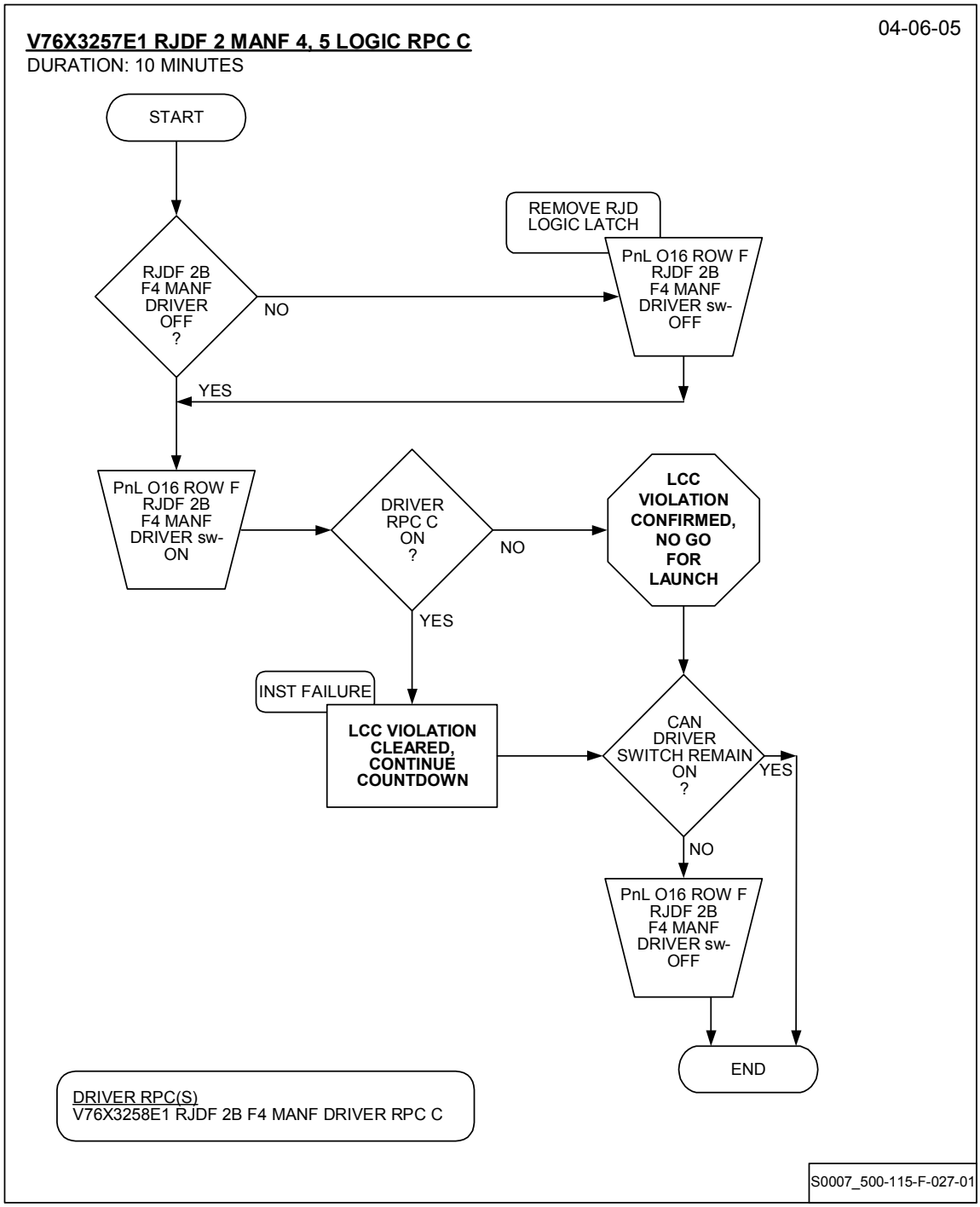
04-06-05

RCS VERNIER LOGIC RPC ASSOCIATIONS

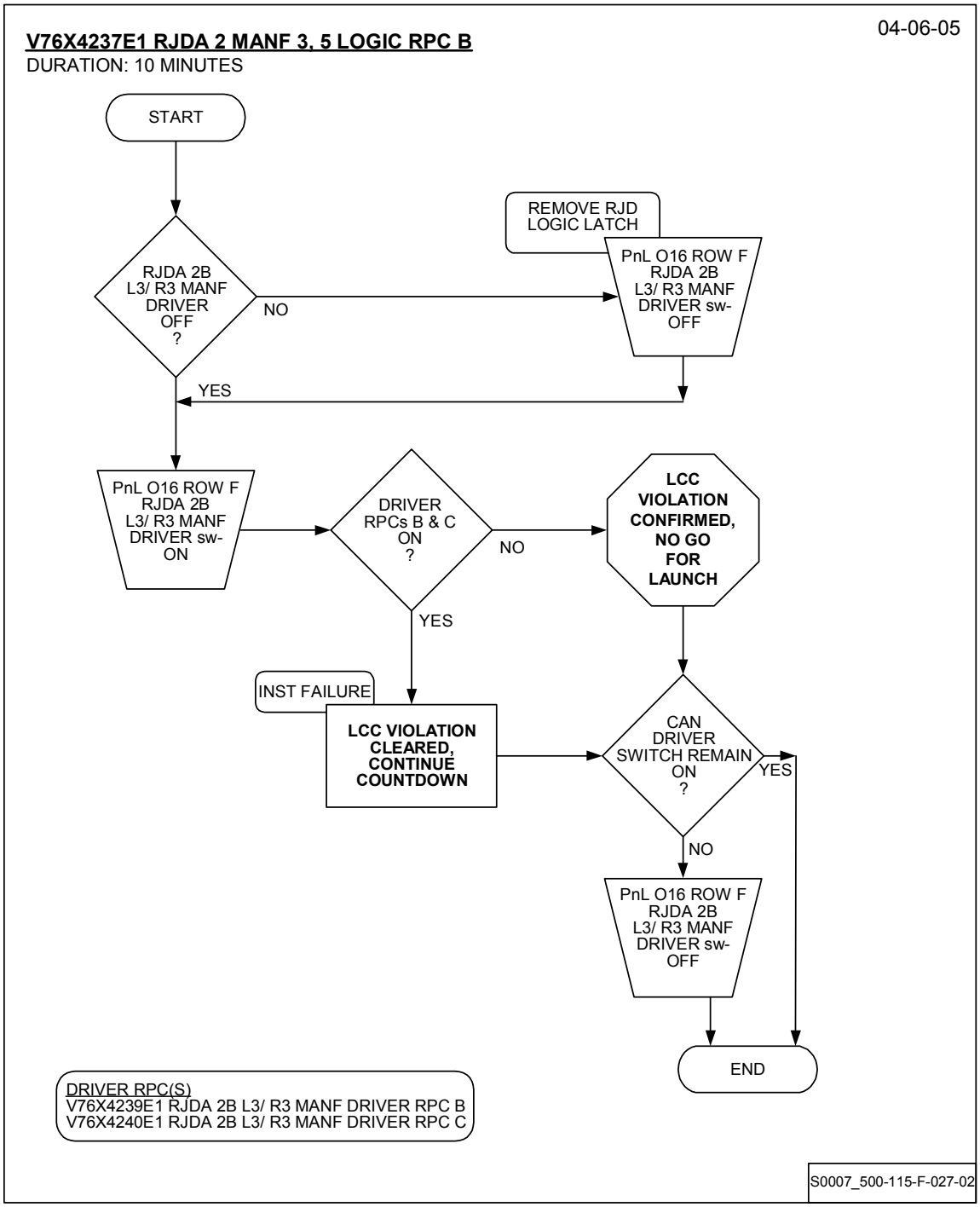
VERNIER LOGIC RPC	DRIVER SWITCH	DRIVER RPC(S)
V76X3257E1 RJDF 2B F4/F5 LOGIC RPC C	PANEL 016 ROW F RJDF 2B F4 MANF DRIVER	**V76X3258E1** RJDF 2B F4 DRIVER RPC C
V76X4237E1 RJDA 2B L3/ R3/ R5 LOGIC RPC B	PANEL 016 ROW F RJDA 2B L3/ R3 MANF DRIVER	**V76X4239E1** RJDA 2B L3/ R3 DRIVER RPC B **V76X4240E1** RJDA 2B L3/ R3 DRIVER RPC C
V76X4221E1 RJDA 1B L1/ L5/ R1 LOGIC RPC A	PANEL 015 ROW F RJDA 1B L1/ R1 MANF DRIVER	**V76X4223E1** RJDA 1B L1/ R1 DRIVER RPC A **V76X4224E1** RJDA 1B L1/ R1 DRIVER RPC B

S0007_500-115-F-026

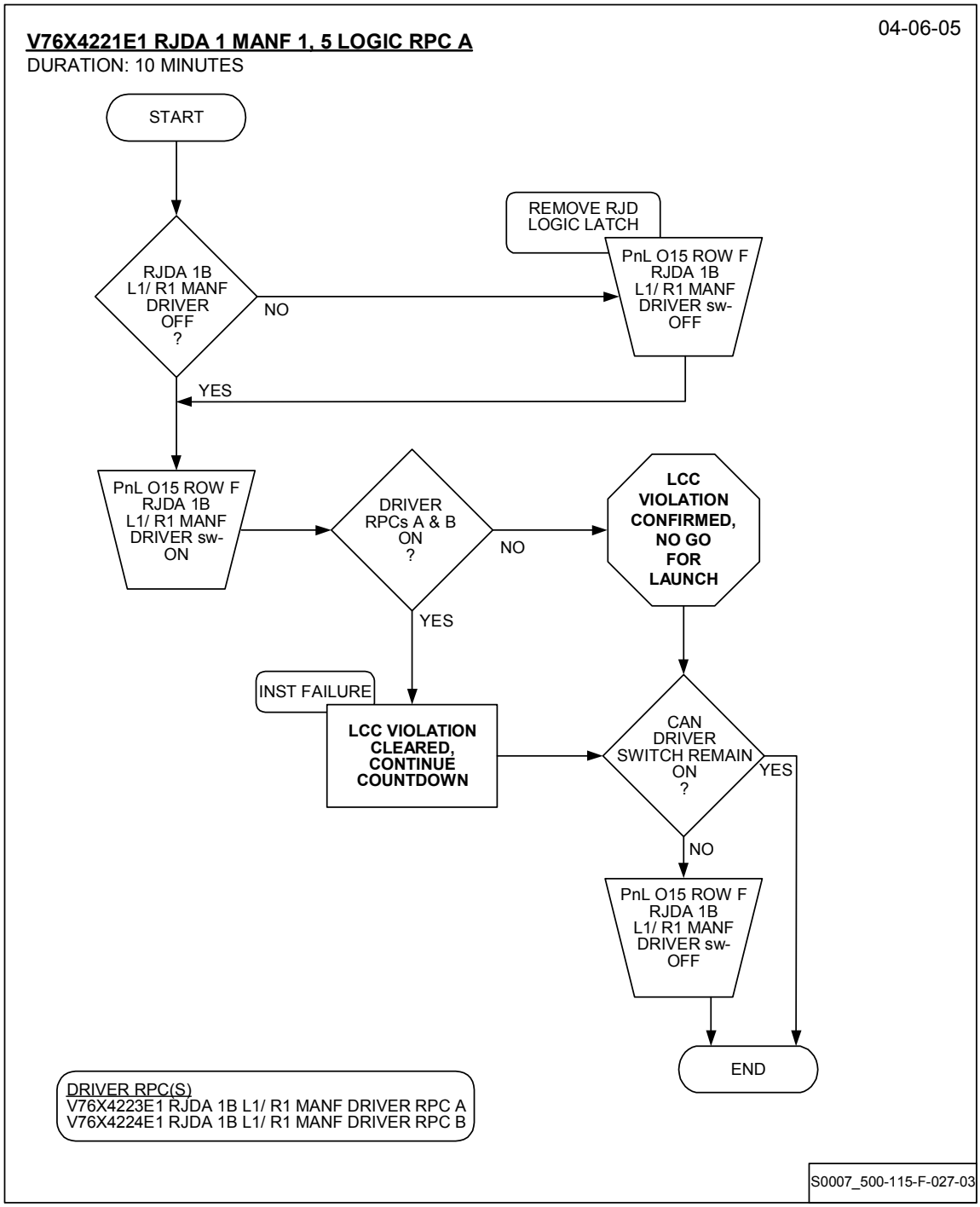
RCS Vernier Logic RPC Failure (SSID GNC-47) (Page 1 of 3)



RCS Vernier Logic RPC Failure (SSID GNC-47) (Page 2 of 3)



RCS Vernier Logic RPC Failure (SSID GNC-47) (Page 3 of 3)



115-35

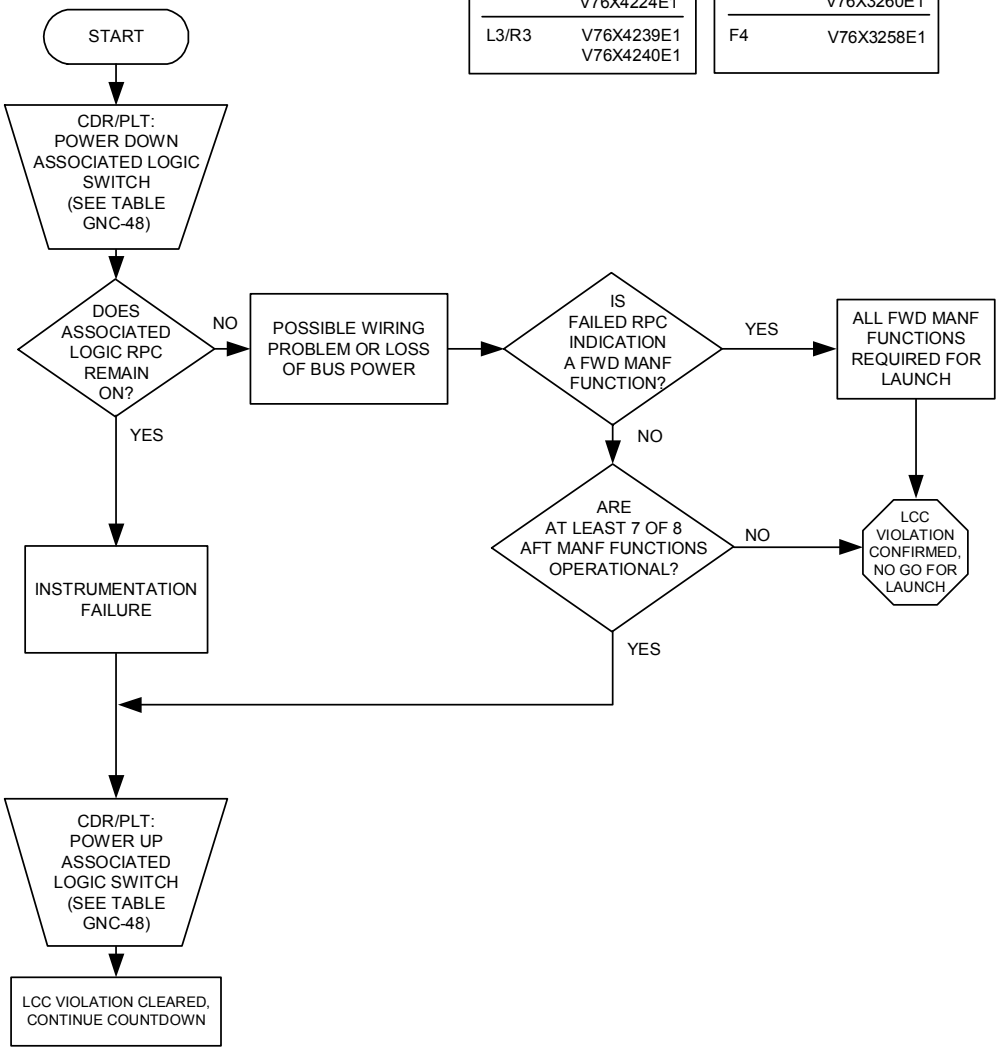
RCS Driver Power Failure (SSID GNC-48)

DURATION: 10 MIN.

04-06-05

AFT MANF FUNCTIONS	
L2/R2	V76X4233E1 V76X4234E1
L4/R4	V76X4243E1 V76X4244E1
L1/R1	V76X4223E1 V76X4224E1
L3/R3	V76X4239E1 V76X4240E1

FWD MANF FUNCTIONS	
F1	V76X3252E1
F2	V76X3254E1
F3	V76X3256E1 V76X3260E1
F4	V76X3258E1



S0007_500-115-F-028

RCS RPC Table (SSID GNC-48)

04-06-05

MANIFOLD	SWITCH NOMEN	LOGIC RPC	DRIVER RPC	TRICKLE CURRENT	RJD BUS POWER	JETS
L2/R2	PANEL O14 ROW F RJDA 1A L2/R2 MANF LOGIC SW (V79S2983E1 L2/R2 MANF DRIVER SW (V79S2984E1)	(A) V76X4231E1 (C) V76X4232E1	(A) V76X4233E1 (C) V76X4234E1	V79X2367X1	RJDA BUS A V76X3400E1 RJDA BUS C V76X3410E1	L2L, L2U L2D, R2R R2U, R2D
L4/R4	PANEL O14 ROW F RJDA 2A L4/R4 MANF LOGIC SW (V79S2993E1 L4/R4 MANF DRIVER SW (V79S2994E1)	(A) V76X4241E1 (C) V76X4242E1	(A) V76X4243E1 (C) V76X4244E1	V79X2377X1	RJDA BUS A V76X3400E1 RJDA BUS C V76X3410E1	L4L, L4U L4D, R4R R4U, R4D
F1	PANEL O14 ROW F RJDF 1B F1 MANF LOGIC SW (V79S2950E1) F1 MANF DRIVER SW (V79S2951E1)	(A) V76X3251E1	(A) V76X3252E1	V79X2345X1	RJDF BUS A V76X3200E1	F1F, F1L F1U, F1D
L1/L5/R1	PANEL O15 ROW F RJDA 1B L1/L5/R1 MANF LOGIC SW (V79S2986E1) L1/R1 MANF DRIVER SW (V79S2987E1)	(A) V76X4221E1 (B) V76X4222E1	(A) V76X4223E1 (B) V76X4224E1	V79X2365X1	RJDA BUS A V76X3400E1 RJDA BUS B V76X3405E1	L1A, L1L L1U, R1A R1R, R1U L5L, L5D

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RCS RPC Table (SSID GNC-48)

04-06-05

MANIFOLD	SWITCH NOMEN	LOGIC RPC	DRIVER RPC	TRICKLE CURRENT	RJD BUS POWER	JETS
F2	PANEL O15 ROW F RJDF 1A F2 MANF LOGIC SW (V79S2955E1) F2 MANF DRIVER SW (V79S2956E1)	(B) V76X3253E1	(B) V76X3254E1	V79X2347X1	RJDF BUS B V76X3205E1	F2F, F2R F2U, F2D
L3/R3/R5	PANEL O16 ROW F RJDA 2B L3/R3/R5 MANF LOGIC SW (V79S2995E1) L3/R3 MANF DRIVER SW (V79S2996E1)	(B) V76X4237E1 (C) V76X4238E1	(B) V76X4239E1 (C) V76X4240E1	V79X2375X1	RJDA BUS B V76X3405E1 RJDA BUS C V76X3410E1	L3A, L3L L3D, R3A R3R, R3D R5R, R5D
F3	PANEL O16 ROW F RJDF 2A F3 MANF LOGIC SW (V79S2965E1) F3 MANF DRIVER SW (V79S2966E1)	(A) V76X3259E1 (C) V76X3255E1	(A) V76X3260E1 (C) V76X3256E1	V79X2357X1	RJDF BUS C V76X3210E1	F3F, F3L F3U, F3D
F4/F5	PANEL O16 ROW F RJDF 2B F4/F5 MANF LOGIC SW (V79S2960E1) F4 MANF DRIVER SW (V79S2961E1)	(C) V76X3257E1	(C) V76X3258E1	V79X2355X1	RJDF BUS C V76X3210E1	F4R, F4D F5L, F5R

S0007_500-115-F-029-02

RCS RPC Table (SSID GNC-48)

04-06-05

MANIFOLD	SWITCH NOMEN	LOGIC RPC	DRIVER RPC	TRICKLE CURRENT	RJD BUS POWER	JETS
L5/F5/R5	PANEL O16 ROW F RJD MANF L5/F5/R5 DRIVER SW (V79S2968E1)	_____	FWD 2C DRVR RPC 1 V76X3269E1 DRVR RPC 2 V76X3270E1 _____ AFT 1 DRVR RPC 1 V76X3265E1 DRVR RPC 2 V76X3266E1 _____ AFT 2 DRVR RPC 1 V76X3267E1 DRVR RPC 2 V76X3268E1	_____	_____	_____

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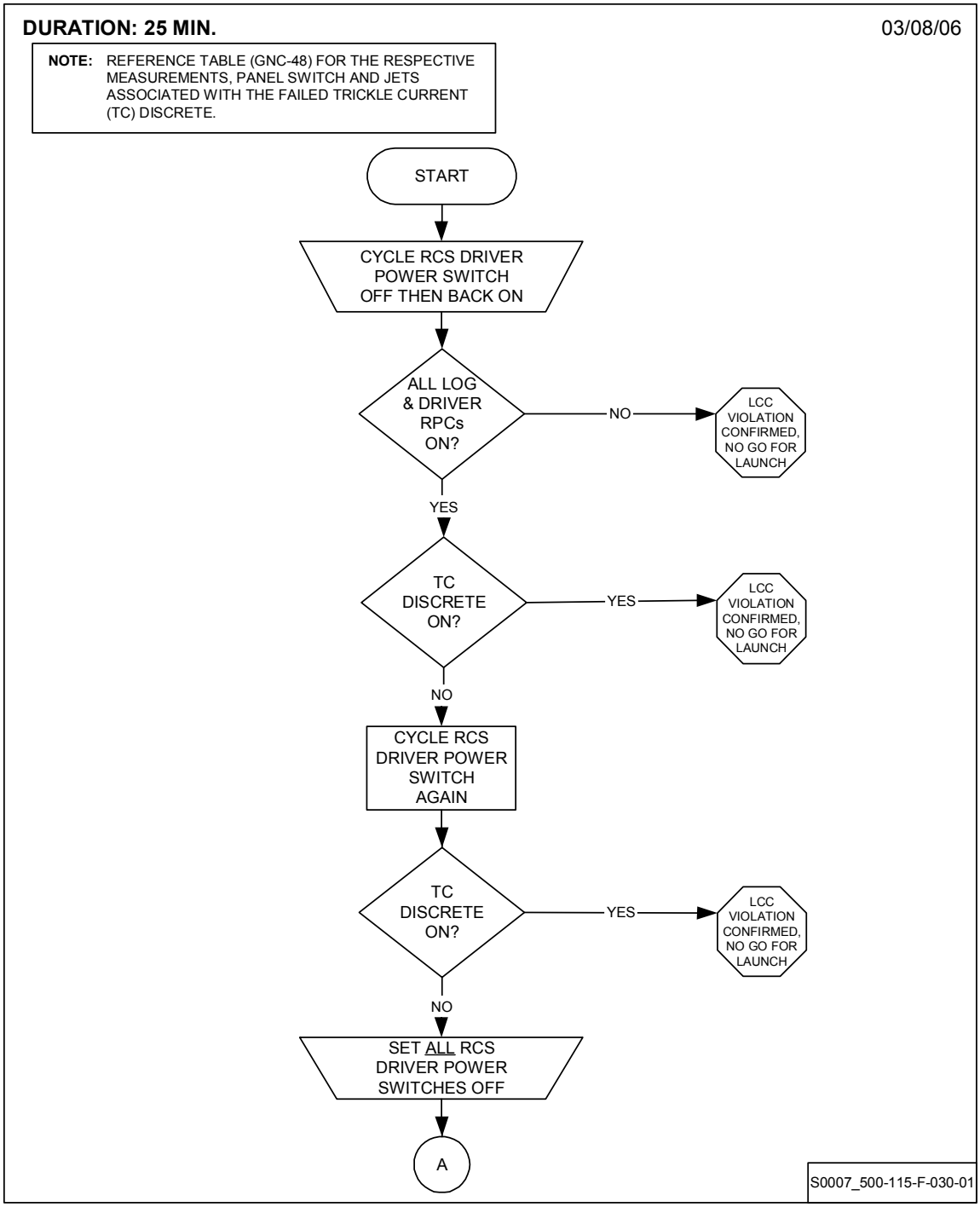
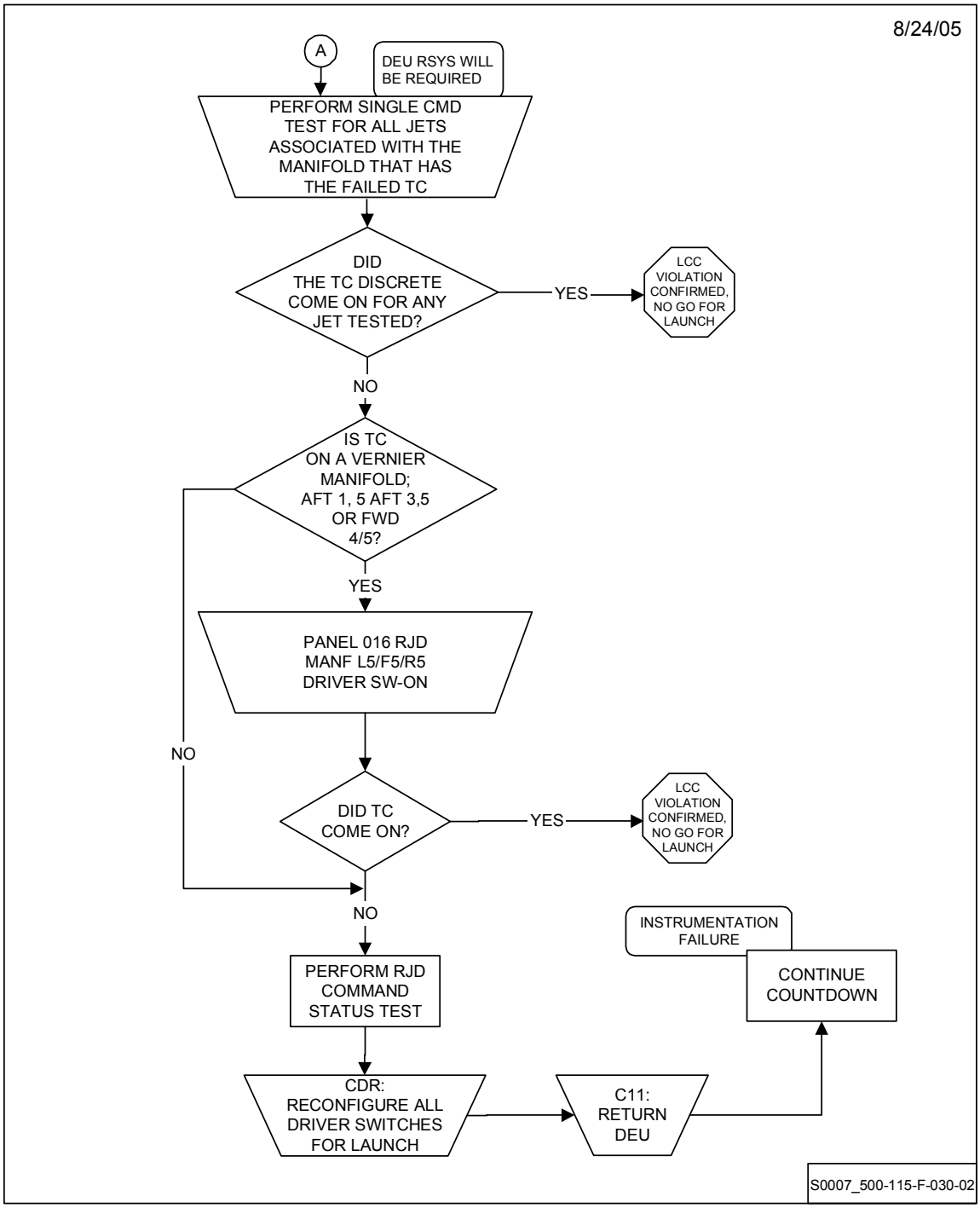
115-36

RJD Trickle Current Anomaly (SSID GNC-49) (Page 1 of 2)



RJD Trickle Current Anomaly (SSID GNC-49) (Page 2 of 2)

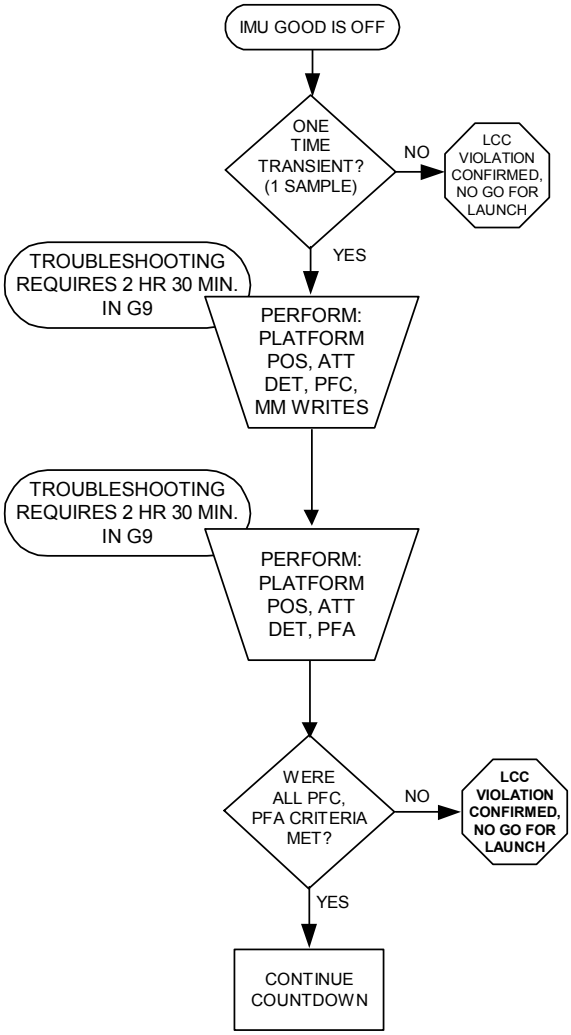


115-37

IMU Hardware BITE Anomaly (SSID GNC-56)

DURATION: 4H00M

03-09-04



S0007_500-115-F-031

115-38

Orbiter IMU Power Anomaly (SSID GNC-57) (Page 1 of 3)

03-08-04

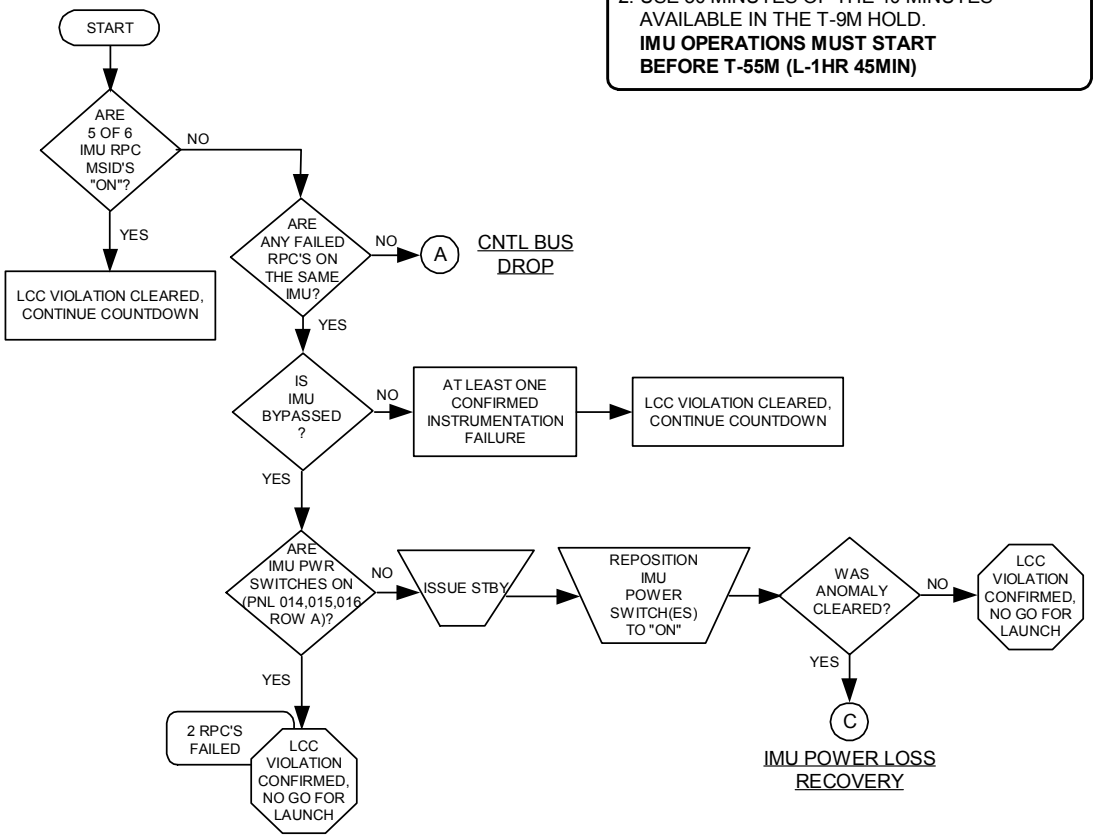
DURATION: 10 MIN. (PROBLEM IDENTIFICATION)

IMU POWER LOSS RECOVERY

IMU RECOVERY OPERATIONS AFTER A POWER LOSS REQUIRES THE MINIMUM TIME IN ORDER TO MEET THE PLANNED LAUNCH TIME.

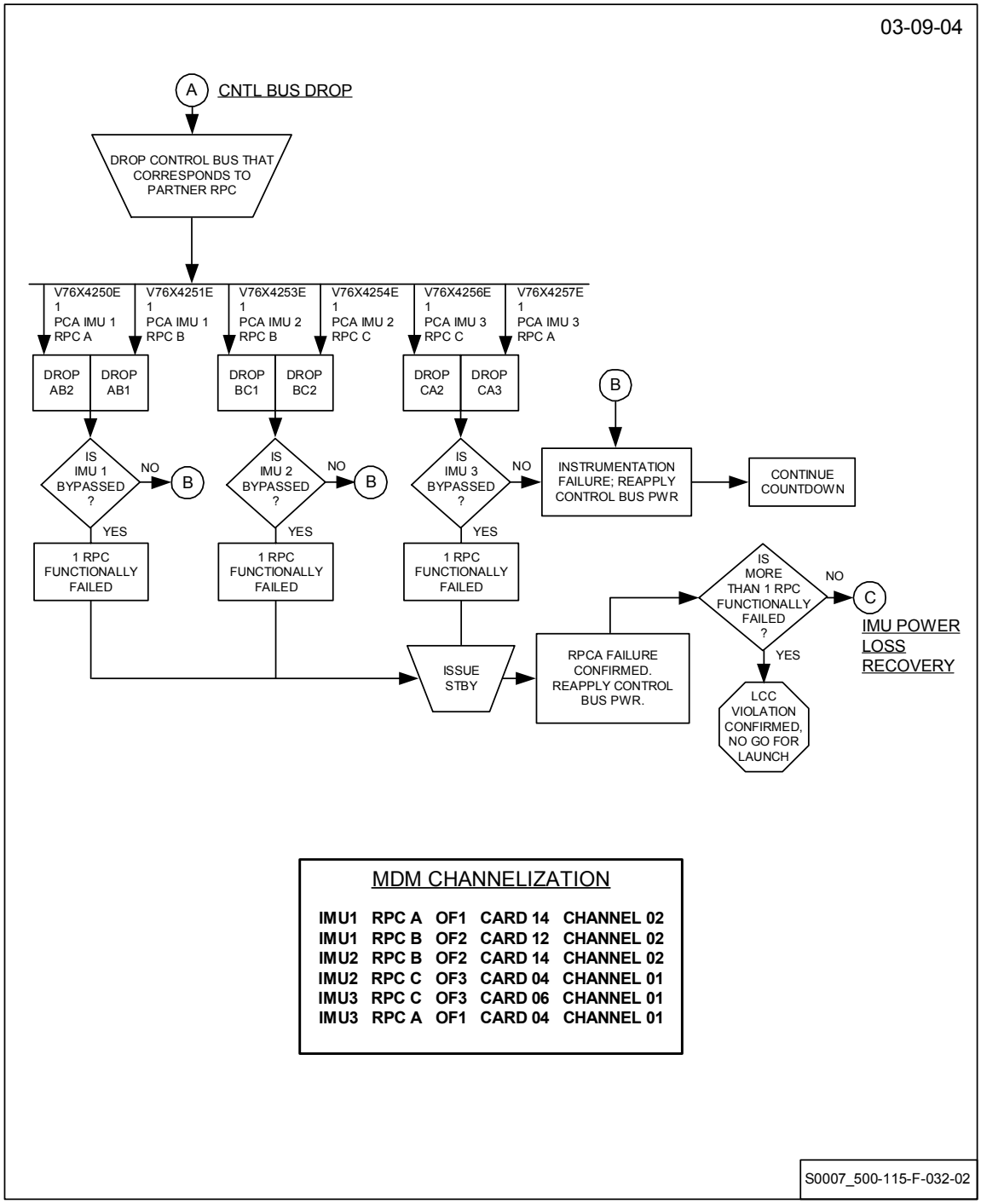
OPTIONS

1. NO CHANGE IN LAUNCH TIMELINE.
   IMU OPERATIONS MUST START BEFORE T-1H25M (L-2HR 15MIN)
2. USE 30 MINUTES OF THE 40 MINUTES AVAILABLE IN THE T-9M HOLD.
   IMU OPERATIONS MUST START BEFORE T-55M (L-1HR 45MIN)

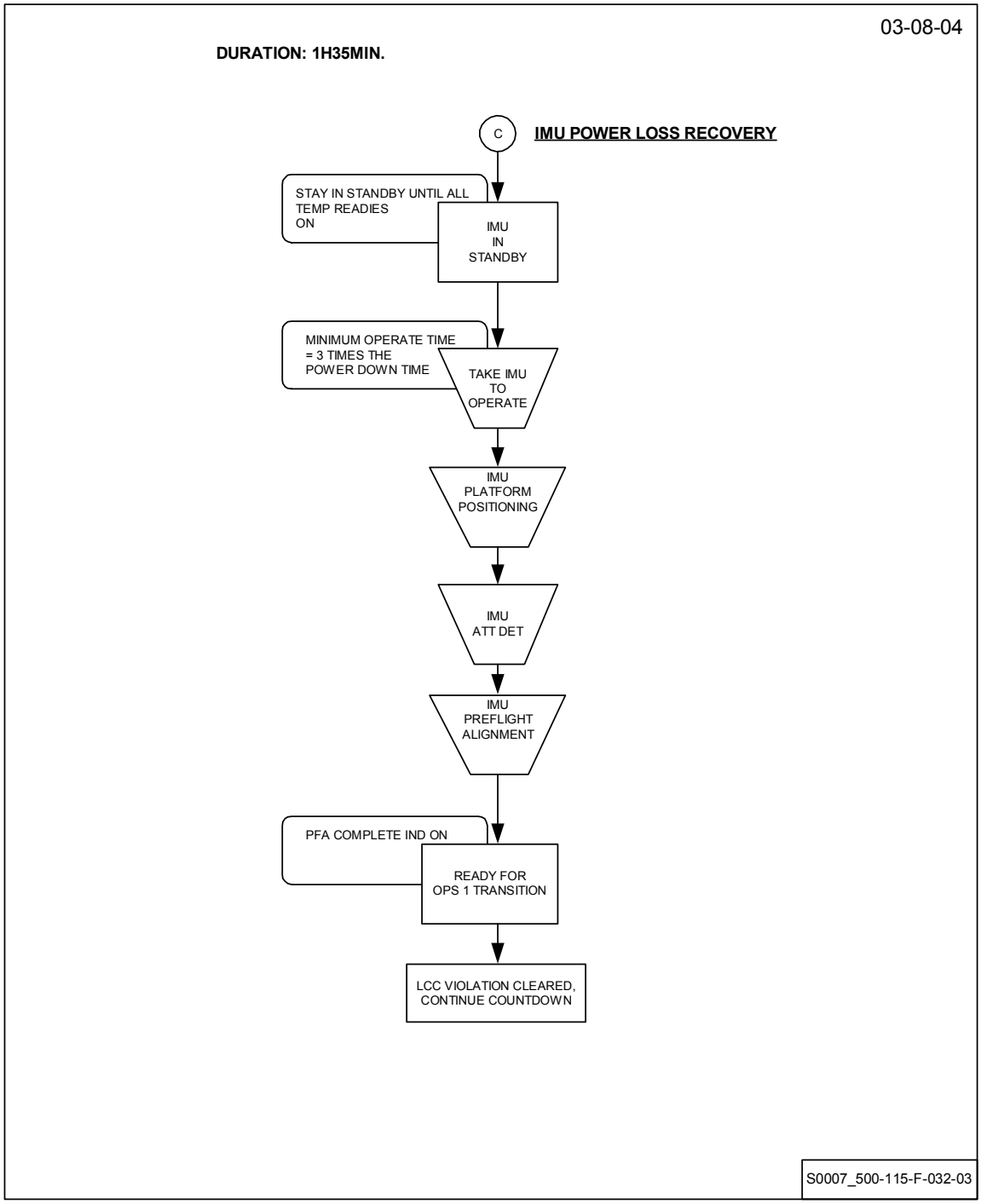


S0007_500-115-F-032-01

Orbiter IMU Power Anomaly (SSID GNC-57) (Page 2 of 3)



Orbiter IMU Power Anomaly (SSID GNC-57) (Page 3 of 3)



Orbiter IMU Power Anomaly (SSID GNC-57) (Cont)

IMU Power Loss Recovery Backup Information

Recovery Options

NOTE

The following are operational examples that will allow completion of all IMU activities without compromising the planned Launch time.

Option	Must start before
1. Preserve OPS transition at the planned T-20 min and counting point (IMU activities will be complete before exiting the hold). This option will support ISS or other Launch timelines	T-1 hrs25 min
2. Use 30 minutes of the 40 minutes available in the T-9 min hold (add 30 minutes to the 10 minute hold at T-20 min hold). This option assumes ISS Launch timeline with 40 minute hold at T-9 min.	T-55 min
Recovery Test Order	**Duration**
1. Standby	5 minutes
2. Transition to Operate	3 minutes
3. Warm-up in Operate	30 minutes
4. Platform Positioning	5 minutes
5. Attitude Determination	4 minutes
6. Pre-flight Alignment	38 minutes
7. Operator Overhead	6 minutes
Total	**91 minutes, round to 1 hr 35 min**

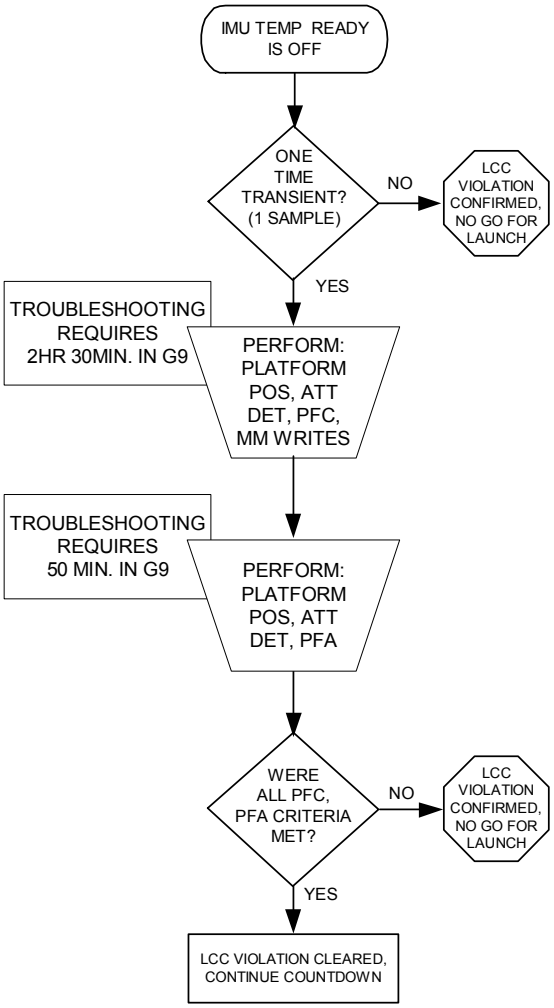
Recovery Test Requirement Assumptions

1. Maximum allowed power off period is 10 minutes. 10 minutes was chosen by IMU PRT as a reasonable time for IMU to be powered off.
2. Platform is ready (temp ready on) to operate within 5 minutes of power restoration.
3. Operate warm-up time required is 30 minutes maximum (3 x 10 minutes)
4. Activities required:
   - Platform positioning - 5 minutes
   - Attitude determination - 4 minutes
   - Pre-flight alignment - 38 minutes
5. Significant time in GA-1 mode is not required.
6. A total overhead of 6 minutes is required for the Console Operator to work through the activities.

115-39

IMU Temperature Ready Anomaly (SSID GNC-58)

DURATION: 4H00M 03-08-04



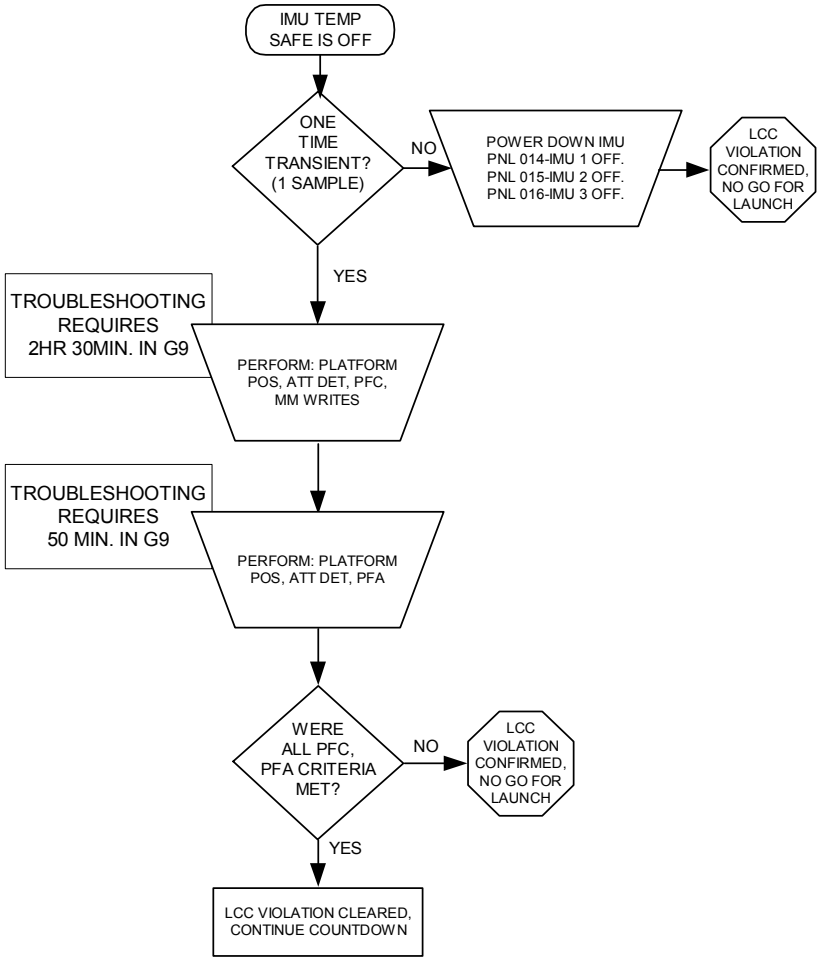
S0007_500-115-F-033

115-40

IMU Over Temperature Indicator (SSID GNC-59)

DURATION: 4H00M

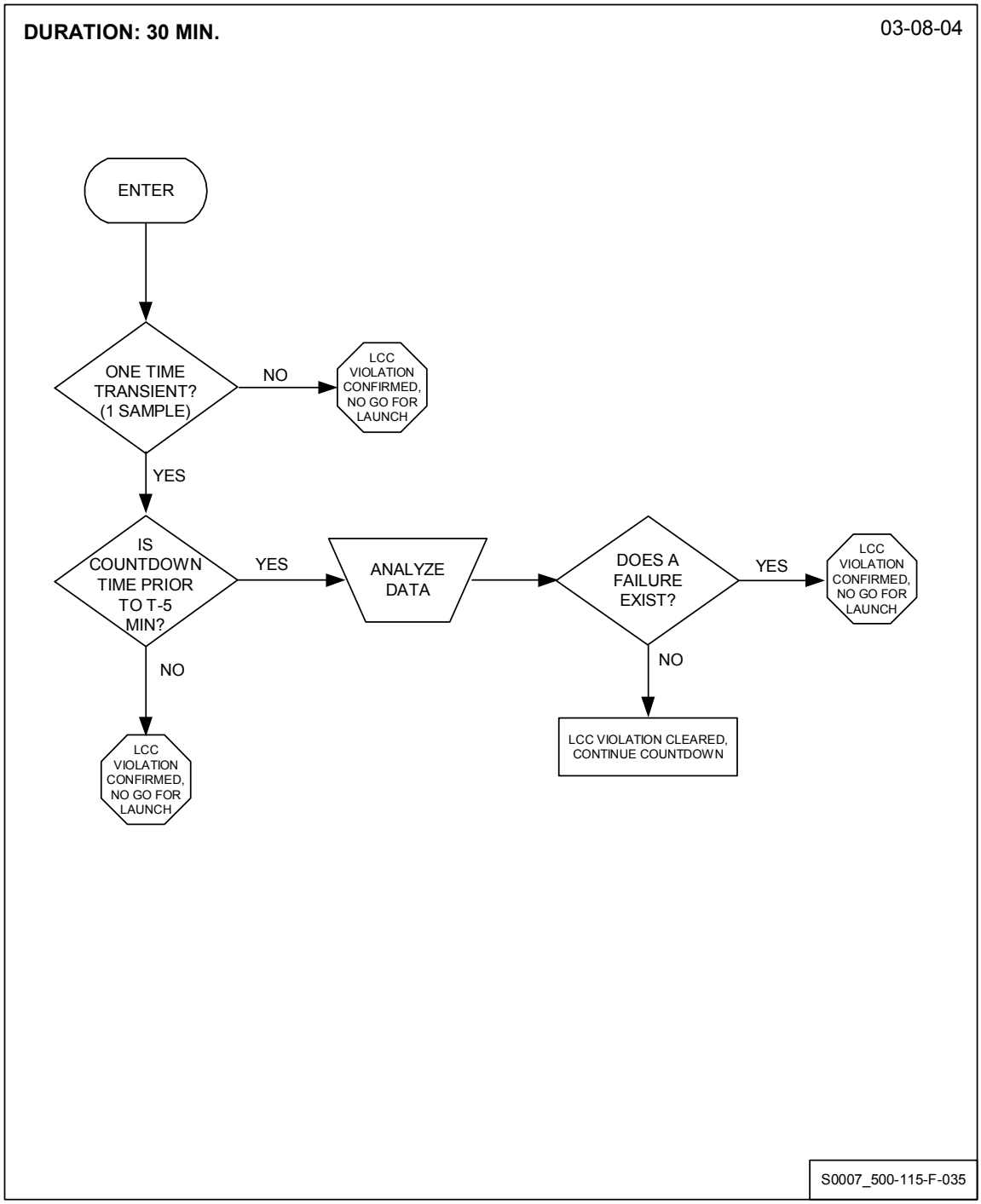
03-09-04



S0007_500-115-F-034

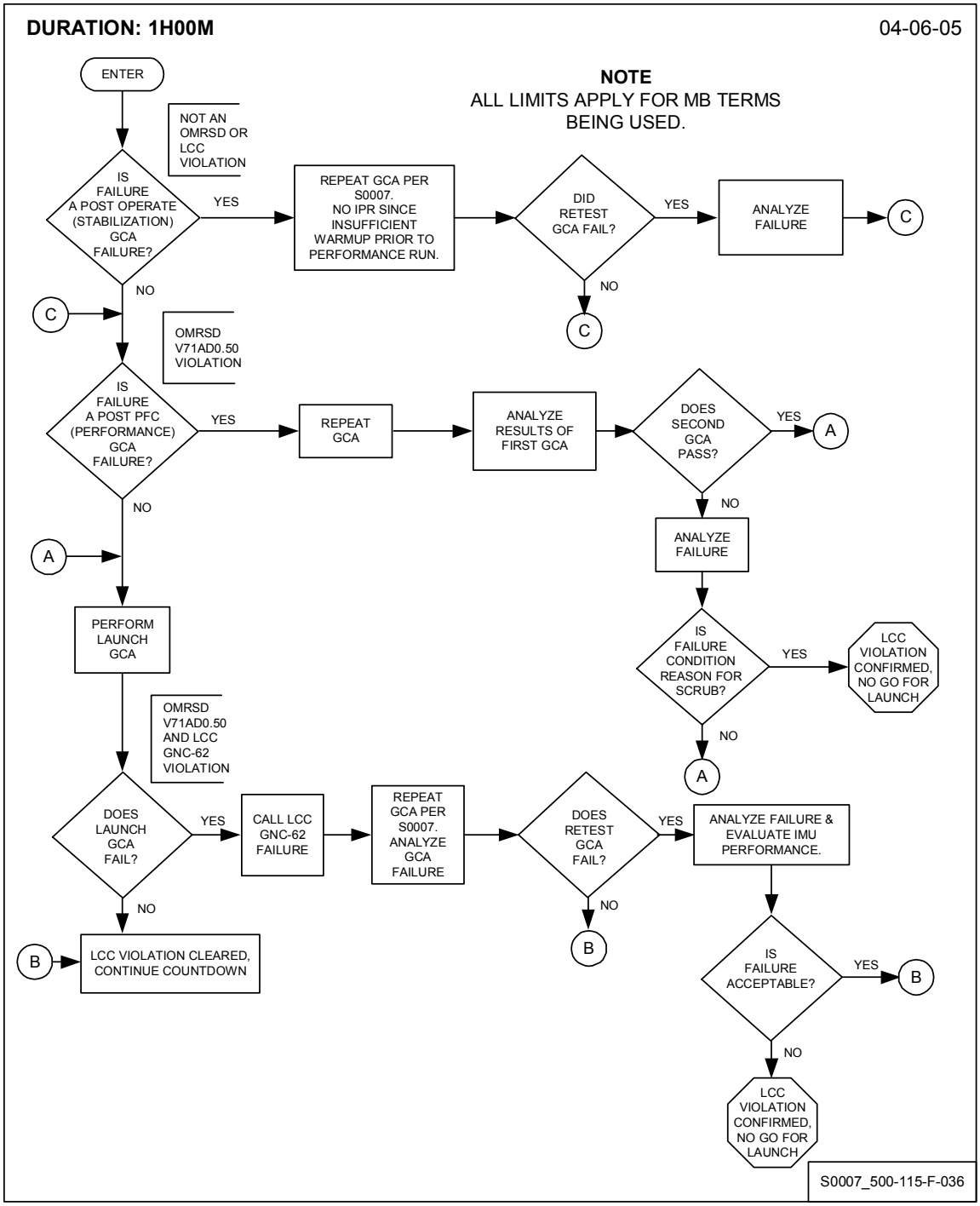
115-41

IMU Software BITE Anomaly (SSID GNC-61)



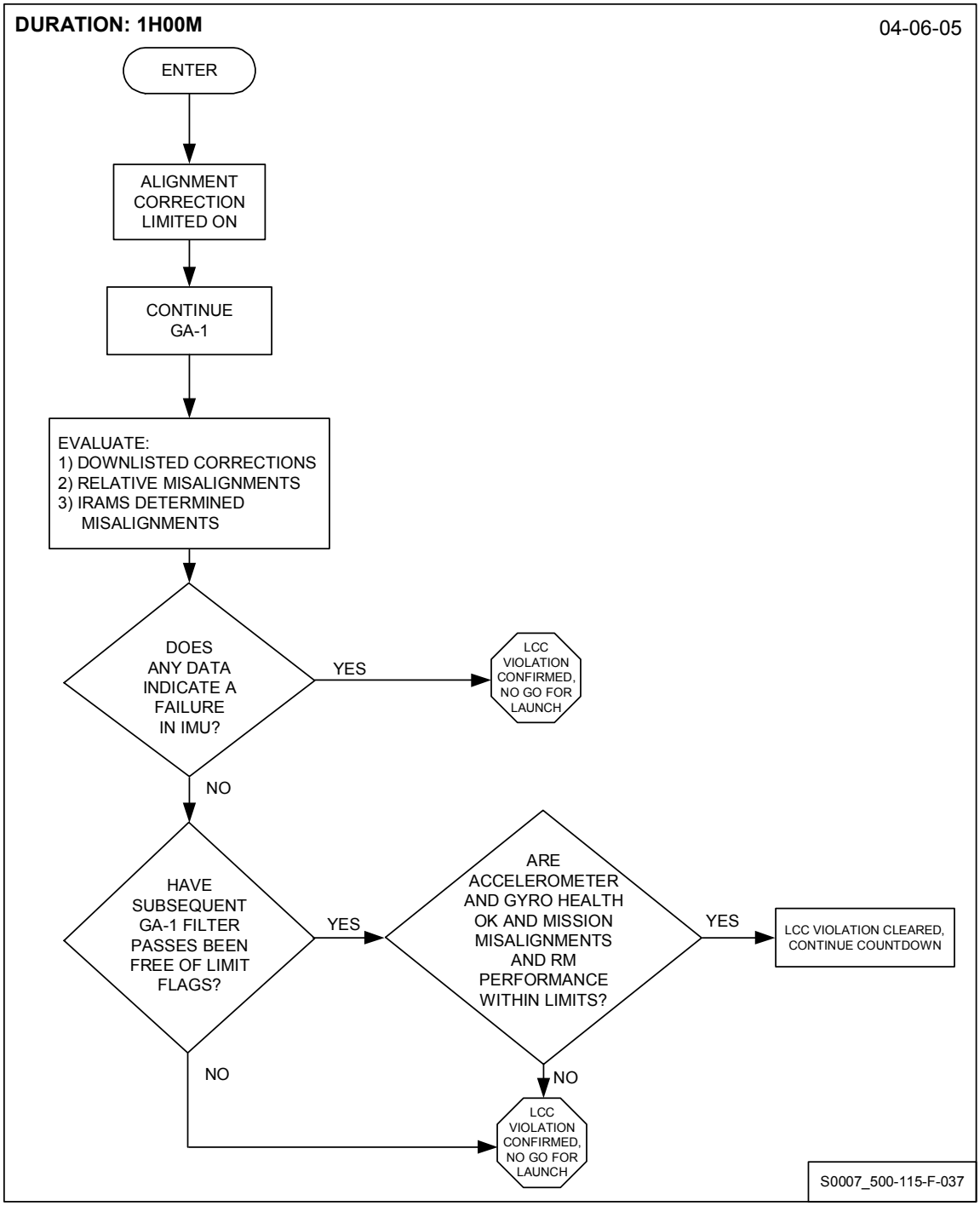
115-42

IMU Gyrocompass Anomaly (SSID GNC-62)



115-43

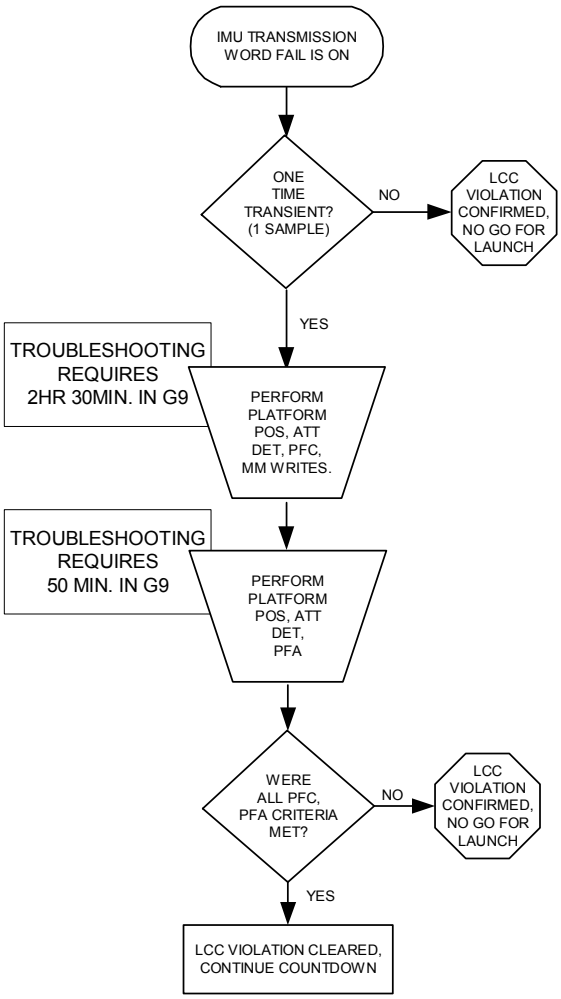
IMU Gyrocompass 1 Alignment Anomaly (SSID GNC-63)



115-44

IMU Transmission Word Failure (SSID GNC-66)

DURATION: 4H00M 03-08-04



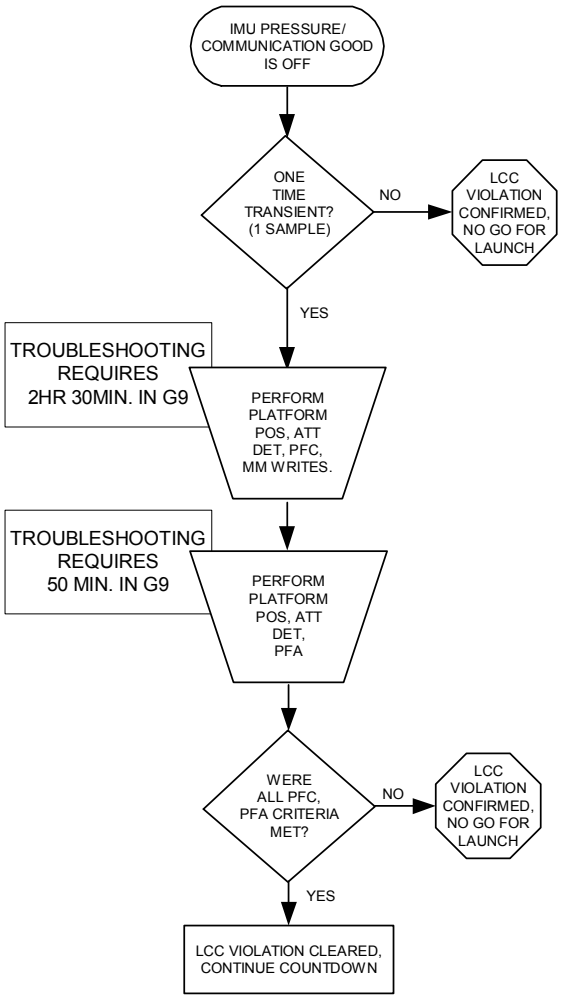
S0007_500-115-F-039

115-45

IMU Pressure/Communication Anomaly (SSID GNC-67)

DURATION: 4H00M

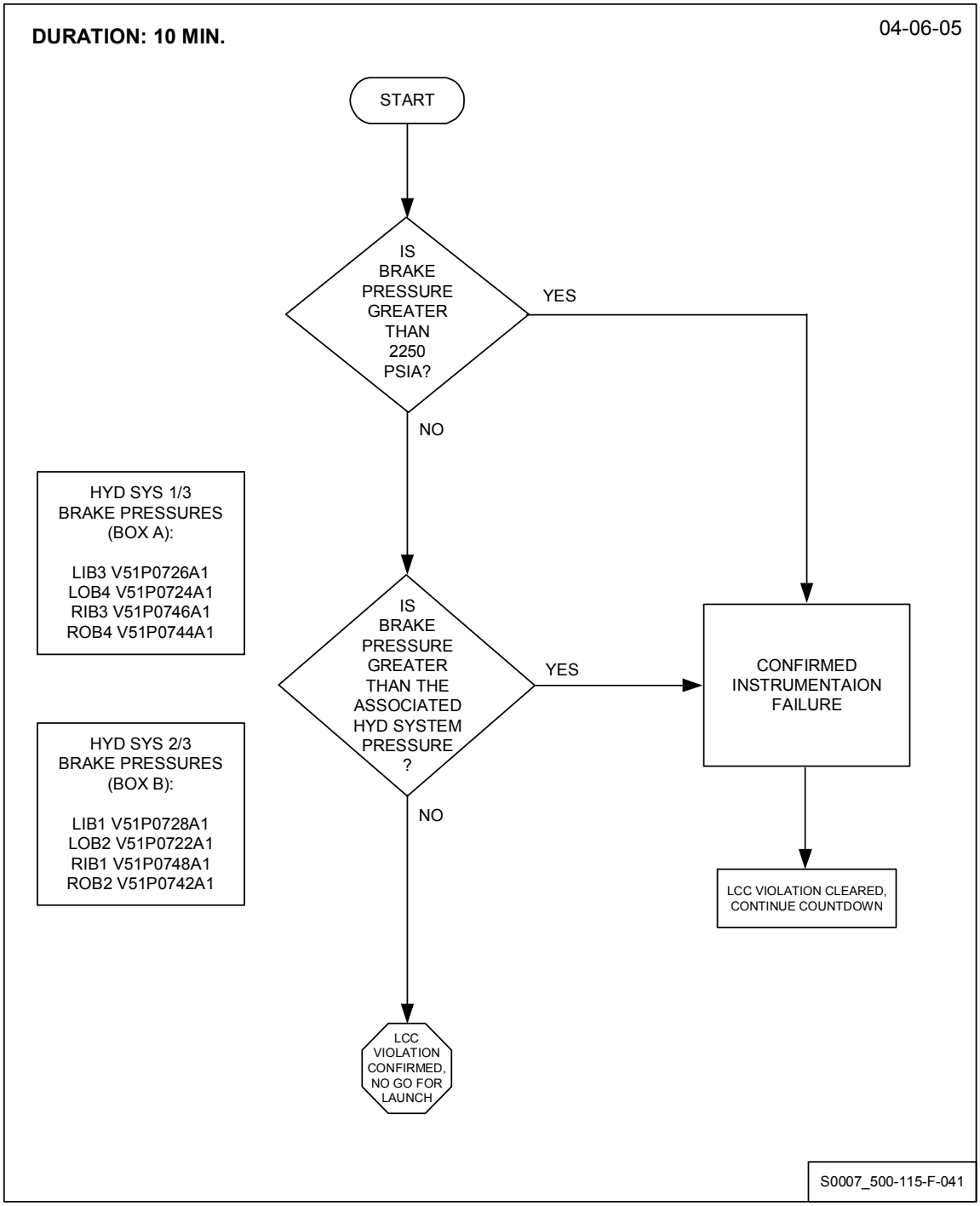
03-08-04



S0007_500-115-F-040

115-46

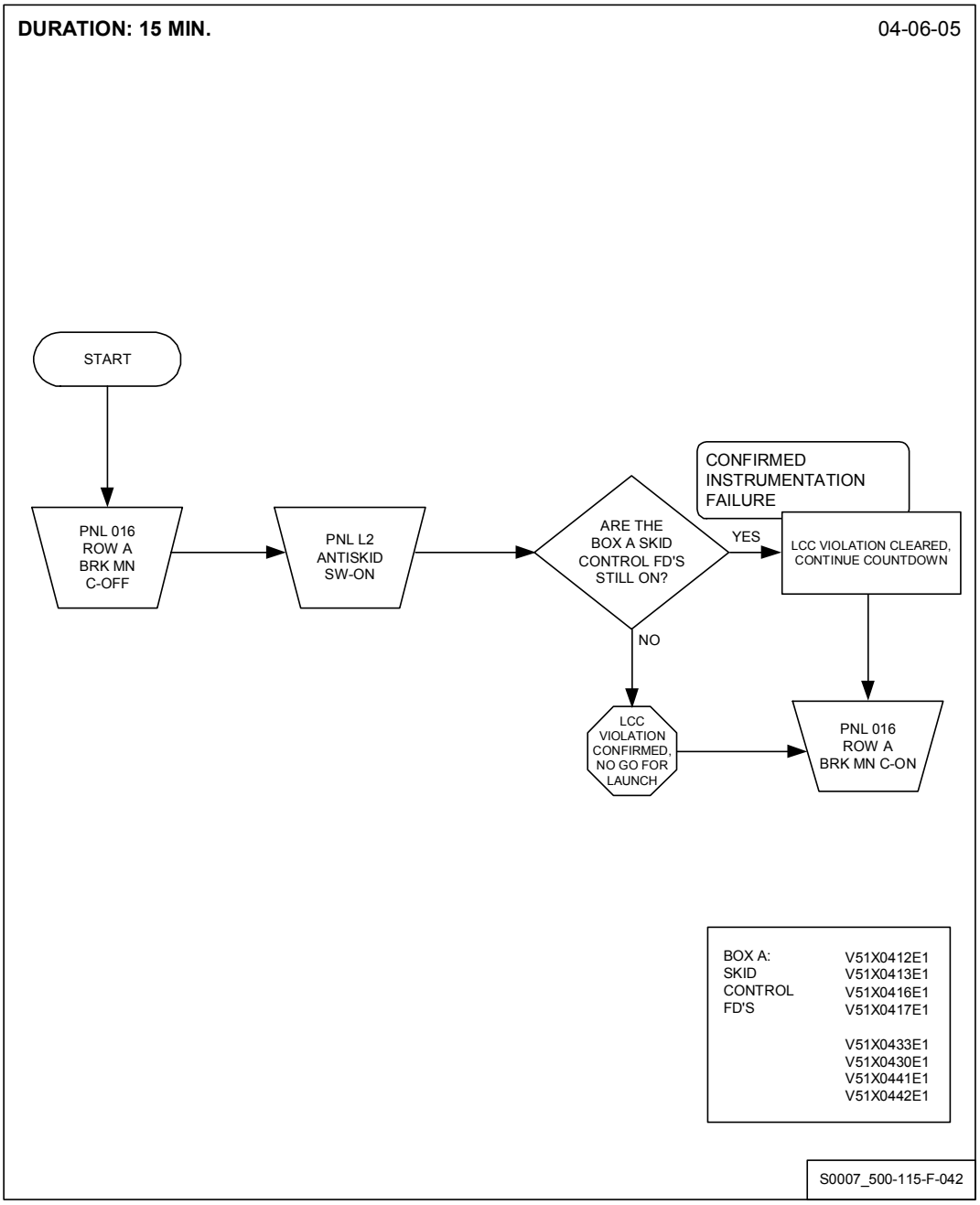
Brake Pressure Anomaly (SSID GNC-79)



Brake Power Anomaly (SSID GNC-80)

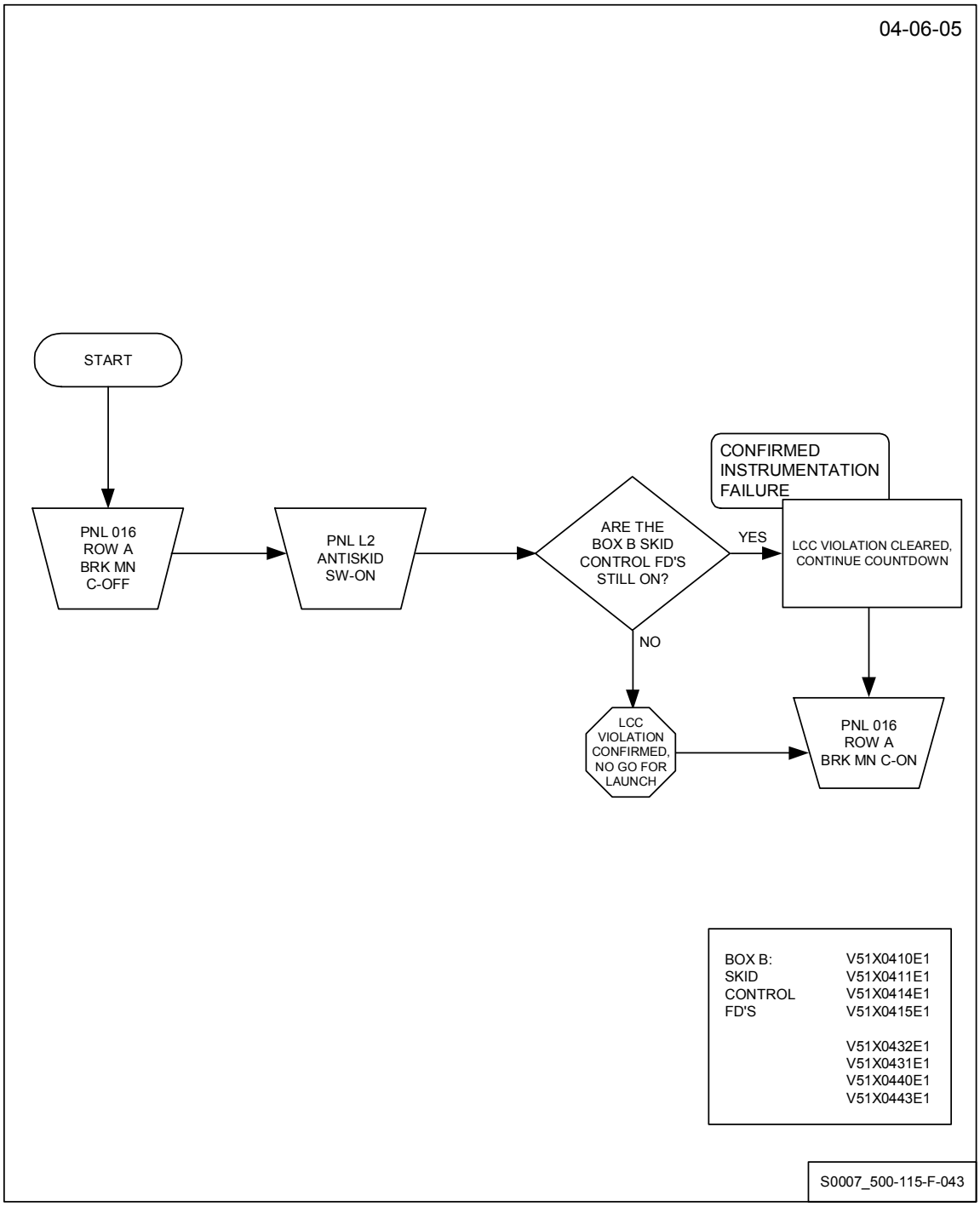
115-47

Loss of V76X5800E1 Brake/Skid Sub Bus C/A RPC Power A (SSID GNC-80) (Page 1 of 4)



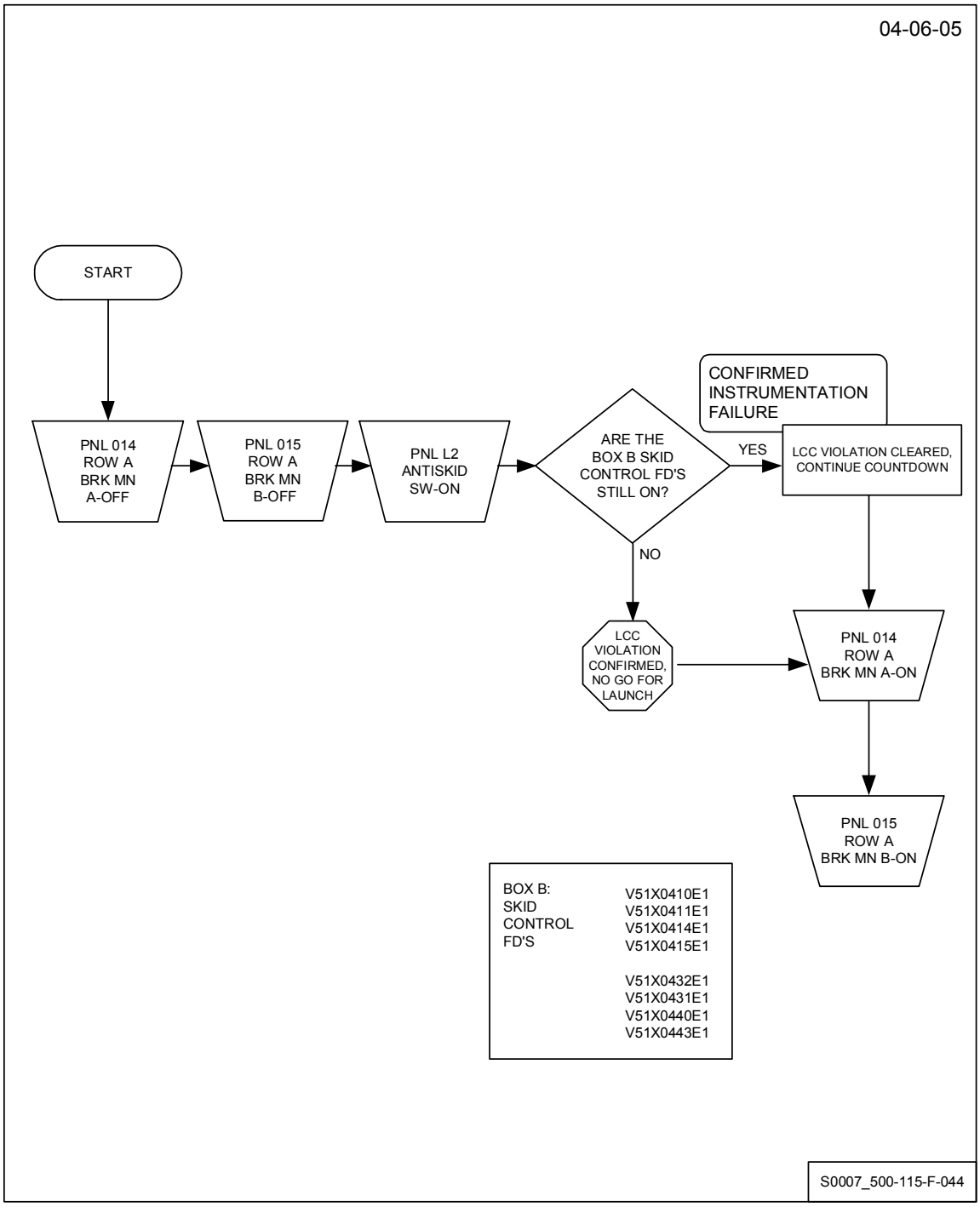
115-48

Loss of V76X5805E1 Brake/Skid Sub Bus B/C RPC Power B (SSID GNC-80) (Page 2 of 4)



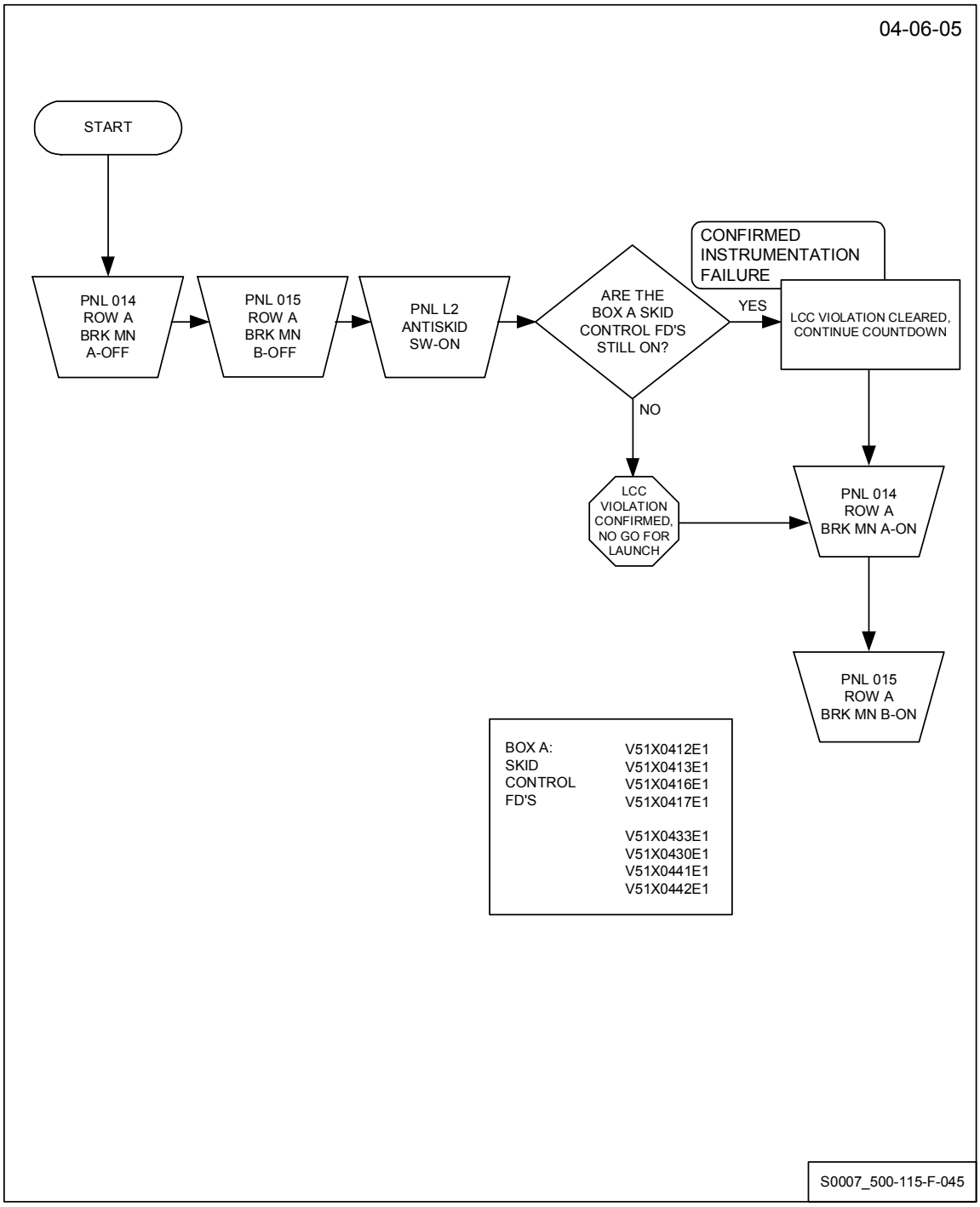
115-49

Loss of V76X5806E1 Brake/Skid Sub Bus B/C RPC Power C (SSID GNC-80) (Page 3 of 4)



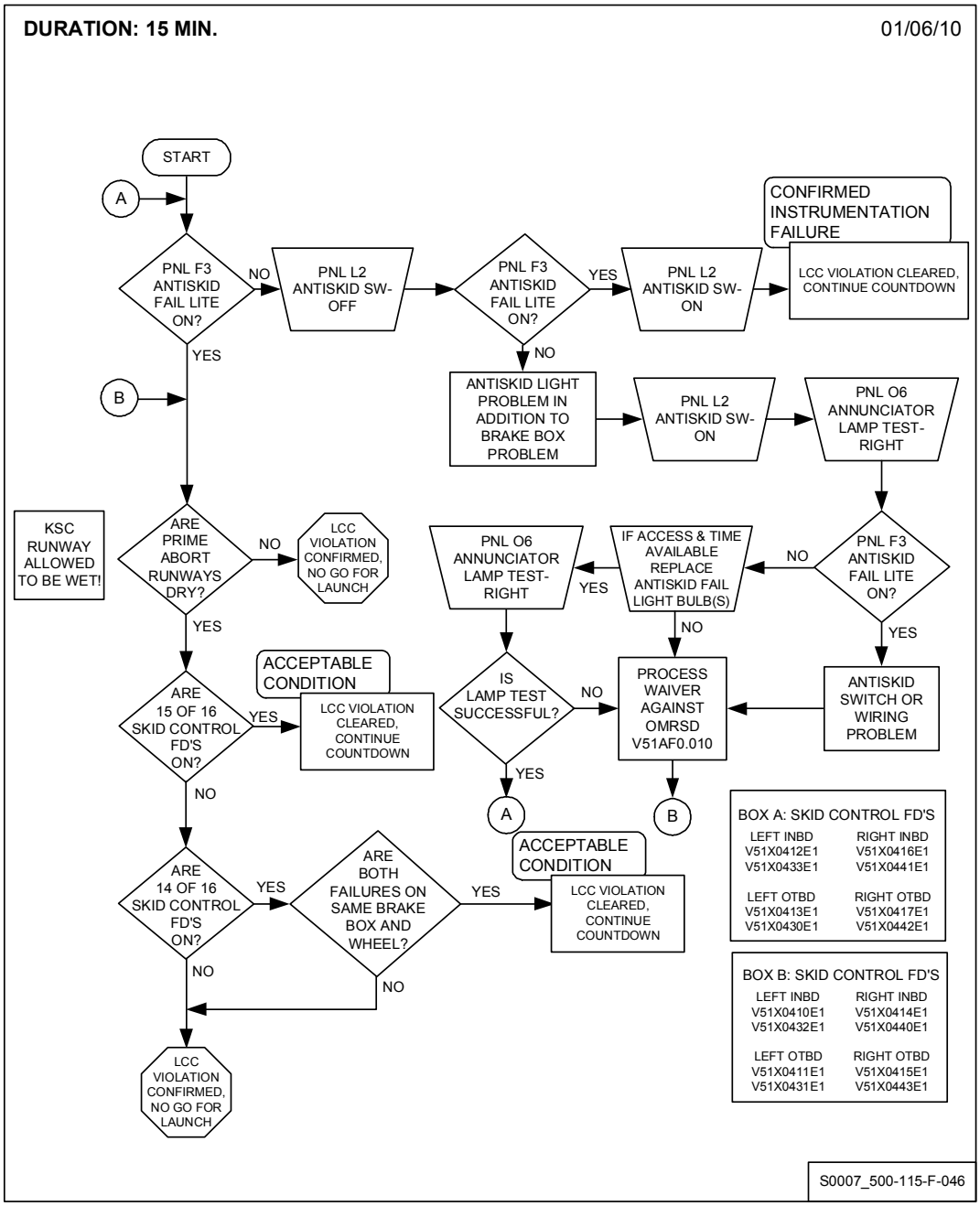
115-50

Loss of V76X5811E1 Brake/Skid Sub Bus C/A RPC Power C (SSID GNC-80) (Page 4 of 4)



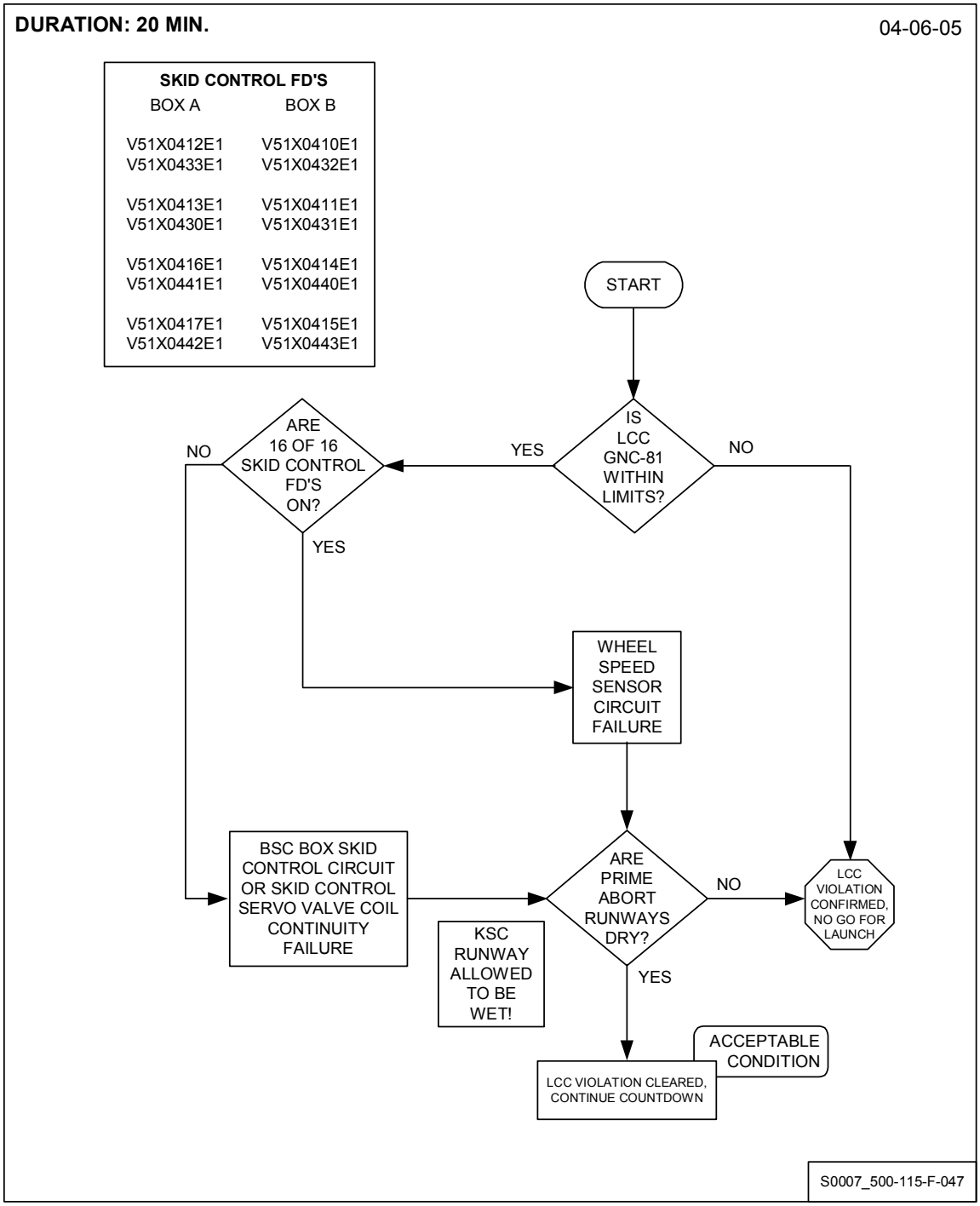
115-51

Landing Gear Anti-Skid Anomaly (SSID GNC-81)



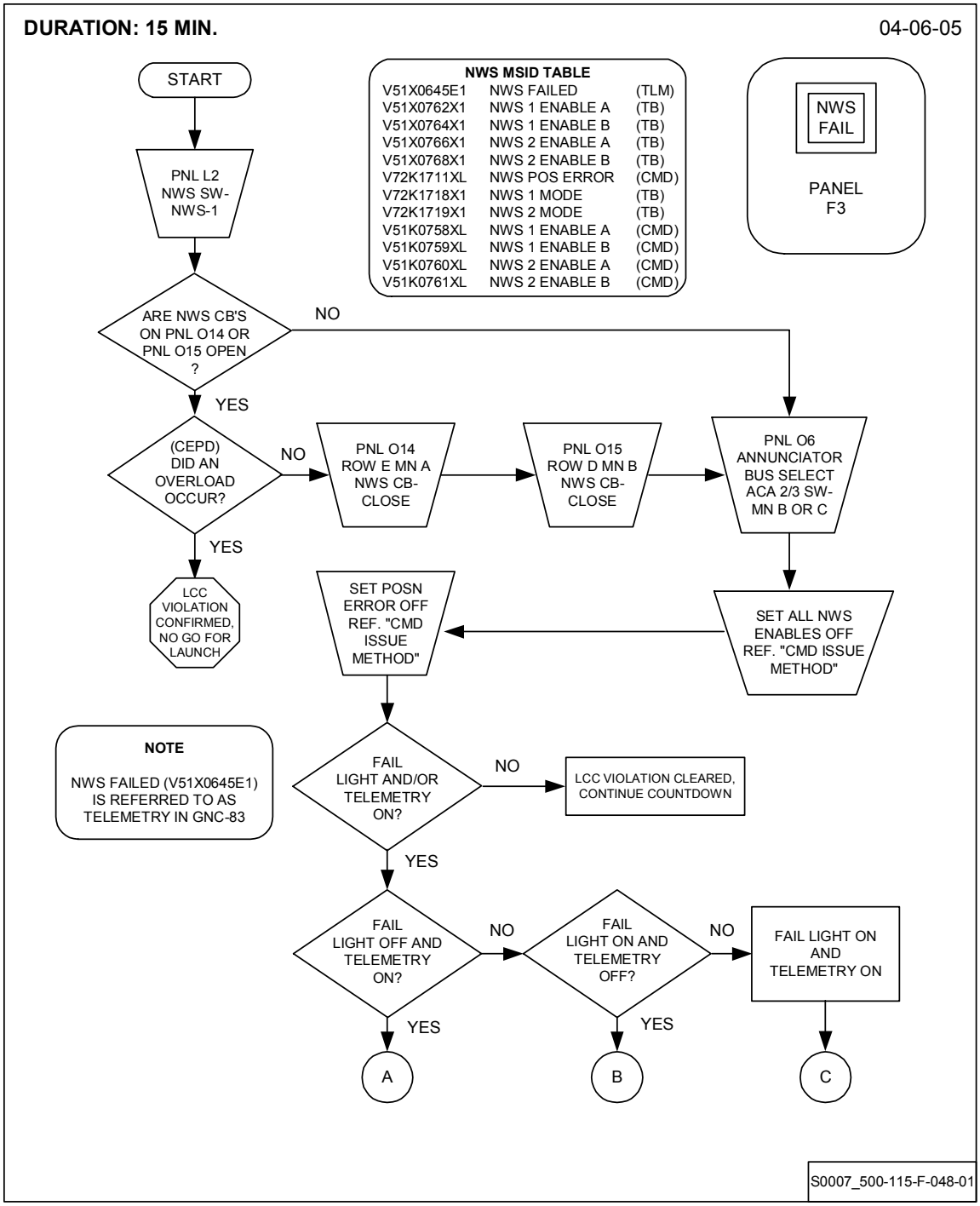
115-52

Anti-Skid Fail Light Anomaly (SSID GNC-82)



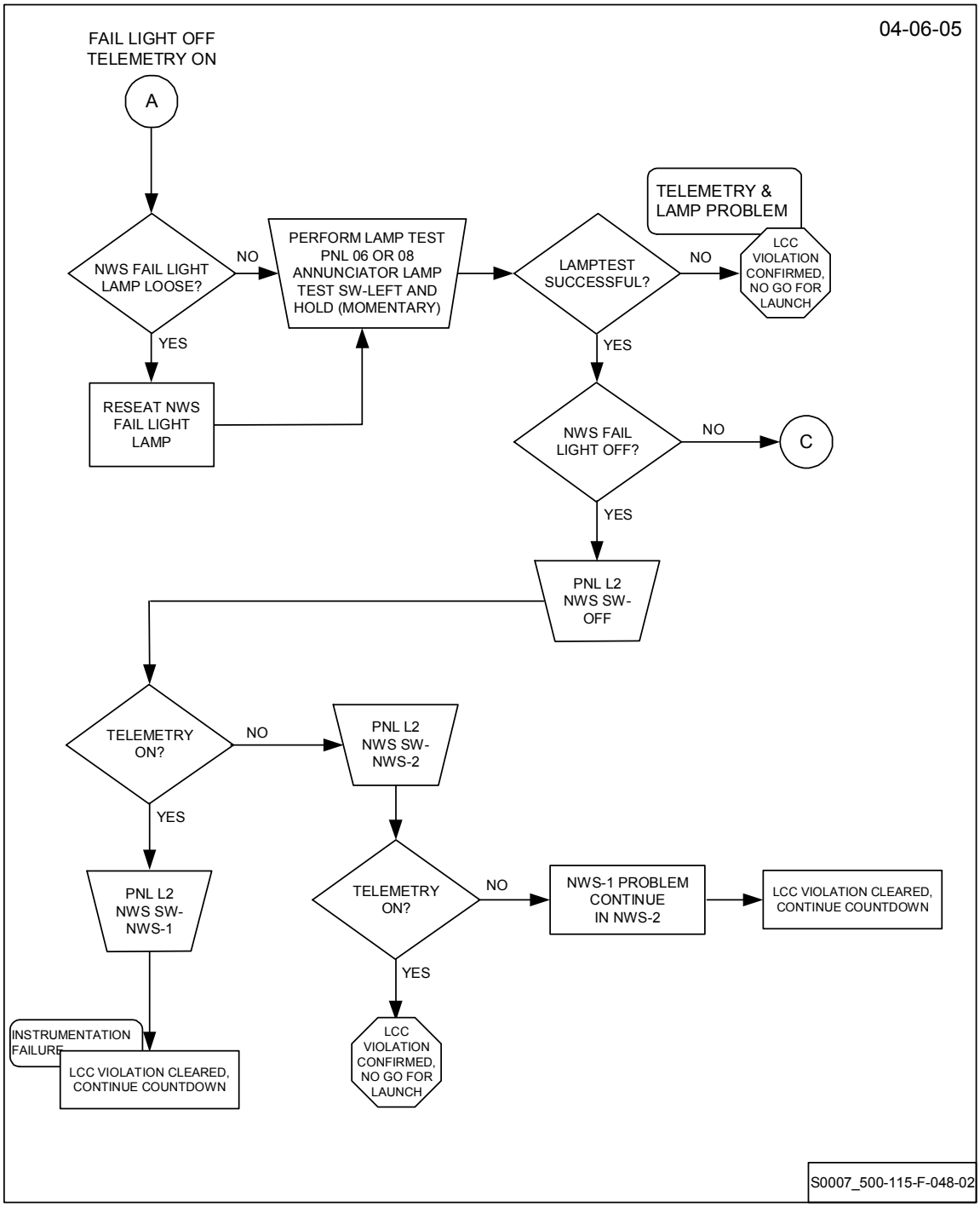
115-53

Nose Wheel Steering Anomaly (SSID GNC-83) (Page 1 of 5)

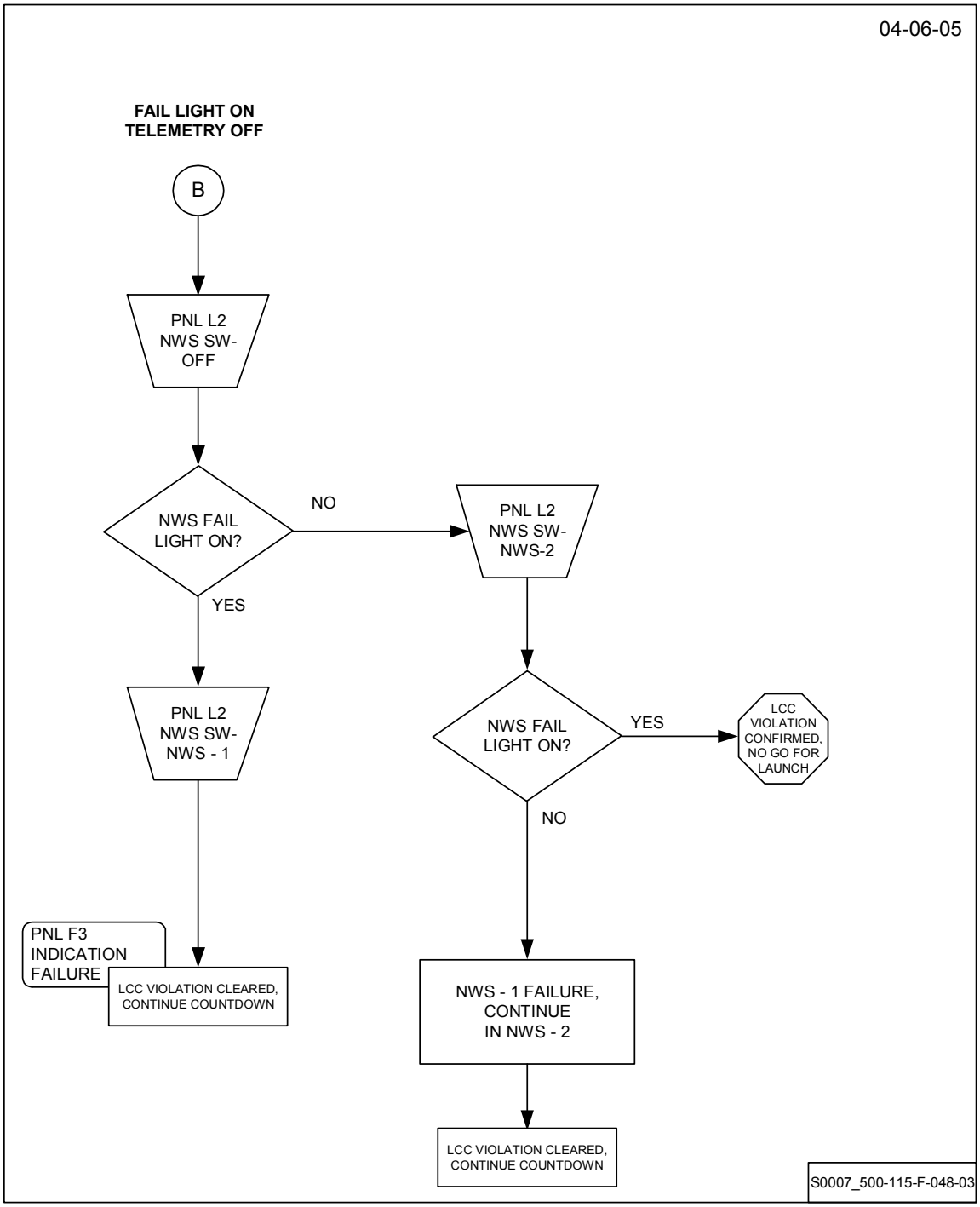


NWS MSID TABLE		
V51X0645E1	NWS FAILED	(TLM)
V51X0762X1	NWS 1 ENABLE A	(TB)
V51X0764X1	NWS 1 ENABLE B	(TB)
V51X0766X1	NWS 2 ENABLE A	(TB)
V51X0768X1	NWS 2 ENABLE B	(TB)
V72K1711XL	NWS POS ERROR	(CMD)
V72K1718X1	NWS 1 MODE	(TB)
V72K1719X1	NWS 2 MODE	(TB)
V51K0758XL	NWS 1 ENABLE A	(CMD)
V51K0759XL	NWS 1 ENABLE B	(CMD)
V51K0760XL	NWS 2 ENABLE A	(CMD)
V51K0761XL	NWS 2 ENABLE B	(CMD)

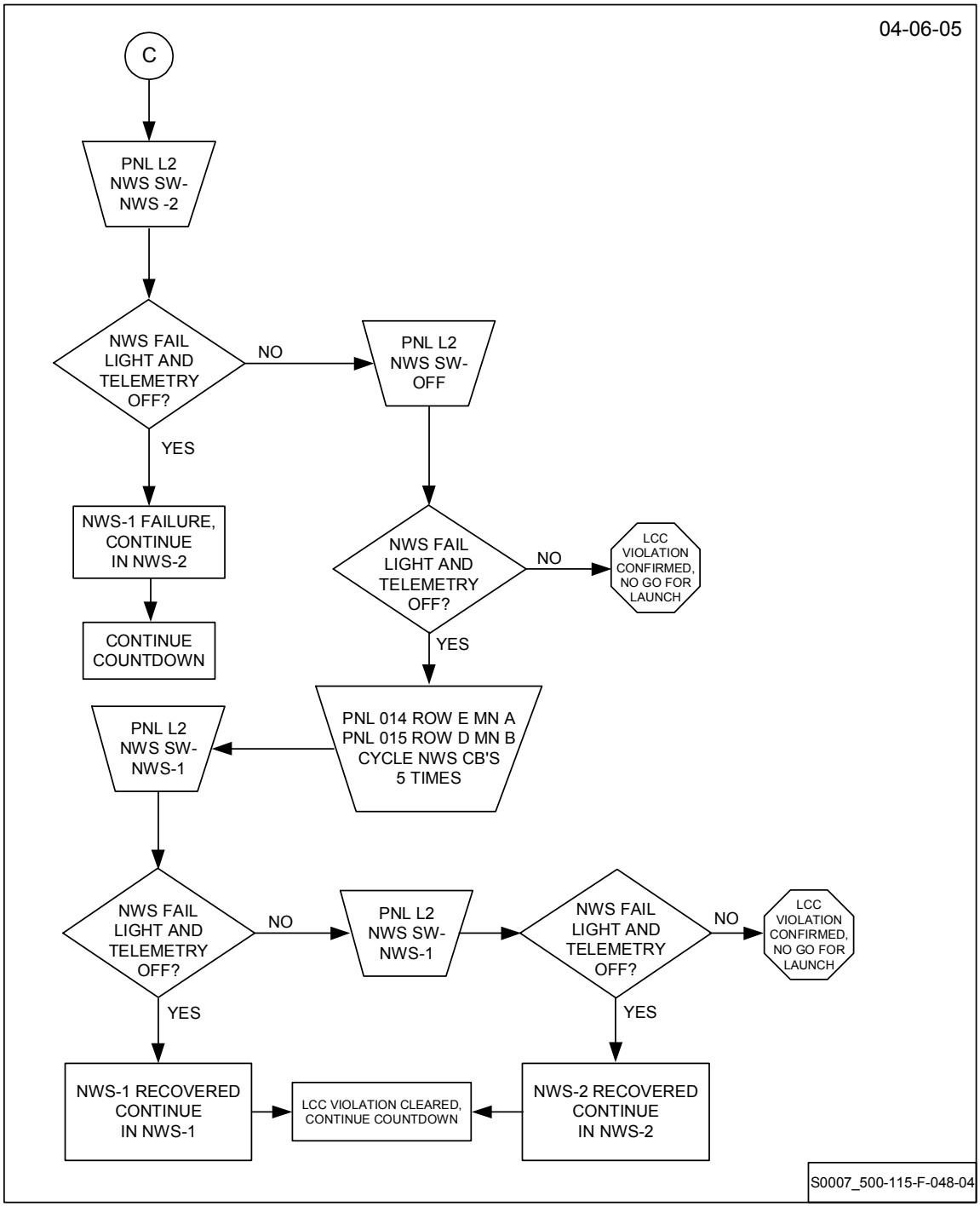
Nose Wheel Steering Anomaly (SSID GNC-83) (Page 2 of 5)



Nose Wheel Steering Anomaly (SSID GNC-83) (Page 3 of 5)



Nose Wheel Steering Anomaly (SSID GNC-83) (Page 4 of 5)



Nose Wheel Steering Anomaly (SSID GNC-83) (Page 5 of 5)

04-06-05

CMD ISSUE METHOD

VWB39, NWS STATUS AND TEST SELECT

NOSEWHEEL FUNCTIONS
ENABLE CMDS 1A = V51K0758XL, NWS 1 ENABLE A CMD
1B = V51K0759XL, NWS 1 ENABLE B CMD
2A = V51K0760XL, NWS 2 ENABLE A CMD
2B = V51K0761XL, NWS 2 ENABLE B CMD

POS ERROR = V72K1711XL, NWS POS ERROR

SELECT ON/OFF RESULTS IN COMMAND TURNED ON/OFF, RESPECTIVELY

TWO STEP PROCESS; XMIT CURSOR, EXEC CMD

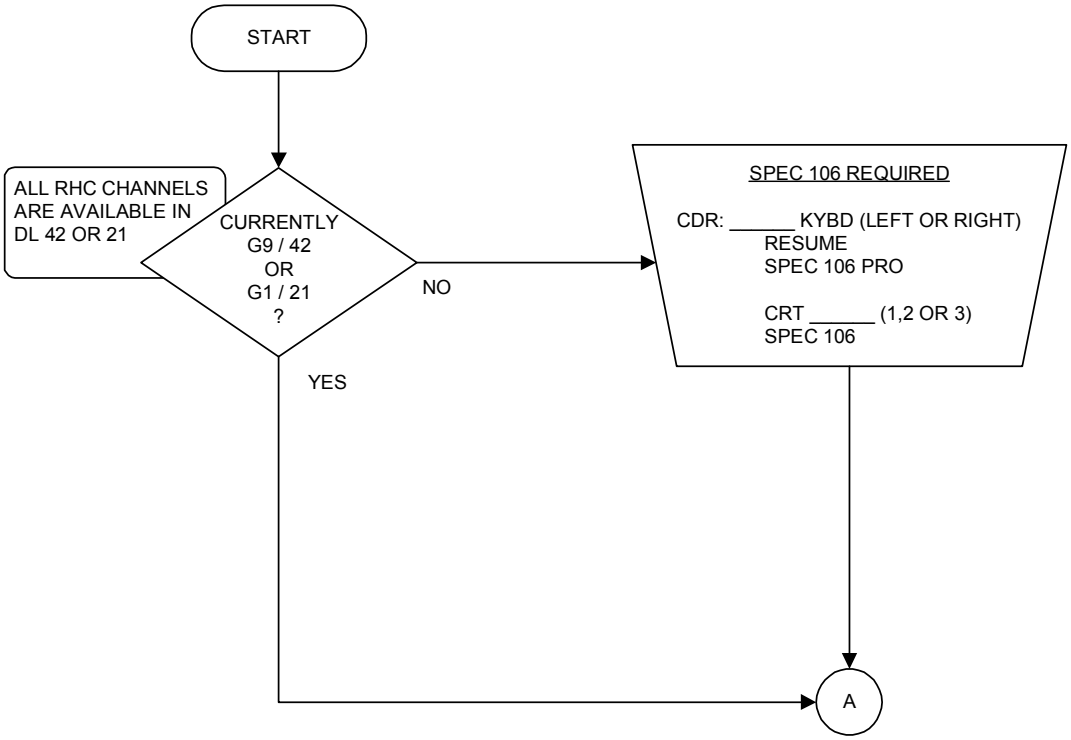
S0007_500-115-F-048-05

115-54

DDU Power Supply Anomaly (SSID GNC-85) (Page 1 of 7)

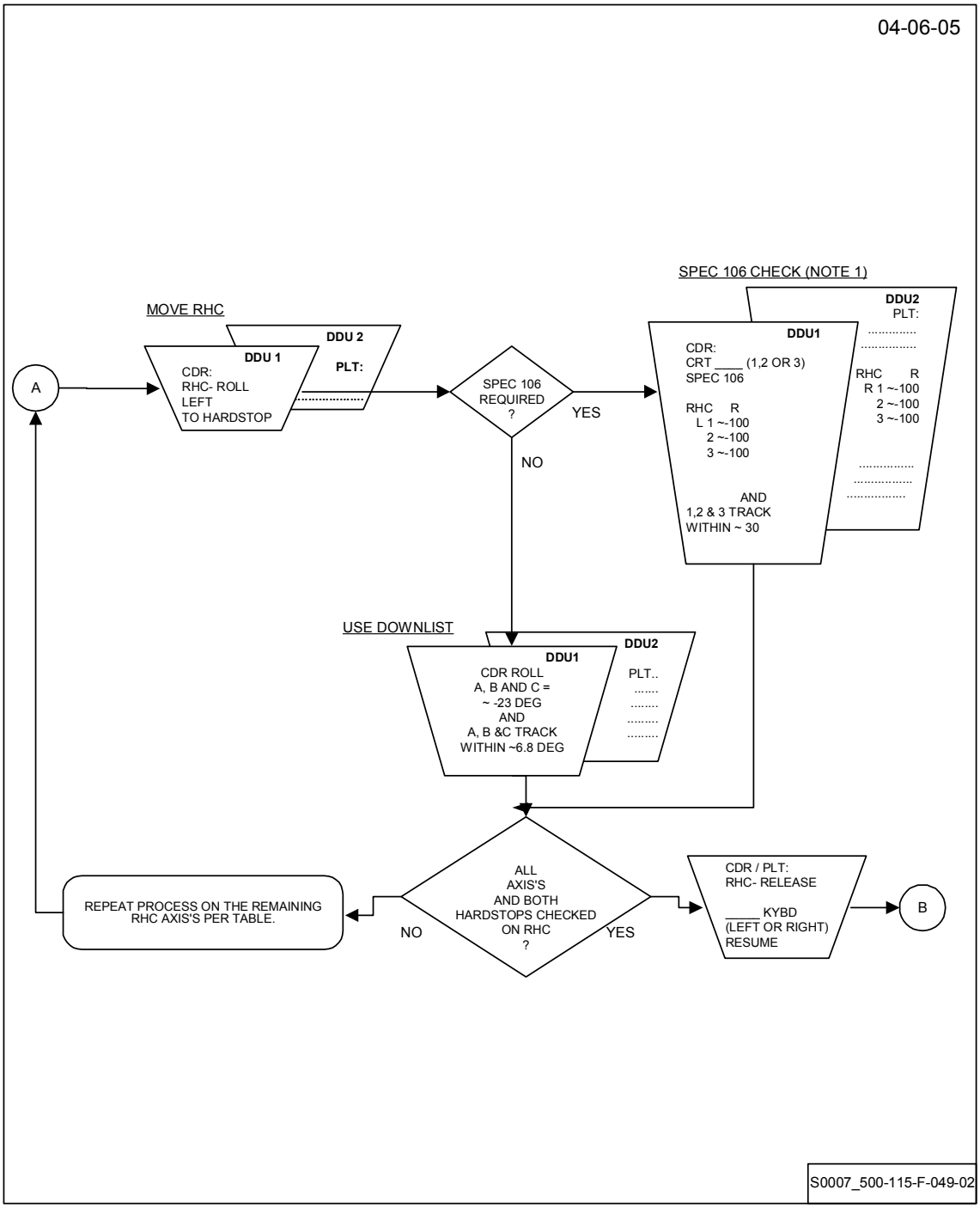
04-06-05

DURATION: 10 MINUTES

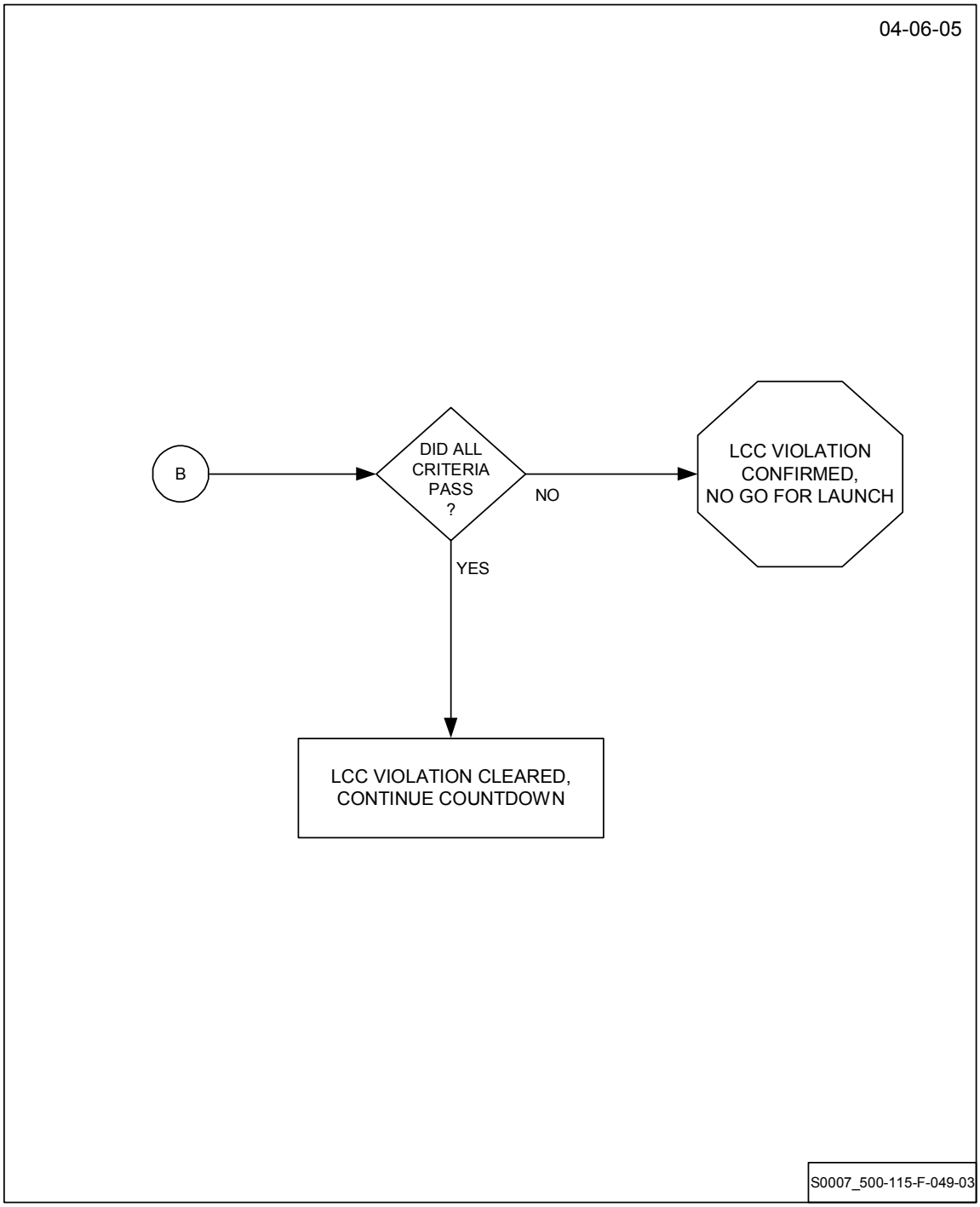


S0007_500-115-049-01

DDU Power Supply Anomaly (SSID GNC-85) (Page 2 of 7)



DDU Power Supply Anomaly (SSID GNC-85) (Page 3 of 7)



DDU Power Supply Anomaly (SSID GNC-85) (Page 4 of 7)

04-06-05

TABLE GNC-85

STATION DDU1 (CDR) DDU2 (PLT)	RHC MOTION	SPEC 106(%) (NOTE1)	DOWNLIST (DEG)
CDR	ROLL LEFT TO HARDSTOP	RHC R L 1 ~ -100 2 ~ -100 3 ~ -100 AND TRACK WITHIN~30	CDR ROLL A,B & C = ~-23 AND TRACK WITHIN ~6.8
CDR	ROLL RIGHT TO HARDSTOP	RHC R L 1 ~ 100 2 ~ 100 3 ~ 100 AND TRACK WITHIN~30	CDR ROLL A,B & C = ~23 AND TRACK WITHIN ~6.8
CDR	PITCH FORWARD TO HARDSTOP	RHC P L 1 ~ -100 2 ~ -100 3 ~ -100 AND TRACK WITHIN~22	CDR PITCH A,B & C = ~-23 AND TRACK WITHIN ~5.1
CDR	PITCH AFT TO HARDSTOP	RHC P L 1 ~ 100 2 ~ 100 3 ~ 100 AND TRACK WITHIN~22	CDR PITCH A,B & C = ~23 AND TRACK WITHIN ~5.1
CDR	YAW CCW TO HARDSTOP	RHC Y L 1 ~ -100 2 ~ -100 3 ~ -100 AND TRACK WITHIN~22	CDR YAW A,B & C = ~-13 AND TRACK WITHIN ~2.8
CDR	YAW CW TO HARDSTOP	RHC Y L 1 ~ 100 2 ~ 100 3 ~ 100 AND TRACK WITHIN~22	CDR YAW A,B & C = ~13 AND TRACK WITHIN ~2.8

S0007_500-115-F-049-04

DDU Power Supply Anomaly (SSID GNC-85) (Page 5 of 7)

04-06-05

TABLE GNC-85

PLT	ROLL LEFT TO HARDSTOP	RHC R R 1 ~ -100 2 ~ -100 3 ~ -100 AND TRACK WITHIN~30	PLT ROLL A,B & C = ~-23 AND TRACK WITHIN ~6.8
PLT	ROLL RIGHT TO HARDSTOP	RHC R R 1 ~ 100 2 ~ 100 3 ~ 100 AND TRACK WITHIN~30	PLT ROLL A,B & C = ~23 AND TRACK WITHIN ~6.8
PLT	PITCH FORWARD TO HARDSTOP	RHC P R 1 ~ -100 2 ~ -100 3 ~ -100 AND TRACK WITHIN~22	PLT PITCH A,B & C = ~-23 AND TRACK WITHIN ~5.1
PLT	PITCH AFT TO HARDSTOP	RHC P R 1 ~ 100 2 ~ 100 3 ~ 100 AND TRACK WITHIN~22	PLT PITCH A,B & C = ~23 AND TRACK WITHIN ~5.1
PLT	YAW CCW TO HARDSTOP	RHC Y R 1 ~ -100 2 ~ -100 3 ~ -100 AND TRACK WITHIN~22	PLT YAW A,B & C = ~-13 AND TRACK WITHIN ~2.8
PLT	YAW CW TO HARDSTOP	RHC Y R 1 ~ 100 2 ~ 100 3 ~ 100 AND TRACK WITHIN~22	PLT YAW A,B & C = ~13 AND TRACK WITHIN ~2.8

S0007_500-115-F-049-05

DDU Power Supply Anomaly (SSID GNC-85) (Page 6 of 7)

04-06-05

GNC-85 PROCEDURE DERIVATION

- RHC ROLL ± HARDSTOP REFERENCES (ABSOLUTE VALUES)
  - 23° (NOMINAL)
  - OMRS REQUIRES EACH CHANNEL IS >/=22.2° (CDR / V79AH0.010, PLT / V79AJ0.010)
  - LCC REQUIRES THREE CHANNELS TRACK 6.8 OF EACH OTHER (GNC -01)
  - ROLL LEFT PRODUCES A (-) OUTPUT AND RIGHT PRODUCES A (+) OUTPUT
- RHC PITCH ± HARDSTOP REFERENCES (ABSOLUTE VALUES)
  - 23° (NOMINAL)
  - OMRS REQUIRES EACH CHANNEL IS >/=22.2° (CDR / V79AH0.010, PLT / V79AJ0.010)
  - LCC REQUIRES THREE CHANNELS TRACK 5.1 OF EACH OTHER (GNC -01)
  - PITCH FORWARD PRODUCES A (-) OUTPUT AND AFT PRODUCES A (+) OUTPUT
- RHC YAW ± HARDSTOP REFERENCES (ABSOLUTE VALUES)
  - 13° (NOMINAL)
  - OMRS REQUIRES EACH CHANNEL IS >/=12.5° (CDR / V79AH0.010, PLT / V79AJ0.010)
  - LCC REQUIRES THREE CHANNELS TRACK 2.8 OF EACH OTHER (GNC -01)
  - YAW CCW PRODUCES A (-) OUTPUT AND CW PRODUCES A (+) OUTPUT
- SPEC 106 OUTPUT ASSUMPTION AND DERIVATION
  - SPEC 106 ROLL OUTPUT = 100% AT 23° (HARDSTOP NOMINAL)
    - 6.8° (TRACKING) = ~ 30% (TRACKING)
  - SPEC 106 PITCH OUTPUT = 100% AT 23° (HARDSTOP NOMINAL)
    - 5.1° (TRACKING) = ~ 22% (TRACKING)
  - SPEC 106 YAW OUTPUT = 100% AT 13° (HARDSTOP NOMINAL)
    - 2.8° (TRACKING) = ~ 22% (TRACKING)

GNC-85 PROCEDURE NOTES

1. SPEC 106 ONLY DISPLAYS TWO DIGITS, I.E, 100 WILL SHOW AS 00.

S0007_500-115-F-049-06

DDU Power Supply Anomaly (SSID GNC-85) (Page 7 of 7)

04-06-05

SPEC 106 REFERENCE

```
XXXX/XXX/106     MANUAL CONTROLS  XX  X DDD/HH:MM:SS
                                          DDD/HH:MM:SS
   RHC      R      P      Y
    L   1 ±XXX ±XXX ±XXX                      L 1   ±XX
        2 ±XXX ±XXX ±XXX                  S     2   ±XX
        3 ±XXX ±XXX ±XXX                  B     3   ±XX
    R   1 ±XXX ±XXX ±XXX                  T   R 1   ±XX
        2 ±XXX ±XXX ±XXX                  C     2   ±XX
        3 ±XXX ±XXX ±XXX                        3   ±XX
    A   1 ±XXX ±XXX ±XXX                      L 1 ±XXX
        2 ±XXX ±XXX ±XXX                  R     2 ±XXX
        3 ±XXX ±XXX ±XXX                  P     3 ±XXX
                                          T   R 1 ±XXX
   TRIM SW    R  P  Y       BDY  FLP      A     2 ±XXX
    PNL  L   1  X  X  X       L    1X           3 ±XXX
             2  X  X  X            2X
         R   1  X  X  X       R    1X   THC   TX  TY  TZ
             2  X  X  X            2X    L  1  X   X   X
    RHC  L   1  X  X                       2  X   X   X
             2  X  X                       3  X   X   X
         R   1  X  X                   A   1  X   X   X
             2  X  X                       2  X   X   X
                                           3  X   X   X

                                                   (XX)
```

S0007_500-115-F-049-07

*** End of Operation **115** ***

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OPERATION 116 Mechanisms

Shop: **ALL**
Cntrl Rm Console: **C5**
OPR: **MEQ**
Zone: **ALL**
Hazard (Y/N): **N**
Duration (Hrs): **1.0**

ET Umbilical Door Centerline Latch Locked Indication Failed Off Should Be On (SSID AFM-01)

NOTE

1. LCC Requirement:

   2 of 2, Verify Dual Motor Capability
   1 of 2, Verify Position

   Position verified by presence of single motor lock limit switch, either directly or inferred by inhibited MCA relay (OP status stays On)

   Dual motor capability to Stow required. Connector integrity verified by either:

   Demonstrating that lock limit switch still present from PDU to MCA and inhibiting MCA relay (OP status stays on); or if MCA relay not inhibited then by demonstrating motor will draw current when commanded lock.

2. Crew Requirements:

   None

3. Time Requirements:

   5 min per centerline latch from go ahead

4. Other Requirements:

   LDB capability to send commands from MECH Console to AFT MDMS

NOTE

5. Troubleshooting Plan:
   CAFM

   A. Issue each of 2 “Lock” commands one-at-a-time
      Verify CMD status in ON with BITE Test 4

   B. Monitor MCA operational statuses
      If MCA OP Status stays ON - MECH is Go
      If MCA OP status goes OFF - perform next step.

   C. Issue both “Lock” commands (2 total) at the same time, to failed motor
      Monitor AC currents for increase.

   D. Safe all commands

NOTE

AC Distribution:

	Motor 1	Motor 2
No. 1 (FWD)	AC-1	AC-2
No. 2 (AFT)	AC-1	AC-3

Use hard copy or EPD/TPE to record before, during and after current value snap shots.

Multi Function Commands:

V56K1277XL:
FWD 1A MCA 1/3
AFT 2B MCA 3/2

V56K1276XL:
FWD 2A MCA 2/1
AFT 1A MCA 1/2

116-1 **CAFM**

```
CURSOR CNTL (VAK20/VWK04)
ET DOORS
XMIT CURSOR KEY - PRESS
```

VERIFY VWK02 IS DISPLAYED

116-2 **CAFM**

```
PFP
VAK20 KEY - PRESS
```

Centerline Latch No. 1 (Forward) Motor 1 Check (SSID AFM-01)

NOTE

Perform only the section for appropriate latch and motor with failure of locked indication failed Off should be On.

Centerline Latch No. 1 (Forward) Motor 1 Check Not Performed:_____

Lock CMD 1A

116-3 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - F CL LCH (L1)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST-F CL LCH (B1)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K1277XL ON.
```

116-4 **CAFM**

```
CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT - OFF/NORMAL - ON)

1/3 __________
(MCA 3/2 AFT C/L LOCK 2B ALSO AFFECTED, IF NOT
INHIBITED BY LIMIT SWITCH)
```

116-5 CAFM

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - F CL LCH (S1)
XMIT CURSOR KEY - PRESS
```

***** End of Lock CMD 1A *****

Lock CMD 1B

116-6 **CAFM**

CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1B
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - F CL LCH (L1)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - F CL LCH (B1)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K1377XL ON.

116-7 **CAFM**

CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT - OFF/NORMAL - ON)

1/4 _____

(MCA 3/2 AFT C/L LOCK 2B ALSO AFFECTED, IF NOT INHIBITED BY LIMIT SWITCH)

116-8 **CAFM**

CURSOR CNTL (VWK02, PG-B)
STP CMD - F CL LCH (S1)
XMIT CURSOR KEY - PRESS

***** End of Lock CMD 1B *****

AC Current Check

NOTE

Perform AC Current Check if MCA relays associated with failed "Off" limit switch did invert (go Off) then latch must be commanded "Lock" to check for current draw.

AC Current Check Not Performed:_____

116-9 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1
XMIT CURSOR KEY - PRESS
```

NOTE

Allow commands to be on for minimum time required to check currents, 5 seconds max.

116-10 **CAFM**
CEPD
CTPE

Begin monitoring currents AC1-MTR1.

116-11 CAFM

```
CURSOR CNTL (VWK02, PG-B)
GPC CMD - F CL LCH (L1)
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
STP CMD - F CL LCH (S1)
(STAND BY TO XMIT CURSOR TO SAFE COMMANDS)

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

WAIT MAXIMUM 5 SECONDS

XMIT CURSOR KEY - PRESS
```

116-12 CAFM

Indicate if current increases while commands were On (Yes/No).

AC-1 _____

***** End of AC Current Check *****

***** End of Centerline Latch No. 1 (Forward) Motor 1 Check (SSID AFM-01) *****

Centerline Latch No. 1 (Forward) Motor 2 Check (SSID AFM-01)

NOTE

Perform only the section for appropriate latch and motor with failure of locked indication failed Off should be On.

Centerline Latch No. 1 (Forward) Motor 2 Check Not Performed:_____

Lock CMD 2A

116-13 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - F CL LCH (L1)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - F CL LCH (B1)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K1276XL ON.
```

116-14 **CAFM**

```
CRT (VWK02)

RECORD MCA OP STATUS STATE
(INVERT - OFF/NORMAL - ON)

2/1 __________
(MCA 1/2 AFT C/L LOCK 1B ALSO AFFECTED, IF NOT
INHIBITED BY L/S)
```

116-15 CAFM

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - F CL LCH (S1)
XMIT CURSOR KEY - PRESS
```

***** End of Lock CMD 2A *****

Lock CMD 2B

116-16 **CAFM**

CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2B
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - F CL LCH (L1)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - F CL LCH (B1)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K1378XL ON.

116-17 **CAFM**

CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT - OFF/NORMAL - ON)

2/2 _____
(MCA 1/2 AFT C/L LOCK 1B ALSO AFFECTED, IF NOT INHIBITED BY L/S)

116-18 **CAFM**

CURSOR CNTL (VWK02, PG-B)
STP CMD - F CL LCH (S1)
XMIT CURSOR KEY - PRESS

***** End of Lock CMD 2B *****

AC Current Check

NOTE

Perform AC Current Check If MCA relays associated with failed "Off" limit switch did invert (go Off) then latch must be commanded "Lock" to check for current draw.

AC Current Check Not Performed:_____

116-19 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2
XMIT CURSOR KEY - PRESS
```

NOTE

Allow commands to be on for minimum time required to check currents, 5 seconds max.

116-20 **CAFM**
CEPD
CTPE

Begin monitoring currents AC2-MTR2.

116-21 CAFM

```
CURSOR CNTL (VWK02, PG-B)
GPC CMD - F CL LCH (L1)
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
STP CMD - F CL LCH (S1)
(STAND BY TO XMIT CURSOR TO SAFE COMMANDS)

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

WAIT MAXIMUM 5 SECONDS

XMIT CURSOR KEY - PRESS
```

116-22 CAFM

Indicate if current increases while commands were On (Yes/No).

AC-2 _____

***** End of AC Current Check *****

***** End of Centerline Latch No. 1 (Forward) Motor 2 Check (SSID AFM-01) *****

Centerline Latch No 2 (AFT) Motor 1 Check (SSID AFM-01)

NOTE

Perform only the section for appropriate latch and motor with failure of locked indication failed Off should be On.

Centerline Latch No. 2 (AFT) Motor 1 Check (SSID AFM-01) Not Performed:_____

Lock CMD 1A

116-23 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - A CL LCH (L2)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL
BTE TST - A CL LCH (B2)
XMIT CURSOR KEY - PRESS

CRT (VWK02,PG-A)

VERIFY V56K1376XL ON.
```

116-24 **CAFM**

```
CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT - OFF/NORMAL - ON)

1/1 __________
(MCA 2/1 FWD C/L LOCK 2A ALSO AFFECTED, IF NOT
INHIBITED BY L/S)
```

116-25 CAFM

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - A CL LCH (S2)
XMIT CURSOR KEY - PRESS
```

***** End of Lock CMD 1A *****

Lock CMD 1B

116-26 **CAFM**

CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1B
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - A CL LCH (L2)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - A CL LCH (B2)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K1276XL ON.

116-27 **CAFM**

CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT - OFF/NORMAL - ON)

1/2 _____
(MCA 2/1 FWD C/L LOCK 2A ALSO AFFECTED, IF NOT INHIBITED BY L/S)

116-28 **CAFM**

CURSOR CNTL (VWK02, PG-B)
STP CMD - A CL LCH (S2)
XMIT CURSOR KEY - PRESS

***** End of Lock CMD 1B *****

AC Current Check

NOTE

Perform AC Current Check if MCA relays associated with failed "Off" limit switch did invert (go Off) then latch must be commanded "Lock" to check for current draw.

AC Current Check Not Performed:_____

116-29 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1
XMIT CURSOR KEY - PRESS
```

NOTE

Allow commands to be on for minimum time required to check currents, 5 seconds max.

116-30 **CAFM**
CEPD
CTPE

Begin monitoring currents AC1-MTR1.

116-31 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
GPC CMD - A CL LCH (L2)
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
STP CMD - A CL LCH (S2)
(STAND BY TO XMIT CURSOR TO SAFE COMMANDS)

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

WAIT MAXIMUM 5 SECONDS

XMIT CURSOR KEY - PRESS
```

116-32 CAFM

Indicate if current increases while commands were On (Yes/No).

AC-1 _____

***** End of AC Current Check *****

***** End of Centerline Latch No. 2 (AFT) Motor 1 Check (SSID AFM-01) *****

Centerline Latch No. 2 (AFT) Motor 2 Check (SSID AFM-01)

NOTE

Perform only the section for appropriate latch and motor with failure of locked indication failed Off should be On.

Centerline Latch No. 2 (AFT) Motor 2 (SSID AFM-01) Check Not Performed:_____

Lock CMD 2A

116-33 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - A CL LCH (L2)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - A CL LCH (B2)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K1275XL ON.
```

116-34 **CAFM**

```
CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT - OFF/NORMAL - ON)

3/1 __________
(MCA 1/3 FWD C/L LOCK 1A ALSO AFFECTED, IF NOT
INHIBITED BY L/S)
```

116-35 CAFM

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - A CL LCH (S2)
XMIT CURSOR KEY - PRESS
```

***** End of Lock CMD 2A *****

Lock CMD 2B

116-36 **CAFM**

CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2B
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - A CL LCH (L2)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - A CL LCH (B2)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K1277XL ON.

116-37 **CAFM**

CRT (VWK02 PG-B)

RECORD MCA OP STATUS STATE
(INVERT - OFF/NORMAL - ON)

3/2 _____
(MCA 1/3 FWD C/L LOCK 1A ALSO AFFECTED, IF NOT INHIBITED BY L/S)

116-38 **CAFM**

CURSOR CNTL (VWK02, PG-B)
STP CMD - A CL LCH (S2)
XMIT CURSOR KEY - PRESS

***** End of Lock CMD 2B *****

AC Current Check

NOTE

Perform AC Current Check if MCA relays associated with failed "Off" limit switch did invert (go Off) then latch must be commanded "Lock" to check for current draw.

AC Current Check Not Performed:_____

116-39 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2
XMIT CURSOR KEY - PRESS
```

NOTE

Allow commands to be On for minimum time required to check currents, 5 seconds maximum.

116-40 **CAFM**
CEPD
CTPE

Begin monitoring currents AC3-MTR2.

116-41 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
GPC CMD - A CL LCH (L2)
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
STP CMD - A CL LCH (S2)
(STAND BY TO XMIT CURSOR TO SAFE COMMANDS)

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

WAIT MAXIMUM 5 SECONDS

XMIT CURSOR KEY - PRESS
```

116-42 CAFM

Indicate if current increases while commands were On (Yes/No).

AC-3 _____

***** End of AC Current Check *****

***** End of Centerline Latch No. 2 (AFT) Motor 2 Check (AFM-01) *****

Troubleshooting Safing Steps

116-43 **CAFM**

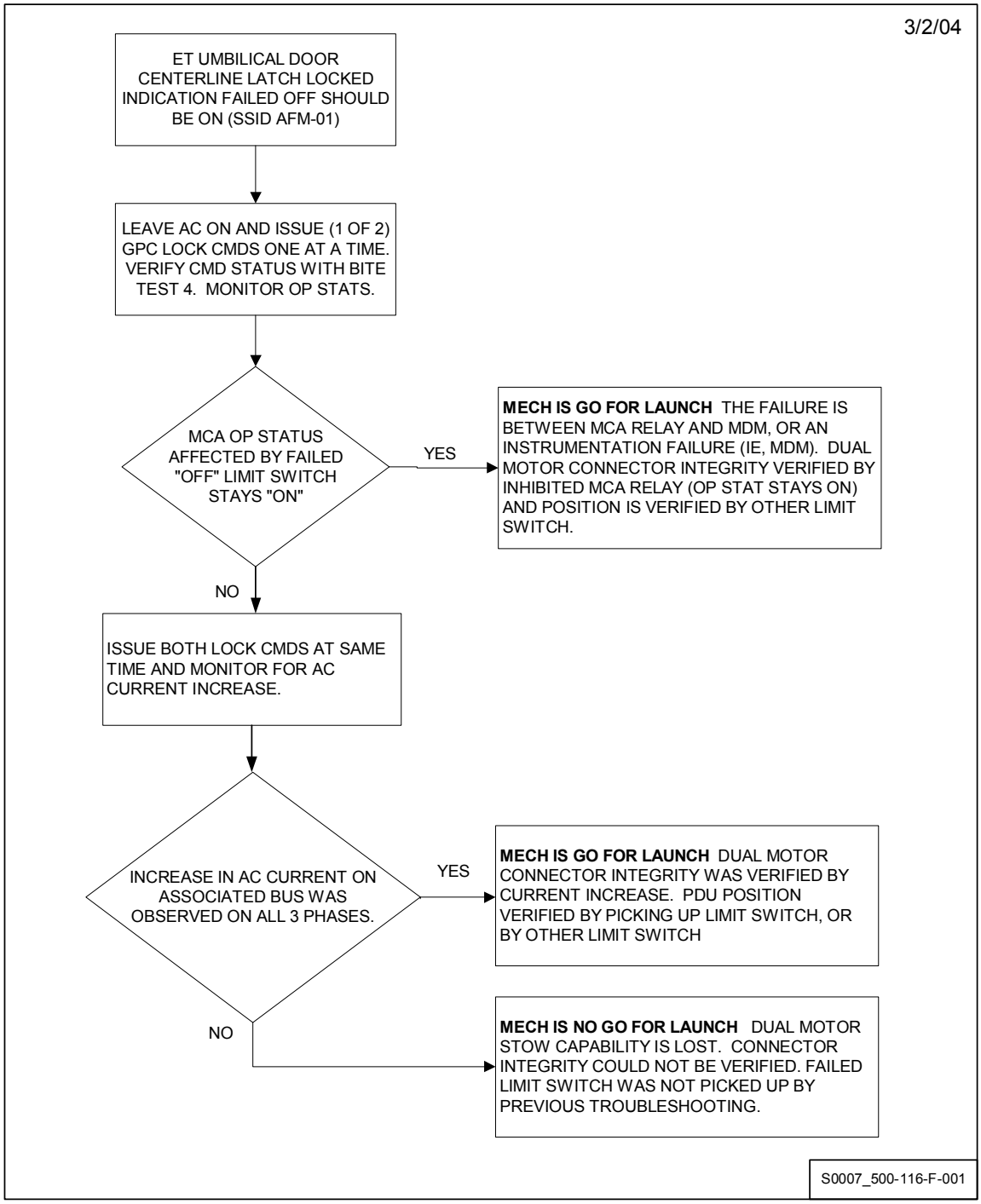
```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE OFF
XMIT CURSOR KEY - PRESS
```

116-44 **CAFM**

```
PFP (VWK02)
PFP KEY 5 (BITE CMDS OFF TST) - PRESS
```

VERIFY ALL COMMANDS OFF.

ET Umbilical Door Centerline Latch Locked indication Failed Off Should Be On (SSID AFM-01) Conclusion/Recommendation:



NOTE
Position must be verified by at least one limit switch. If at least one MCA relay inhibited (OP status remains On) position verified.

116-45 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. Failed limit switch was not picked up. Dual motor stow capability is lost. ☐
LCC violation confirmed. NO GO for Launch.

116-46 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-47 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of ET Umbilical Door Centerline Latch Locked Indication Failed Off Should Be On (SSID AFM-01) *****

ET Umbilical Door Centerline Latch Stow Indication Failed On Should Be Off (SSID AFM-01)

NOTE

1. LCC Requirement:

   2 of 2, Verify dual motor capability. Dual motor capability to Stow required. If an "On" limit switch inhibits MCA relay (OP status stays On), then motor cannot Stow.

2. Crew Requirements:

   None

3. Time Requirements:

   5 min per centerline latch from go ahead

4. Other Requirements:

   LDB capability to send commands from MECH Console to AFT MDMS

5. Troubleshooting plan:

   A. CAFM issue each of 2 "Stow" commands one-at-a-time

   B. Verify CMD status is ON with BITE Test 4

   C. Monitor MCA operational statuses
      If MCA OP status stays ON - MECH is No Go
      If MCA OP status goes OFF - MECH is Go for Launch

   D. Safe all commands

116-48 **CAFM**

CURSOR CNTL (VWK04, PG-B)
ET DOORS
XMIT CURSOR KEY - PRESS

VERIFY VWK02 IS DISPLAYED.

116-49 **CAFM**

PFP (VAK20)
VAK20 KEY - PRESS

VERIFY VWK02 IS DISPLAYED.

Centerline Latch No. 1 (Forward) Motor 1 Check (SSID AFM-01)

NOTE

Perform only the section for appropriate latch and motor with failure of Stow indication failed On should be Off.

Centerline Latch No. 1 (Forward) Motor 1 Check Not Performed:_____

CAUTION

Only 1 of 2 commands shall be active at one time else latch will Stow. Latches cannot be relocked without manual access to ET doors.

Stow CMD 1A

116-50

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - F CL LCH (C1)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - F CL LCH (B1)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K1271XL ON.
```

116-51 **CAFM**

CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/2 - _____
(AFT C/L STOW 2A MCA 3/3 WILL ALSO BE AFFECTED)

116-52 **CAFM**

CURSOR CNTL (VWK02, PG-B)
STP CMD - F CL LCH (S1)
XMIT CURSOR KEY - PRESS

***** End of Stow CMD 1A *****

Stow CMD 1B

116-53 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1B
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - F CL LCH (C1)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - F CL LCH (B1)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)
```

VERIFY V56K1371XL ON.

116-54 **CAFM**

```
CRT (VWK02, PG-B)
```

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/1 - _____
(MCA 3/3 AFT C/L STOW 2A ALSO AFFECTED, IF NOT INHIBITED BY L/S)

116-55 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - F CL LCH (S1)
XMIT CURSOR KEY - PRESS
```

***** End of Stow CMD 1B *****

***** End of Centerline Latch No. 1 (Forward) Motor 1 Check (SSID AFM-01) *****

Centerline Latch No. 1 (Forward) Motor 2 Check (SSID AFM-01)

NOTE

Perform only the section for appropriate latch and motor with failure of Stow indication failed On should be Off.

Centerline Latch No. 1 (Forward) Motor 2 Check Not Performed:_____

CAUTION

Only 1 of 2 commands shall be active at one time else the latch will Stow. Latches cannot be relocked without manual access to ET doors.

Stow CMD 2A

116-56 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - F CL LCH (C1)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - F CL LCH (B1)
XMIT CURSOR KEY - PRESSS

CRT (VWK02, PG-A)

VERIFY V56K1372XL ON.
```

116-57 **CAFM**

CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/3 - _____
(MCA 1/4 AFT C/L STOW 1B ALSO AFFECTED, IF NOT INHIBITED BY L/S)

116-58 **CAFM**

CURSOR CNTL (VWK02, PG-B)
STP CMD - F CL LCH (S1)
XMIT CURSOR KEY - PRESS

***** End of Stow CMD 2A *****

Stow CMD 2B

116-59 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2B
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - F CL LCH (C1)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - F CL LCH (B1)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)
```

VERIFY V56K1274XL ON.

116-60 **CAFM**

```
CRT (VWK02, PG-B)
```

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/4 - _____
(AFT C/L STOW 1B MCA 1/4 WILL ALSO BE AFFECTED)

116-61 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - F CL LCH (S1)
XMIT CURSOR KEY - PRESS
```

***** End of Stow CMD 2B *****

***** End of Centerline Latch No. 1 (Forward) Motor 2 Check (SSID AFM-01) *****

Centerline Latch No. 2 (AFT) Motor 1 Check (SSID AFM-01)

NOTE

Perform only the section for appropriate latch and motor with failure of Stow indication failed On should be Off.

Centerline Latch No. 2 (AFT) Motor 1 Check Not Performed:_____

CAUTION

Only 1 of 2 commands shall be active at one time else the latch will Stow. Latches cannot be relocked without manual access to ET doors.

Stow CMD 1A

116-62 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - A CL LCH (C2)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - A CL LCH (B2)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K1272XL ON.
```

116-63 **CAFM**

CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/3 - _____
(FWD C/L STOW 2A MCA 2/3 WILL ALSO BE AFFECTED)

116-64 **CAFM**

CURSOR CNTL (VWK02, PG-B)
STP CMD - A CL LCH (S2)
XMIT CURSOR KEY - PRESS

***** End of Stow CMD 1A *****

Stow CMD 1B

116-65 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1B
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - A CL LCH (C2)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - A CL LCH (B2)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)
```

VERIFY V56K1372XL ON.

116-66 **CAFM**

CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/4 - _____
(MCA 2/3 FWD C/L STOW 2A ALSO AFFECTED, IF NOT INHIBITED BY L/S)

116-67 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - A CL LCH (S2)
XMIT CURSOR KEY - PRESS
```

***** End of Stow CMD 1B *****

***** End of Centerline Latch No. 2 (AFT) Motor 1 Check (SSID AFM-01) *****

Centerline Latch No. 2 (AFT) Motor 2 Check (SSID AFM-01)

NOTE

Perform only the section for appropriate latch and motor with failure of Stow indication failed On should be Off.

Centerline Latch No. 2 (AFT) Motor 2 Check Not Performed:_____

CAUTION

Only 1 of 2 commands shall be active at one time else the latch will Stow. Latches cannot be relocked without manual access to ET doors.

Stow CMD 2A

116-68 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - A CL LCH (C2)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - A CL LCH (B2)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K1271XL ON.
```

116-69 **CAFM**

```
CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/3 - __________
(FWD C/L STOW 1A MCA 1/2 WILL ALSO BE AFFECTED)
```

116-70 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - A CL LCH (S2)
XMIT CURSOR KEY - PRESS
```

***** End of Stow CMD 2A *****

Stow CMD 2B

116-71 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2B
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - A CL LCH (C2)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - A CL LCH (B2)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)
```

VERIFY V56K1273XL ON.

116-72 **CAFM**

```
CRT (VWK02, PG-B)
```

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/4 - _____
(FWD STOW 1A MCA 1/2 WILL ALSO BE AFFECTED)

116-73 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - A CL LCH (S2)
XMIT CURSOR KEY - PRESS
```

***** End of Stow CMD 2B *****

***** End of Centerline Latch No. 2 (AFT) Motor 2 Check (SSID AFM-01) *****

Troubleshooting Safing Steps

116-74 **CAFM**

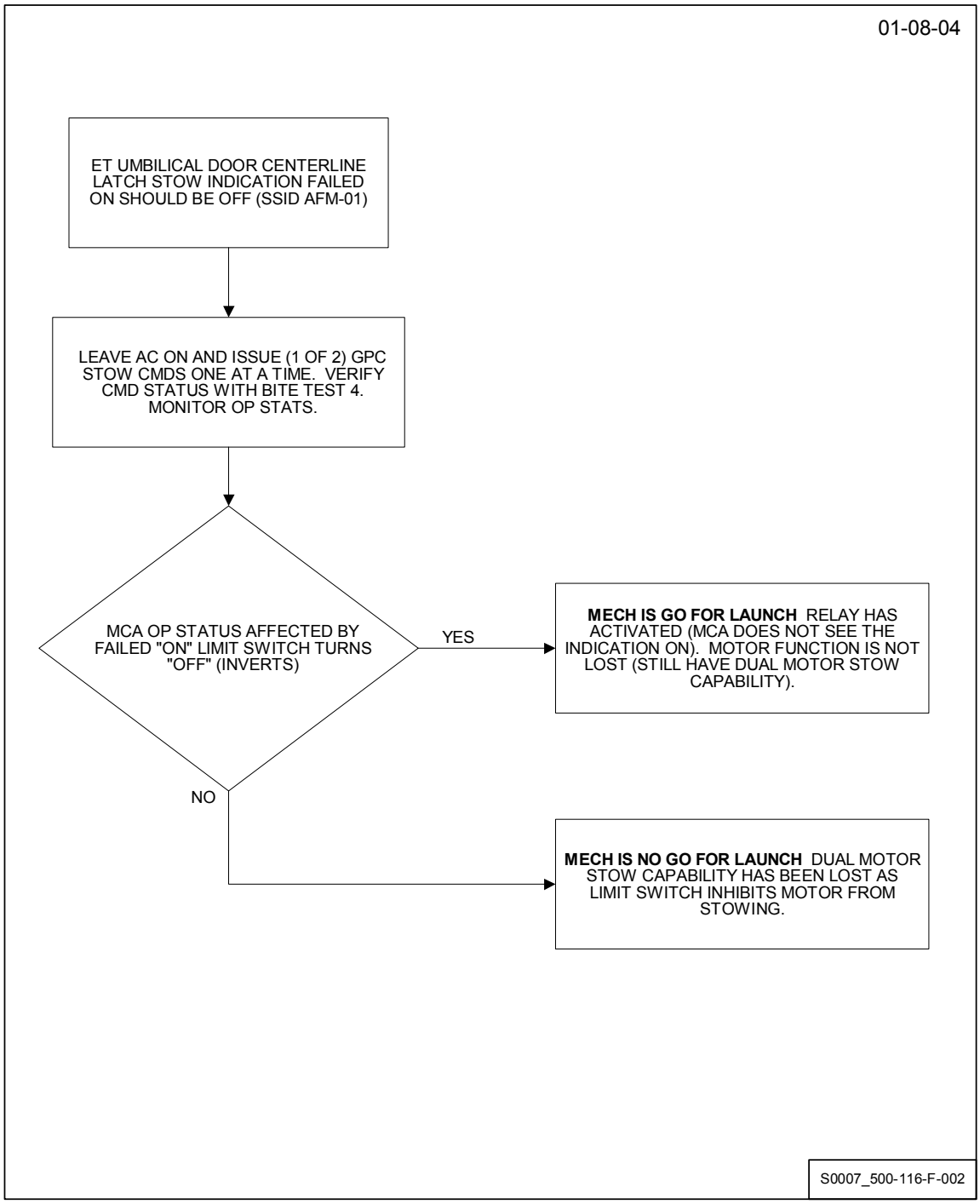
```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE OFF
XMIT CURSOR KEY - PRESS
```

116-75 **CAFM**

```
PFP (VWK02)
PFP KEY 5 (BITE CMDS OFF TST) - PRESS
```

VERIFY ALL COMMANDS OFF.

ET Umbilical Door Centerline Latch Stow Indication Failed On Should Be Off (SSID AFM-01) Conclusion/Recommendation:



116-76 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor stow capability still exists. **LCC violation cleared. Continue Countdown.** ☐

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor stow capability is lost as limit switch inhibits motor from stowing. **LCC violation confirmed. NO GO for Launch.** ☐

116-77 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-78 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of ET Umbilical Door Centerline Latch Stow Indication Failed On Should Be Off (SSID AFM-01) *****

ET Umbilical Door Close Indication Failed On Should Be Off (SSID AFM-02)

NOTE

Troubleshooting this anomaly requires access to Panel MA73C. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a scrub will be called.

1. LCC Requirement:

   2 of 2, Verify dual motor capability. Dual motor capability to close is required. If an 'On' limit switch inhibits MCA relay (OP status stays On), then motor cannot close.

2. Crew Requirements:

   Access to Panel R2
   Access to Panel MA73C (ASP)

3. Time Requirements:

   5 min (from go ahead with PLT at Panel R2 and ASP at MA73C)

4. Troubleshooting plan

   A. (ASP) Open circuit breakers AFT MCA power Panel MA73C

   B. (PLT) Issue switch command to close

   C. CAFM monitor MCA operational statuses
      If MCA OP status stays on - MECH is No Go
      If MCA OP status goes off - MECH is Go for Launch

   D. (PLT) Return switches and circuit breakers to Launch configuration.

116-79 CAFM

```
CURSOR CNTL (VWK04, PG-B)
ET DOORS
XMIT CURSOR KEY - PRESS
```

VERIFY VWK02 IS DISPLAYED.

116-80 ASP

```
PANEL MA73C
ROW D
  MCA POWER AC 1 AFT 1 - OPEN
  MCA POWER AC 2 AFT 2 - OPEN
  MCA POWER AC 3 AFT 3 - OPEN
```

Left Door

NOTE
Perform Left Door for failure of left ET Door closed indication failed On should be Off.

Left Door Not Performed:_____

116-81 **PLT**

```
PANEL R2
ET UMBIL DOOR
  MODE SW - GPC/MAN
  LEFT
    DOOR SW - CLOSE
```

116-82 **CAFM**

```
CRT (VWK02, PG-B)

RECORD MCA OP STAUS STATE
(INVERT = OFF/NORMAL = ON)

1/1 - __________ (MTR 1)

3/2 - __________ (MTR 2)
```

116-83 **PLT**

```
PANEL R2
ET UMBIL DOOR
  LEFT
    DOOR SW - OFF
    MODE SW - GPC
```

***** End of Left Door *****

Right Door

NOTE
Perform Right Door for failure of Right ET Door closed indication failed On should be Off.

Right Door Not Performed:_____

116-84 **PLT**

```
PANEL R2
ET UMBIL DOOR
  MODE SW - GPC/MAN
  RIGHT
    DOOR SW - CLOSE
```

116-85 **CAFM**

CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/1 - _____ (MTR 1)

2/3 - _____ (MTR 2)

116-86 **PLT**

```
PANEL R2
ET UMBIL DOOR
  RIGHT
    DOOR SW - OFF
    MODE SW - GPC
```

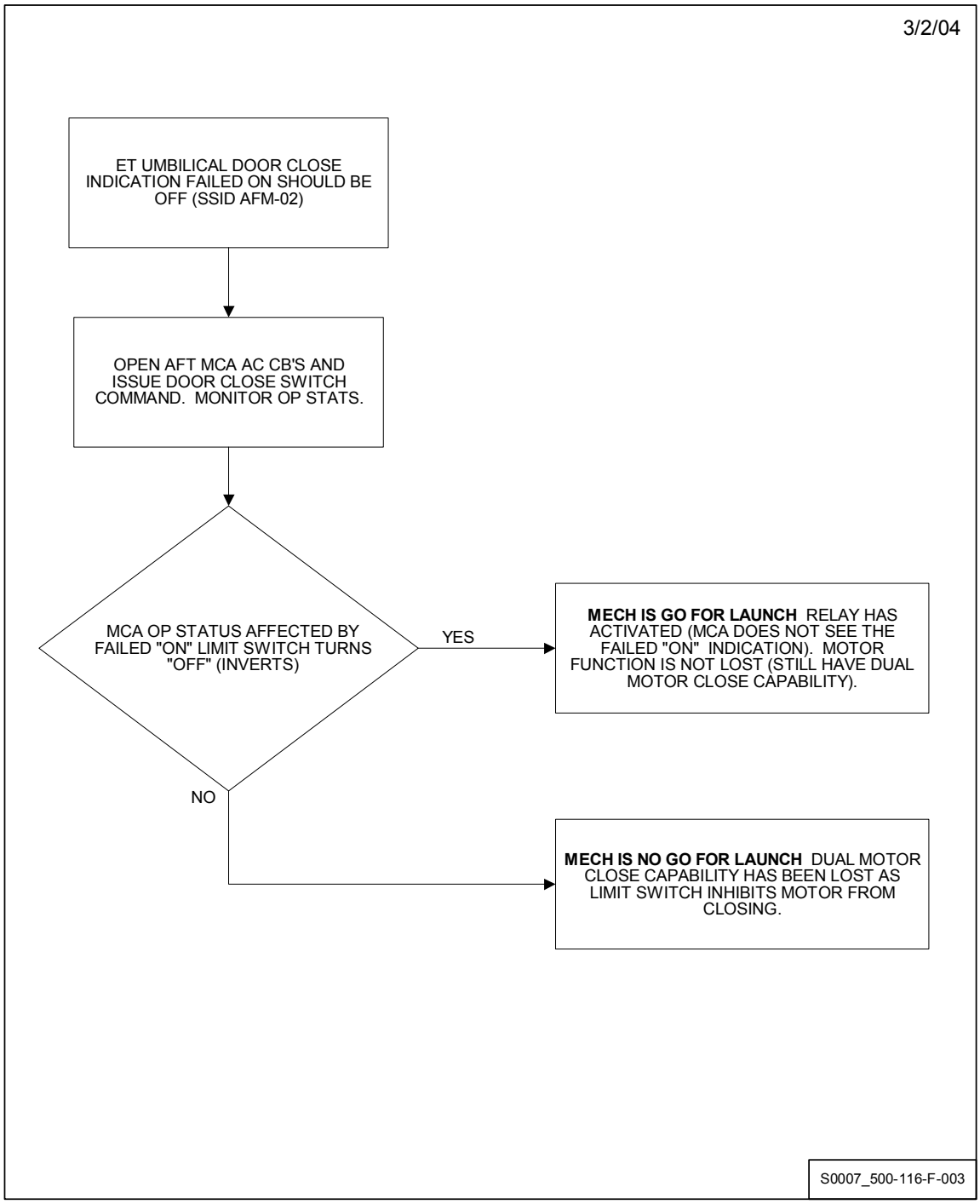
***** End of Right Door *****

Troubleshooting Safing Steps

116-87 ASP

```
PANEL MA73C
ROW D
  MCA POWER AC 1 AFT 1 - CLOSE
  MCA POWER AC 2 AFT 2 - CLOSE
  MCA POWER AC 3 AFT 3 - CLOSE
```

ET Umbilical Door Close Indication Failed On Should Be Off (SSID AFM-02) Conclusion/Recommendation:



116-88 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure. (i.e., MDM). Dual motor close capability still exists ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor door closing capability is lost as limit switch inhibits motor from closing. ☐
LCC violation confirmed. NO GO for Launch.

116-89 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

*****End of Troubleshooting Safing Steps *****

116-90 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of ET Umbilical Door Close Indication Failed On Should Be Off (SSID AFM-02) *****

ET Umbilical Door Open Indication Failed Off Should Be On (SSID AFM-02)

NOTE

1. LCC Requirement:

   2 of 2, Verify dual motor capability
   1 of 2, Verify position

   Position verified by presence of single motor open limit switch, either directly or inferred by inhibited MCA relay (OP status stays On)

   Dual motor capability to close is required. Connector integrity verified by either:

   Demonstrating that open limit switch still present from PDU to MCA and inhibiting MCA relay (OP status stays On) or if MCA relay not inhibited, then by demonstrating motor will draw current when commanded open.

2. Crew Requirements:

   PLT access to Panel R2

3. Time requirements:

   5 min (from go ahead with Crew at Panel R2)

NOTE

4. Troubleshooting plan:

A. (PLT) Issue switch command to open failed ET door.

B. CAFM monitor MCA operational statuses and AC Bus currents

If MCA OP status stays on, MECH is Go

If MCA OP status goes off and AC Busses show an increase in current then MECH is go. No current increase and MECH is No Go.

C. (PLT) Return switches to Launch configuration.

NOTE

AC Distribution:

	Motor 1	Motor 2
Left door	AC-1	AC-3
Right door	AC-3	AC-2

Use hard copy or EPD/TPE to record before, during and after current value snap shots.

116-91 CAFM

```
CURSOR CNTL (VWK04, PG-B)
ET DOORS
XMIT CURSOR KEY - PRESS

VERIFY VWK02 IS DISPLAYED.
```

Left Door

NOTE

Perform Left Door for left hand ET door open indication failed Off should be On.

Left Door Not Performed:_____

116-92 **CAFM** **OTC**
OTC **CEPD**

Begin monitoring currents AC1-MTR1 and AC3-MTR2

NOTE

Command door open for the minimum time required to monitor currents and relay states. Do not exceed 5 seconds.

116-93 **PLT**

```
PANEL R2
ET UMBIL DOOR
  MODE SW - GPC/MAN
  LEFT
    DOOR SW - OPEN
```

116-94 **CAFM**

```
CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/3 - __________ (MTR 1)

3/4 - __________ (MTR 2)
```

116-95 CAFM

Indicate if current increases (Yes/No).

AC-1 _____

AC-3 _____

116-96 PLT

```
PANEL R2
ET UMBIL DOOR
  LEFT
    DOOR SW - OFF
    MODE SW - GPC
```

***** End of Left Door *****

Right Door

NOTE
Perform Right Door for right-hand ET door open indication failed Off should be On.

Right Door Not Performed:_____

116-97 **CAFM**

Begin monitoring currents AC3-MTR1 and AC2-MTR2

NOTE
Command door open for the minimum time required to monitor currents and relay states. Do not exceed 5 seconds.

116-98 **PLT**

```
PANEL R2
ET UMBIL DOOR
  MODE SW - GPC/MAN
  RIGHT
    DOOR SW - OPEN
```

116-99 **CAFM**

```
CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/3- __________ (MTR 1)

2/1- __________ (MTR 2)
```

116-100 CAFM

Indicate if current increases (Yes/No).

AC-3 _____

AC-2 _____

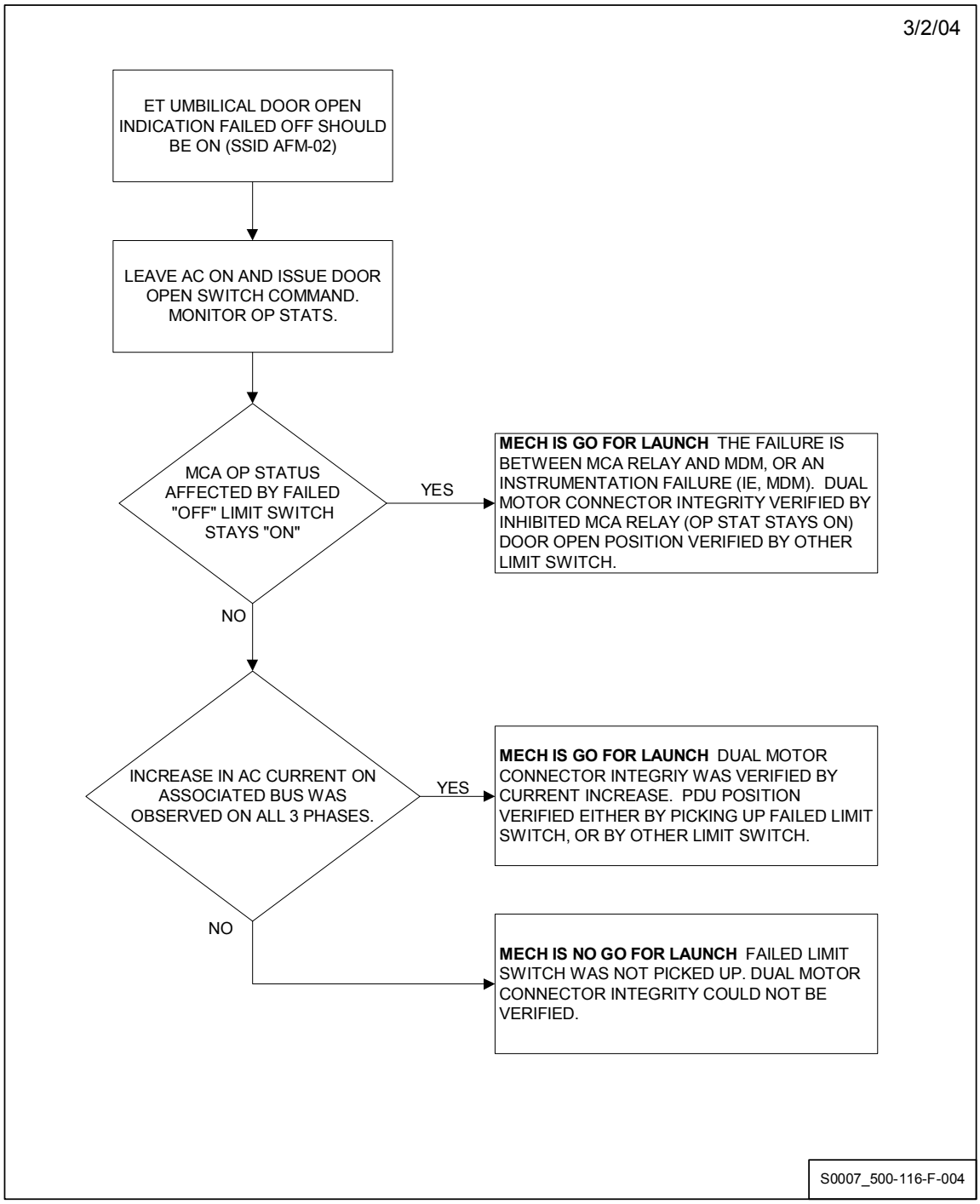
116-101 PLT

```
PANEL R2
ET UMBIL DOOR
  RIGHT
    DOOR SW - OFF
    MODE SW - GPC
```

***** End of Right Door *****

Troubleshooting Safing Steps

ET Umbilical Door Open Indication Failed Off Should Be On (SSID AFM-02) Conclusion/Recommendation:



NOTE
Position must be verified by at least one limit switch. If at least one MCA relay inhibited (OP status remains On) position verified.

116-102 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. Failed "Off" limit switch was NOT picked up. Dual motor connector integrity is lost. ☐
LCC violation confirmed. NO GO for Launch.

116-103 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-104 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of ET Umbilical Door Open Indication Failed Off Should Be On (SSID AFM-02) *****

ET Umbilical Door Latch - Latch Indication Failed On Should Be Off (SSID AFM-03)

NOTE

1. LCC Requirement:

   2 of 2, Verify dual motor capability

   Dual motor capability to latch is required. If an 'On' limit switch inhibits MCA relay (OP status stays On), then motor can not latch.

2. Crew Requirements:

   None

3. Time Requirements:

   5 min per side from go ahead

4. Other Requirements:

   LDB capability to send commands from MECH Console to AFT MDMS

NOTE

5. Troubleshooting Plan:

A. CAFM issue ET door arm commands

B. Issue latch commands A (1 of 2)

C. Verify commands with BITE Test 4

D. Monitor MCA operational statuses

If MCA OP status stays on - MECH is No Go
If MCA OP status goes off - MECH is Go for Launch

E. Safe all commands

NOTE

All "B" latch MCA relays are inhibited by missing RTL limit switch.

116-105 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
ET DOORS
XMIT CURSOR KEY - PRESS
```

VERIFY VWK02 IS DISPLAYED.

116-106 **CAFM**

```
PFP (VAK20)
VAK20 KEY - PRESS
```

VERIFY VWK02 IS DISPLAYED

116-107 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
ARM ENABLE CMDS - ALL
XMIT CURSOR KEY - PRESS
```

Left Latch Motor 1 Check - CMD 1A

NOTE

Perform section for appropriate latch and motor with failure of latch indication failed On should be Off.

Left Latch Motor 1 Check - CMD 1A Not Performed:_____

116-108 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - L LATCH (C4)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02 PG-B)
BTE TST - L LATCH (B4)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K3531XL ON.
```

116-109 **CAFM**

```
CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/3 - __________
```

116-110 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - L LATCH (S4)
XMIT CURSOR KEY - PRESS
```

***** End of Left Latch Motor 1 Check - CMD 1A *****

Left Latch Motor 2 Check - CMD 2A

NOTE

Perform section for appropriate latch and motor with failure of latch indication failed On should be Off.

Left Latch Motor 2 Check - CMD 2A Not Performed:_____

116-111 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - L LATCH (C4)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL
BTE TST - L LATCH (B4)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)

VERIFY V56K3533XL ON.
```

116-112 **CAFM**

```
CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/4 - __________
```

116-113 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - L LATCH (S4)
XMIT CURSOR KEY - PRESS
```

***** End of Left Latch Motor 2 Check - CMD 2A *****

Right Latch Motor 1 Check - CMD 1A

NOTE
Perform section for appropriate latch and motor with failure of latch indication failed On should be Off.

Right Latch Motor 1 Check - CMD 1A Not Performed:_____

116-114 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 1A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - R LATCH (C6)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - R LATCH (B6)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)
```

VERIFY V56K3532XL ON.

116-115 **CAFM**

```
CRT (VWK02, PG-B)
```

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/3 - _____

116-116 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - R LATCH (S6)
XMIT CURSOR KEY - PRESS
```

***** End of Right Latch Motor 1 Check - CMD 1A *****

Right Latch Motor 2 Check - CMD 2A

NOTE

Perform section for appropriate latch and motor with failure of latch indication failed On should be Off.

Right Latch Motor 2 Check - CMD 2A Not Performed:_____

116-117 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
MOTOR MODE 2A
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK02, PG-B)
GPC CMD - R LATCH (C6)
XMIT CURSOR KEY - PRESS

PFP (VWK02)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK02, PG-B)
BTE TST - R LATCH (B6)
XMIT CURSOR KEY - PRESS

CRT (VWK02, PG-A)
```

VERIFY V56K3532XL ON.

116-118 **CAFM**

```
CRT (VWK02, PG-B)
```

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/1 - _____

116-119 **CAFM**

```
CURSOR CNTL (VWK02, PG-B)
STP CMD - R LATCH (S6)
XMIT CURSOR KEY - PRESS
```

***** End of Right Latch Motor 2 Check - CMD 2A *****

Troubleshooting Safing Steps

116-120 CAFM

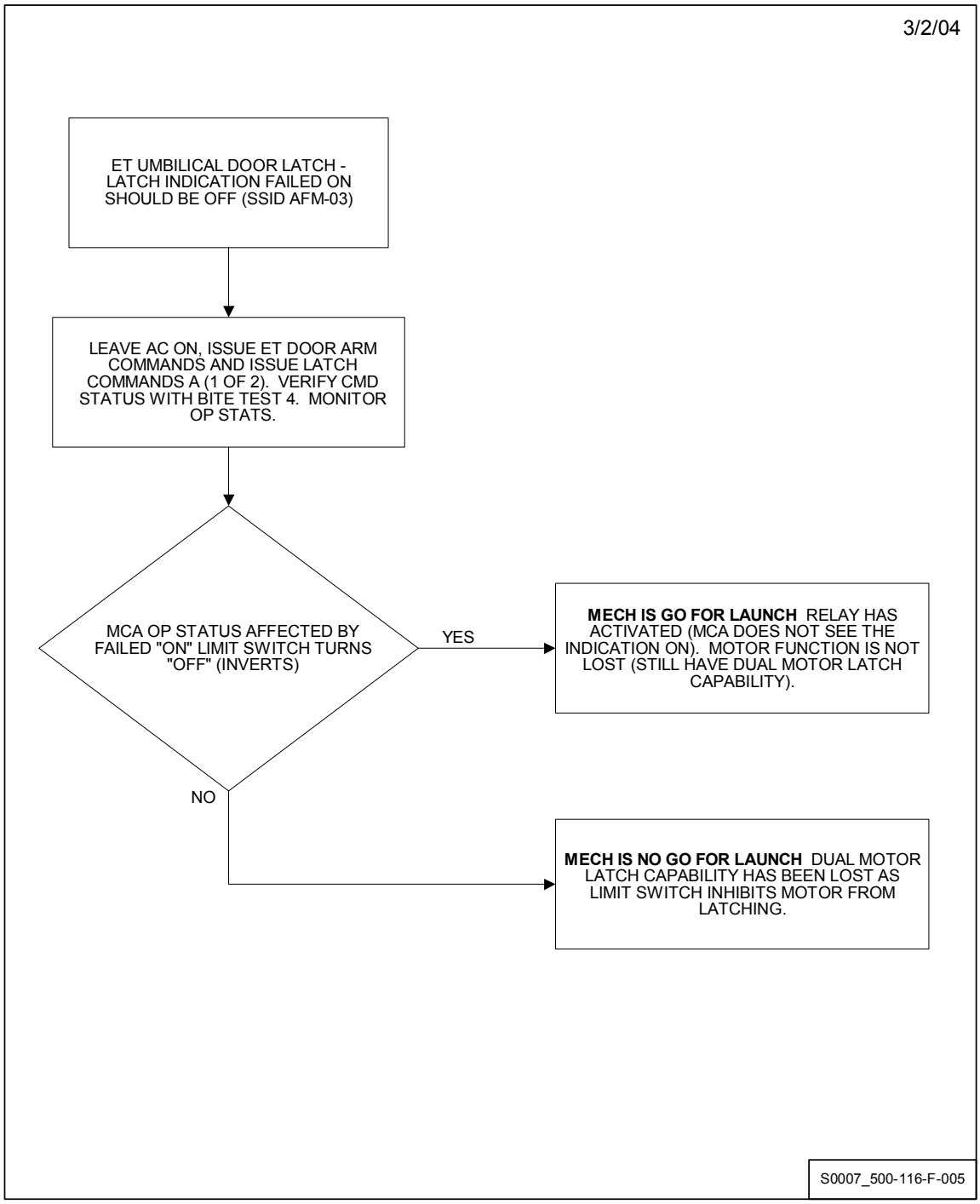
```
CURSOR CNTL (VWK02, PG-B)
ARM ENABLE CMDS - ALL
XMIT CURSOR KEY - PRESS
```

116-121 CAFM

```
PFP (VWK02)
PFP KEY 5 (BITE CMDS OFF TST) - PRESS
```

VERIFY ALL COMMANDS OFF.

ET Umbilical Door Latch - Latch Indication Failed On Should Be Off (SSID AFM-03) Conclusion/Recommendation:



116-122 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor latch capability still exists. **LCC violation cleared. Continue Countdown.** ☐

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor latching capability is lost as limit switch inhibits motor from latching. **LCC violation confirmed. NO GO for Launch.** ☐

116-123 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

*****End of Troubleshooting Safing Steps *****

116-124 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of ET Umbilical Door Latch - Latch Indication Failed On Should Be Off (SSID AFM-03) *****

ET Umbilical Door Latch - Release Indication Failed Off Should Be On (SSID AFM-03)

NOTE

1. LCC Requirement:

   2 of 2, Verify dual motor capability
   1 of 2, Verify position

   Position verified by presence of single motor release limit switch, either directly or inferred by inhibited MCA relay (OP status stays On)

   Dual motor capability to latch required. Connector integrity verified by either demonstrating release limit switch is still present from PDU to MCA and inhibiting MCA relay (OP status stays On) or if MCA relay not inhibited then by demonstrating that the motor will draw current when commanded release.

2. Crew Requirements:

   PLT access to Panel R2

3. Time Requirements:

   5 min (from go ahead with Crew at Panel R2)

NOTE

4. Troubleshooting Plan:

   A. (PLT) Issue switch command to release

   B. CAFM monitor MCA operational statuses and AC Bus currents

      If MCA OP status stays on - MECH is Go

      If MCA OP status goes Off and AC Busses show an increase in current then MECH is Go. No current increase and MECH is No Go.

   C. (PLT) Return switches to Launch configuration.

NOTE

AC Distribution:

	Motor 1	Motor 2
Left Latch	AC-1	AC-2
Right Latch	AC-3	AC-2

Use hard copy or EPD/TPE to record before, during and after current value snap shots.

116-125 CAFM

```
CURSOR CNTL (VWK04, PG-B)
ET DOORS
XMIT CURSOR KEY - PRESS

PFP (VAK20)
VAK20 KEY - PRESS

VERIFY VWK02 IS DISPLAYED.
```

Left Latch

NOTE

Perform section for appropriate latch and motor with failure of release indication failed Off should be On.

Left Latch Not Performed:_____

116-126 **CAFM** **OTC**
OTC **CEPD**

Begin monitoring currents AC1-MTR1 and AC2-MTR2

CAUTION

Command latch release for minimum time required to monitor currents and relay states. Do not exceed 5 seconds.

116-127 **PLT**

```
PANEL R2
ET UMBIL DOOR
  MODE SW - GPC/MAN
  LEFT
    LATCH SW - RELEASE
```

116-128 **CAFM**

CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

MTR 1

1/1- _____ (MTR 1)

1/2- _____ (MTR 1)

MTR 2

2/1- _____ (MTR 2)

2/3- _____ (MTR 2)

116-129 **CAFM**

Indicate if current increases (Yes/No).

AC-1 _____

AC-2 _____

116-130 **PLT**

PANEL R2
ET UMBIL DOOR
  LEFT
    LATCH SW - OFF
    MODE SW - GPC

***** End of Left Latch *****

Right Latch

NOTE
Perform section for appropriate latch and motor with failure of release indication failed Off should be On.

Right Latch Not Performed:_____

116-131 **CAFM**

Begin monitoring currents AC3-MTR1 and AC2-MTR2

NOTE
Command latch release for the minimum time required to monitor currents and relay states. Do not exceed 5 seconds.

116-132 **PLT**

```
PANEL R2
ET UMBIL DOOR
  MODE SW - GPC/MAN
  RIGHT
    LATCH SW - RELEASE
```

116-133 **CAFM**

```
CRT (VWK02, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

        MTR 1
3/1- __________ (MTR 1)

3/2- __________ (MTR 1)

        MTR 2
2/3- __________ (MTR 2)

2/4- __________ (MTR 2)
```

116-134 **CAFM**

Indicate if current increases (Yes/No).

AC-3 _____

AC-2 _____

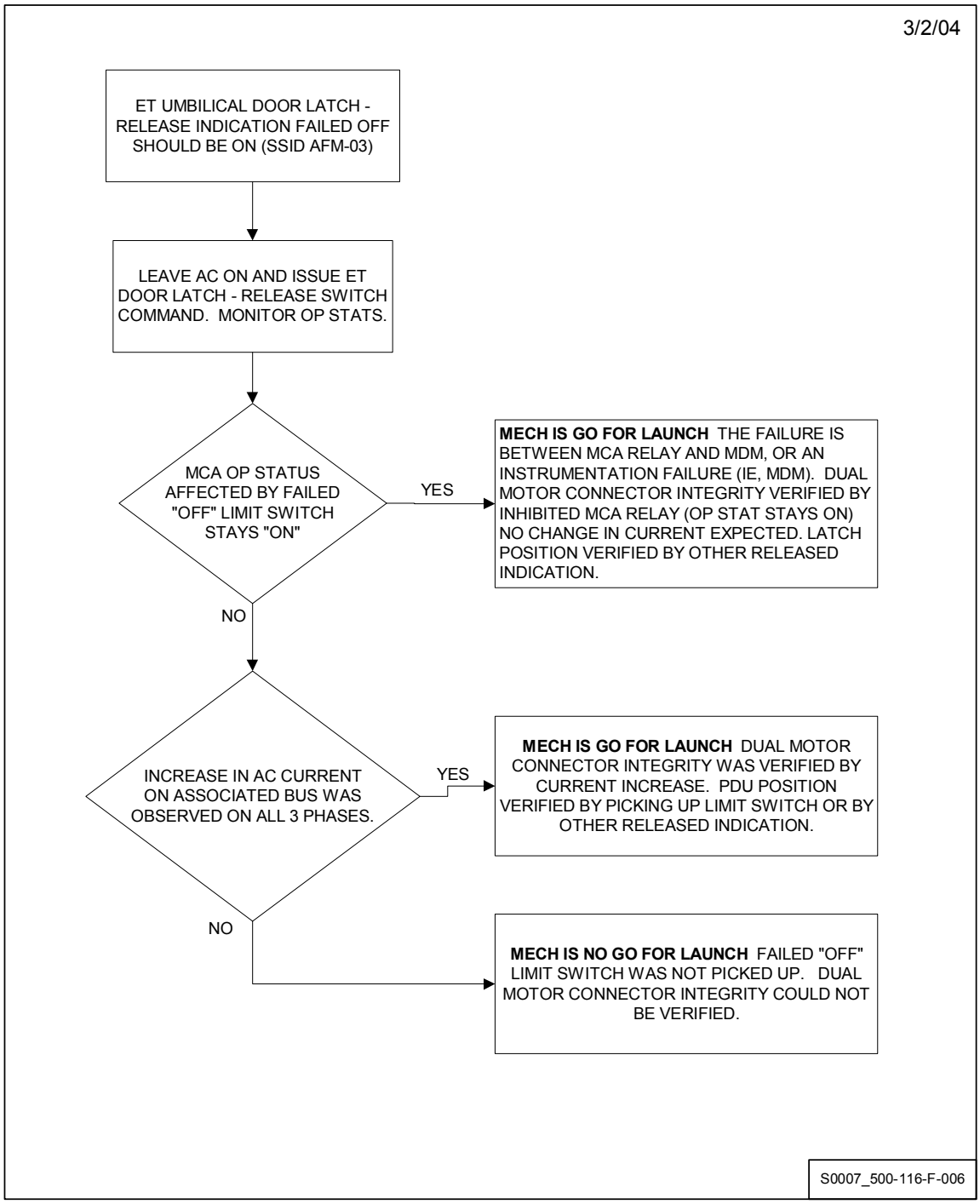
116-135 **PLT**

```
PANEL R2
ET UMBIL DOOR
  RIGHT
    LATCH SW - OFF
    MODE SW - GPC
```

***** End of Right Latch *****

Troubleshooting Safing Steps

ET Umbilical Door Latch - Release Indication Failed Off Should Be On (SSID AFM-03) Conclusion/Recommendation:



NOTE
Position must be verified by at least one limit switch. If at least one MCA relay inhibited (OP status remains On) position verified.

116-136 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. Failed "Off" limit switch was NOT picked up. Dual motor connector integrity is lost. ☐
LCC violation confirmed. NO GO for Launch.

116-137 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-138 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of ET Umbilical Door Latch - Release Indication Failed Off Should Be On (SSID AFM-03) *****

Radiator Deploy Indication Failed On Should Be Off (SSID AFM-04)

NOTE

Perform this option only after the second deploy indication failure. (The first indication failure is an IPR condition, not an LCC violation.)

Radiator Deploy Indication Failed On Should be Off
Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a Scrub will be called.

1. LCC Requirement:

   1 of 2, Verify instrumentation failure or single motor capability

   Single motor capability to Deploy is required. If an 'On' limit switch inhibits MCA relay (OP status remains On), motor capability is lost.

   If indication can be attributed to an MDM failure, then instrumentation failure is confirmed.

2. Crew Requirements:

   ASP access to Panel R13L

3. Time Requirements:

   2 min (from go ahead with ASP at Panel)

NOTE

4. Troubleshooting Plan:

NOTE:
PDU's are already isolated from AC power by P/L Bay MECH Power SW at Panel R13L.

A. (Crew) Issue switch command to Deploy.

B. CAFM monitor MCA operational statuses

If MCA OP Status stays On - MECH is No Go
If MCA OP Status goes Off for at least one motor - MECH is Go for Launch.

C. (Crew) Return switches to Launch configuration.

NOTE

Radiator Control SYS A SW - commands - PORT MTR 1 and STBD motor 2
Radiator Control SYS B SW - commands - PORT MTR 2 and STBD motor 1
PL Bay MECH PWR SYS1 SW - supplies power to - PORT and STBD motor 1
PL Bay MECH PWR SYS2 SW - supplies power to - PORT and STBD motor 2

116-139 CAFM

```
CURSOR CNTL (VWK04, PG-B)
RAD
XMIT CURSOR KEY - PRESS

VERIFY VWK07 IS DISPLAYED.
```

116-140 CAFM ASP

PANEL R13L
RADIATOR
  RADIATOR CONTROL
  SYS A - DEPLOY
  RADIATOR CONTROL
  SYS B - DEPLOY

116-141 CAFM

CRT (VWK07, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

PORT

MTR 1 1/3- _____

MTR 2 4/7- _____

STBD

MTR 1 3/3- _____

MTR 2 2/7- _____

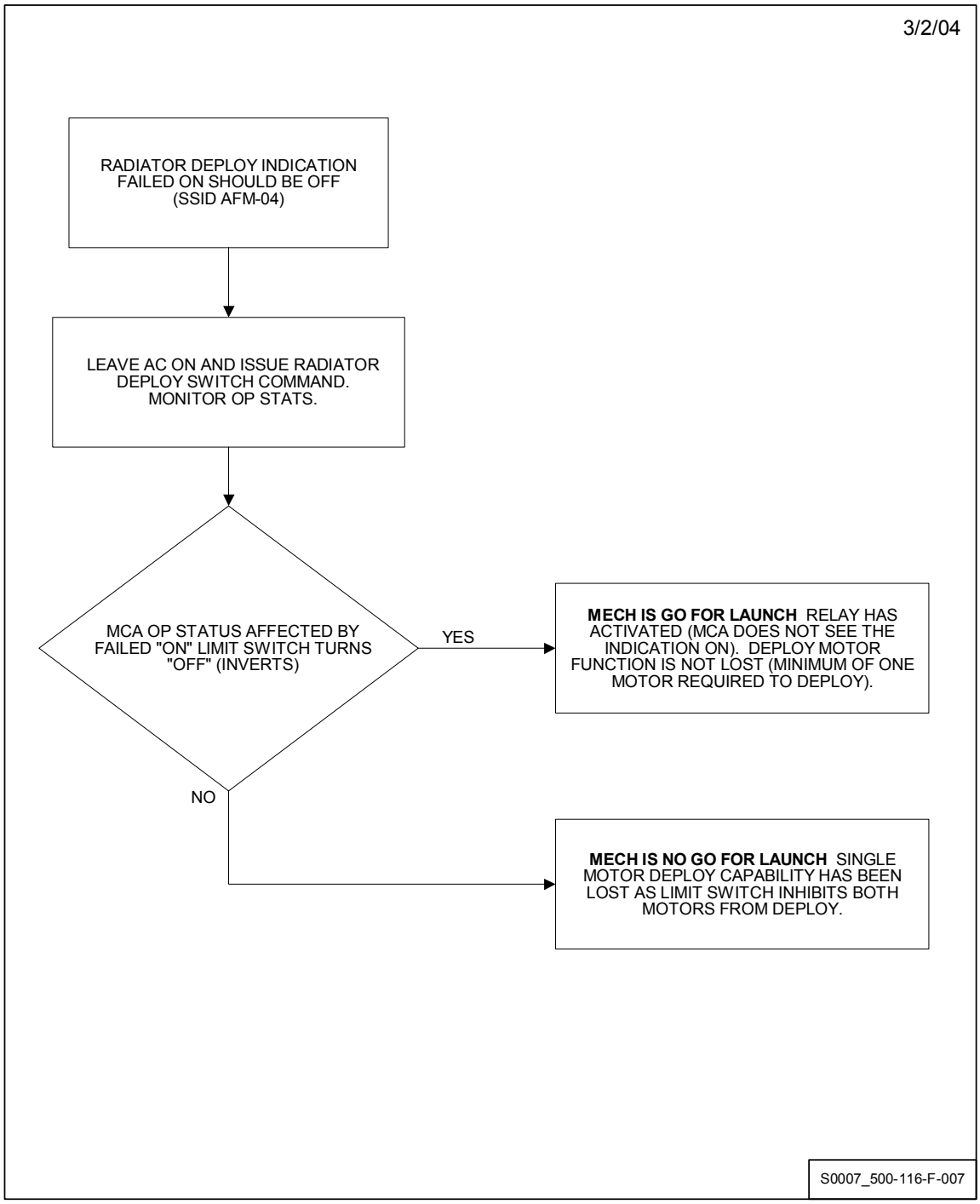
(3/1 AND 2/6 STBD, AND 1/4 AND 4/5 PORT, ARE INHIBITED BY LATCH LIMIT SWITCH)

116-142 CAFM ASP

PANEL R13L
RADIATOR
  RADIATOR CONTROL
  SYS A - OFF
  RADIATOR CONTROL
  SYS B - OFF

Troubleshooting Safing Steps

Radiator Deploy Indication Failed On Should Be Off (SSID AFM-04) Conclusion/Recommendation:



116-143 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Single motor deploy capability still exists (minimum of one motor is required to deploy). **LCC violation cleared. Continue Countdown.** ☐

2. MCA OP Status associated with failed "On" limit switch stayed On. Single motor connector integrity is lost as limit switch inhibits both motors from deploying. **LCC violation confirmed. NO GO for Launch.** ☐

116-144 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-145 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of Radiator Deploy Indication Failed On Should Be Off (SSID AFM-04) *****

Radiator Stow Indication Failed Off Should Be On (SSID AFM-04)

Option A

NOTE

Perform Option A only for missions with planned radiator deployment.

Option A Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a Scrub will be called.

1. LCC Requirements:

   2 of 2, Verify instrumentation failure or dual motor stow capability

   For missions that require a radiator deployment, need to verify instrumentation failure or dual motor Stow capability by verifying PDU connector integrity for both motors.

   Integrity verified by:

   MCA OP status remaining On (limit switch indication is inhibiting the MCA relay) or if limit switch does not inhibit MCA relay then when motor commanded Stow, current increases are observed or limit switch activates.

   If loss of stow indication can be attributed to an MDM failure then instrumentation failure is confirmed.

2. Crew Requirements:

   ASP access to Panel R13L

3. Time Requirements:

   5 min (from go ahead with Crew at panel)

NOTE

4. Troubleshooting Plan:

NOTE:
PDU's are already isolated from AC power by P/L Bay MECH Power SW Panel R13L.

A. (ASP) Issue switch command to Stow.

B. Monitor MCA operational statuses

If MCA OP status stays On - MECH is Go for Launch
If MCA OP status goes Off - perform next step

C. (ASP) Apply AC power for 5 sec max using Panel R13L PL MECH PWR switches

D. Monitor:
AC Busses for current increase and/or return of limit switch - MECH is Go
Else MECH is No Go

E. (Crew) Return switches to Launch configuration.

NOTE

Radiator Control SYS A SW - commands - PORT MTR 1 and STBD motor 2
Radiator Control SYS B SW - commands - PORT MTR 2 and STBD motor 1
PL Bay MECH PWR SYS1 SW - supplies power to - PORT and STBD motor 1
PL Bay MECH PWR SYS2 SW - supplies power to - PORT and STBD motor 2

AC Bus Distribution

	PORT	
	MTR1	MTR2
Radiator	AC-1	AC-3

	STBD	
	MTR1	MTR2
Radiator	AC-1	AC-3

116-146 CAFM

```
CURSOR CNTL (VWK04, PG-B)
RAD
XMIT CURSOR KEY - PRESS
```

VERIFY VWK07 IS DISPLAYED.

116-147 CAFM ASP

```
PANEL R13L
RADIATOR
  RADIATOR CONTROL
  SYS A - STOW
  RADIATOR CONTROL
  SYS B - STOW
```

116-148 **CAFM**

CRT (VWK07, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

		PORT
MTR 1	1/5-	_____
	1/1-	_____
MTR 2	4/6-	_____
	4/8-	_____

		STBD
MTR 1	3/2-	_____
	3/4-	_____
MTR 2	2/4-	_____
	2/5-	_____

NOTE

Apply MECH power for minimum required time to verify current increase: 5 seconds max.

AC Current Check

NOTE

If expected MCA OP status invert (Off), relay not inhibited. Perform this option to check for current increases.

AC Current Check Not Performed:_____

116-149 **CAFM** **OTC**
OTC **CEPD**

Begin monitoring AC currents:

AC1 - PORT and STBD MTR 1
AC3 - PORT and STBD MTR 2

116-150 **CAFM** **ASP**

```
PANEL R13L (SIMULTANEOUSLY)
PL BAY MECH PWR
  SYS 1 SW - ON
  SYS 2 SW - ON
```

116-151 **CAFM**

Record if current increases with MECH Power On (Yes/No):

AC1 - PORT and STBD MTR 1 _____

AC3 - PORT and STBD MTR 2 _____

***** End of AC Current Check *****

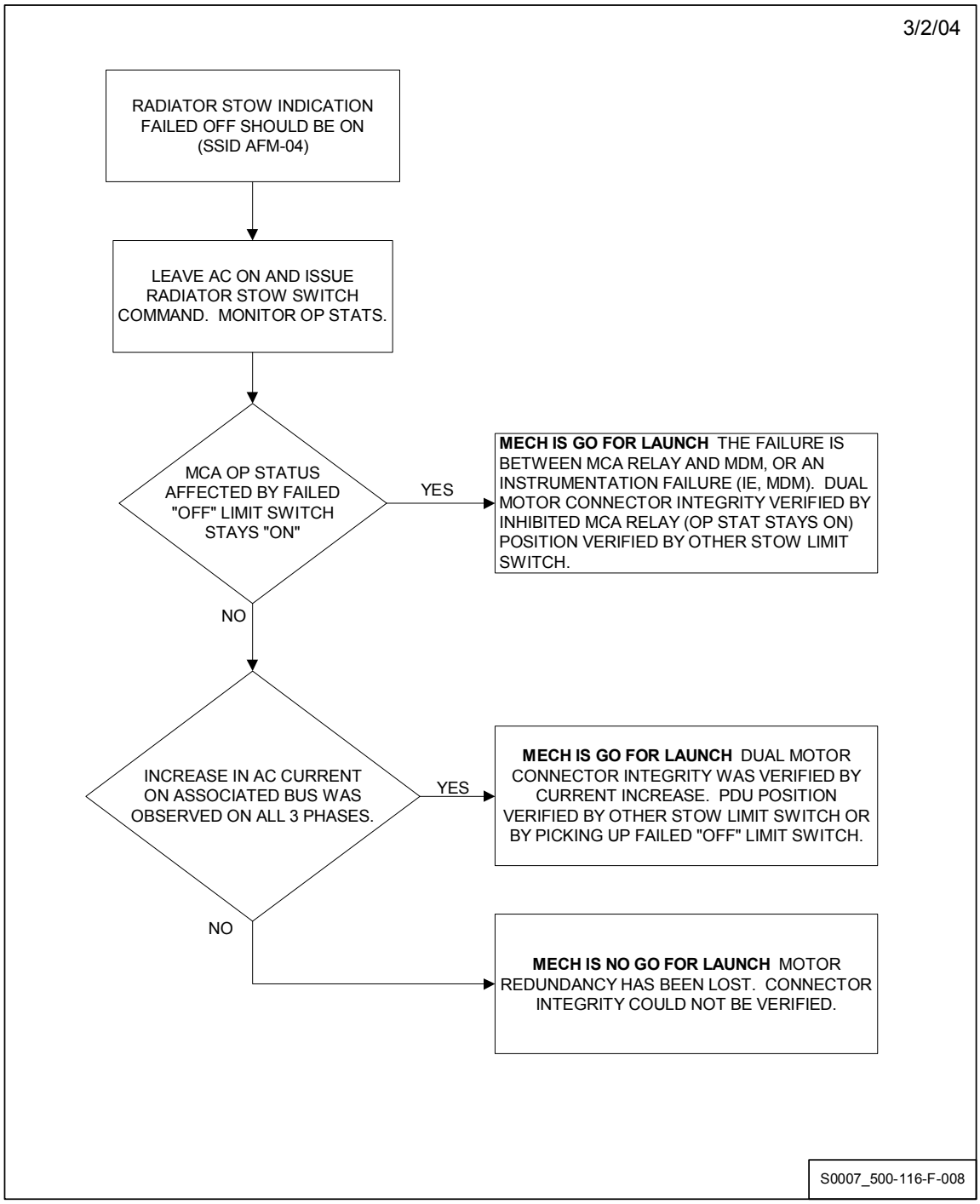
Troubleshooting Safing Steps

116-152 CAFM ASP

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF

RADIATOR
  RADIATOR CONTROL SYS A - OFF
  RADIATOR CONTROL SYS B - OFF
```

Radiator Stow Indication Failed Off Should Be On (SSID AFM-04) Option A Conclusion/Recommendation:



NOTE
Position must be verified by at least one limit switch. If at least one MCA relay inhibited (OP status remains On) position verified.

116-153 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor stow capability was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off and there was no AC current increase. Motor redundancy has been lost. Connector integrity could not be verified. ☐
LCC violation confirmed. NO GO for Launch.

116-154 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-155 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of Option A *****

Radiator Stow Indication Failed Off Should Be On (SSID AFM-04)

Option B

NOTE

Perform Option B only for missions where no radiator deployment is planned after second stow indication failure.

Option B Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a Scrub will be called.

1. LCC Requirements:

   1 of 2, Verify instrumentation failure or single motor stow capability

   For missions where no radiator deployment is planned, need to verify instrumentation failure or single motor Stow capability by verifying PDU connector integrity for one motor.
   Integrity verified by:

   MCA OP status remaining On (limit switch indication is inhibiting the MCA relay) or if limit switch does not inhibit MCA relay then when motor commanded Stow, current increases are observed or limit switch activates.
   If loss of stow indication can be attributed to an MDM failure, then instrumentation failure is confirmed.

2. Crew Requirements:

   ASP access to Panel R13L

3. Time Requirements:

   5 min (from go ahead with Crew at panel)

NOTE

4. Troubleshooting Plan:

NOTE:
PDU's are already isolated from AC power by P/L Bay MECH Power SW Panel R13L.

A. (ASP) Issue switch command to Stow.

B. Monitor MCA operational statuses

If MCA OP status stays On for at least one motor - MECH is Go for Launch
If MCA OP status goes Off for both motors - perform next step

C. (ASP) Apply AC power for 5 sec max using Panel R13L PL MECH PWR switches

D. Monitor:
AC Busses for current increase and/or return of limit switch for at least one motor -
MECH is Go
Else MECH is No Go

E. (Crew) Return switches to Launch configuration.

NOTE

Radiator Control SYS A SW - commands - PORT MTR 1 and STBD motor 2
Radiator Control SYS B SW - commands - PORT MTR 2 and STBD motor 1
PL Bay MECH PWR SYS1 SW - supplies power to - PORT and STBD motor 1
PL Bay MECH PWR SYS2 SW - supplies power to - PORT and STBD motor 2

AC Bus Distribution

	PORT	
	MTR1	MTR2
Radiator	AC-1	AC-3

	STBD	
	MTR1	MTR2
Radiator	AC-1	AC-3

116-156 CAFM

```
CURSOR CNTL (VWK04, PG-B)
RAD
XMIT CURSOR KEY - PRESS

VERIFY VWK07 IS DISPLAYED.
```

116-157 CAFM ASP

```
PANEL R13L
RADIATOR
  RADIATOR CONTROL
  SYS A - STOW
  RADIATOR CONTROL
  SYS B - STOW
```

116-158 **CAFM**

CRT (VWK07, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

		PORT
MTR 1	1/5-	_____
	1/1-	_____
MTR 2	4/6-	_____
	4/8-	_____

		STBD
MTR 1	3/2-	_____
	3/4-	_____
MTR 2	2/4-	_____
	2/5-	_____

NOTE

Apply MECH power for minimum required time to verify current increase: 5 seconds max.

AC Current Check

NOTE

If expected MCA OP status invert (Off), relay not inhibited. Perform this option to check for current increases.

AC Current Check Not Performed:_____

116-159 **CAFM** **OTC**
OTC **CEPD**

Begin monitoring AC currents:

AC1 - PORT and STBD MTR 1
AC3 - PORT and STBD MTR 2

116-160 **CAFM** **ASP**

```
PANEL R13L (SIMULTANEOUSLY)
PL BAY MECH PWR
  SYS 1 SW - ON
  SYS 2 SW - ON
```

116-161 **CAFM**

Record if current increases with MECH Power On (Yes/No):

AC1 - PORT and STBD MTR 1 _____

AC3 - PORT and STBD MTR 2 _____

***** End of AC Current Check *****

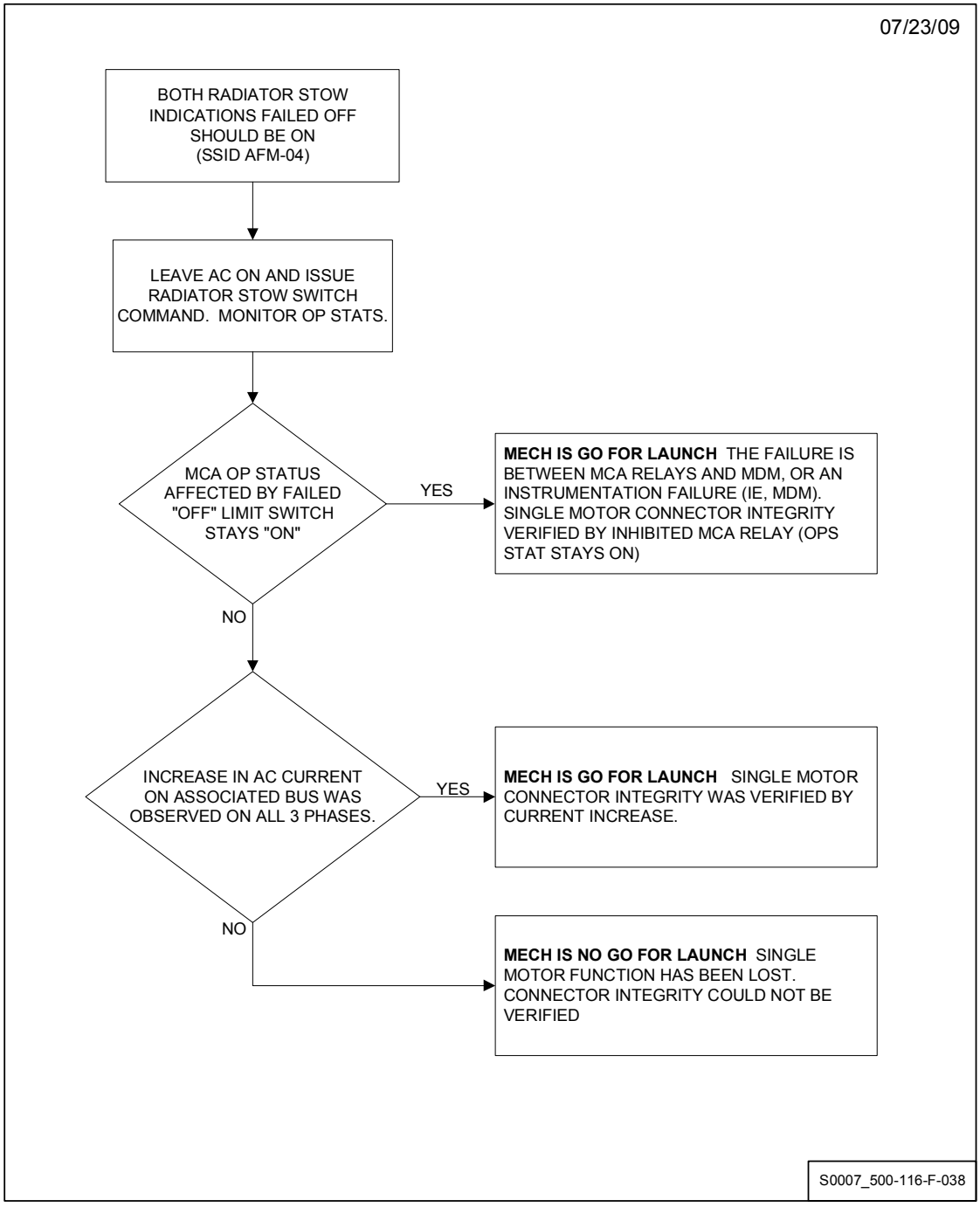
Troubleshooting Safing Steps

116-162 CAFM ASP

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF

RADIATOR
  RADIATOR CONTROL SYS A - OFF
  RADIATOR CONTROL SYS B - OFF
```

Radiator Stow Indication Failed Off Should Be On (SSID AFM-04) Option B Conclusion/Recommendation:



116-163 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with one of the failed "Off" limit switches stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Single motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with one of the failed "Off" limit switches changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. Single motor stow capability was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with both failed "Off" limit switches changed state to Off and there was no AC current increase. Function has been lost. Connector integrity could not be verified. ☐
LCC violation confirmed. NO GO for Launch.

116-164 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-165 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of Option B *****

***** End of Radiator Stow Indication Failed On Should Be Off (SSID AFM-04) *****

Radiator Latches - Latch Indication Failed Off Should Be On (SSID AFM-05)

Option A

NOTE

Perform Option A only for missions with planned radiator deployment.

Option A Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a Scrub will be called.

1. LCC Requirement:

   2 of 2, Verify instrumentation failure or dual motor capability

   Verify each latch gang latched (one latched limit switch per latch gang required) and

   For missions that require radiator deployment need to verify instrumentation failure or dual motor capability exists in latch direction by verifying PDU connector integrity for both motors.
   Integrity verified by:

MCA OP status remaining On (limit switch indication is inhibiting the MCA relay) or if limit switch does not inhibit MCA relay then when motor commanded Latch, current increases are observed or limit switch activates.
If loss of latch indication can be attributed to an MDM failure, then instrumentation failure is confirmed.

2. Crew Requirements:

   ASP access to Panel R13L

3. Time Requirements:

   5 min (from go ahead with Crew at panel) per latch group

NOTE

4. Troubleshooting plan:

NOTE:
PDU's are already isolated from AC power by P/L Bay MECH Power SW Panel R13L.

A. (ASP) Issue switch command to latch

B. CAFM monitor MCA operational statuses

If MCA OP status stays On - MECH is Go for Launch
If MCA OP status goes Off - perform next step

C. (ASP) Apply AC power for 5 sec max

D. CAFM monitor
AC Busses for current increase and/or return of limit switch - MECH is Go
Else-MECH is No Go

E. (ASP) Return switches to Launch configuration.

NOTE

Radiator Latch Control SYS A SW controls all Motor 1 PORT and STBD latches

Radiator Latch Control SYS B SW controls all Motor 2 PORT and STBD latches

PL Bay MECH Power SYS1 SW powers PORT Motor 1 and STBD Motor 2 latches

PL Bay MECH Power SYS2 SW powers PORT Motor 2 and STBD Motor 1 latches

AC Bus Distribution

PORT

1-6 LCH MTR

MTR1	MTR2
AC-1	AC-2

7-12 LCH MTR

MTR1	MTR2
AC-1	AC-3

STBD

1-6 LCH MTR

MTR1	MTR2
AC-1	AC-2

7-12 LCH MTR

MTR1	MTR2
AC-1	AC-3

116-166 CAFM

CURSOR CNTL (VWK04, PG-B)
RAD
XMIT CURSOR KEY - PRESS

VERIFY VWK07 IS DISPLAYED.

116-167 CAFM ASP

PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - LATCH
    SYS B SW - LATCH

116-168 CAFM

CRT (VWK07, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

	MTR 1	MTR 2
STBD 1-6	3/6 _____	2/1 _____
STBD 7-12	3/1 _____	2/8 _____
PORT 1-6	1/6 _____	4/3 _____
PORT 7-12	1/2 _____	4/5 _____

PORT Latches Motor 1 Current Test

NOTE
If expected MCA OP status inverted (Off) perform appropriate group of steps for latch and motor affected.

PORT Latches Motor 1 Current Test Not Performed:_____

116-169 **CAFM** **OTC**
OTC **CEPD**

Begin monitoring AC currents:

PORT 1-6 AC-1
PORT 7-12 AC-1

NOTE
Apply MECH power for minimum required time 5 seconds maximum.

116-170 **CAFM** **ASP**

```
PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - LATCH
    SYS B SW - OFF

  PL BAY MECH PWR
    SYS 1 SW - ON
```

116-171 **CAFM**

Record if current increases with MECH power On (Yes/No)
(increase will be approx 0.2 amps per phase per motor):

PORT 1-6 MTR 1 AC-1_____

PORT 7-12 MTR 1 AC-1_____

116-172 CAFM ASP

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF

RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
```

***** End of PORT Latches Motor 1 Current Test *****

PORT Latches Motor 2 Current Test

NOTE
If expected MCA OP status inverted (Off), perform appropriate group of steps for latch and motor affected.

PORT Latches Motor 2 Current Test Not Performed:_____

NOTE
Apply MECH power for minimum required time 5 seconds maximum .

116-173 **CAFM OTC**
OTC CEPD

Begin monitoring AC currents:

PORT 1-6 AC-2
PORT 7-12 AC-3

116-174 **CAFM ASP**

```
PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - LATCH

PL BAY MECH PWR
  SYS 2 SW - ON
```

116-175 **CAFM**

Record if current increases with MECH power On (Yes/No)
(increase will be approx 0.2 amps per phase per motor):

PORT 1-6 MTR 2 AC-2_____

PORT 7-12 MTR 2 AC-3_____

116-176 CAFM ASP

```
PANEL R13L
PL BAY MECH PWR
  SYS 2 SW - OFF

RADIATOR
  LATCH CONTROL
    SYS B SW - OFF
```

***** End of PORT Latches Motor 2 Current Test *****

STBD Latches Motor 1 Current Test

NOTE
If expected MCA OP status inverted (Off), perform appropriate group of steps for latch and motor affected.

STBD Latches Motor 1 Current Test Not Performed:_____

NOTE
Apply MECH power for minimum required time 5 seconds maximum .

116-177 **CAFM OTC**
OTC CEPD

Begin monitoring AC currents

STBD 1-6 AC-1
STBD 7-12 AC-1

116-178 **CAFM ASP**

```
PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - LATCH
    SYS B SW - OFF

PL BAY MECH PWR
  SYS 2 SW - ON
```

116-179 **CAFM**

Record if current increases with MECH power On (Yes/No)
(increase will be approx 0.2 amps per phase per motor):

STBD 1-6 MTR 1 AC-1_____

STBD 7-12 MTR 1 AC-1_____

116-180 CAFM ASP

```
PANEL R13L
PL BAY MECH PWR
  SYS 2 SW - OFF

RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
```

***** End of STBD Latches Motor 1 Current Test *****

STBD Latches Motor 2 Current Test

NOTE
If expected MCA OP status inverted (Off), perform appropriate group of steps for latch and motor affected.

STBD Latches Motor 2 Current Test Not Performed:_____

NOTE
Apply MECH power for minimum required time 5 seconds maximum .

116-181 **CAFM OTC**
OTC CEPD

Begin monitoring AC currents:

STBD 1-6 AC-2
STBD 7-12 AC-3

116-182 **CAFM ASP**

```
PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - LATCH

PL BAY MECH PWR
  SYS 1 SW - ON
```

116-183 **CAFM**

Record if current increases with MECH power On (Yes/No)
(increase will be approx 0.2 amps per phase per motor):

STBD 1-6 MTR 2 AC-2_____

STBD 7-12 MTR 2 AC-3_____

116-184 ASP

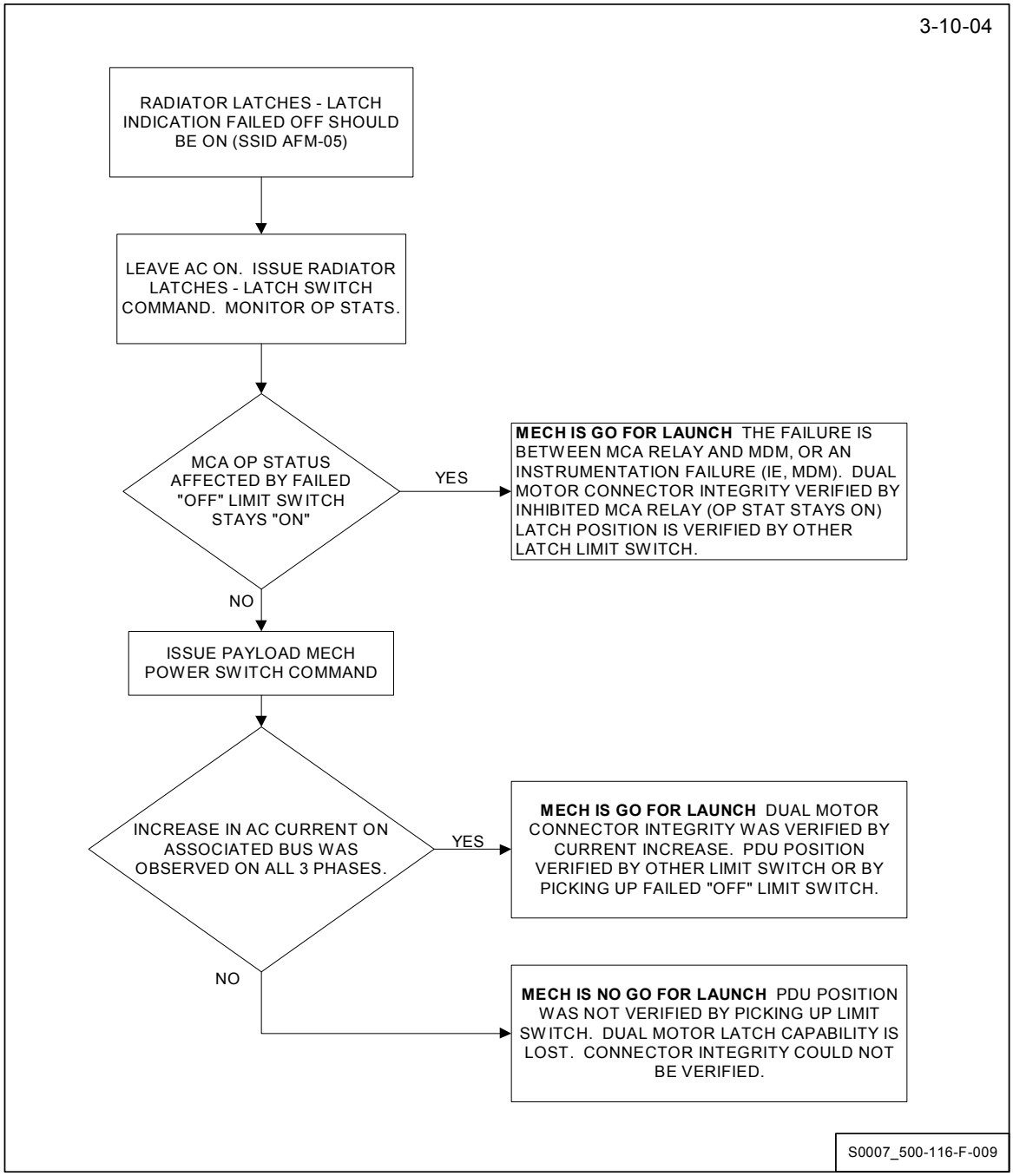
```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF

RADIATOR
  LATCH CONTROL
    SYS B SW - OFF
```

***** End of STBD Latches Motor 2 Current Test *****

Radiator Latches - Latch Indication Failed Off Should Be On (SSID AFM-05)

Option A Conclusion/Recommendation:



NOTE
Position must be verified by at least one limit switch. If at least one MCA relay inhibited (OP status remains On) position verified.

116-185 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. PDU position was NOT verified by picking up limit switch. Dual motor connector integrity is lost. ☐
LCC violation confirmed. NO GO for Launch.

116-186 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

116-187 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of Option A *****

Radiator Latches - Latch Indication Failed Off Should Be On (SSID AFM-05)

Option B

NOTE

Perform Option B only for missions where no radiator deployment is planned after second latch indication failure.

Option B Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a Scrub will be called.

1. LCC Requirement:

   1 of 2, Latch indication per latch gang

   Verify each latch gang latched (one latched limit switch per latch gang required). If both latch indication are off, drive the latch in the latch direction to reacquire the indication.

2. Crew Requirements:

   ASP access to Panel R13L

3. Time Requirements:

   5 min (from go ahead with Crew at panel) per latch group

NOTE

4. Troubleshooting plan:

   A. Turn on both P/L Bay MECH Power SWs on Panel R13L

   B. (ASP) Issue switch command to latch for 5 sec max

   C. CAFM monitor
      Return of limit switch -
      MECH is Go
      Else-MECH is No Go

   D. (ASP) Return switches to Launch configuration.

NOTE

Radiator Latch Control SYS A SW controls all Motor 1 PORT and STBD latches

Radiator Latch Control SYS B SW controls all Motor 2 PORT and STBD latches

PL Bay MECH Power SYS1 SW powers PORT Motor 1 and STBD Motor 2 latches

PL Bay MECH Power SYS2 SW powers PORT Motor 2 and STBD Motor 1 latches

AC Bus Distribution

PORT

1-6 LCH MTR

MTR1	MTR2
AC-1	AC-2

7-12 LCH MTR

MTR1	MTR2
AC-1	AC-3

STBD

1-6 LCH MTR

MTR1	MTR2
AC-1	AC-2

7-12 LCH MTR

MTR1	MTR2
AC-1	AC-3

116-188 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
RAD
XMIT CURSOR KEY - PRESS

VERIFY VWK07 IS DISPLAYED.
```

116-189 **CAFM** **ASP**

```
PANEL R13L
PL BAY MECH POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

NOTE
Issue switch command for 5 seconds maximum.

116-190 **CAFM** **ASP**

```
PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - LATCH
    SYS B SW - LATCH
```

116-191 **CAFM** **ASP**

```
PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - OFF
```

116-192 **CAFM**

CRT (VWK07, PG-B)

RECORD latch limit switch indications

Port 1-6 _____
Port 7-12 _____
STBD 1-6 _____
STBD 7-12 _____

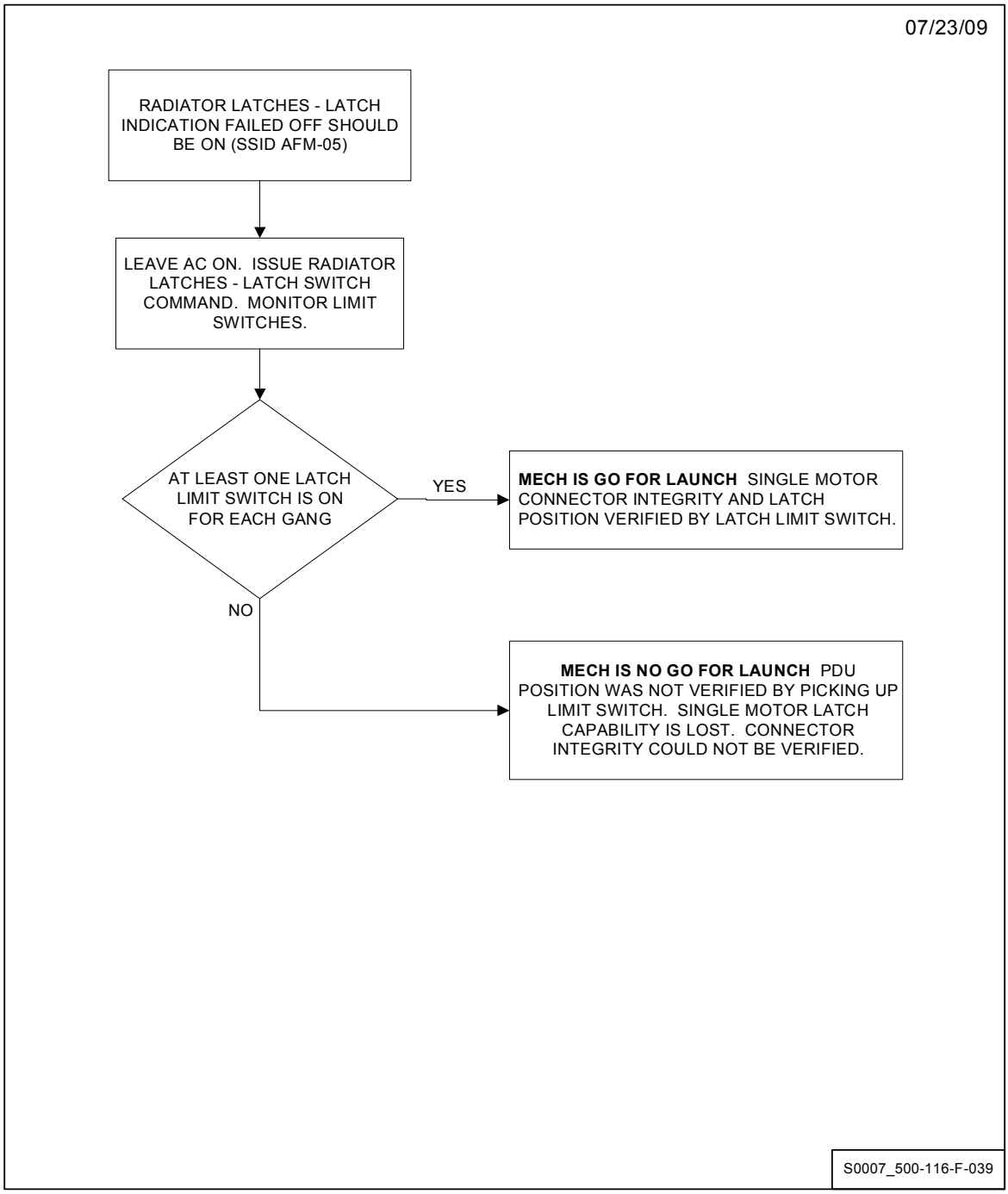
Troubleshooting Safing Steps

116-193 **CAFM** **ASP**

PANEL R13L
PL BAY MECH POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF

Radiator Latches - Latch Indication Failed Off Should Be On (SSID AFM-05)

Option B Conclusion/Recommendation:



NOTE
Position must be verified by at least one limit switch.

116-194 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. Latch position and single motor connector integrity verified. ☐
LCC violation cleared. Continue Countdown.

2. PDU position was NOT verified by picking up limit switch. Single motor connector integrity is lost. ☐
LCC violation confirmed. NO GO for Launch.

116-195 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

***** End of Option B *****

***** End of Radiator Latches - Latch Indication Failed Off Should Be On (SSID AFM-05) *****

Radiator Latches Release Indication Failed On Should Be Off (SSID AFM-05)

NOTE

LCC Requirement:

1 of 2, release indications OFF required for each latch gang

Failure of both release indications for a latch gang is unacceptable for flight due to total loss of visibility in the release position.
No troubleshooting exists.

LCC violation exists - MECH is NO GO for Launch.

***** End of Radiator Latches Release Indication Failed On Should Be Off (SSID AFM-05) *****

Payload Bay Door Open Indication Failed On Should Be Off (SSID AFM-06)

NOTE

Notify OTC/NTD as soon as possible that a format change to G9 Format 42 and use of LDB is required.

1. LCC Requirement:

   2 of 2, Verify dual motor capability

   Dual motor capability to open is required. If an "On" limit switch inhibits MCA relay (OP status stays On), motor cannot open.

2. Crew Requirements:

   None

3. Time Requirements:

   5 min from go ahead after OPS transition

4. Other Requirements:

   A. OPS transition to G9 Format 42

   B. LDB capability to send commands MECH Console to P/L MDMS

NOTE

5. Troubleshooting Plan:

   A. Perform OPS format transition to G9 Format 42 or equivalent to allow P/L MDM reception of LDB commands and visibility of limit switches.

   B. CAFM issue open commands with AC isolated from PDU (enable relays - Open)

   C. Verify CMD status with BITE Test 4

   D. Monitor MCA operational statuses
      If MCA OP status stays On - MECH is No Go
      If MCA OP status goes Off - MECH is Go for Launch

   E. Safe all commands

116-196 **CAFM** **NTD** **212**
OTC

OPS transition to G9 Format 42 requested.

116-197 **OTC** **CTPE** **132/212**

Verify systems can support a format change to GPC Downlist 42.

NOTE

The following functions are not valid in Format 42. Data displayed using these measurements will be stale following the format change from 44 to 42. Reference http://p51.ksc.nasa.gov/aps/mml/FormatCompareForm.cfm for a detailed list of affected measurements:

1. SSME Status, Health, Pressure, and Temperature Measurements
2. IMU SLEW, Theta, Gain, Velocity, Angle, Azimuth Measurements
3. GPS 1, 3 Log, Tracking, Antenna, Status, and Health Measurements
4. PDI Decom Measurements
5. [V92X] GPC Port Status Fail Indicators
6. MPS/ET Low Level Sensor DSBL Word

116-198 CTPE CDPS 132/212
CSME
CNSE
CGNC
CISL
CMPS

Downlist format change from 44 to 42 has been requested by CAFM. Select system measurements are not available in Format 42 for monitoring and the following Launch Commit Criteria cannot be verified:

SSID	Nomenclature
SSME-07	SSME Phase Effect and Operating Mode
SSME-10	HPOT I-SEAL PGE P CH A DW 20
SSME-20	PBP DISCH TEMP CH A DW 11
MPS-33	LPFT DISCH PRESS (AVG) DW 9
DPS-27	ARCHIVE STATUS, GPC1-4
CT-11	GPS 1/3 RPU FAIL AND DATA VALID
GNC-56	KT70/HAINS GOOD WD1B0
GNC-61	ECHO, RED RATE, RESOLVER, VEL, CAPRI FAIL
GNC-62	G/C FAILED IMU PAIR
GNC-63	ALIGNMENT CORRECTION LIMITED
GNC-66	TRANS WD1/WD2 FAIL WD1B9/WD1B10

116-199 CTPE OTC 132/212

Systems have verified that they can support a format change to GPC Downlist 42.

116-200 CAFM

```
CURSOR CNTL (VWK04, PG-B)
PRI PLB DOOR
XMIT CURSOR KEY - PRESS

VERIFY VWK05 IS DISPLAYED.
```

116-201 CAFM

```
CRT (VWK05, PG-B)

VERIFY ALL ENABLE MCA RELAY STATUSES
(1/9 THRU 4/12) ON (NORMAL)
```

Right Payload Bay Door Motor 1 Check

NOTE
Perform section for appropriate door and motor with failure.

Right Payload Bay Door Motor 1 Check Not Performed:_____

116-202 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR-1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - R PLB DOOR (O7)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 - (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - R PLB DOOR (B7)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2050Y1 ON.
```

116-203 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/5 __________
```

116-204 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - R PLB DOOR (S7)
XMIT CURSOR KEY - PRESS
```

***** End of Right Payload Bay Door Motor 1 Check *****

Right Payload Bay Door Motor 2 Check

NOTE
Perform section for appropriate door and motor with failure.

Right Payload Bay Door Motor 2 Check Not Performed:_____

116-205 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR-2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPEN - R PLB DOOR (O7)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - R PLB DOOR (B7)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2051Y1 ON.
```

116-206 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/1 _________
```

116-207 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - R PLB DOOR (S7)
XMIT CURSOR KEY - PRESS
```

***** End of Right Payload Bay Door Motor 2 Check *****

Left Payload Bay Door Motor 1 Check

NOTE
Perform section for appropriate door and motor with failure.

Left Payload Bay Door Motor 1 Check Not Performed:_____

116-208 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR-1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - L PLB DOOR (O0)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - L PLB DOOR (B0)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2070Y1 ON.
```

116-209 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/5_________
```

116-210 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - L PLB DOOR (S0)
XMIT CURSOR KEY - PRESS
```

***** End of Left Payload Bay Door Motor 1 Check *****

Left Payload Bay Door Motor 2 Check

NOTE
Perform section for appropriate door and motor with failure.

Left Payload Bay Door Motor 2 Check Not Performed:_____

116-211 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR-2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - L PLB DOOR (O0)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - L PLB DOOR (B0)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)
```

VERIFY V37K2071Y1 ON.

116-212 **CAFM**

```
CRT (VWK05, PG-B)
```

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/1_____

116-213 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - L PLB DOOR (S0)
XMIT CURSOR KEY - PRESS
```

***** End of Left Payload Bay Door Motor 2 Check *****

Troubleshooting Safing Steps

116-214 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - OFF
XMIT CURSOR KEY - PRESS
```

116-215 **CAFM**

```
PFP (VWK05)
PFP KEY 5 (BITE CMDS OFF TST) - PRESS
```

VERIFY ALL COMMANDS OFF.

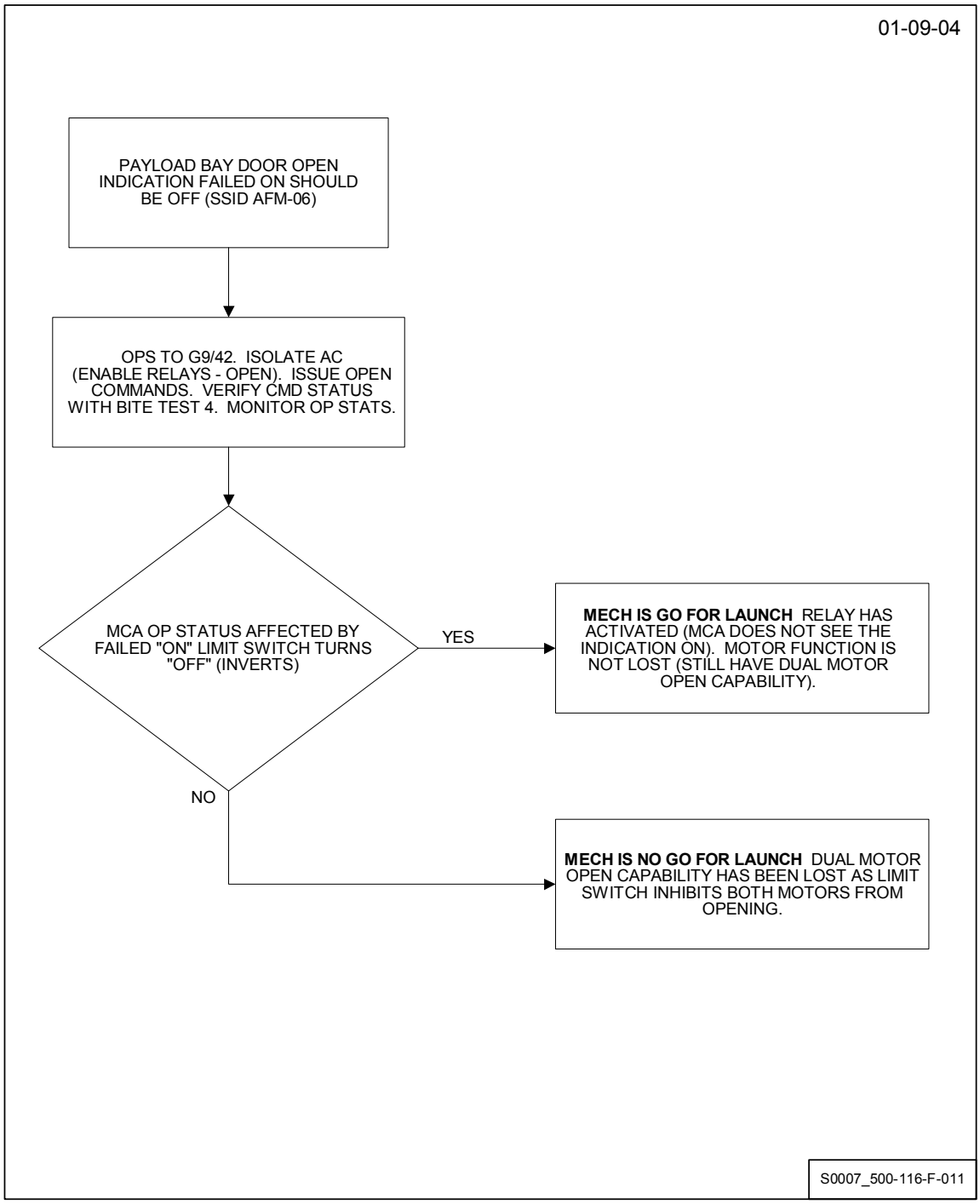
116-216 **CAFM** **OTC**
NTD

IF troubleshooting is complete,

THEN G9 Format 42 no longer required.

Not Performed:_____

Payload Bay Door Open Indication Failed On Should Be Off (SSID AFM-06) Conclusion/Recommendation:



116-217 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor open capability still exists. ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor PLBD opening capability is lost as limit switch inhibits motor from opening. ☐
LCC violation confirmed. NO GO for Launch.

116-218 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-219 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of Payload Bay Door Open Indication Failed On Should Be Off (SSID AFM-06) *****

PLBD Bulkhead Latch - Latch Indication Failed Off Should Be On (SSID AFM-07)

NOTE

Troubleshooting this anomaly requires access to Panel R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a scrub will be called.

Notify OTC/NTD as soon as possible that a format change to G9 Format 42 and use of LDB is required.

1. LCC Requirement:

   2 of 2, Verify dual motor capability
   1 of 2, Verify position.

   Position verified by presence of either single motor latch limit switch, either directly or inferred by inhibited MCA relay (OP status stays On)

   Dual motor capability required, connector integrity verified by either (1) demonstrating latch limit switch still present from PDU to MCA and inhibiting MCA relay (OP status stays on) or if MCA relay not inhibited, then by (2) demonstrating motor will draw current when commanded latched.

2. Crew Requirements:

   ASP access to Panel R13L

3. Time Requirements:

   5 minutes per latch from go ahead after OPS transition.

NOTE

4. Other Requirements:

   A. OPS transition to G9 Format 42

   B. LDB capability to send commands from MECH Console to P/L MDMS

5. Troubleshooting plan:

   A. Perform OPS format transition to G9 Format 42 or equivalent to allow PL MDM reception of LDB commands and visibility of limit switches.

   B. CAFM issue latch commands with AC On

   C. Verify CMD status with BITE Test 4

   D. Monitor MCA operational statuses

      If MCA OP status stays On - MECH is Go
      If MCA OP status goes Off - Monitor currents for increase

   E. Safe all commands

NOTE

AC Distribution

	Motor 1	Motor 2
LEFT FWD		
BKHD LCH	AC-1	AC-2
LEFT AFT		
BKHD LCH	AC-1	AC-3
RIGHT FWD		
BKHD LCH	AC-1	AC-2
RIGHT AFT		
BKHD LCH	AC-3	AC-2

Use hard copy or EPD/TPE to record before, during, and after current snapshots.

116-220 CAFM NTD 212
OTC

OPS transition to G9 Format 42 requested.

116-221 OTC CTPE 132/212

Verify systems can support a format change to GPC Downlist 42.

NOTE

The following functions are not valid in Format 42. Data displayed using these measurements will be stale following the format change from 44 to 42. Reference http://p51.ksc.nasa.gov/aps/mml/FormatCompareForm.cfm for a detailed list of affected measurements:

1. SSME Status, Health, Pressure, and Temperature Measurements
2. IMU SLEW, Theta, Gain, Velocity, Angle, Azimuth Measurements
3. GPS 1, 3 Log, Tracking, Antenna, Status, and Health Measurements
4. PDI Decom Measurements
5. [V92X] GPC Port Status Fail Indicators
6. MPS/ET Low Level Sensor DSBL Word

116-222 CTPE CDPS 132/212
CSME
CNSE
CGNC
CISL
CMPS

Downlist format change from 44 to 42 has been requested by CAFM. Select system measurements are not available in Format 42 for monitoring and the following Launch Commit Criteria cannot be verified:

SSID	Nomenclature
SSME-07	SSME Phase Effect and Operating Mode
SSME-10	HPOT I-SEAL PGE P CH A DW 20
SSME-20	PBP DISCH TEMP CH A DW 11
MPS-33	LPFT DISCH PRESS (AVG) DW 9
DPS-27	ARCHIVE STATUS, GPC1-4
CT-11	GPS 1/3 RPU FAIL AND DATA VALID
GNC-56	KT70/HAINS GOOD WD1B0
GNC-61	ECHO, RED RATE, RESOLVER, VEL, CAPRI FAIL
GNC-62	G/C FAILED IMU PAIR
GNC-63	ALIGNMENT CORRECTION LIMITED
GNC-66	TRANS WD1/WD2 FAIL WD1B9/WD1B10

116-223 CTPE OTC 132/212

Systems have verified that they can support a format change to GPC Downlist 42.

116-224 CAFM

```
CURSOR CNTL (VWK04, PG-B)
PLBD PRI
XMIT CURSOR KEY - PRESS
```

VERIFY VWK05 IS DISPLAYED.

116-225 CAFM ASP

```
PANEL R13L
PL BAY ENABLE SYS 1 SW - ON
PL BAY ENABLE SYS 2 SW - ON
```

116-226 CAFM

```
CURSOR CNTL (VWK05, PG-B)
ENABLES - ON
XMIT CURSOR KEY - PRESS
```

VERIFY ALL ENABLE MCA RELAY STATUSES (1/9 THRU 4/12) OFF (INVERTED)

PLBD Left Forward Bulkhead Latch Motor 1 Check with AC On (SSID AFM-07)

NOTE

Perform section for appropriate latch and motor with failure latch indication failed Off should be On.

PLBD Left Forward Bulkhead Latch Motor 1 Check with AC On
Not Performed:_____

NOTE

Allow commands to be on for minimum time required to check currents (5 seconds maximum).

116-227 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC1-MTR1.

116-228 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR-1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - L FWD BHD LCH (C8)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - L FWD BHD LCH (B8)
XMIT CURSOR KEY - PRESS
```

116-229 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/3_____

116-230 **CAFM**

CURSOR CNTL (VWK05, PG-B)

CURSOR CNTL
STP CMD - L FWD BHD LCH (S8)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2160Y1 WAS ON.

116-231 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-1_____

***** End of PLBD Left Forward Bulkhead Latch Motor 1 Check with AC On *****

PLBD Left Forward Bulkhead Latch Motor 2 Check with AC On (SSID AFM-07)

NOTE

Perform section for appropriate latch and motor with failure latch indication failed Off should be On.

PLBD Left Forward Bulkhead Latch Motor 2 Check with AC On
Not Performed:_____

NOTE

Allow commands to be on for minimum time required to check currents (5 seconds maximum).

116-232 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC2-MTR2.

116-233 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR-2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - L FWD BHD LCH (C8)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - L FWD BHD LCH (B8)
XMIT CURSOR KEY - PRESS
```

116-234 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/2_________
```

116-235 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - L FWD BHD LCH (S8)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2161Y1 WAS ON.
```

116-236 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-2_____

***** End of PLBD Left Forward Bulkhead Latch Motor 2 Check with AC On (SSID AFM-07)**

PLBD Left AFT Bulkhead Latch Motor 1 Check with AC On (SSID AFM-07)

NOTE

Perform section for appropriate latch and motor with failure latch indication failed Off should be On.

PLBD Left AFT Bulkhead Latch Motor 1 Check with AC On
Not Performed:_____

NOTE

Allow commands to be on for minimum time required to check currents (5 seconds maximum).

116-237 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC1-MTR1.

116-238 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWR05, PG-B)
GPC CLS - L AFT BHD LCH (C9)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - L AFT BHD LCH (B9)
XMIT CURSOR KEY - PRESS
```

116-239 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/1_____

116-240 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - L AFT BHD LCH (S9)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2180Y1 WAS ON.

116-241 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-1_____

***** End of PLBD Left AFT Bulkhead Latch Motor 1 Check with AC On (AFM-07) *****

PLBD Left AFT Bulkhead Latch Motor 2 Check with AC On (SSID AFM-07)

NOTE

Perform section for appropriate latch and motor with failure latch indication failed Off should be On.

PLBD Left AFT Bulkhead Latch Motor 2 Check with AC On
Not Performed:_____

NOTE

Allow commands to be on for minimum time required to check currents (5 seconds maximum).

116-242 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC3-MTR2.

116-243 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - L AFT BHD LCH (C9)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - L AFT BHD LCH (B9)
XMIT CURSOR KEY - PRESS
```

116-244 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/5_____

116-245 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - L AFT BHD LCH (S9)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2181Y1 WAS ON.

116-246 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-3_____

***** End of PLBD Left AFT Bulkhead Latch Motor 2 Check with AC On (SSID AFM-07) *****

PLBD Right Forward Bulkhead Latch Motor 1 Check with AC On (SSID AFM-07)

NOTE

Perform section for appropriate latch and motor with failure latch indication failed Off should be On.

PLBD Right Forward Bulkhead Latch Motor 1 Check with AC On
Not Performed:_____

NOTE

Allow commands to be on for minimum time required to check currents (5 seconds maximum).

116-247 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC1-MTR1.

116-248 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - R FWD BHD LCH (C5)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CONTROL (VWK05, PG-B)
BTE TST - R FWD BHD LCH (B5)
XMIT CURSOR KEY - PRESS
```

116-249 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/2- _____

116-250 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - R FWD BHD LCH (S5)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2110Y1 WAS ON.

116-251 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-1 _____

***** End of PLBD Right Forward Bulkhead Latch Motor 1 Check with AC On (SSID AFM-07) *****

PLBD Right Forward Bulkhead Latch Motor 2 Check with AC On (SSID AFM-07)

NOTE

Perform section for appropriate latch and motor with failure latch indication failed Off should be On.

PLBD Right Forward Bulkhead Latch Motor 2 Check with AC On
Not Performed:_____

NOTE

Allow commands to be on for minimum time required to check currents (5 seconds maximum).

116-252 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC2-MTR2.

116-253 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - R FWD BHD LCH (C5)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - R FWD BHD LCH (B5)
XMIT CURSOR KEY - PRESS
```

116-254 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/1 - _____

116-255 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - R FWD BHD LCH (S5)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2111Y1 WAS ON.

116-256 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-2 _____

***** End of PLBD Right Forward Bulkhead Latch Motor 2 Check with AC On (SSID AFM-07) *****

PLBD Right AFT Bulkhead Latch Motor 1 Check with AC On (SSID AFM-07)

NOTE

Perform section for appropriate latch and motor with failure latch indication failed Off should be On.

PLBD Right AFT Bulkhead Latch Motor 1 Check with AC On
Not Performed:_____

NOTE

Allow commands to be on for minimum time required to check currents (5 seconds maximum).

116-257 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC3 - MTR1.

116-258 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - R AFT BHD LCH (C6)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - R AFT BHD LCH (B6)
XMIT CURSOR KEY - PRESS
```

116-259 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/6 - _____

116-260 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - R AFT BHD LCH (S6)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2130Y1 WAS ON.

116-261 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-3 _____

***** End of PLBD Right AFT Bulkhead Latch Motor 1 Check with AC On (SSID AFM-07) *****

PLBD Right AFT Bulkhead Latch Motor 2 Check With AC On (SSID AFM-07)

NOTE

Perform section for appropriate latch and motor with failure latch indication failed Off should be On.

PLBD Right AFT Bulkhead Latch Motor 2 Check with AC On
Not Performed:_____

NOTE

Allow commands to be on for minimum time required to check currents (5 seconds maximum).

116-262 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC2 - MTR2.

116-263 **CAFM**

```
CURSOR CNTL (VWK05 PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - R AFT BHD LCH (C6)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - R AFT BHD LCH (B6)
XMIT CURSOR KEY - PRESS
```

116-264 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/1 - _____

116-265 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - R AFT BHD LCH (S6)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2131Y1 WAS ON.

116-266 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-2 _____

***** End of PLBD Right AFT Bulkhead Latch Motor 2 Check with AC On (SSID AFM-07) *****

Troubleshooting Safing Steps

116-267 **CAFM** **ASP**

PANEL R13L
PL BAY ENABLE SYS 1 SW - OFF
PL BAY ENABLE SYS 2 SW - OFF

116-268 **CAFM**

CURSOR CNTL (VWK05, PG-B)
ENABLES - OFF
XMIT CURSOR KEY - PRESS

VERIFY ALL ENABLE MCA RELAY STATUSES
(1/9 THRU 4/12) ON (NORMAL)

116-269 **CAFM**

CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - OFF
XMIT CURSOR KEY - PRESS

116-270 **CAFM**

PFP (VWK05)
PFP KEY 5 (BITE CMDS OFF TST) - PRESS

VERIFY ALL COMMANDS OFF.

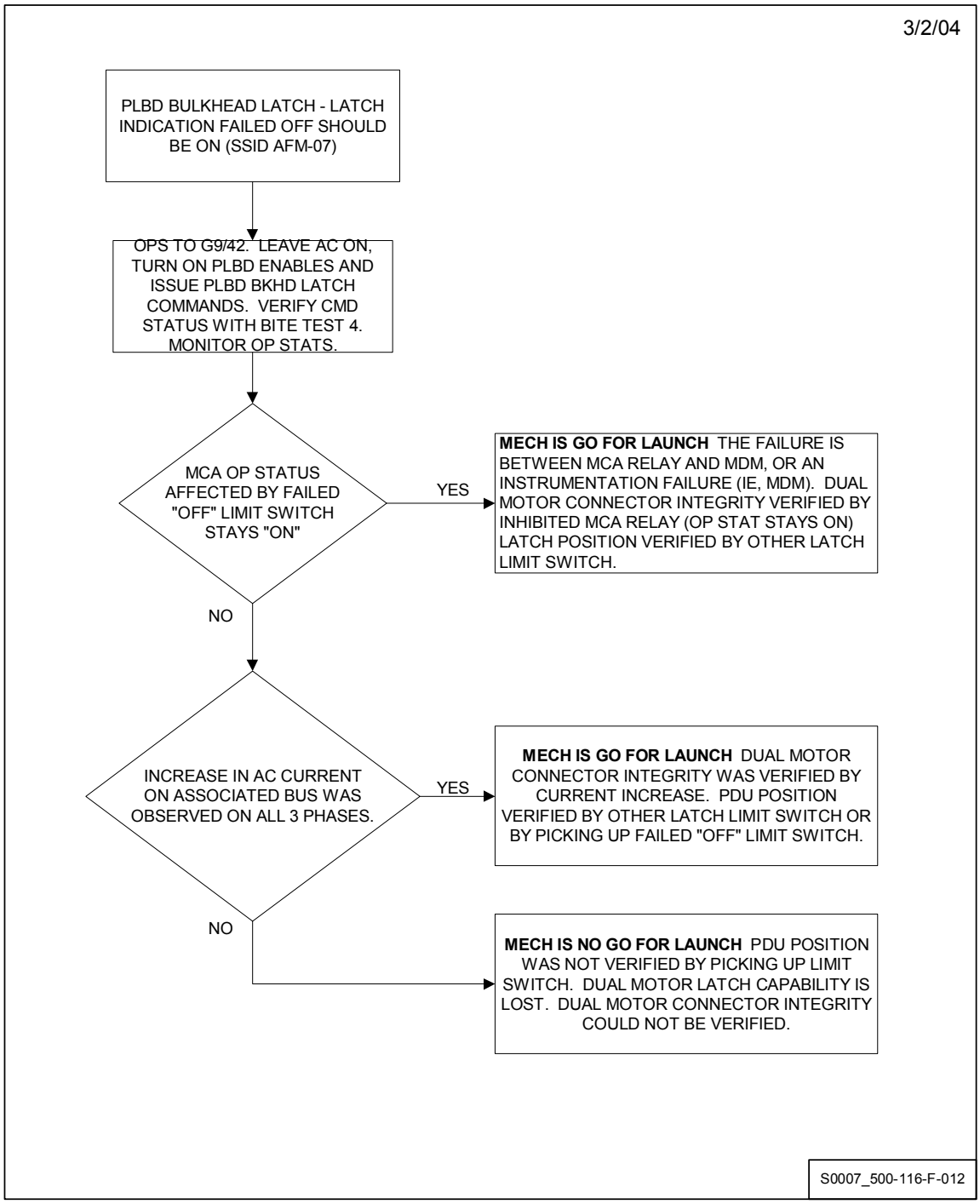
116-271 **CAFM** **OTC**
NTD

IF troubleshooting is complete,

THEN G9 Format 42 no longer required.

Not Performed:_____

Payload Bay Door Bulkhead Latch - Latch Indication Failed Off Should Be On (SSID AFM-07) Conclusion/Recommendation:



NOTE

Position must be verified by at least one limit switch. If at least one MCA relay inhibited (OP status remains On) position verified.

116-272 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. PDU position was NOT verified by picking up limit switch. Dual motor latching capability cannot be verified. ☐
LCC violation confirmed. NO GO for Launch.

116-273 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-274 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of PLBD Bulkhead Latch - Latch Indication Failed Off Should Be On (SSID AFM-07) *****

PLBD Bulkhead Latch - Release Indication Failed On Should Be Off (SSID AFM-07)

NOTE

Notify OTC/NTD as soon as possible that a format change to G9 Format 42 and use of LDB is required.

1. LCC Requirement:

   2 of 2, Verify dual motor capability

   Dual motor capability to release required. If an 'On' limit switch inhibits MCA relay (OP status stays On), motor cannot release.

2. Crew Requirements:

   None

3. Time Requirements:

   2 minutes from go ahead after OPS transition.

4. Other Requirements:

   A. OPS transition to G9 Format 42

   B. LDB capability to send commands from MECH Console to P/L MDMS

NOTE

5. Troubleshooting Plan:

   A. Perform OPS format transition to G9 Format 42 or equivalent to allow PL MDM reception of LDB commands and visibility of limit switches.

   B. CAFM issue release commands with AC isolated from PDU (Enable relays - disabled)

   C. Verify CMD status with BITE Test 4

   D. Monitor MCA operational statuses

      If MCA OP status stays On - MECH is No Go
      If MCA OP status goes Off - MECH is Go for Launch

   E. Safe all commands.

116-275 CAFM NTD 212
OTC

OPS transition to G9 Format 42 requested.

116-276 OTC CTPE 132/212

Verify systems can support a format change to GPC Downlist 42.

NOTE

The following functions are not valid in Format 42. Data displayed using these measurements will be stale following the format change from 44 to 42. Reference http://p51.ksc.nasa.gov/aps/mml/FormatCompareForm.cfm for a detailed list of affected measurements:

1. SSME Status, Health, Pressure, and Temperature Measurements
2. IMU SLEW, Theta, Gain, Velocity, Angle, Azimuth Measurements
3. GPS 1, 3 Log, Tracking, Antenna, Status, and Health Measurements
4. PDI Decom Measurements
5. [V92X] GPC Port Status Fail Indicators
6. MPS/ET Low Level Sensor DSBL Word

116-277 CTPE CDPS 132/212
CSME
CNSE
CGNC
CISL
CMPS

Downlist format change from 44 to 42 has been requested by CAFM. Select system measurements are not available in Format 42 for monitoring and the following Launch Commit Criteria cannot be verified:

SSID	Nomenclature
SSME-07	SSME Phase Effect and Operating Mode
SSME-10	HPOT I-SEAL PGE P CH A DW 20
SSME-20	PBP DISCH TEMP CH A DW 11
MPS-33	LPFT DISCH PRESS (AVG) DW 9
DPS-27	ARCHIVE STATUS, GPC1-4
CT-11	GPS 1/3 RPU FAIL AND DATA VALID
GNC-56	KT70/HAINS GOOD WD1B0
GNC-61	ECHO, RED RATE, RESOLVER, VEL, CAPRI FAIL
GNC-62	G/C FAILED IMU PAIR
GNC-63	ALIGNMENT CORRECTION LIMITED
GNC-66	TRANS WD1/WD2 FAIL WD1B9/WD1B10

116-278 CTPE OTC 132/212

Systems have verified that they can support a format change to GPC Downlist 42.

116-279 CAFM

```
CURSOR CNTL (VWK04, PG-B)
PRI PLBD DRS
XMIT CURSOR KEY - PRESS
```

116-280 CAFM

```
CRT (VWK05, PG-B)

VERIFY ALL ENABLE MCA RELAY STATUSES
(1/9 THRU 4/12) ON (NORMAL)
```

PLBD Left Forward Bulkhead Latch Motor 1 Check (SSID AFM-07)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD Left Forward Bulkhead Latch Motor 1 Check Not Performed:_____

116-281 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - L FWD BHD LCH (O8)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - L FWD BHD LCH (B8)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2150Y1 ON
```

116-282 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/4- __________
```

116-283 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - L FWD BHD LCH (S8)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD Left Forward Bulkhead Motor 1 Check (SSID AFM-07) *****

PLBD Left Forward Bulkhead Latch Motor 2 Check (SSID AFM-07)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD Left Forward Bulkhead Latch Motor 2 Check Not Performed:_____

116-284 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - L FWD BHD LCH (O8)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - L FWD BHD LCH (B8)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2151Y1 ON.
```

116-285 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/3 - __________
```

116-286 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - L FWD BHD LCH (S8)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD Left Forward Bulkhead Latch Motor 2 Check (SSID AFM-07) *****

PLBD Left AFT Bulkhead Latch Motor 1 Check (SSID AFM-07)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD Left AFT Bulkhead Latch Motor 1 Check Not Performed:_____

116-287 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - L AFT BHD LCH (O9)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - L AFT BHD LCH (B9)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2170Y1 ON.
```

116-288 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/2 - __________
```

116-289 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - L AFT BHD LCH (S9)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD Left AFT Bulkhead Latch Motor 1 Check (SSID AFM-07) *****

PLBD Left AFT Bulkhead Latch Motor 2 Check (SSID AFM-07)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD Left AFT Bulkhead Latch Motor 2 Check Not Performed:_____

116-290 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - L AFT BHD LCH (O9)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR  CNTL (VWK05, PG-B)
BTE TST - L AFT BHD LCH (B9)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2171Y1 ON.
```

116-291 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/6 - __________
```

116-292 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - L AFT BHD LCH (S9)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD Left AFT Bulkhead Latch Motor 2 Check (SSID AFM-07) *****

PLBD Right Forward Bulkhead Latch Motor 1 Check (SSID AFM-07)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD Right Forward Bulkhead Latch Motor 1 Check Not Performed:_____

116-293 CAFM

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - R FWD BHD LCH (O5)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - R FWD BHD LCH (B5)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2100Y1 ON.
```

116-294 CAFM

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/1 - __________
```

116-295 CAFM

```
CURSOR CNTL (VWK05 PG-B)
STP CMD - R FWD BHD LCH (S5)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD Right Forward Bulkhead Latch Motor 1 Check (SSID AFM-07) *****

PLBD Right Forward Bulkhead Latch Motor 2 Check (SSID AFM-07)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD Right Forward Bulkhead Latch Motor 2 Check Not Performed:_____

116-296 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - R FWD BHD LCH (O5)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - R FWD BHD LCH (B5)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2101Y1 ON.
```

116-297 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/4 - __________
```

116-298 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - R FWD BHD LCH (S5)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD Right Forward Bulkhead Latch Motor 2 Check (SSID AFM-07) *****

PLBD Right AFT Bulkhead Latch Motor 1 Check (SSID AFM-07)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD Right AFT Bulkhead Latch Motor 1 Check Not Performed:_____

116-299 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - R AFT BHD LCH (O6)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - R AFT BHD LCH (B6)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2120Y1 ON.
```

116-300 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/7 - __________
```

116-301 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - R AFT BHD LCH (S6)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD Right AFT Bulkhead Latch Motor 1 Check (SSID AFM-07) *****

PLBD Right AFT Bulkhead Latch Motor 2 Check (SSID AFM-07)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD Right AFT Bulkhead Latch Motor 2 Check Not Performed:_____

116-302 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - R AFT BHD LCH (O6)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - R AFT BHD LCH (B6)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2121Y1 ON.
```

116-303 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/2 - __________
```

116-304 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - R AFT BHD LCH (S6)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD Right AFT Bulkhead Latch Motor 2 Check (SSID AFM-07) *****

Troubleshooting Safing Steps

116-305 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - OFF
XMIT CURSOR KEY - PRESS
```

116-306 **CAFM**

```
PFP (VWK05)
PFP KEY 5 (BITE CMDS OFF TST) - PRESS
```

VERIFY ALL COMMANDS OFF.

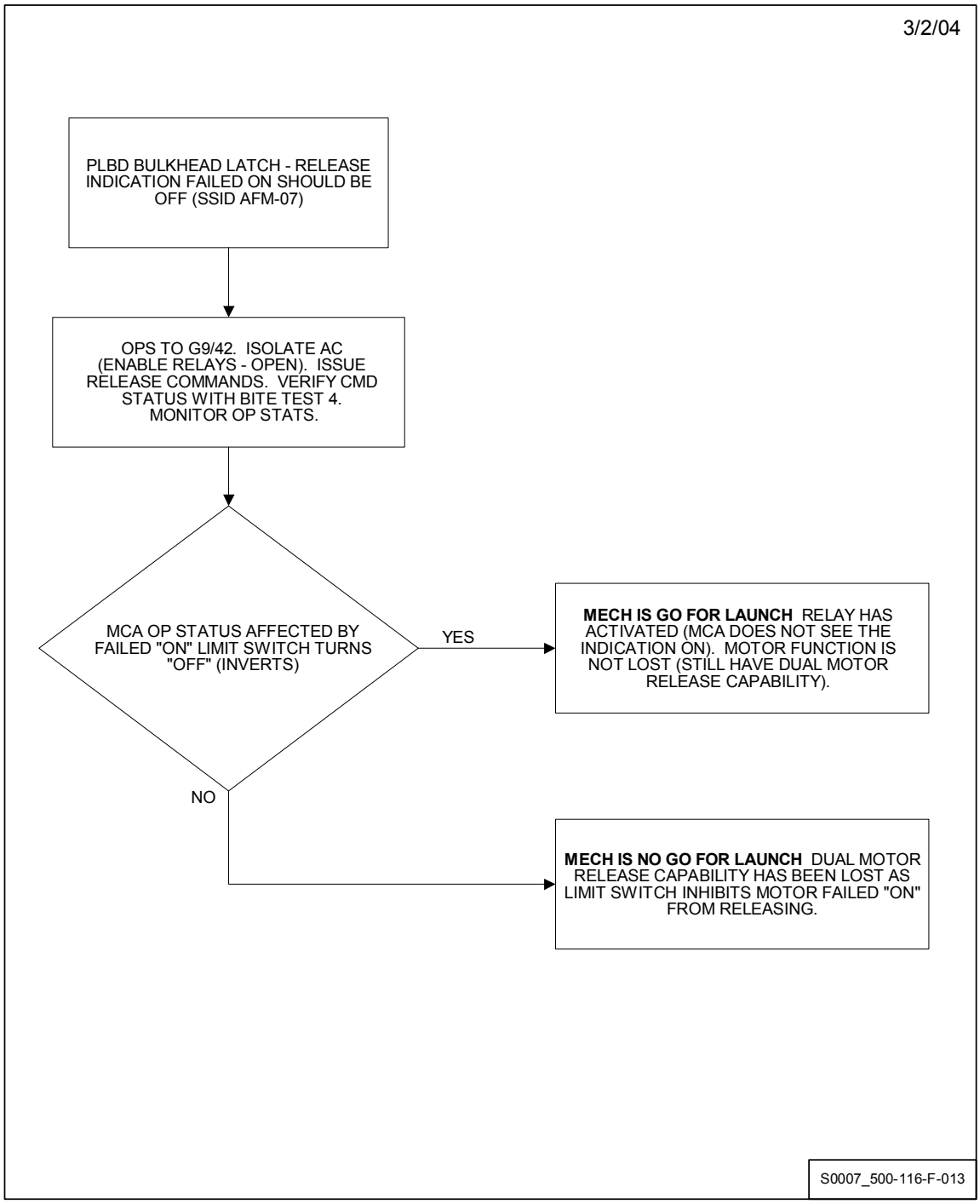
116-307 **CAFM** **OTC**
NTD

IF troubleshooting is complete,

THEN G9 Format 42 no longer required.

Not Performed:_____

Payload Bay Door Bulkhead Latch - Release Indication Failed On Should Be Off (SSID AFM-07) Conclusion/Recommendation:



116-308 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor release capability still exists. ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor latch release capability is lost as limit switch inhibits motor from releasing. ☐
LCC violation confirmed. NO GO for Launch.

116-309 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-310 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of PLBD Bulkhead Latch - Release Indication Failed On Should Be Off (SSID AFM -07) *****

PLBD Ready To Latch Indication Failed Off Should Be On (SSID AFM-08)

NOTE

No troubleshooting for this anomaly without opening PLBD.

Two of 3 indications “ON” is acceptable (LCC voting logic anomaly)

PLBD Centerline Latch - Latch Indication Failed Off Should Be On (SSID AFM-09)

NOTE

Troubleshooting this anomaly requires access to Panel R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a scrub will be called.

Notify OTC/NTD as soon as possible that a format change to G9 Format 42 and use of LDB is required.

1. LCC Requirement:

   2 of 2, Verify dual motor capability
   1 of 2, Verify position

   Position verified by presence of single motor latch limit switch, either directly or inferred by inhibited MCA relay (OP status stays On)

   Dual motor capability required. Connector integrity verified by either:

   Demonstrating that latch limit switch still present from PDU to MCA and inhibiting MCA relay (OP status stays On) or if MCA relay not inhibited then by demonstrating motor will draw current when commanded latched.

2. Crew Requirements:

   ASP access to Panel R13L

3. Time Requirements:

   5 minutes per latch from go ahead after OPS transition.

NOTE

4. Other Requirements:

   A. OPS transition to G9 Format 42

   B. LDB capability to send commands from MECH Console to P/L MDMs.

5. Troubleshooting Plan:

   A. Perform OPS format transition to G9 Format 42 or equivalent to allow PL MDM reception of LDB commands and visibility of limit switches.

   B. CAFM issue latch commands with AC On

   C. Verify CMD status with BITE Test 4

   D. Monitor MCA operational statuses

      If MCA OP status stays On - MECH is Go
      If MCA OP status goes Off - Monitor currents for increase from suspect motor.

   E. Safe all commands

NOTE

AC Distribution:

		Motor 1	Motor 2
1-4	C/L LCH	AC-1	AC-3
5-8	C/L LCH	AC-1	AC-3
9-12	C/L LCH	AC-1	AC-3
13-16	C/L LCH	AC-3	AC-2

Use hard copy or EPD/TPE to record before, during and after AC current snapshots.

116-311 CAFM NTD 212
OTC

OPS transition to G9 Format 42 requested.

116-312 OTC CTPE 132/212

Verify systems can support a format change to GPC Downlist 42.

NOTE

The following functions are not valid in Format 42. Data displayed using these measurements will be stale following the format change from 44 to 42. Reference http://p51.ksc.nasa.gov/aps/mml/FormatCompareForm.cfm for a detailed list of affected measurements:

1. SSME Status, Health, Pressure, and Temperature Measurements
2. IMU SLEW, Theta, Gain, Velocity, Angle, Azimuth Measurements
3. GPS 1, 3 Log, Tracking, Antenna, Status, and Health Measurements
4. PDI Decom Measurements
5. [V92X] GPC Port Status Fail Indicators
6. MPS/ET Low Level Sensor DSBL Word

116-313 CTPE CDPS 132/212
CSME
CNSE
CGNC
CISL
CMPS

Downlist format change from 44 to 42 has been requested by CAFM. Select system measurements are not available in Format 42 for monitoring and the following Launch Commit Criteria cannot be verified:

SSID	Nomenclature
SSME-07	SSME Phase Effect and Operating Mode
SSME-10	HPOT I-SEAL PGE P CH A DW 20
SSME-20	PBP DISCH TEMP CH A DW 11
MPS-33	LPFT DISCH PRESS (AVG) DW 9
DPS-27	ARCHIVE STATUS, GPC1-4
CT-11	GPS 1/3 RPU FAIL AND DATA VALID
GNC-56	KT70/HAINS GOOD WD1B0
GNC-61	ECHO, RED RATE, RESOLVER, VEL, CAPRI FAIL
GNC-62	G/C FAILED IMU PAIR
GNC-63	ALIGNMENT CORRECTION LIMITED
GNC-66	TRANS WD1/WD2 FAIL WD1B9/WD1B10

116-314 CTPE OTC 132/212

Systems have verified that they can support a format change to GPC Downlist 42.

116-315 CAFM

```
CURSOR CNTL (VWK04, PG-B)
PLBD PRI
XMIT CURSOR KEY - PRESS
```

VERIFY VWK05 IS DISPLAYED.

116-316 CAFM ASP

```
PANEL R13L
PL BAY ENABLE
  SYS 1 SW - ON
  SYS 2 SW - ON
```

116-317 CAFM

```
CURSOR CNTL (VWK05, PG-B)
ENABLES - ON
XMIT CURSOR KEY - PRESS
```

VERIFY ALL ENABLE MCA RELAY STATUSES (1/9 THRU 4/12) OFF (INVERTED)

PLBD C/L Latch 1-4 Motor 1 Check with AC On (SSID AFM-09)

NOTE

Perform section for appropriate latch and motor with failure of latch indication failed Off should be On.

PLBD C/L Latch 1-4 Motor 1 Check with AC On Not Performed:_____

NOTE

Apply AC power for 5 seconds maximum.

116-318 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC1 - MTR1

116-319 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - 1-4 C/L LCH (C3)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 1-4 C/L LCH (B3)
XMIT CURSOR KEY - PRESS
```

116-320 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/3 - _____

116-321 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - 1-4 C/L LCH (S3)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2210Y1 WAS ON.

116-322 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-1 _____

***** End of PLBD C/L Latch 1-4 Motor 1 Check with AC On (SSID AFM-09) *****

PLBD C/L Latch 1-4 Motor 2 Check With AC On (SSID AFM-09)

NOTE

Perform section for appropriate latch and motor with failure of latch indication failed Off should be On.

PLBD C/L Latch 1-4 Motor 2 Check With AC On (SSID AFM-09)
Not Performed:_____

NOTE

Apply AC power for 5 seconds maximum.

116-323 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC3 - MTR2.

116-324 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - 1-4 C/L LCH (C3)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TEST - 1-4 C/L LCH (B3)
XMIT CURSOR KEY - PRESS
```

116-325 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/3 - _____

116-326 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - 1-4 C/L LCH (S3)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2211Y1 WAS ON.

116-327 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-3 _____

***** End of PLBD C/L Latch 1-4 Motor 2 Check with AC On (SSID AFM-09) *****

PLBD C/L Latch 5-8 Motor 1 Check with AC On (SSID AFM-09)

NOTE

Perform section for appropriate latch and motor with failure of latch indication failed Off should be On.

PLBD C/L Latch 5-8 Motor 1 Check with AC On Not Performed:_____

NOTE

Apply AC power for 5 seconds maximum.

116-328 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC1 - MTR1.

116-329 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - 5-8 C/L LCH (C1)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 5-8 C/L LCH (B1)
XMIT CURSOR KEY - PRESS
```

116-330 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/5 - _____

116-331 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - 5-8 C/L LCH (S1)
XMIT CURSOR KEY - PRESS

CRT (VWK05,PG-A)

VERIFY V37K2230Y1 WAS ON.

116-332 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-1 _____

***** End of PLBD C/L Latch 5-8 Motor 1 Check with AC On (SSID AFM-09) *****

PLBD C/L Latch 5-8 Motor 2 Check with AC On (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of latch indication failed Off should be On.

PLBD C/L Latch 5-8 Motor 2 Check with AC On Not Performed:_____

NOTE
Apply AC power for 5 seconds maximum.

116-333 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC3 - MTR2.

116-334 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - 5-8 C/L LCH (C1)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 5-8 C/L LCH (B1)
XMIT CURSOR KEY - PRESS
```

116-335 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/7 - _____

116-336 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - 5-8 C/L LCH (S1)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2231Y1 WAS ON.

116-337 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-3 _____

***** End of PLBD C/L Latch 5-8 Motor 2 Check with AC On (SSID AFM-09) *****

PLBD C/L Latch 9-12 Motor 1 Check with AC On (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of latch indication failed Off should be On.

PLBD C/L Latch 9-12 Motor 1 Check with AC On Not Performed:_____

NOTE
Apply AC power for 5 seconds maximum.

116-338 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC1 - MTR1.

116-339 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - 9-12 C/L LCH (C2)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 9-12 C/L LCH (B2)
XMIT CURSOR KEY - PRESS
```

116-340 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/4 - _____

116-341 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - 9-12 C/L LCH (S2)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2250Y1 WAS ON.

116-342 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-1 _____

***** End of PLBD C/L Latch 9-12 Motor 1 Check with AC On (SSID AFM-09) *****

PLBD C/L Latch 9-12 Motor 2 Check with AC On (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of latch indication failed Off should be On.

PLBD C/L Latch 9-12 Motor 2 Check with AC On Not Performed:_____

NOTE
Apply AC power for 5 seconds maximum.

116-343 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC3 - MTR2.

116-344 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - 9-12 C/L LCH (C2)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 9-12 C/L LCH (B2)
XMIT CURSOR KEY - PRESS
```

116-345 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/5 - _____

116-346 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - 9-12 C/L LCH (S2)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2251Y1 WAS ON.

116-347 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-3 _____

***** End of PLBD C/L Latch 9-12 Motor 2 Check with AC On (SSID AFM-09) *****

PLBD C/L Latch 13-16 Motor 1 Check with AC On (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of latch indication failed Off should be On.

PLBD C/L Latch 13-16 Motor 1 Check with AC On Not Performed:_____

NOTE
Apply AC power for 5 seconds maximum.

116-348 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC3 - MTR1.

116-349 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - 13-16 C/L LCH (C4)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 13-16 C/L LCH (B4)
XMIT CURSOR KEY - PRESS
```

116-350 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/7 - _____

116-351 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - 13-16 C/L LCH (S4)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2270Y1 WAS ON.

116-352 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-3 _____

***** End of PLBD C/L Latch 13-16 Motor 1 Check with AC On (SSID AFM-09) *****

PLBD C/L Latch 13-16 Motor 2 Check with AC On (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of latch indication failed Off should be On.

PLBD C/L Latch 13-16 Motor 2 Check with AC On Not Performed:_____

NOTE
Apply AC power for 5 seconds maximum.

116-353 **CAFM** **CEPD**
CTPE

Begin monitoring currents AC2 - MTR2.

116-354 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC CLS - 13-16 C/L LCH (C4)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 13-16 C/L LCH (B4)
XMIT CURSOR KEY - PRESS
```

116-355 **CAFM**

CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/2 - _____

116-356 **CAFM**

CURSOR CNTL (VWK05, PG-B)
STP CMD - 13-16 C/L LCH (S4)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2271Y1 WAS ON.

116-357 **CAFM**

Indicate if current increased while commands were On (Yes/No).

AC-2 _____

***** End of PLBD C/L Latch 13-16 Motor 2 Check with AC On (SSID AFM-09) *****

Troubleshooting Safing Steps

116-358 CAFM ASP

PANEL R13L
PL BAY ENABLE SYS 1 SW - OFF
PL BAY ENABLE SYS 2 SW - OFF

116-359 CAFM

CURSOR CNTL (VWK05, PG-B)
ENABLES - OFF
XMIT CURSOR KEY - PRESS

VERIFY ALL ENABLE MCA RELAY STATUSES (1/9 THRU 4/12) ON (NORMAL).

116-360 CAFM

CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - OFF
XMIT CURSOR KEY - PRESS

116-361 CAFM

PFP (VWK05)
PFP KEY 5 (BITE CMDS OFF TST) - PRESS

VERIFY ALL COMMANDS OFF.

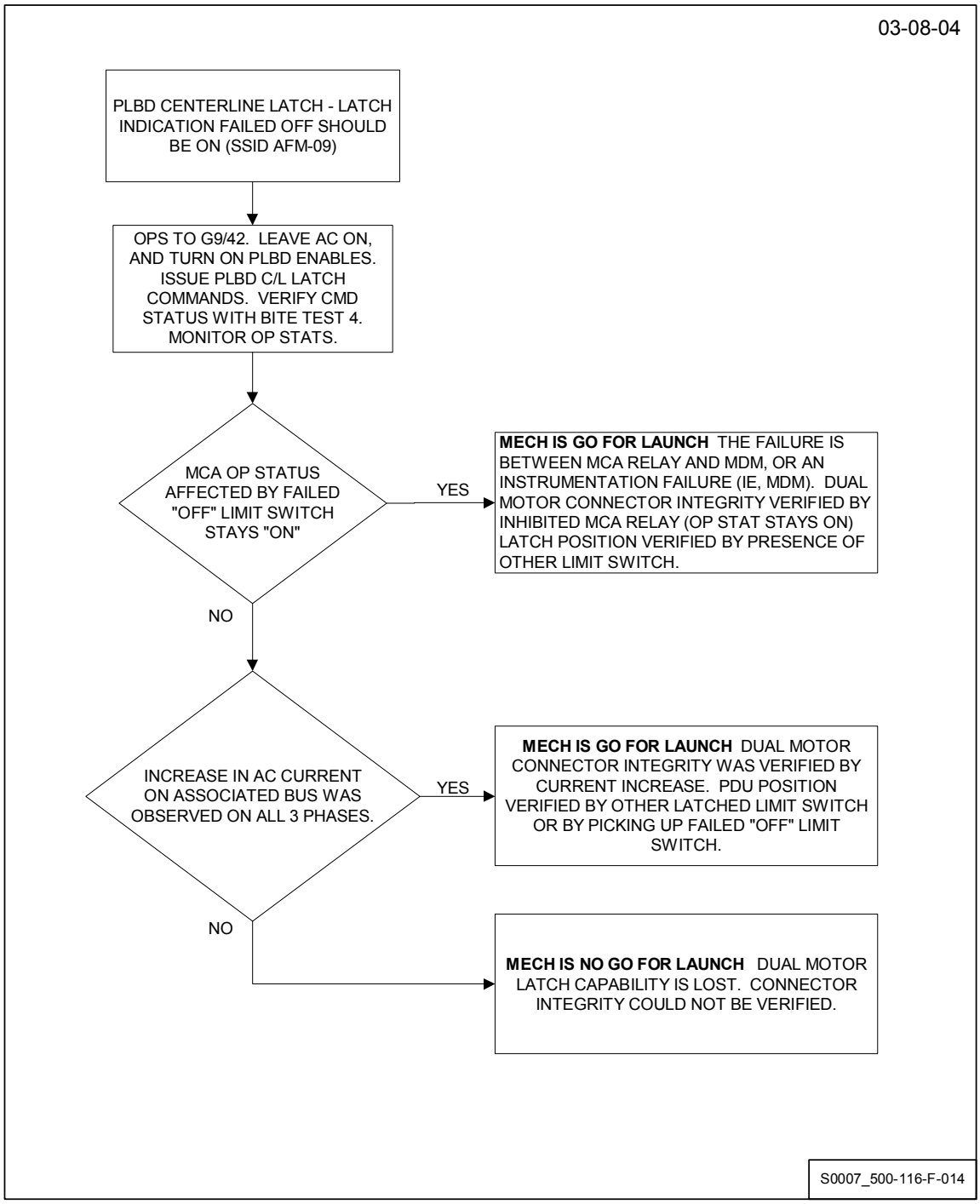
116-362 CAFM OTC
NTD

IF troubleshooting is complete,

THEN G9 Format 42 no longer required.

Not Performed:_____

Payload Bay Door Bulkhead Centerline Latch - Latch Indication Failed Off Should Be On (SSID AFM-09) Conclusion/Recommendation:



NOTE

Position must be verified by at least one limit switch. If at least one MCA relay inhibited (OP status remains On) position verified.

116-363 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. Failed "Off" limit switch was NOT picked up by troubleshooting. Dual motor latching capability is lost. ☐
LCC violation confirmed. NO GO for Launch.

116-364 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-365 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of PLBD Centerline Latch - Latch Indication Failed Off Should Be On (SSID AFM-09) *****

PLBD Center Line Latch - Release Indication Failed On Should Be Off (SSID AFM-09)

NOTE

Notify OTC/NTD as soon as possible that a format change to G9 Format 42 and use of LDB is required.

1. LCC Requirement:

   2 of 2, Verify dual motor capability.

   Dual motor capability to release required. If an 'On' limit switch inhibits MCA relay (OP status stays On), motor cannot release.

2. Crew Requirements:

   None

3. Time Requirements:

   2 minutes from go ahead after DPS back in G9.

4. Other Requirements:

   DPS in G9 Format 42 and LDB capability to send commands from MECH Console to P/L MDMs.

NOTE

5. Troubleshooting Plan:

   A. Perform OPS format transition to G9 Format 42 or equivalent to allow PL MDM reception of LDB commands and visibility of limit switches.

   B. CAFM - Issue release commands with AC isolated from PDU (Enable relays - Open)

   C. Verify CMD status with BITE Test 4

   D. Monitor MCA operational statuses:
      If MCA OP status stays On MECH is No Go
      If MCA OP status goes Off, MECH is Go for Launch

   E. Safe all commands.

116-366 **CAFM** **NTD** **212**
OTC

DPS transition to G9 Format 42 requested.

116-367 **OTC** **CTPE** **132/212**

Verify systems can support a format change to GPC Downlist 42.

NOTE

The following functions are not valid in Format 42. Data displayed using these measurements will be stale following the format change from 44 to 42. Reference http://p51.ksc.nasa.gov/aps/mml/FormatCompareForm.cfm for a detailed list of affected measurements:

1. SSME Status, Health, Pressure, and Temperature Measurements
2. IMU SLEW, Theta, Gain, Velocity, Angle, Azimuth Measurements
3. GPS 1, 3 Log, Tracking, Antenna, Status, and Health Measurements
4. PDI Decom Measurements
5. [V92X] GPC Port Status Fail Indicators
6. MPS/ET Low Level Sensor DSBL Word

116-368 CTPE CDPS 132/212
CSME
CNSE
CGNC
CISL
CMPS

Downlist format change from 44 to 42 has been requested by CAFM. Select system measurements are not available in Format 42 for monitoring and the following Launch Commit Criteria cannot be verified:

SSID	Nomenclature
SSME-07	SSME Phase Effect and Operating Mode
SSME-10	HPOT I-SEAL PGE P CH A DW 20
SSME-20	PBP DISCH TEMP CH A DW 11
MPS-33	LPFT DISCH PRESS (AVG) DW 9
DPS-27	ARCHIVE STATUS, GPC1-4
CT-11	GPS 1/3 RPU FAIL AND DATA VALID
GNC-56	KT70/HAINS GOOD WD1B0
GNC-61	ECHO, RED RATE, RESOLVER, VEL, CAPRI FAIL
GNC-62	G/C FAILED IMU PAIR
GNC-63	ALIGNMENT CORRECTION LIMITED
GNC-66	TRANS WD1/WD2 FAIL WD1B9/WD1B10

116-369 CTPE OTC 132/212

Systems have verified that they can support a format change to GPC Downlist 42.

116-370 CAFM

```
CURSOR CNTL (VWK04, PG-B)
PLBD PRI
XMIT CURSOR KEY - PRESS
```

VERIFY VWK05 IS DISPLAYED.

116-371 CAFM

```
CRT (VWK05, PG-B)
```

VERIFY ALL ENABLE MCA RELAY STATUSES (1/9 THRU 4/12) ON (NORMAL).

PLBD C/L Latch 1-4 Motor 1 Check (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD C/L Latch 1-4 Motor 1 Check Not Performed:_____

116-372 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN 1-4 C/L LCH (O3)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 1-4 C/L LCH (B3)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2200Y1 ON.
```

116-373 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/4 - ________
```

116-374 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - 1-4 C/L LCH (S3)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD C/L 1-4 Motor 1 Check (SSID AFM-09) *****

PLBD C/L Latch 1-4 Motor 2 Check (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD C/L Latch 1-4 Motor 2 Check Not Performed:_____

116-375 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN 1-4 C/L LCH (O3)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 1-4 C/L LCH (B3)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2201Y1 ON.
```

116-376 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/4 - ________
```

116-377 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - 1-4 C/L LCH (S3)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD C/L Latch 1-4 Motor 2 Check (SSID AFM-09) *****

PLBD C/L Latch 5-8 Motor 1 Check (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD C/L Latch 5-8 Motor 1 Check Not Performed:_____

116-378 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - 5-8 C/L LCH (O1)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 5-8 C/L LCH (B1)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2220Y1 ON.
```

116-379 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

3/6 - ________
```

116-380 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - 5-8 C/L LCH (S1)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD C/L Latch 5-8 Motor 1 Check (SSID AFM-09) *****

PLBD C/L Latch 5-8 Motor 2 Check (SSID AFM-09)

NOTE

Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD C/L Latch 5-8 Motor 2 Check Not Performed:_____

116-381 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - 5-8 C/L LCH (O1)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 5-8 C/L LCH (B1)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2221Y1 ON.
```

116-382 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/8 - ________
```

116-383 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - 5-8 C/L LCH (S1)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD C/L Latch 5-8 Motor 2 Check (SSID AFM-09) *****

PLBD C/L Latch 9-12 Motor 1 Check (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD C/L Latch 9-12 Motor 1 Check Not Performed:_____

116-384 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - 9-12 C/L LCH (O2)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 9-12 C/L LCH (B2)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2240Y1 ON.
```

116-385 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

1/3 - ________
```

116-386 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - 9-12 C/L LCH (S2)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD C/L Latch 9-12 Motor 1 Check (SSID AFM-09) *****

PLBD C/L Latch 9-12 Motor 2 Check (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD C/L Latch 9-12 Motor 2 Check Not Performed:_____

116-387 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - 9-12 C/L LCH (O2)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 9-12 C/L LCH (B2)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2241Y1 ON.
```

116-388 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/8 - ________
```

116-389 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - 9-12 C/L LCH (S2)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD C/L Latch 9-12 Motor 2 Check (SSID AFM-09) *****

PLBD C/L Latch 13-16 Motor 1 Check (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD C/L Latch 13-16 Motor 1 Check Not Performed:_____

116-390 CAFM

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR1
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - 13-16 C/L LCH (O4)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 13-16 C/L LCH (B4)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2260Y1 ON.
```

116-391 CAFM

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

4/6 - ________
```

116-392 CAFM

```
CURSOR CNTL (VWK05, PG-B)
STP CMD - 13-16 C/L LCH (S4)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD C/L Latch 13-16 Motor 1 Check (SSID AFM-09) *****

PLBD C/L Latch 13-16 Motor 2 Check (SSID AFM-09)

NOTE
Perform section for appropriate latch and motor with failure of release indication failed On should be Off.

PLBD C/L Latch 13-16 Motor 2 Check Not Performed:_____

116-393 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - MTR2
XMIT CURSOR KEY - PRESS

CURSOR CNTL (VWK05, PG-B)
GPC OPN - 13-16 C/L LCH (O4)
XMIT CURSOR KEY - PRESS

PFP (VWK05)
PFP KEY 1 (EXECUTE) - PRESS

CURSOR CNTL (VWK05, PG-B)
BTE TST - 13-16 C/L LCH (B4)
XMIT CURSOR KEY - PRESS

CRT (VWK05, PG-A)

VERIFY V37K2261Y1 ON.
```

116-394 **CAFM**

```
CRT (VWK05, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

2/1 - ________
```

116-395 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
STP CMD-13-16 C/L LCH (S4)
XMIT CURSOR KEY - PRESS
```

***** End of PLBD C/L Latch 13-16 Motor 2 Check (SSID AFM-09) *****

Troubleshooting Safing Steps

116-396 **CAFM**

```
CURSOR CNTL (VWK05, PG-B)
MOTOR MODE - OFF
XMIT CURSOR KEY - PRESS
```

116-397 **CAFM**

```
PFP (VWK05)
PFP KEY 5 (BITE CMDS OFF TST) - PRESS
```

VERIFY ALL COMMANDS OFF.

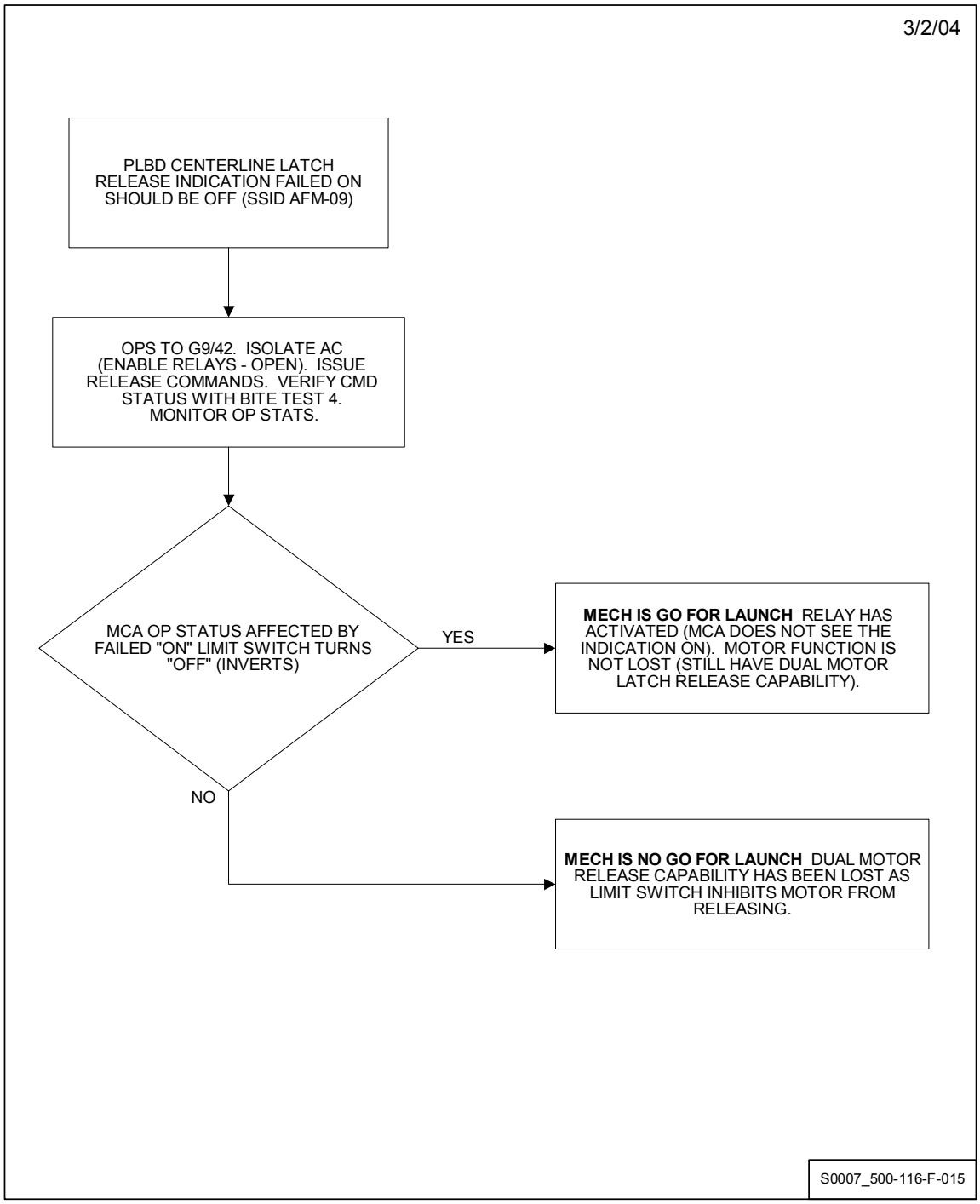
116-398 **CAFM** **OTC**
NTD

IF troubleshooting is complete,

THEN G9 Format 42 no longer required.

Not Performed:_____

Payload Bay Door Bulkhead Centerline Latch Release Indication Failed On Should Be Off (SSID AFM-09) Conclusion/Recommendation:



116-399 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor release capability still exists. ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor release capability is lost as limit switch inhibits motor from releasing. ☐
LCC violation confirmed. NO GO for Launch.

116-400 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-401 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of PLBD Centerline Latch "Release" Indication Failed On Should Be Off (SSID AFM-09) *****

Landing Gear/Door Uplock Indication Failed Off Should Be On (SSID AFM-10)

NOTE

There is no troubleshooting for this anomaly without accessing the Landing Gear Proximity Sensor Electronic Boxes.

Two of 3 indications per gear in proper configuration is acceptable (LCC voting logic anomaly). GLS mask is not required.

***** End of Landing Gear/Door Uplock Indication Failed Off Should Be On (SSID AFM-10) *****

Landing Shuttle Valve Indication Failed Off Should Be On (SSID AFM-11)

NOTE

Troubleshooting this anomaly requires access to connectors 83J798 (AV Bay 3) and 80J813 (AV Bay 2). If this anomaly occurs after hatch closure, the hatch must be reopened and the Close-Out Crew must ingress the Crew Module to install breakout boxes. NTD will determine if there is sufficient time to perform this procedure else a scrub will be called.

LCC requirements 3 of 3 On. Verification of indications at GSE interface confirms anomaly as an instrumentation failure.

1. Crew Requirements:

   None

2. Time Requirements:

   20 minutes (after access to Crew Module obtained)

3. Troubleshooting Plan:

   Connect breakout box at landing gear GSE connector on Crew Deck. Check Shuttle valve indication at GSE connector. If indication is On (28 VDC from Shuttle valve) anomaly is an instrumentation failure.

Access Connectors

NOTE

Connectors 83J798 (LMG & RMG) and 80J813 (NLG) qualify as low-level current limited circuits (Ref: USA004758 (LI) Performance of Intrusion Electrical on Shuttle Flight Systems) and require no safing.

Perform this section if required to access landing gear ground checkout box connectors.

Access Connectors Not Performed:_____

116-402 **OMTO**

IF the Sleep Station is installed and access to connector 83J798 (LMG & RMG) is required,

THEN remove plate V650-651109-001 from lower 4 bunk Sleep Station by removing (8) NAS1581C3T2 Bolts and (8) MD153-5001-0003 Washers. Retain for re-installation.

T:_____

Not Performed:_____

116-403 **OMTO**

IF V070-337414 door assembly is not already open and access to connector 80J813 (NLG) is required,

THEN release two captive fasteners securing door assembly to AV Bay 2 closeout panel and open door assembly to access ground checkout box connectors.

T:_____

Not Performed:_____

***** End of Access Connectors *****

Main Landing Gear Shuttle Valve Indication Check

NOTE
Perform this option for V58X1725E1 LMG or V58X1775E1 RMG Shuttle Valve Indication Off should be On.

Main Landing Gear Shuttle Valve Indication Check Not Performed:_____

116-404 **OETO**

CSR-028

OK To Install Qw:_____ N:_____

Crew Deck AV Bay 3

Remove all fuses from breakout box except for pins 'H' and 'N'. Connect (1) 79K10243-2 adapter cable to 79K07833 or 79K21099 breakout box, then to connector 83W4J798.

T:_____ Qw:_____ N:_____

116-405 **OETO**

CSR-403

Breakout Box

Check for voltage between breakout box pin H (LMG) and any suitable ground, from fused side of Breakout Box, using Simpson meter or DVM. Record:

Voltage _____ (S/B 28 VDC)

Scale _____

Cal No._____

T:_____ Qw:_____ N:_____

116-406 **OETO**

CSR-403

Breakout Box

Check for voltage between breakout box pin N (RMG) and any suitable ground, from fused side of Breakout Box, using Simpson meter or DVM. Record:

Voltage _____ (S/B 28 VDC)

Scale _____

Cal No._____

T:_____ Qw:_____ N:_____

116-407 **OETO**

CSR-028

IF no further troubleshooting required at this time,

THEN perform:

Crew Deck AV Bay 3

Demate 79K10243-2 adapter cable from connector 83W4J798, then from Breakout Box.

T:_____ Qw:_____ N:_____

Not Performed:_____

***** End of Main Landing Gear Shuttle Valve Indication Check *****

Nose Landing Gear Shuttle Valve Indication Check

NOTE

Perform Nose Landing Gear Shuttle Valve Indication Check for V58X1825E1 NLG Shuttle Valve Indication Off should be On.

Nose Landing Gear Shuttle Valve Indication Check Not Performed:_____

116-408 **OETO**

CSR-028

OK To Install Qw:_____ N:_____

Crew Deck AV Bay 2

Remove all fuses from Breakout Box except for pin "D". Connect (1) 79K10247-2 adapter cable to 79K07833 or 79K21099 Breakout Box, then to connector 80W40J813.

T:_____ Qw:_____ N:_____

116-409 **OETO**

CSR-403

Breakout Box

Check for voltage between Breakout Box Pin D and any suitable ground, from fused side of Breakout Box, using Simpson meter or DVM.
Record:

Voltage _____ (S/B 28 VDC)

Scale _____

Cal No._____

T:_____ Qw:_____ N:_____

116-410 OETO

CSR-028

IF no further troubleshooting required at this time,

THEN perform:

Crew Deck AV Bay 2

Demate 79K10247-2 adapter cable from connector 80W40J813, then from Breakout Box.

T:_____ Qw:_____ N:_____

Not Performed:_____

***** End of Nose Landing Gear Shuttle Valve Indication Check *****

Access Closeout

NOTE

Perform this option as required to close out connector access and reconfigure Sleep Station.

Access Closeout Not Performed:_____

116-411 **OMTO**

CSR-242

OK To Install Qw:_____ N:_____

IF V070-337414 Door Assembly was opened to access connector 80J813 (NLG),

THEN Close V070-337414 door assembly to AV Bay 2 and torque two captive fasteners

(1) TORQUE TO 36-88 in. oz.

Cal No._____

Not Performed:_____

T:_____ Qw:_____ N:_____

116-412 **OMTO**

CSR-242

OK To Install T:_____

IF V650-651109-001 Plate was removed to access connector 83J798 (LMG & RMG)

CMID_____

THEN Reinstall V650-651109-001 plate to lower 4 bunk Sleep Station using (8) NAS1581C3T2 Bolts and (8) MD153-5001-0003 Washers.
(1) Torque To 20-30 in. lbs.

Cal No._____

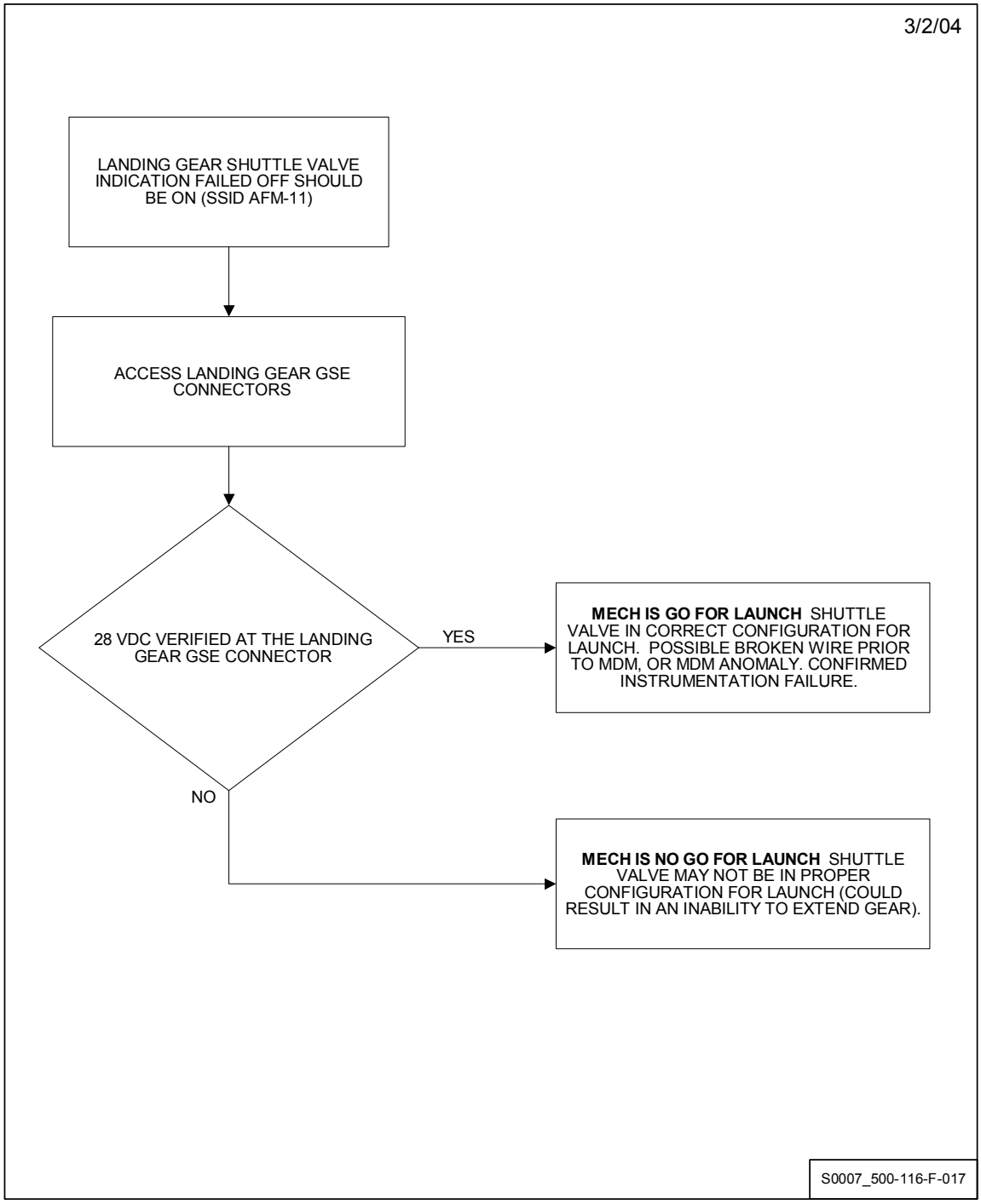
Not Performed:_____

T:_____

***** End of Access Closeout *****

Troubleshooting Safing Steps

Landing Gear Shuttle Valve Indication Failed Off Should Be On (SSID AFM-11) Conclusion/Recommendation:



116-413 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. 28 VDC verified at the Landing Gear GSE connector. Shuttle valve in correct configuration for Launch. Possible broken wire prior to MDM, or MDM anomaly. Confirmed instrumentation failure. GLS mask of failed function designator will be required. **LCC violation cleared. Continue Countdown.** ☐

2. 28 VDC not verified at the Landing Gear GSE connector. Shuttle valve may not be in proper configuration for Launch. (Could result in an inability to extend gear.) **LCC violation confirmed. NO GO for Launch.** ☐

116-414 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-415 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of Landing Shuttle Valve Indication Failed Off Should Be On (SSID AFM-11) *****

PORT RMS Shoulder Stow Indication Failed Off Should Be On (SSID AFM-12)

NOTE

Troubleshooting this anomaly requires access to Panel R13L and A8. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a scrub will be called.

1. LCC Requirement:

   2 of 2, Verify dual motor Deploy capability
   1 of 2, Verify Stowed position

   Position is verified by presence of single motor shoulder stow limit switch, either directly or inferred by inhibited MCA relay (OP status stays On).

   Dual motor Deploy capability is required. Connector integrity must be verified by either:

   - Demonstrating that limit switch is still present from PDU to MCA and inhibiting MCA relay (OP stat stays On)

   - Or if MCA relay is not inhibited, by demonstrating that the motor will draw A/C current when commanded in the Stow direction.

2. Crew Requirements:

   ASP access to Panel A8 and R13L

3. Time Requirements:

   3 minutes from go ahead with Crew at panel

NOTE

4. Troubleshooting Plan:

   A. PDU's already isolated from A/C power by P/L Bay MECH Power SW Panel R13L (Crew) issue switch command to Stow.

   B. Monitor MCA OP status, if OP status stays On MECH is Go for Launch.

   C. If OP status goes Off, (ASP) apply A/C power for 5 seconds max.

   D. If limit switch is picked up, or if motor draws current, MECH is Go for Launch.

   E. (ASP) Return switches to Launch configuration.

116-416 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
PORT RMS
XMIT CURSOR KEY - PRESS
```

VERIFY VWK06 IS DISPLAYED.

116-417 **ASP**

```
PANEL A8L
PORT RMS DEPLOY/STOW SW - STOW
```

116-418 **CAFM**

```
CRT (VWK06, PG-B)
```

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

```
MTR 1                MTR 2
4/7________          2/2_______
```

AC Current Check

NOTE

If MCA OP status inverted in previous step, perform AC Current Check. Apply MECH power for minimum required time, 5 seconds maximum.

AC Current Check Not Performed:_____

116-419 CAFM CEPD

Begin monitoring AC currents (AC3- MTR 1)
(AC2- MTR 2)

116-420 CAFM ASP

```
PANEL R13L

(MTR 1)
PL BAY MECH PWR
  SYS 2 SW - ON (NOT MORE THAN 5 SECONDS)

(MTR 2)
PL BAY MECH PWR
  SYS 1 SW - ON (NOT MORE THAN 5 SECONDS)
```

116-421 CAFM ASP

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
PL BAY MECH PWR
  SYS 2 SW - OFF
```

116-422 **CAFM**

Record if failed "Off" limit switch was picked up (Yes/No).

SHLD_____

FWD_____

MID_____

AFT_____

116-423 **CAFM**

Record if currents increased (Yes/No).

AC3 - MTR 1_____

AC2 - MTR 2_____

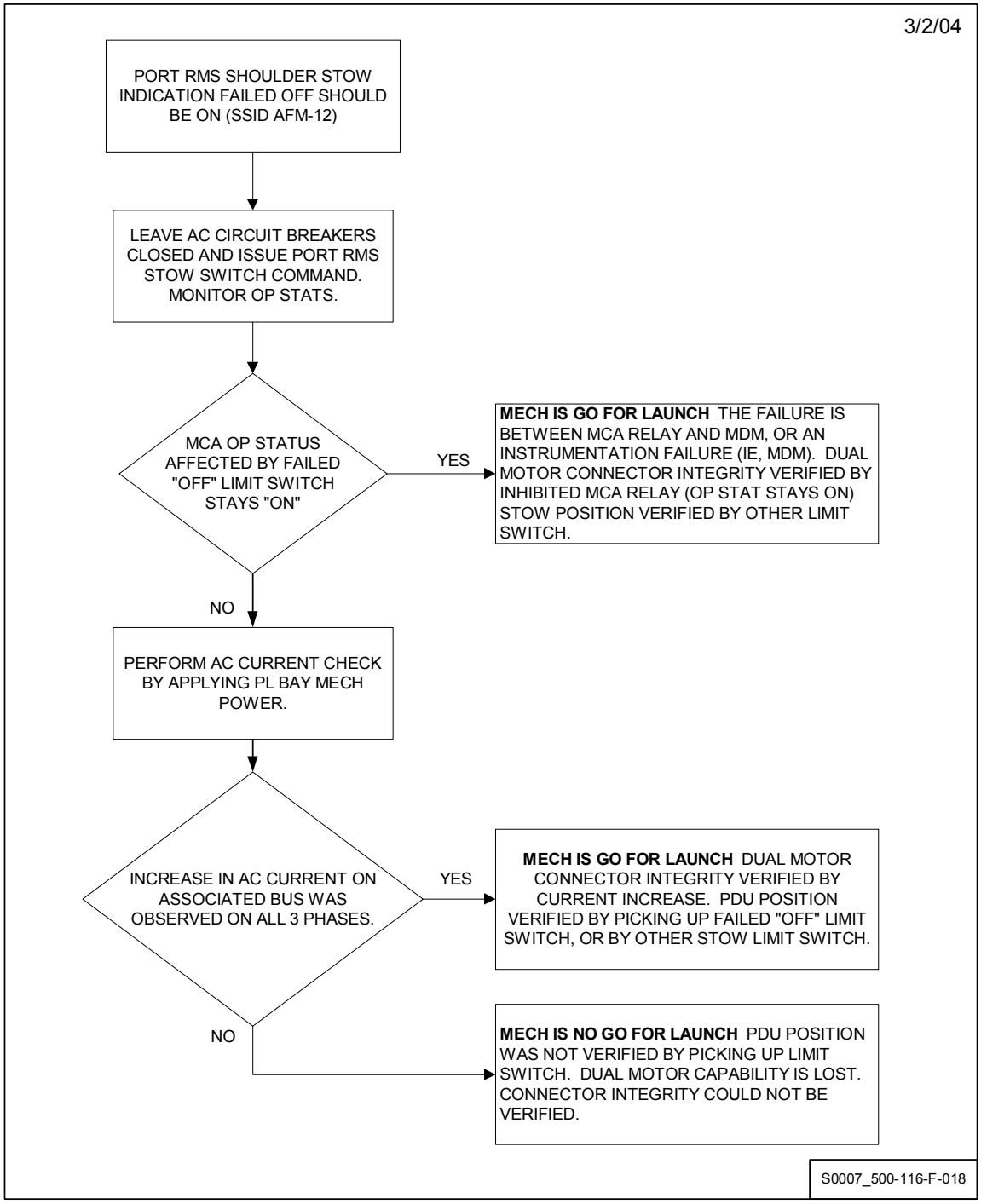
***** End of AC Current Check *****

116-424 **CAFM** **ASP**

```
PANEL A8L
PORT RMS DEPLOY/STOW SW - OFF
```

Troubleshooting Safing Steps

PORT RMS Shoulder Stow Indication Failed Off Should Be On (SSID AFM-12) Conclusion/Recommendation:



NOTE

Position is verified by presence of single motor shoulder limit switch, either directly or inferred by inhibited MCA relay.

116-425 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. PDU position was NOT verified by picking up limit switch. Dual motor connector integrity is lost. Dual motor drive capability lost. ☐
LCC violation confirmed. NO GO for Launch.

116-426 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-427 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of PORT RMS Shoulder Stow Indication Failed Off Should Be On (SSID AFM-12) *****

PORT RMS Shoulder Deploy Indication Failed On Should Be Off (SSID AFM-12)

NOTE

Perform this option only for missions that require RMS deployment.

PORT RMS Shoulder Deploy Indication Failed On Should Be Off
Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel A8. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a scrub will be called.

1. LCC Requirements:

   2 of 2 Deploy capability required for missions requiring deployment of MPMS only, dual motor deployment capability required. If an 'On' limit switch inhibits MCA relay (OP status stays On), motor cannot deploy. If MCA OP status changes state motor capability verified.

2. Crew Requirements:

   Access to Panel A8.

3. Time Requirements:

   2 min (from go ahead with ASP at panel)

NOTE

4. Troubleshooting Plan:

NOTE:
PDU's are already isolated from AC power by P/L Bay MECH Power Switch Panel R13L.

A. (ASP) Issue PORT RMS switch command to Deploy.

B. Monitor MCA operational statuses.
If MCA OP status goes Off (inverts) - MECH is Go for Launch.

C. Return switches to Launch configuration.

116-428 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
PORT RMS
XMIT CURSOR KEY - PRESS

VERIFY VWK06 IS DISPLAYED
```

116-429 **CAFM** **ASP**

```
PANEL R13L
P/L BAY MECH POWER
VERIFY
SYSTEM 1 SW - OFF
SYSTEM 2 SW - OFF
```

116-430 **CAFM** **ASP**

```
PANEL A8L
PORT RMS DEPL/STOW SW - DEPLOY
```

116-431 **CAFM**

CRT (VWK06, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

MTR 1 4/8 - _____

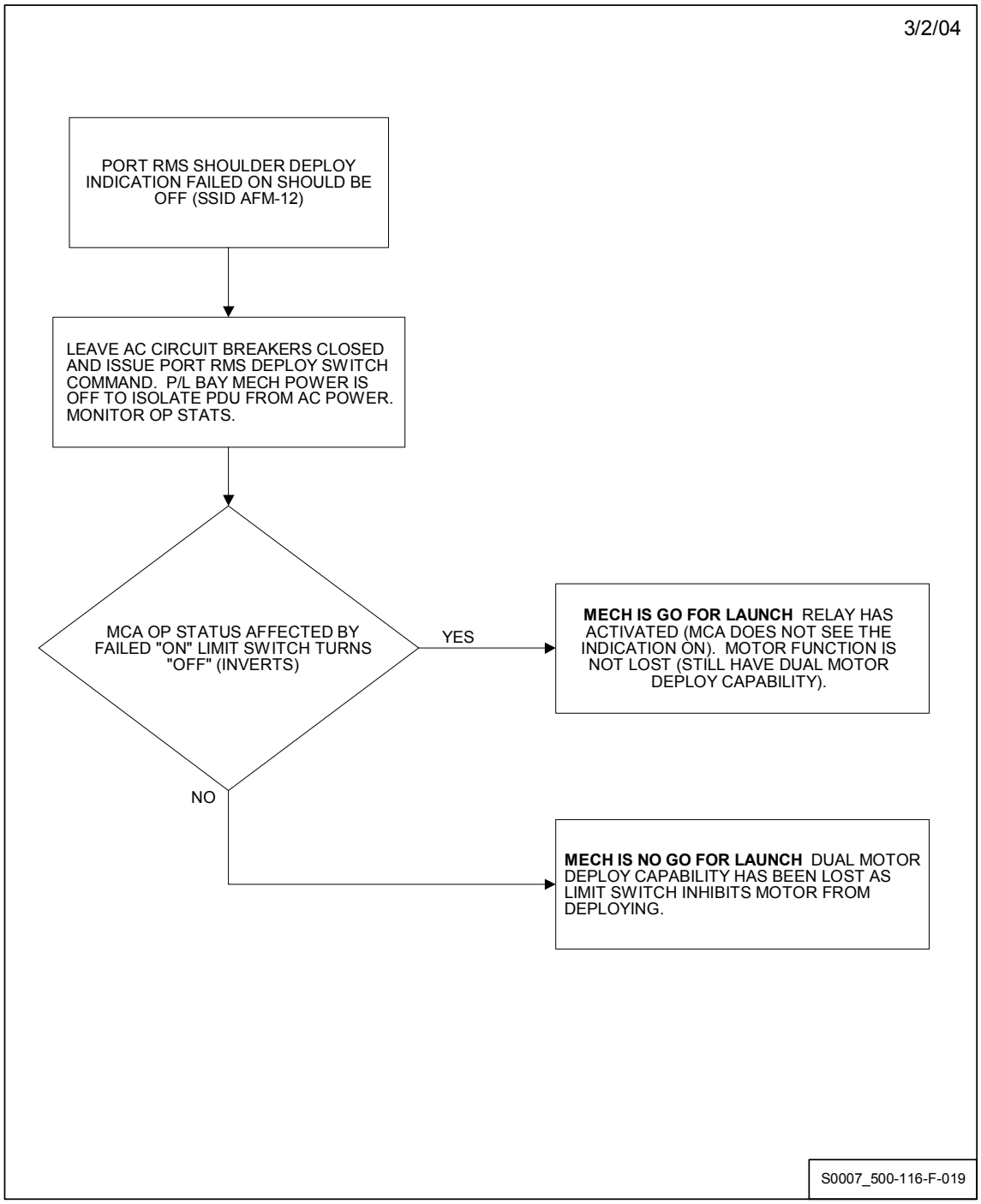
MTR 2 2/1 - _____

116-432 **CAFM ASP**

PANEL A8L
PORT RMS DEPLOY/STOW SW - OFF

Troubleshooting Safing Steps

PORT RMS Shoulder Deploy Indication Failed On Should Be Off (SSID AFM-12) Conclusion/Recommendation:



116-433 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor deploy capability still exists. ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor connector integrity is lost as limit switch inhibits motor from deploying. ☐
LCC violation confirmed. NO GO for Launch.

116-434 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-435 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of PORT RMS Shoulder Deploy Indication Failed On Should Be Off (SSID AFM-12) *****

PORT RMS Retention Latch - Release Indication Failed On Should Be Off (SSID AFM-13)

NOTE

Perform this option only for missions that require RMS deployment.

PORT RMS Retention Latch - Release Indication Failed On Should Be Off

Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel A8. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a scrub will be called.

1. LCC Requirement:

   2 of 2, Verify dual motor capability (mission dependent). Dual motor capability to release required. If an 'On' limit switch inhibits MCA relay (OP status stays On), motor cannot release. Motor capability verified if MCA OP status changes state.

2. Crew Requirements:

   ASP access to Panel A8.

3. Time requirements:

   2 min (from go ahead with ASP at panel)

NOTE

4. Troubleshooting Plan:

NOTE:
PDU's are already isolated from AC power by P/L Bay MECH Power Switch Panel R13L.

A. (Crew) Issue switch command to Release.

B. CAFM monitor MCA operational statuses
If MCA OP status stays On MECH is No Go.
If MCA OP status goes Off MECH is Go for Launch.

C. Return switches to Launch configuration.

116-436 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
PORT RMS
XMIT CURSOR KEY - PRESS

VERIFY VWK06 IS DISPLAYED.
```

116-437 **CAFM ASP**

```
PANEL R13L
P/L BAY MECH POWER
VERIFY
SYSTEM 1 SW - OFF
SYSTEM 2 SW - OFF
```

116-438 **CAFM ASP**

```
PANEL A8L
PORT RMS RETENTION LATCH SW - REL
```

116-439 CAFM

CRT (VWK06, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

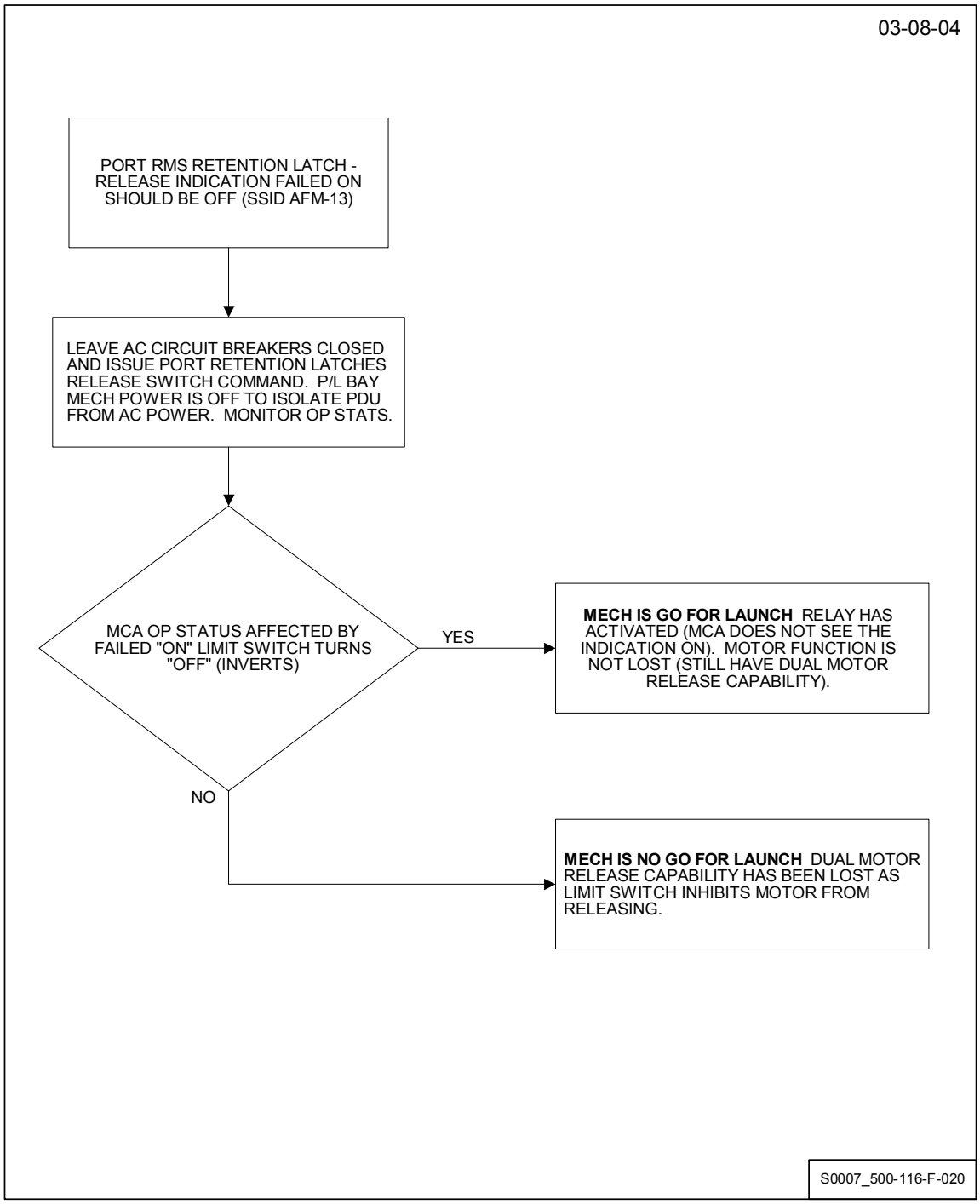
	MTR1		MTR2
FWD 2/1	_____	4/8	_____
MID 1/3	_____	4/2	_____
AFT 2/6	_____	3/5	_____

116-440 CAFM ASP

PANEL A8
PORT RMS RETENTION LATCH SW - OFF

Troubleshooting Safing Steps

PORT RMS Retention Latch - Release Indication Failed On Should Be Off (SSID AFM-13) Conclusion/Recommendation:



116-441 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor release capability still exists. ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor connector integrity is lost as limit switch inhibits motor from releasing. ☐
LCC violation confirmed. NO GO for Launch.

116-442 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-443 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of PORT RMS Retention Latch - Release Indication Failed On Should Be Off (SSID AFM-13) *****

PORT RMS Latch - Latch Indication Failed Off Should Be On (SSID AFM-13)

NOTE

Perform this option only for missions with PORT RMS installed.

PORT RMS Latch - Latch Indication Failed Off Should Be On
Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panel R13L and A8. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure else a scrub will be called.

1. LCC Requirement:

   2 of 2, Verify dual motor release capability
   1 of 2, Verify position

   Position is verified by presence of single motor latch limit switch, either directly or inferred by inhibited MCA relay (OP status stays On).

   Dual motor release capability is required, connector integrity must be verified by either,

   - Demonstrating that limit switch is still present from PDU to MCA and inhibiting MCA relay (OP stat stays On)

   - Or if MCA relay is not inhibited, by demonstrating that the motor will draw A/C current when commanded in the latch direction.

2. Crew Requirements:

   ASP access to Panel A8 and R13L.

NOTE

3. Time Requirements:

   2 min (from go ahead with Crew at panel)

4. Troubleshooting Plan:

   NOTE:
   PDU's are already isolated from AC power by P/L Bay MECH Power Switch Panel R13L.

   A. (ASP) Issue PORT RMS switch command to latch MRL's.

   B. Monitor MCA operational statuses.
      If MCA OP status stays On MECH is Go for Launch.
      If MCA OP status goes Off perform next step.

   C. (ASP) Apply AC power for 5 sec max.

   D. Monitor AC Busses for current increase and/or return of limit switch. MECH is Go for Launch. Else MECH is No Go.

   E. (ASP) Return switches to Launch configuration.

116-444 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
PORT RMS
XMIT CURSOR KEY - PRESS

VERIFY VWK06 IS DISPLAYED.
```

116-445 CAFM ASP

PANEL A8L
PORT RMS RETENTION LATCH SW - LATCH

116-446 CAFM

CRT (VWK06, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

	MTR 1		MTR 2
FWD 2/2	_____	4/7	_____
MID 1/4	_____	4/3	_____
AFT 2/8	_____	3/6	_____

Motor 1 AC Test

NOTE
If expected MCA OP status is inverted (Off), perform AC test for appropriate motor. Apply MECH Power for minimum required time, 5 seconds maximum.

Motor 1 AC Test Not Performed:_____

116-447 CAFM CEPD

Begin monitoring AC currents:

MTR 1

FWD AC-2
MID AC-1
AFT AC-3

116-448 CAFM ASP

```
PANEL R13L
(MTR 1)
PL BAY MECH PWR
  SYS 1 SW - ON (NO LONGER THAN 5 SECONDS)
```

116-449 CAFM ASP

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
```

116-450 **CAFM**

Record if current increases with MECH Power On (Yes/No):

MTR 1

FWD AC-2 _____

MID AC-1 _____

AFT AC-3 _____

116-451 **CAFM**

Record if failed "Off" limit switch was picked up (Yes/No):

MTR 1

FWD_____

MID_____

AFT_____

***** End of Motor 1 AC Test *****

Motor 2 AC Test

NOTE
If expected MCA OP status is inverted (Off), perform AC test for appropriate motor. Apply MECH Power for minimum required time, 5 seconds maximum.

Motor 2 AC Test Not Performed:_____

116-452 **CAFM** **CEPD**

Begin monitoring AC currents:

MTR 2

FWD AC-3
MID AC-2
AFT AC-1

116-453 **CAFM** **ASP**

```
PANEL R13L
(MTR 2)
PL BAY MECH PWR
  SYS 2 SW - ON (NO LONGER THAN 5 SECONDS)
```

116-454 **CAFM** **ASP**

```
PANEL R13L
PL BAY MECH PWR
  SYS 2 SW - OFF
```

116-455 **CAFM**

Record if current increases with MECH Power On (Yes/No):

MTR 2

FWD AC-3 _____

MID AC-2 _____

AFT AC-1 _____

116-456 **CAFM**

Record if failed "Off" limit switch was picked up (Yes/No):

MTR 2

FWD_____

MID_____

AFT_____

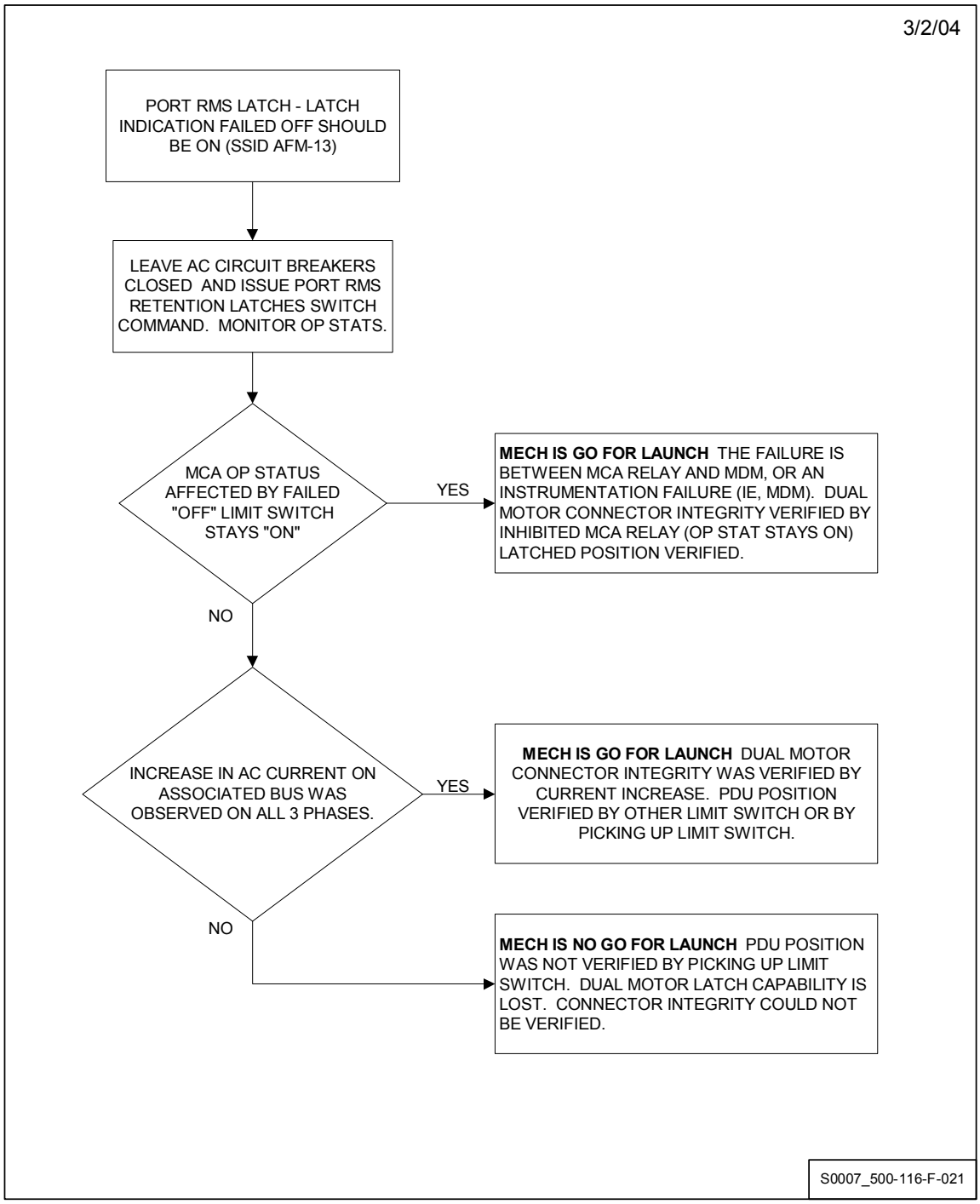
***** End of Motor 2 AC Test *****

Troubleshooting Safing Steps

116-457 CAFM ASP

```
PANEL A8
PORT RMS RETENTION LATCH SW - OFF
```

PORT RMS Latch - Latch Indication Failed Off Should Be On (SSID AFM-13) Conclusion/Recommendation:



NOTE

Position must be verified by at least one limit switch. If at least one MCA relay inhibited (OP status remains On) position verified.

116-458 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. PDU position was NOT verified by picking up limit switch. Dual motor latching capability is lost. ☐
LCC violation confirmed. NO GO for Launch.

116-459 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-460 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of PORT RMS Latch - Latch Indication Failed Off Should Be On (SSID AFM-13) *****

Star Tracker Door Close Indication Failed Off Should Be On (SSID AFM-14)

NOTE

Perform this troubleshooting only after the second (of 8 open/close) indication failure. (The first indication failure is an IPR condition, not an LCC violation.)

1. LCC Requirements:

   3 of 4 motors required for door closing. Integrity verified by MCA OP status remaining On (limit switch connector inhibiting MCA relay) or if limit switch does not inhibit MCA relay, motor can be driven and current increases are observed.

2. Crew Requirements:

   Access to Panel O6.

3. Time Requirements:

   2 min (from go ahead with CDR at panel)

4. Troubleshooting Plan:

   A. (CDR) Issue switch command to close.

   B. Monitor MCA operational statuses
      If MCA OP status stays On, MECH is Go for Launch.
      If MCA OP status goes Off, perform next step.

   C. (CDR) Apply AC power for 5 seconds max.

   D. Monitor AC Busses for current increase and/or return of limit switch. MECH is Go. Else MECH is No Go.

   E. (CDR) Return switches to Launch configuration.

116-461 CAFM

```
CURSOR CNTL (VWK04, PG-B)
STARTRKR
XMIT CURSOR KEY - PRESS
```

VERIFY VWK08 IS DISPLAYED.

Y Door Motor 1 And Z Door Motor 2 (SSID AFM-14)

NOTE

Perform Y Door Motor 1 and Z Door Motor 2 if the STD Y Motor 1 or Z Motor 2 closed indications failed Off should be On.

Y Door Motor 1 and Z Door Motor 2 Not Performed:_____

NOTE

Apply AC power for 5 seconds maximum.

116-462 CAFM CEPD

Begin monitoring AC currents (Y DR MTR 1 - AC1) (Z DR MTR 2 - AC2).

116-463 CAFM CDR

```
PANEL O6
STAR TRACKER DOOR CONTROL
SYS 1 SW - CLOSE (NO LONGER THAN 5 SECONDS)
```

116-464 CAFM CDR

```
PANEL O6
STAR TRACKER DOOR CONTROL
SYS 1 SW - OFF
```

116-465 **CAFM**

CRT (VWK08, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

	Y DOOR		Z DOOR
MTR 1 1/3-	_____	MTR 2 2/1-	_____
1/4-	_____	2/3-	_____

116-466 **CAFM**

Record if current increases with control SW Close (Yes/No):

Y DR AC-1 -_____

Z DR AC-2 -_____

***** End of Y Door Motor 1 and Z Door Motor 2 (SSID AFM-14) *****

Y Door Motor 2 And Z Door Motor 1 (SSID AFM-14)

NOTE

Perform Y Door Motor 2 and Z Door Motor 1 if the STD Y Motor 2 or Z Motor 1 closed indications failed Off should be On.

Y Door Motor 2 and Z Door Motor 1 Not Performed:_____

NOTE

Apply AC power for 5 seconds maximum.

116-467 CAFM CEPD

Begin monitoring AC currents (Y DR MTR 2 - AC2) (Z DR MTR 1 - AC3).

116-468 CAFM CDR

```
PANEL O6
STAR TRACKER DOOR CONTROL
SYS 2 SW - CLOSE (NO LONGER THAN 5 SECONDS)
```

116-469 CAFM CDR

```
PANEL O6
STAR TRACKER DOOR CONTROL
SYS 2 SW - OFF
```

116-470 **CAFM**

CRT (VWK08, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

	Y DOOR		Z DOOR
MTR 2 2/4	-_____	MTR 1 3/3	-_____
2/2	-_____	3/4	-_____

116-471 **CAFM**

Record if current increases with control SW Close.(Yes/No):

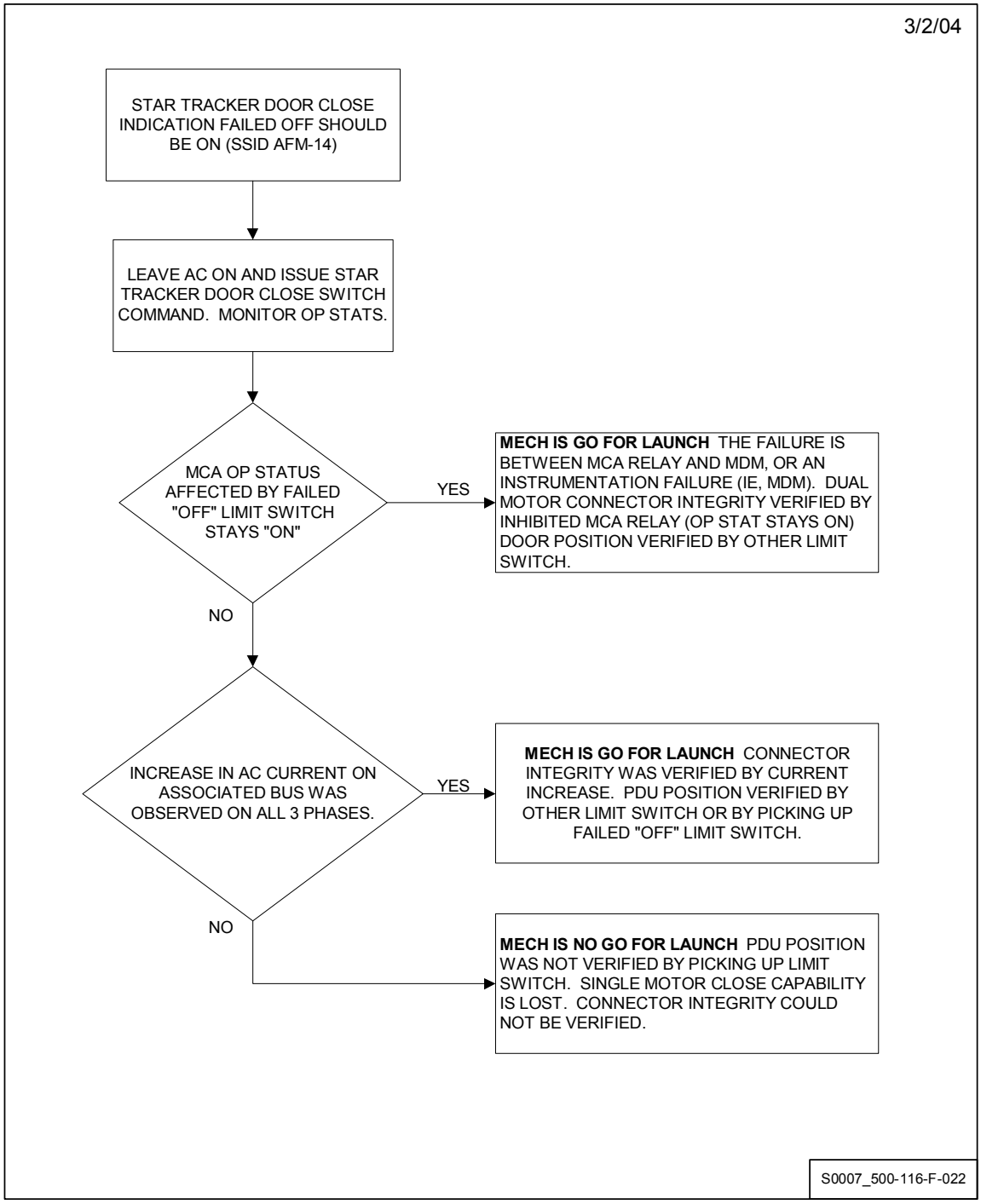
Y DR AC-2 -_____

Z DR AC-3 -_____

***** End of Y Door Motor 2 and Z Door Motor 1 (SSID AFM-14) *****

Troubleshooting Safing Steps

Star Tracker Door Close Indication Failed Off Should Be On (SSID AFM-14) Conclusion/Recommendation:



NOTE
3 of 4 motors required for door closing.

116-472 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. PDU position was NOT verified by picking up limit switch. Connector integrity is lost. ☐
LCC violation confirmed. NO GO for Launch.

116-473 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-474 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of Star Tracker Door Close Indication Failed Off Should Be On (SSID AFM-14) *****

Star Tracker Door Open Indication Failed On Should Be Off (SSID AFM-14)

NOTE

Perform this troubleshooting only after the second (of 8 open/close) indication failure. (The first indication failure is an IPR condition, not an LCC violation.)

1. LCC Requirement:

   3 of 4 motors required for door opening. If an "On" limit switch inhibits the MCA relay (OP status stays On), then motor will not operate.

2. Crew Requirements:

   Access to Panel O6.

3. Time Requirements:

   2 min (from go ahead with CDR at panel)

4. Troubleshooting Plan:

   A. (CDR) Issue switch command to open.

   B. Monitor MCA operational statuses and currents.
      If MCA OP status goes Off, MECH is Go for Launch.
      If MCA OP status stays On, MECH is No Go.

   C. Return switches to Launch configuration.

116-475 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
STAR TRACKER
XMIT CURSOR KEY - PRESS
```

VERIFY VWK08 IS DISPLAYED.

Y Door Motor 1 And Z Door Motor 2 (SSID AFM-14)

NOTE

Perform this option if Y Door Motor 1 or Z Door Motor 2 open indication failed On should be Off.

Y Door Motor 1 and Z Door Motor 2 Not Performed:_____

116-476 CAFM CDR

PANEL O6
VERIFY

STAR TRACKER POWER
-Y SW - OFF
-Z SW - OFF

116-477 CAFM CDR

PANEL O6
STAR TRACKER DOOR CONTROL
SYS 1 SW - OPEN

116-478 CAFM

CRT (VWK08, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

	Y DOOR		Z DOOR
MTR 1 1/2-	_____	MTR 2 2/2-	_____

116-479 CAFM CDR

PANEL O6
STAR TRACKER DOOR CONTROL
SYS 1 SW - OFF

***** End of Y Door Motor 1 and Z Door Motor 2 (SSID AFM-14) *****

Y Door Motor 2 And Z Door Motor 1 (SSID AFM-14)

NOTE

Perform this option if Y Door Motor 2 or Z Door Motor 1 open indication failed On should be Off.

Y Door Motor 2 and Z Door Motor 1 Not Performed:_____

116-480 CAFM CDR

PANEL O6
VERIFY

STAR TRACKER POWER
-Y SW - OFF
-Z SW - OFF

116-481 CDR

PANEL O6
STAR TRACKER DOOR CONTROL
SYS 2 SW - OPEN

116-482 CAFM

CRT (VWK08, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

	Y DOOR		Z DOOR
MTR 2 2/3-	_____	MTR 1 3/2-	_____

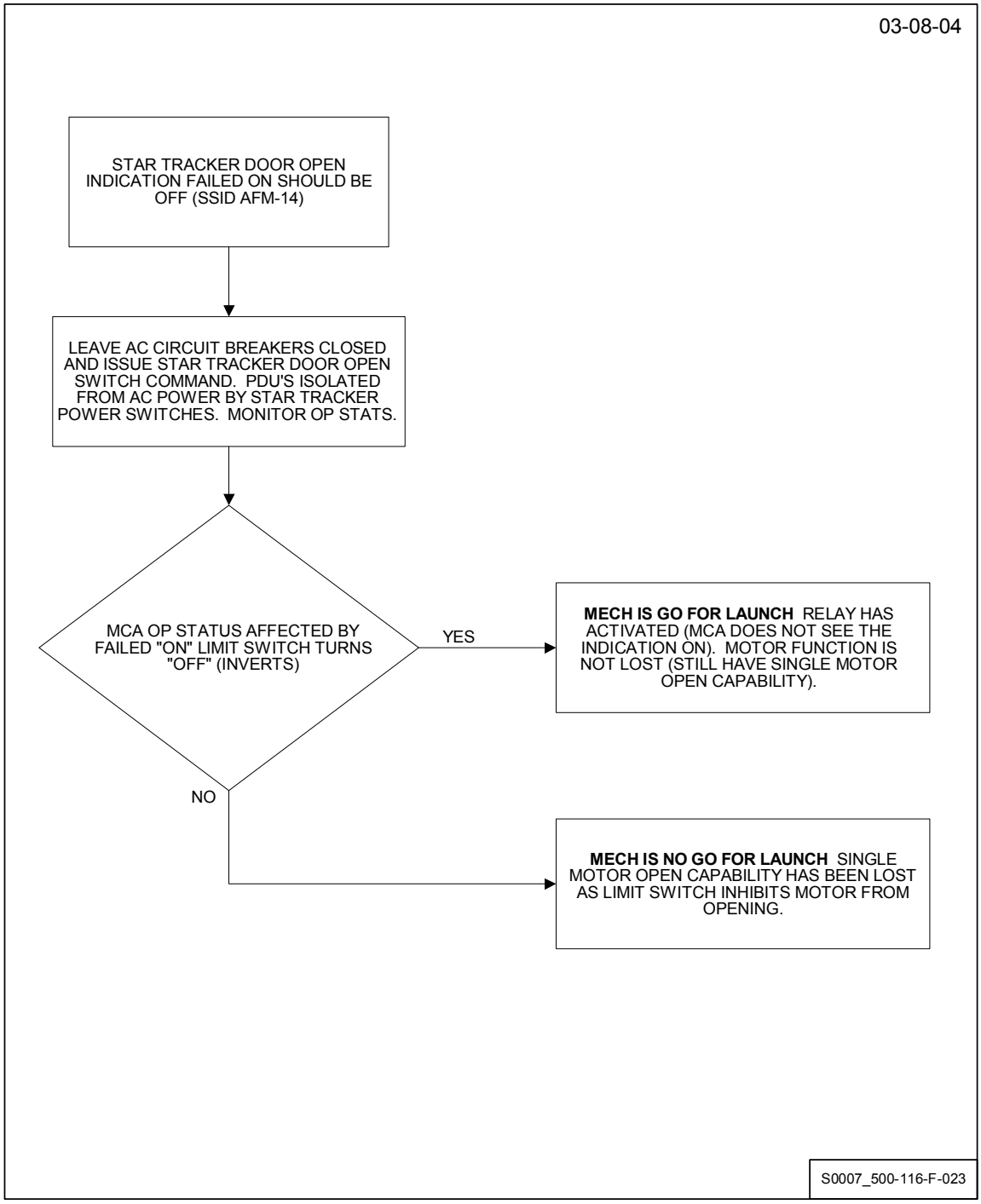
116-483 CAFM CDR

PANEL O6
STAR TRACKER DOOR CONTROL
SYS 2 SW - OFF

***** End of Y Door Motor 2 and Z Door Motor 1 (SSID AFM-14) *****

Troubleshooting Safing Steps

Star Tracker Door Open Indication Failed On Should Be Off (SSID AFM-14) Conclusion/Recommendation:



116-484 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Single motor open capability still exists. **LCC violation cleared. Continue Countdown.** ☐

2. MCA OP Status associated with failed "On" limit switch stayed On. Single motor connector integrity is lost as limit switch inhibits motor from opening. **LCC violation confirmed. NO GO for Launch.** ☐

116-485 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-486 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of Star Tracker Door Open Indication Failed On Should Be Off (SSID AFM-14) *****

ADP Door "Stow" Indication Failed Off Should Be On (SSID AFM-15)

NOTE

1. LCC Requirement:

   2 of 2, Verify dual motor Deploy capability.
   1 of 2, Verify position.

   Position verified by presence of single motor Stow limit switch, either directly or inferred by inhibited MCA relay (OP status stays On). Dual motor capability to deploy required. Connector integrity verified by either (1) demonstrating Stow limit switch still present from PDU to MCA and inhibiting MCA relay (OP status stays On) or if MCA relay not inhibited then by (2) demonstrating motor will draw current when commanded Stow.

   NOTE:
   With ADP switch in Stow position, loss of limit switch to MCA results in Stow "A" relays activating (OP statuses Off). Stow "B" relays are inhibited by enable/inhibit switches.

2. Crew Requirements:

   Access to Panel C3 (for dual motor capability check only)

3. Time Requirements:

   2 min (from go ahead with CDR at panel)

NOTE

4. Troubleshooting Plan:

   A. CAFM monitor MCA stats and EPD monitor AC Bus current.

   B. (Crew) Apply AC power for 5 sec max.

   C. If MCA OP stats stay On, MECH is Go for Launch.

   D. If MCA OP status goes Off and there is a current increase on AC Bus, or limit switch is picked up, MECH is Go for Launch. Else, MECH is No Go.

   E. (Crew) Return switches to Launch configuration.

116-487 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
ADP
XMIT CURSOR KEY - PRESS
```

VERIFY VWK01 IS DISPLAYED.

116-488 **CAFM**

CRT (VWK01, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

	MTR 1	MTR 2
RT ADP	3/3-_____	2/3-_____
LH ADP	1/3-_____	2/4-_____

Right ADP (SSID AFM-15)

NOTE
Perform following options as required to check for AC current draw if MCA Op Status was inverted (Off).

Right ADP Not Performed:_____

NOTE
If MCA OP status associated with failed "Off" limit switch is normal (On), then both position and connector integrity are verified.

116-489 CAFM CEPD

Begin monitoring AC currents.

MTR 1 - AC3
MTR 2 - AC2

NOTE
Apply AC power for 5 seconds maximum.

116-490 CAFM CDR

PANEL C3
ADP STOW
RIGHT SW - ENABLE

116-491 CAFM

CRT (VWK01, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

MTR 1	MTR 2
3/3-_____	2/3-_____
3/4-_____	2/1-_____

116-492 CAFM CDR

```
PANEL C3
ADP STOW
RIGHT SW - INHIBIT
```

116-493 CAFM

Record if current increased with ADP Stow switch in Enable (Yes/No):

MTR 1 AC-3 -_____

MTR 2 AC-2 -_____

***** End of Right ADP (SSID AFM-15) *****

Left ADP (AFM-15)

NOTE

If MCA OP status associated with failed "Off" limit switch is normal (On), then both position and connector integrity are verified.

Perform following options as required to check for AC current draw if MCA Op Status was inverted (Off).

Left ADP Not Performed:_____

116-494 CAFM CEPD

Begin monitoring AC currents.

MTR 1 - AC1
MTR 2 - AC2

NOTE

Apply AC power for 5 seconds maximum.

116-495 CAFM CDR

PANEL C3
ADP STOW
LEFT SW - ENABLE

116-496 CAFM

CRT (VWK01, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

MTR 1	MTR 2
1/3-_____	2/4-_____
1/4-_____	2/2-_____

116-497 CAFM CDR

```
PANEL C3
ADP STOW
LEFT SW - INHIBIT
```

116-498 CAFM

Record if current increased with ADP stow switch in Enable (Yes/No):

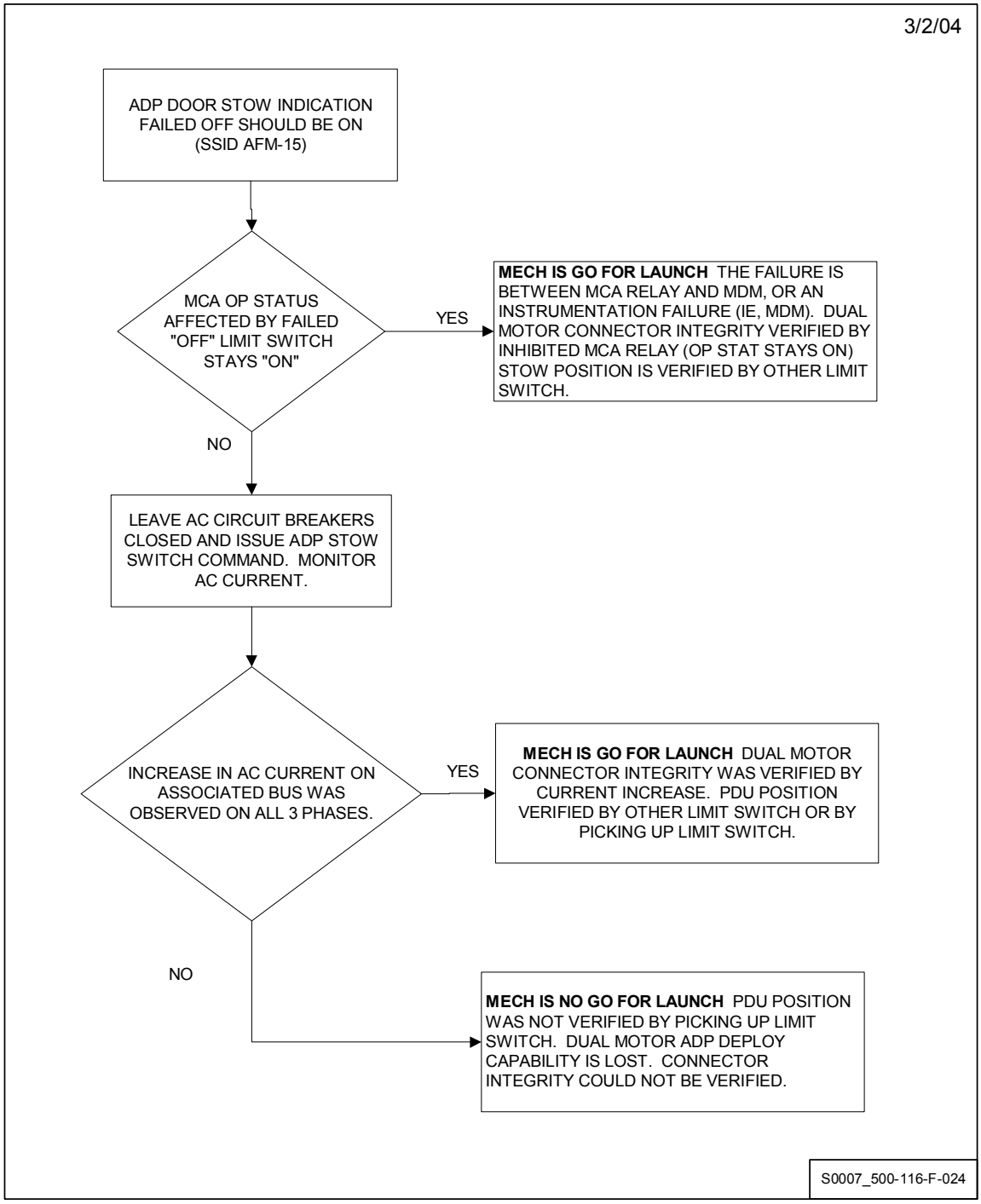
MTR 1 AC-1 -_____

MTR 2 AC-2 -_____

***** End of Left ADP (SSID AFM-15) *****

Troubleshooting Safing Steps

ADP Door Stow Indication Failed Off Should Be On (SSID AFM-15) Conclusion/Recommendation:



NOTE

Position must be verified by at least one limit switch. If at least one MCA relay inhibited (OP status remains On) position verified.

116-499 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OPSTAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC Current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. PDU position was NOT verified by picking up limit switch. Dual motor deploy capability is lost. ☐
LCC violation confirmed. NO GO for Launch.

116-500 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-501 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of ADP Door "Stow" Indication Failed Off Should Be On (SSID AFM-15) *****

ADP Door "Deploy" Indication Failed On Should Be Off (SSID AFM-15)

NOTE

1. LCC Requirement:

   2 of 2, Verify dual motor capability

   Dual motor capability to deploy required. If 'On' limit switch inhibits MCA relay (OP status stays On), motor cannot deploy.

2. Crew Requirements:

   Access to Panel C3.

3. Time Requirements:

   3 min (from go ahead with CDR at panel)

4. Troubleshooting Plan:

   A. (CDR) Deploy ADP.

   B. Monitor MCA operational statuses and currents.
      If MCA OP status goes Off and probe deploys using that motor, MECH is Go for Launch.
      If MCA OP status stays On and motor inhibited, MECH is No Go.

   C. (CDR) cycle ADP back to Stow and return switches to Launch configuration.

116-502 CAFM

```
CURSOR CNTL (VWK04, PG-B)
ADP
XMIT CURSOR KEY - PRESS
```

VERIFY VWK01 IS DISPLAYED.

Right ADP (SSID AFM-15)

NOTE

Perform the following option for appropriate side only for deploy indication failed On should be Off.

Right ADP Not Performed:_____

116-503 CAFM CEPD
CAFM

Perform the following:

1. **Begin** monitoring AC currents

   MTR 1 - AC3
   MTR 2 - AC2

2. **Prepare** to time Deploy/Stow cycle (15 - sec dual, 30 sec - single)

116-504 CAFM CDR

PANEL C3
ADP STOW RIGHT SW - INHIBIT
RIGHT ADP SW - DEPLOY

116-505 CAFM

CRT (VWK01, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

MTR1	MTR2
3/1 -_____	2/2 -_____
3/2 -_____	2/4 -_____

RECORD DEPLOYMENT TIME_____

116-506 **CAFM**

CRT (VWK01, PG-B)

RECORD DEPLOY L/S INDICATIONS:_____

116-507 **Record** if AC current increases during Deploy (Yes/No):

AC3 - _____ (Motor 1)

AC2 - _____ (Motor 2)

NOTE
Following step will stow ADP. Monitor AC current and motor run time.

116-508 **CAFM** **CDR**

PANEL C3
ADP STOW RIGHT SW - ENABLE
RIGHT ADP SW - STOW

116-509 **CAFM**

CRT (VWK01, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

	MTR1		MTR2
3/3 -	_____	2/3 -	_____
3/4 -	_____	2/1 -	_____

116-510 **CAFM** **CDR**

PANEL C3
ADP STOW RIGHT SW - INHIBIT

116-511 **CAFM**

CRT (VWK01, PG-B)
RECORD

STOW L/S INDICATIONS:_____

STOW TIME_____

116-512 **CAFM**

Record if AC current increases during Stow (Yes/No):

AC3 - _____ (Motor 1)

AC2 - _____ (Motor 2)

***** End of Right ADP (SSID AFM-15) *****

Left ADP (SSID AFM-15)

NOTE

Perform the following option for appropriate side only for Deploy indication failed On should be Off.

Left ADP Not Performed:_____

116-513 **CAFM** **CEPD**
CAFM

Perform the following:

1. **Begin** monitoring AC currents

   MTR 1 - AC1
   MTR 2 - AC2

2. **Prepare** to time Deploy/Stow cycle (15 sec - dual, 30 sec - single)

116-514 **CAFM** **CDR**

PANEL C3
ADP STOW LEFT SW - INHIBIT
LEFT ADP SW - DEPLOY

116-515 **CAFM**

CRT (VWK01, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

MTR1	MTR2
1/1 -_____	2/1 -_____
1/2 -_____	2/3 -_____

RECORD DEPLOYMENT TIME_____

116-516 **CAFM**

CRT (VWK01, PG-B)

RECORD DEPLOY L/S INDICATIONS:_____

116-517 **CAFM**

Record if AC current increases during Deploy (Yes/No).

AC1 - _____ (motor 1)

AC2 - _____ (motor 2)

NOTE
Following step will stow ADP. Monitor AC current and motor run time.

116-518 **CAFM** **CDR**

PANEL C3
ADP STOW LEFT SW - ENABLE
LEFT ADP SW - STOW

116-519 **CAFM**

CRT (VWK01, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF/NORMAL = ON)

	MTR1		MTR2
1/3 -	_____	2/4 -	_____
1/4 -	_____	2/2 -	_____

116-520 **CAFM** **CDR**

PANEL C3
ADP STOW LEFT SW - INHIBIT

116-521 **CAFM**

CRT (VWK01, PG-B)
RECORD

STOW L/S INDICATIONS:_____

STOW TIME_____

116-522 **CAFM**

Record if AC current increases during Stow (Yes/No):

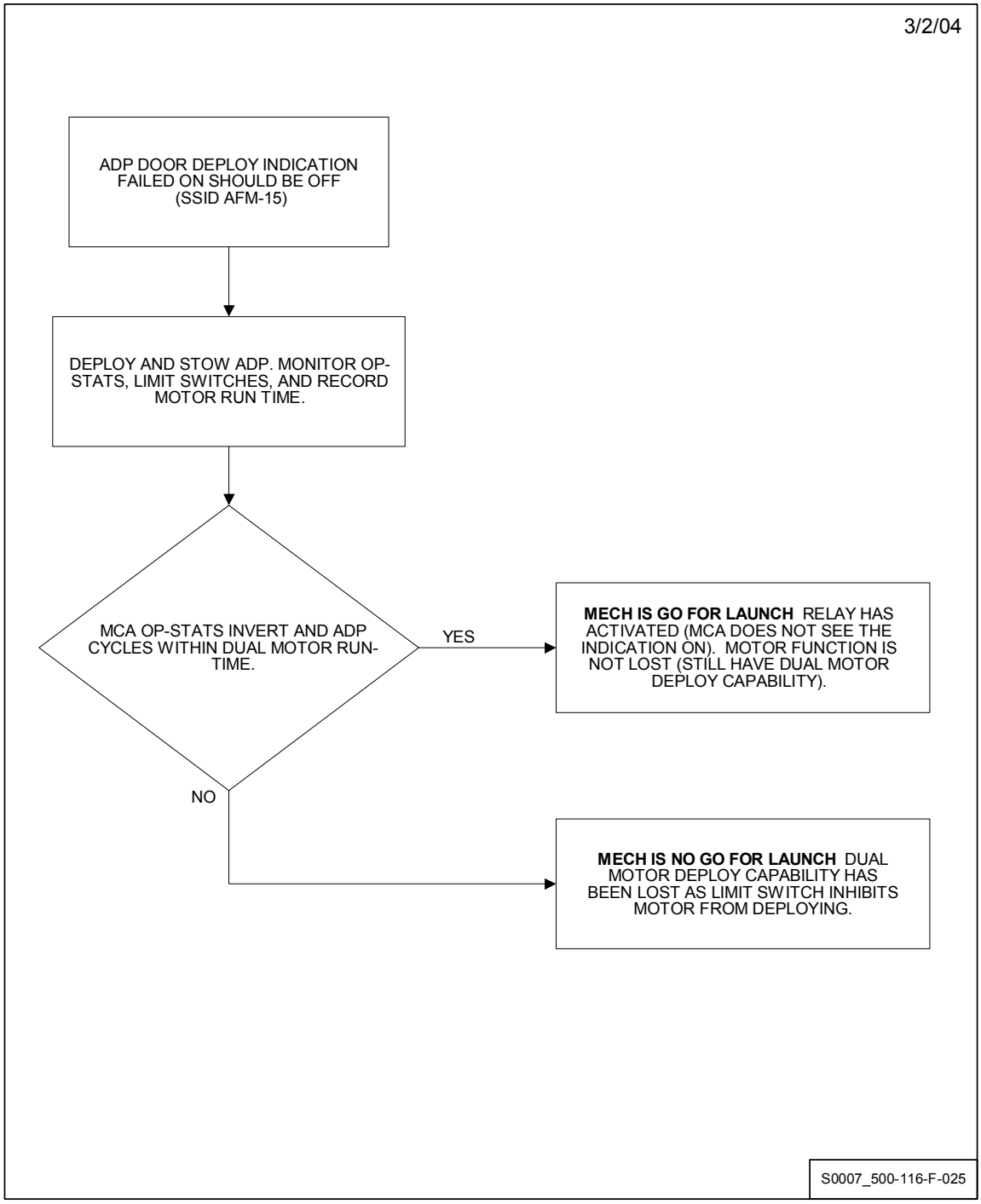
AC1 - _____ (motor 1)

AC2 - _____ (motor 2)

***** End of Left ADP (SSID AFM-15) *****

Troubleshooting Safing Steps

ADP Door Deploy Indication Failed On Should Be Off (SSID AFM-15) Conclusion/Recommendation:



116-523 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor deploy capability still exists. ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor deploy capability is lost as failed "On" limit switch inhibits motor from deploying. ☐
LCC violation confirmed. NO GO for Launch.

116-524 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-525 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind _____

Not Performed:_____

***** End of ADP Door "Deploy" Indication Failed On Should Be Off (SSID AFM-15) *****

Forward Motor Control Assembly Operational Status Anomaly (SSID AFM-16)

NOTE

Perform MCA OPS status troubleshooting for FWD as required. (Reference Table 1 - OP Status Chains at the end of this section.)

NOTE

1. LCC Requirement:

   All forward MCA operational status on except during planned vent door operation.

2. Crew Requirements:

   Access to switches at Panels C3, O6, and O8 may be required. If anomaly occurs after Hatch closure, and ASP required to access panels, then NTD to determine if there is sufficient time to perform this procedure

3. Time Requirements:

   5 minutes

4. Troubleshooting Plan:

   All systems who have relays on the failed OP status chain will verify proper configuration of Crew Module switches and LPS commands affecting that OP status.

116-526 CAFM OTC

Following systems (see below) report to channel 161 to discuss MCA OP-Status troubleshooting.

MCA OP-Stat	FD	Systems Affected
FWD MCA 1 OP-Stat 1	V76X2111E1	MEQ,PVD,OMS/RCS, DPS
FWD MCA 1 OP-Stat 2	V76X2112E1	MEQ,PVD,OMS/RCS, DPS
FWD MCA 1 OP-Stat 3	V76X2113E1	MEQ,PVD,OMS/RCS, DPS
FWD MCA 1 OP-Stat 4	V76X2114E1	MEQ,PVD,OMS/RCS, DPS
FWD MCA 2 OP-Stat 1	V76X2121E1	MEQ,PVD,OMS/RCS, DPS
FWD MCA 2 OP-Stat 2	V76X2122E1	MEQ,PVD
FWD MCA 2 OP-Stat 3	V76X2123E1	MEQ,PVD,OMS/RCS, DPS
FWD MCA 2 OP-Stat 4	V76X2124E1	MEQ,PVD
FWD MCA 3 OP-Stat 1	V76X2131E1	MEQ,PVD,OMS/RCS, DPS
FWD MCA 3 OP-Stat 2	V76X2132E1	MEQ,PVD,OMS/RCS, DPS
FWD MCA 3 OP-Stat 3	V76X2133E1	MEQ,PVD,OMS/RCS, DPS
FWD MCA 3 OP-Stat 4	V76X2134E1	MEQ,PVD,OMS/RCS, DPS

MEQ (CAFM) Troubleshooting

116-527 **CAFM**

CRT (VWK04 PG-B)

VERIFY SWITCH SCANS FOR THE FOLLOWING SYSTEMS INDICATE GREEN UP ARROWS:

- AIR DATA PROBES
- STAR TRACKER DOORS

CHECK INDIVIDUAL DISPLAY DRIVERS IF ANY SWITCHES ARE SUSPECTED OUT OF CONFIGURATION.

116-528 **CAFM** **CDR**
ASP

IF SWITCH SCANS INDICATE ANY SWITCH OUT OF CONFIGURATION,

THEN

PANEL C3
AIR DATA PROBE
  LEFT SW - STOW
  RIGHT SW - STOW
AIR DATA PROBE STOW
  LEFT SW - INHIBIT
  RIGHT SW - INHIBIT

PANEL O6
STAR TRACKER DOORS
  SYSTEM 1 SW - OFF
  SYSTEM 2 SW - OFF

STAR TRACKER POWER
  -Y SW - OFF
  -Z SW - OFF

Not Performed:_____

***** End of MEQ (CAFM) Troubleshooting *****

Forward RCS (COOS) Troubleshooting

NOTE
Do not perform Forward RCS (COOS) Troubleshooting if failed FWD MCA OP-Stat is 2/2 or 2/4.

Forward RCS (COOS) Troubleshooting Not Performed:_____

116-529 **CAFM** **OTC**
CDPS

Verify OK to perform MDM BITE Test 4 OPS.

116-530 **CDPS**

Perform BITE Test 4 for flight forward MDM's and deliver to COOS.

116-531 **COOS**

Verify forward RCS tank and manifold 1-4 switch scans are in the "GPC" position.

116-532 **COOS**

Verify all MDM commands which control FWD MCA relays are Off (Ref BITE Test 4).

***** End of Forward RCS (COOS) Troubleshooting *****

PVD (CPVD) Troubleshooting

116-533 CPVD

CRT/PFP (VAM09A or VAM65A, PG-A)

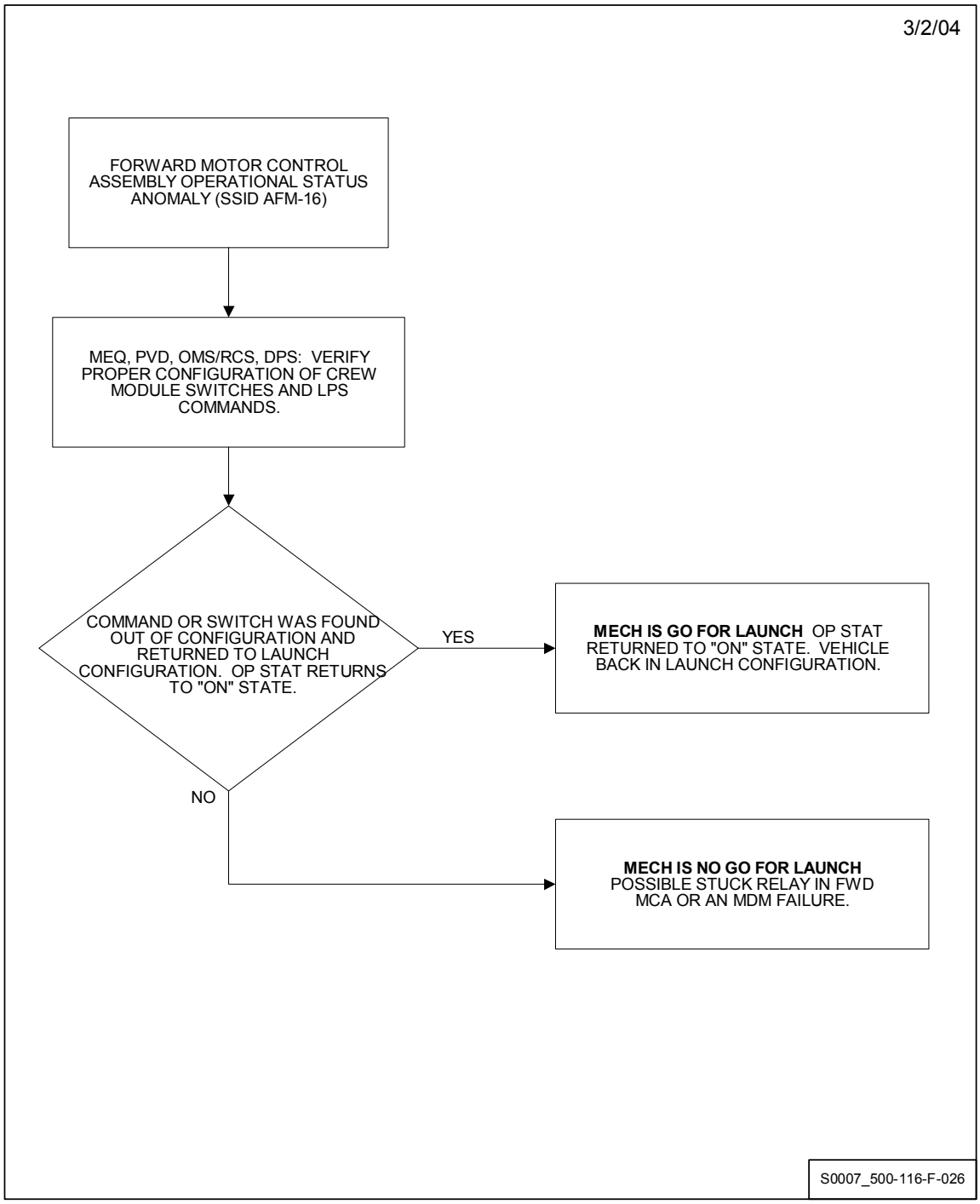
PERFORM VENT DOOR COMMAND STATUS CHECK PER THE FOLLOWING TO VERIFY ALL VENT DOOR COMMANDS ARE OFF:

1. PFPK4 - PRESS

2. **WAIT** UNTIL GREEN LIGHT ON PFPK4 IS OFF

3. **VERIFY** NO VENT DOOR COMMAND FD'S LISTED ON PAGE A

Forward Motor Control Assembly Operational Status Anomaly (SSID AFM-16) Conclusion/Recommendation:



116-534 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. Troubleshooting found command "On"/Switch out of configuration. Command/Switch returned to Launch Configuration and Op stat returned to "On" state. ☐
LCC violation cleared. Continue Countdown.

2. Troubleshooting did not find any command "On"/Switch out of configuration. Possible stuck relay in FWD MCA, or an MDM failure. ☐
LCC violation confirmed. NO GO for Launch.

116-535 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

*****End of PVD (CPVD) Troubleshooting *****

***** End of Forward Motor Control Assembly Operational Status Anomaly (SSID AFM-16) *****

MID Motor Control Assembly Operational Status Anomaly (SSID AFM-17)

Not Performed:_____

NOTE

1. LCC Requirement:

   All midbody MCA operational status On except during planned vent door operation.

2. Crew Requirements:

   Access to Panel O6. After hatch closure, the capability to view switches at Panel R13L, A6, and A8 may be required. If not possible, ASP may be required.

3. Time Requirements:

   7 minutes

4. Troubleshooting Plan:

   All systems who have MCA relays on the failed OP status chain will verify proper configuration of Crew Module switches and LPS commands affecting that OP status.

116-536 CAFM OTC

Following systems (see below) report to channel 161 to discuss MCA OP-Status troubleshooting.

MCA OP-Stat	FD	Systems Affected
MID MCA 1 OP-Stat 1	V76X2211E1	MEQ,PLE,PVD, DPS
MID MCA 1 OP-Stat 2	V76X2212E1	MEQ,PLE,PVD, DPS
MID MCA 1 OP-Stat 3	V76X2213E1	MEQ,PLE,PVD, DPS
MID MCA 1 OP-Stat 4	V76X2214E1	MEQ,PLE,PVD, DPS
MID MCA 1 OP-Stat 5	V76X2215E1	MEQ,PLE,PVD, DPS
MID MCA 1 OP-Stat 6	V76X2216E1	MEQ,PLE,PVD, DPS
MID MCA 1 OP-Stat 7	V76X2217E1	PVD
MID MCA 1 OP-Stat 8	V76X2218E1	PVD
MID MCA 2 OP-Stat 1	V76X2221E1	MEQ,PVD, DPS
MID MCA 2 OP-Stat 2	V76X2222E1	MEQ,PVD, DPS
MID MCA 2 OP-Stat 3	V76X2223E1	COM,MEQ,PVD, DPS
MID MCA 2 OP-Stat 4	V76X2224E1	COM,MEQ,PVD, DPS
MID MCA 2 OP-Stat 5	V76X2225E1	COM,MEQ,PVD, DPS
MID MCA 2 OP-Stat 6	V76X2226E1	COM,MEQ,PVD, DPS
MID MCA 2 OP-Stat 7	V76X2227E1	MEQ,PVD, DPS
MID MCA 2 OP-Stat 8	V76X2228E1	MEQ,PVD, DPS
MID MCA 3 OP-Stat 1	V76X2231E1	MEQ,PLE,PVD, DPS
MID MCA 3 OP-Stat 2	V76X2232E1	MEQ,PLE,PVD, DPS
MID MCA 3 OP-Stat 3	V76X2233E1	MEQ,PLE,PVD, DPS
MID MCA 3 OP-Stat 4	V76X2234E1	MEQ,PLE,PVD, DPS
MID MCA 3 OP-Stat 5	V76X2235E1	MEQ,PLE,PVD, DPS
MID MCA 3 OP-Stat 6	V76X2236E1	MEQ,PLE,PVD, DPS
MID MCA 3 OP-Stat 7	V76X2237E1	PLE
MID MCA 3 OP-Stat 8	V76X2238E1	PLE
MID MCA 4 OP-Stat 1	V76X2241E1	COM,MEQ,PVD, DPS
MID MCA 4 OP-Stat 2	V76X2242E1	COM,MEQ,PVD, DPS
MID MCA 4 OP-Stat 3	V76X2243E1	COM,MEQ,PVD, DPS
MID MCA 4 OP-Stat 4	V76X2244E1	COM,MEQ,PVD, DPS
MID MCA 4 OP-Stat 5	V76X2245E1	MEQ,PVD, DPS
MID MCA 4 OP-Stat 6	V76X2246E1	MEQ,PVD, DPS
MID MCA 4 OP-Stat 7	V76X2247E1	MEQ,PVD, DPS
MID MCA 4 OP-Stat 8	V76X2248E1	MEQ,PVD, DPS

COMM (CSKU) Troubleshooting

NOTE

Perform troubleshooting sections only for systems that have functions on the failed MCA OP-Status chain. Reference previous step or Table 1 at the end of this section.

COMM (CSKU) Troubleshooting Not Performed:_____

NOTE

Perform next three steps only if one of the following MID MCA OP-Stats is failed Off:

2/4, 2/5, 4/2, or 4/3.

116-537 **CSKU** **OTC**
CDPS

Verify OK to perform MDM BITE Test 4 OPS.

Not Performed:_____

116-538 **OTC** **CDPS**

Perform BITE Test 4 for MDM LF1. Deliver to CNSE.

Not Performed:_____

116-539 **CSKU**

Verify all KU antenna MDM Deploy commands are Off (Ref BITE Test 4).

Not Performed:_____

NOTE
If KU antenna SW is in "Deploy" multiple MCA OP-Stats will be Off.

116-540 CSKU

CRT (VWN80)

VERIFY KU ANTENNA SW SCAN INDICATES "GND".

NOTE
Perform one of the next two steps (based on hatch configuration) if switch scan indicates KU antenna SW is out of configuration.

116-541 CSKU ASP

PRIOR TO HATCH CLOSURE:

PANEL R13L
VERIFY

KU ANTENNA
DEPLOY/STOW SW - GND
DIRECT STOW SW - OFF

Not Performed:_____

116-542 CSKU MS1

AFTER HATCH CLOSURE:

ATTEMPT TO VERIFY POSITION OF THE FOLLOWING SWITCHES, USING A MIRROR:

PANEL R13L
KU ANTENNA
DEPLOY/STOW SW - GND
DIRECT STOW SW - OFF

Not Performed:_____

***** End of COMM (CSKU) Troubleshooting *****

MEQ (CAFM) Troubleshooting

NOTE

Perform troubleshooting sections only for systems that have functions on the failed MCA OP-Status chain. Reference Table 1 at the end of this section.

MEQ (CAFM) Troubleshooting Not Performed:_____

NOTE

If a Radiator Switch is out of position, multiple MCA OP-Stats will be Off.

116-543 CAFM

```
CRT (VWK04, PG-B)

VERIFY RADIATOR SWITCH SCAN INDICATES A GREEN UP
ARROW.  CHECK RADIATOR DISPLAY DRIVER IF ANY
SWITCHES ARE SUSPECTED OUT OF CONFIGURATION.
```

NOTE

Perform one of the next two steps (based on hatch configuration) if switch scan indicates a Radiator Switch is out of configuration.

116-544 CAFM ASP

PRIOR TO HATCH CLOSURE:

PANEL R13L
VERIFY

P/L BAY MECH POWER
SYSTEM 1 SW - OFF
SYSTEM 2 SW - OFF

PLBD ENABLE/DISABLE
SYSTEM 1 SW - DISABLE
SYSTEM 2 SW - DISABLE

RADIATOR
RADIATOR CONTROL
SYS A SW - OFF
SYS B SW - OFF

LATCH CONTROL
SYS A SW - OFF
SYS B SW - OFF

Not Performed:_____

116-545 CAFM MS1

AFTER HATCH CLOSURE:

ATTEMPT TO VERIFY POSITION OF THE FOLLOWING SWITCHES, USING A MIRROR:

PANEL R13L
  P/L BAY MECH POWER
    SYSTEM 1 SW - OFF
    SYSTEM 2 SW - OFF

  PLBD ENABLE/DISABLE
    SYSTEM 1 SW - DISABLE
    SYSTEM 2 SW - DISABLE

  RADIATOR
  RADIATOR CONTROL
    SYS A SW - OFF
    SYS B SW - OFF

  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - OFF

Not Performed:_____

NOTE

No SW scan visibility to MPM Deploy or MRL release switch positions.

NOTE

Perform one of the next two steps (based on hatch configuration) if the following MID MCA OP-Stats are failed Off and Panel A8L is installed:

2/1 and 4/8 (Port MPM) or 1/3, 2/1, 2/6, 3/5, 4/2, and 4/8 (Port MRL)
2/2 and 4/5 (Stbd MPM) or 1/2, 2/2, 2/3, 3/3, 4/4, and 4/6 (Stbd MRL)

116-546 CAFM ASP

```
PRIOR TO HATCH CLOSURE:

PANEL A8L
VERIFY

  PORT RMS
    DEPLOY/STOW SW - OFF
    RETENTION LATCHES SW - OFF

  STBD RMS
    DEPLOY/STOW SW - OFF
    RETENTION LATCHES SW - OFF
```

Not Performed:_____

116-547 CAFM MS1

```
AFTER HATCH CLOSURE:

ATTEMPT TO VERIFY POSITION OF THE FOLLOWING
SWITCHES, USING A MIRROR:

PANEL A8L
  PORT RMS
    DEPLOY/STOW SW - OFF
    RETENTION LATCHES SW - OFF

  STBD RMS
    DEPLOY/STOW SW - OFF
    RETENTION LATCHES SW - OFF
```

Not Performed:_____

116-548 CAFM

```
CURSOR CNTL (VWK04, PG-B)
PRI PLB DRS
XMIT CURSOR KEY - PRESS

VERIFY VWK05 - PLBD OPERATIONS DISPLAY DRIVER IS
ACTIVATED.
```

NOTE

Perform the next two steps if troubleshooting is being performed after BFS transition (T-17 min). Troubleshooting must be performed during the T-9 minute hold.

116-549 CAFM OTC
CDPS
CGLS

Verify OK to take BFS to standby to support BITE Tests of PF MDM's. GLS should expect payload PF1 and PF2 indications to transition to On.

Not Performed:_____

116-550 OTC CDPS

During T-9 minute hold:

Take BFS to standby. **Report** completion.

Not Performed:_____

116-551 CAFM

```
PFP (VWK05)
KEY 5 (BITE CMDS OFF TST) - PRESS

VERIFY ALL COMMANDS ARE OFF.
```

NOTE
Perform next two steps if BFS was taken to Standby.

116-552 OTC CDPS

Take BFS to Run and OPS 1. **Report** completion.

Not Performed:_____

116-553 OTC CGLS

Reset payload PF1 and PF2 indications. **Report** completion.

Not Performed:_____

***** End of MEQ (CAFM) Troubleshooting *****

Payload Elec (CPLE) Troubleshooting

NOTE

Perform troubleshooting sections only for systems that have functions on the failed MCA OP-Status chain. Reference Table 1 at the end of this section.

Payload Elec (CPLE) Troubleshooting Not Performed:_____

116-554 CPLE

```
CRT (VWT33/PCGOAL OVRVIEW2)

VERIFY FOLLOWING PANEL A6 SWITCH SCANS INDICATE
OFF:

PAYLOAD RETENTION
  LOGIC POWER SYS 1 SW
  LOGIC POWER SYS 2 SW
  LATCH/REL SW (1-5)
```

NOTE

Perform one of the next two steps (based on hatch configuration) if switch scan indicates a switch is out of configuration.

116-555 CPLE ASP

```
PRIOR TO HATCH CLOSURE:

PANEL A6U
VERIFY

  PAYLOAD RETENTION
  LOGIC POWER
    SYS 1 SW - OFF
    SYS 2 SW - OFF
  LATCH/REL 1-5 SW - OFF
```

Not Performed:_____

116-556 CPLE MS1

AFTER HATCH CLOSURE:

ATTEMPT TO VERIFY POSITION OF THE FOLLOWING SWITCHES, USING A MIRROR:

PANEL A6U
  PAYLOAD RETENTION
  LOGIC POWER
    SYS 1 SW - OFF
    SYS 2 SW - OFF
  LATCH/REL 1-5 SW - OFF

Not Performed:_____

***** End of Payload Elec (CPLE) Troubleshooting *****

PVD (CPVD) Troubleshooting

NOTE

Perform troubleshooting sections only for systems that have functions on the failed MCA OP-Status chain. Reference Table 1 at the end of this section.

PVD (CPVD) Troubleshooting Not Performed:_____

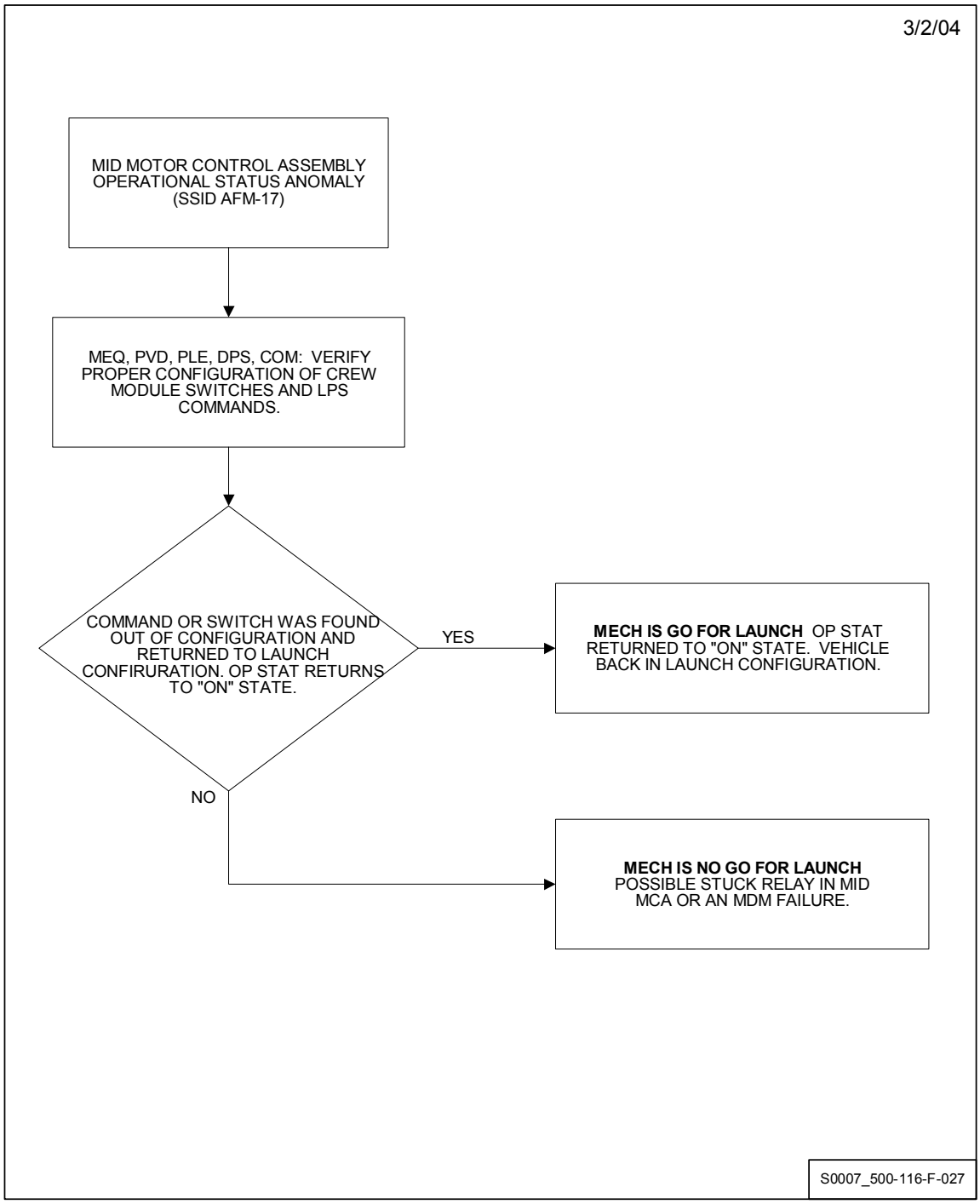
116-557 CPVD

CRT/PFP (VAM09A or VAM65A, PG-A)

PERFORM VENT DOOR COMMAND STATUS CHECK PER THE FOLLOWING TO VERIFY ALL VENT DOOR MDM COMMANDS ARE OFF:

1. PFPK4 - PRESS
2. **WAIT** UNTIL GREEN LIGHT ON PFPK4 IS OFF
3. **VERIFY** NO VENT DOOR COMMAND FD'S LISTED ON PAGE A.
4. **REPORT** COMPLETION.

MID Motor Control Assembly Operational Status Anomaly (SSID AFM-17) Conclusion/Recommendation:



116-558 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. Troubleshooting found command "On"/Switch out of configuration. Command/Switch returned to Launch Configuration and Op stat returned to "On" state. ☐
LCC violation cleared. Continue Countdown.

2. Troubleshooting did not find any command "On"/Switch out of configuration. Possible stuck relay in MID MCA, or and MDM failure. ☐
LCC violation confirmed. NO GO for Launch.

116-559 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of PVD (CPVD) Troubleshooting *****

***** End of MID Motor Control Assembly Operational Status Anomaly (SSID AFM-17) *****

AFT Motor Control Assembly Operational Status Anomaly (SSID AFM-18)

NOTE

1. LCC Requirement:

   All AFT MCA operational status On except during planned vent door or OMS cross feed valve operation.

2. Crew Requirements:

   Access to switches at Panel R2, O7, and O8 may be required.

3. Time Requirements:

   5 minutes

4. Troubleshooting Plan:

   All systems who have MCA relays on the failed OP status chain will verify proper configuration of Crew Module switches and LPS commands affecting that OP status.

116-560 CAFM OTC

Following systems report to channel 161 to discuss MCA OP-Status troubleshooting:

MCA OP-Stat	FD	Systems Affected
AFT MCA 1 OP-Stat 1	V76X2251E1	AFM, PVD, OMS, RCS
AFT MCA 1 OP-Stat 2	V76X2252E1	AFM, PVD, OMS, RCS
AFT MCA 1 OP-Stat 3	V76X2253E1	AFM, PVD, OMS, RCS
AFT MCA 1 OP-Stat 4	V76X2254E1	AFM, PVD, OMS, RCS
AFT MCA 2 OP-Stat 1	V76X2261E1	AFM, PVD, OMS, RCS
AFT MCA 2 OP-Stat 2	V76X2262E1	AFM, PVD, OMS, RCS
AFT MCA 2 OP-Stat 3	V76X2263E1	AFM, PVD, OMS, RCS
AFT MCA 2 OP-Stat 4	V76X2264E1	AFM, PVD, OMS, RCS
AFT MCA 3 OP-Stat 1	V76X2271E1	AFM, PVD, OMS, RCS
AFT MCA 3 OP-Stat 2	V76X2272E1	AFM, PVD, OMS, RCS
AFT MCA 3 OP-Stat 3	V76X2273E1	AFM, PVD, OMS, RCS
AFT MCA 3 OP-Stat 4	V76X2274E1	AFM, PVD, OMS, RCS

116-561 CAFM OTC
CDPS

Verify OK to perform MDM BITE Test 4 OPS.

OMS/RCS (COOS) Troubleshooting

NOTE

Perform troubleshooting sections only for systems that have functions on the failed MCA OP-Status chain. Reference previous step or Table 1 at the end of this section.

OMS/RCS (COOS) Troubleshooting Not Performed:_____

116-562 **COOS** **OTC**
OTC **CDPS**

Perform BITE Test 4 for flight AFT MDM's and deliver to COOS.

116-563 **COOS**

Verify

AFT OMS and RCS tank isolation switch scans and AFT RCS manifold isolation valve switch scans are in the "GPC" position.

All MDM commands which control AFT MCA relays are Off (Ref. BITE Test 4).

***** End of OMS/RCS (COOS) Troubleshooting *****

MEQ (CAFM) Troubleshooting

NOTE

Perform troubleshooting sections only for systems that have functions on the failed MCA OP-Status chain. Reference Table 1 at the end of this section.

MEQ (CAFM) Troubleshooting Not Performed:_____

116-564 **CAFM**

CRT (VWK04, PG-B)

VERIFY SWITCH SCANS FOR ET DOORS INDICATE GREEN UP ARROWS. CHECK ET DOOR DISPLAY DRIVER IF ANY SWITCHES ARE SUSPECTED OUT OF CONFIGURATION.

116-565 **CAFM** **CDR**
ASP

IF SWITCH SCANS INDICATE ANY SWITCH IS OUT OF CONFIGURATION,

THEN
PANEL R2
ET UMB DOORS
  MODE SW - GPC
  LEFT DOOR SW - OFF
  RIGHT DOOR SW - OFF
  LEFT LATCH SW - OFF
  RIGHT LATCH SW - OFF
  C/L LATCH SW - GND

Not Performed:_____

116-566 **CAFM**

CURSOR CNTL (VWK04, PG-B)
ET DOORS
XMIT CURSOR KEY - PRESS

VERIFY VWK02 - ET DOOR DISPLAY DRIVER IS ACTIVATED.

116-567 **CAFM**

PFP (VWK02)
KEY 5 (BITE CMDS OFF TST) - PRESS

VERIFY ALL COMMANDS ARE OFF.

***** End of MEQ (CAFM) Troubleshooting *****

PVD (CPVD) Troubleshooting

NOTE

Perform troubleshooting sections only for systems that have functions on the failed MCA OP-Status chain. Reference Table 1 at the end of this section.

PVD (CPVD) Troubleshooting Not Performed:_____

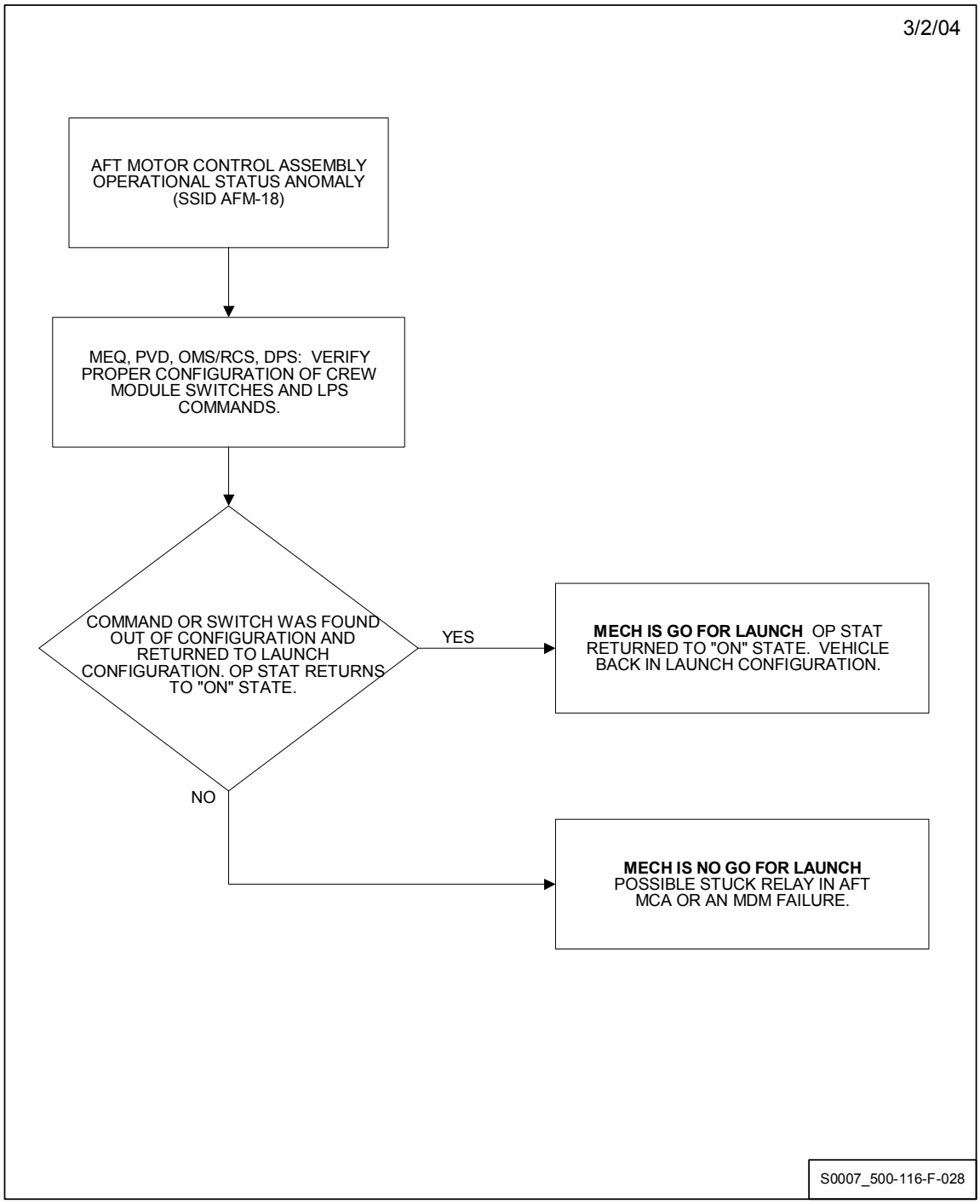
116-568 CPVD

CRT/PFP (VAM09A or VAM65A, PG-A)

PERFORM VENT DOOR COMMAND STATUS CHECK PER THE FOLLOWING TO VERIFY ALL VENT DOOR COMMANDS ARE OFF:

1. PFPK4 - PRESS
2. **WAIT** UNTIL GREEN LIGHT ON PFPK4 IS OFF
3. **VERIFY** NO VENT DOOR COMMAND FD'S LISTED ON PAGE A
4. **REPORT** COMPLETION

AFT Motor Control Assembly Operational Status Anomaly (SSID AFM-18) Conclusion/Recommendation:



116-569 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. Troubleshooting found command "On"/Switch out of configuration. Command/Switch returned to Launch Configuration and Op stat returned to "On" state. ☐
LCC violation cleared. Continue Countdown.

2. Troubleshooting did not find any command "On"/Switch out of configuration. Possible stuck relay in AFT MCA, or and MDM failure. ☐
LCC violation confirmed. NO GO for Launch.

116-570 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of PVD (CPVD) Troubleshooting *****

***** End of AFT Motor Control Assembly Operational Status Anomaly (SSID AFM-18) *****

TABLE 1 - OP Status Chains	
FWD MCA 1 MN A MDM OF1	**FWD MCA 1 MN A MDM OF1**
OP Stat 1 <V76X2111E>	**OP Stat 2 <V76X2112E>**
L ADP Deploy 1A	L ADP Deploy 1B
-Y ST Door Open 1A	-Y ST Door Open 1B
R Vent Door 1/2 Open 1A	R Vent Door 1/2 Open 1B
FRCS Manif 1 Iso Valves Close	FRCS Oxid Tank Iso Valve 3/4/5 Close B
FRCS Fuel Tank Iso Valve 3/4/5 Open	
FRCS Oxid Tank Iso Valve 3/4/5 Close A	
FWD MCA 1 MN A MDM OF1	**FWD MCA 1 MN A MDM OF1**
OP Stat 3 <V76X2113E>	**OP Stat 4 <V76X2114E>**
L ADP Stow 1A	L ADP Stow 1B
-Y ST Door Close 1A	-Y ST Door Close 1B
R Vent Door 1/2 Close 1A	R Vent Door 1/2 Close 1B
FRCS Manif 1 Iso Valves Open	FRCS Fuel Tank Iso Valve 3/4/5 Close B
FRCS Fuel Tank Iso Valve 3/4/5 Close	FRCS Oxid Tank Iso Valve 3/4/5 Open A
FWD MCA 2 MN B MDM OF2	**FWD MCA 2 MN B MDM OF2**
OP Stat 1 <V76X2121E>	**OP Stat 2 <V76X2122E>**
R ADP Stow 2B	L ADP Stow 2B
L ADP Deploy 2A	R ADP Deploy 2A
-Y ST Door Open 2A	-Y ST Door Close 2B
-Z ST Door Close 2A	-Z ST Door Open 2B
R Vent Door 1/2 Open 2A	R Vent Door 1/2 Close 2A
L Vent Door 1/2 Close 2A	L Vent Door 1/2 Open 2B
FRCS Manif 2 Iso Valves Close	

FWD MCA 2 MN B MDM OF2	**FWD MCA 2 MN B MDM OF2**
OP Stat 3 <V76X2123E>	**OP Stat 4 <V76X2124E>**
L ADP Deploy 2B	R ADP Deploy 2B
R ADP Stow 2A	L ADP Stow 2A
-Y ST Door Open 2B	-Y ST Door Close 2A
-Z ST Door Close 2B	-Z ST Door Open 2A
R Vent Door 1/2 Open 2B	R Vent Door 1/2 Close 2B
L Vent Door 1/2 Close 2B	L Vent Door 1/2 Open 2A
FRCS Manif 2 Iso Valves Open	
FWD MCA 3 MN C MDM OF3	**FWD MCA 3 MN C MDM OF3**
OP Stat 1 <V76X2131E>	**OP Stat 2 <V76X2132E>**
R ADP Deploy 1A	R ADP Deploy 1B
-Z ST Door Open 1A	-Z ST Door Open 1B
L Vent Door 1/2 Open 1A	L Vent Door 1/2 Open 1B
FRCS Manif 4 Iso Valves Open	FRCS Fuel Tank Iso Valve 1/2 Open
FRCS Oxid Tank Iso Valve 1/2 Close A	FRCS Fuel Tank Iso Valve 1/2 Close A
FRCS Oxid Tank Iso Valve 1/2 Open	FRCS Manif 3 Iso Valves Open
FWD MCA 3 MN C MDM OF3	**FWD MCA 3 MN C MDM OF3**
OP Stat 3 <V76X2133E>	**OP Stat 4 <V76X2134E>**
R ADP Stow 1A	R ADP Stow 1B
-Z ST Door Close 1A	-Z ST Door Close 1B
L Vent Door 1/2 Close 1A	L Vent Door 1/2 Close 1B
FRCS Manif 4 Iso Valves Close	FRCS Manif 3 Iso Valves Close
FRCS Oxid Tank Iso Valve 1/2 Close B	FRCS Fuel Tank Iso Valve 1/2 Close B

MID MCA 1 MN A MDM OF1	**MID MCA 1 MN A MDM OF1**
OP Stat 1 <V76X2211E>	**OP Stat 2 <V76X2212E>**
R Vent Door 3 Open 1B	R Vent Door 3 Open 1A
R Vent Door 3 Close 1B	R Vent Door 3 Close 1A
PORT RAD Stow Motor 1 Sys A	PORT RAD Latch 7-12 Latch 1
PORT RAD Latch 7-12 Release 1	
R PLBD FWD Bulkhead Latch Release 1	R PLBD FWD Bulkhead Latch Latch 1
STBD MRL FWD Latch Latch 2	STBD MRL FWD Latch Release 2
PLD Select Pos 2 Latch 1 Release 1	PLD Select Pos 2 Latch 1 Latch 1
PLD Select Pos 2 Latch 3 Release 1	PLD Select Pos 2 Latch 3 Latch 1
PLD Select Pos 2 Latch 5 Release 1	PLD Select Pos 2 Latch 5 Latch 1
PLD Select Pos 2 Latch 2 Latch 1	PLD Select Pos 2 Latch 2 Release 1
PLD Select Pos 2 Latch 4 Latch 1	PLD Select Pos 2 Latch 4 Release 1
MID MCA 1 MN A MDM OF1	**MID MCA 1 MN A MDM OF1**
OP Stat 3 <V76X2213E>	**OP Stat 4 <V76X2214E>**
R Vent Door 6 Close 1B	R Vent Door 6 Close 1A
R Vent Door 6 Open 1B	R Vent Door 6 Open 1A
PORT RAD Deploy Motor 1 Sys A	PORT RAD Deploy Motor 1 Sys A
PLBD 9-12 C/L Latch Release 1	PLBD 9-12 C/L Latch Latch 1
L PLBD FWD Bulkhead Latch Latch 1	L PLBD FWD Bulkhead Latch Release 1
PORT MRL MID Latch Release 1	PORT MRL MID Latch Latch 1
PLD Select Pos 3 Latch 1 Release 1	PLD Select Pos 3 Latch 1 Latch 1
PLD Select Pos 3 Latch 3 Release 1	PLD Select Pos 3 Latch 3 Latch 1
PLD Select Pos 3 Latch 5 Release 1	PLD Select Pos 3 Latch 5 Latch 1
PLD Select Pos 3 Latch 2 Latch 1	PLD Select Pos 3 Latch 2 Release 1
PLD Select Pos 3 Latch 4 Latch 1	PLD Select Pos 3 Latch 4 Release 1

MID MCA 1 MN A MDM OF2	**MID MCA 1 MN A MDM OF2**
OP Stat 5 <V76X2215E>	**OP Stat 6 <V76X2216E>**
R Vent Door 5 Open 1B	R Vent Door 5 Open 1A
R Vent Door 5 Close 1B	R Vent Door 5 Close 1A
PORT RAD Stow Motor 1 Sys A	PORT RAD Latch 1-6 Latch 1
PORT RAD Latch 1-6 Release 1	
R PLBD Open 1	R PLBD Close 1
PLD Select Pos 1 Latch 1 Release 1	PLD Select Pos 1 Latch 1 Latch 1
PLD Select Pos 1 Latch 3 Release 1	PLD Select Pos 1 Latch 3 Latch 1
PLD Select Pos 1 Latch 5 Release 1	PLD Select Pos 1 Latch 5 Latch 1
PLD Select Pos 1 Latch 2 Latch 1	PLD Select Pos 1 Latch 2 Release 1
PLD Select Pos 1 Latch 4 Latch 1	PLD Select Pos 1 Latch 4 Release 1
MID MCA 1 MN B MDM OF2	**MID MCA 1 MN B MDM OF2**
OP Stat 7 <V76X2217E>	**OP Stat 8 <V76X2218E>**
L Vent Door 5 Close 2A	L Vent Door 5 Close 2B
L Vent Door 5 Open 2A	L Vent Door 5 Open 2B
MID MCA 1 MN A MDM OF1	**MID MCA 1 MN A MDM OF1**
OP Stat 9 <V76X2161E>	**OP Stat 10 <V76X2162E>**
PLB MECH AC-1 Enable Sys 1	PLB MECH AC-1 Enable Sys 1
PLBD AC-1 Sys 1 Enable 1A	PLBD AC-1 Sys 1 Enable 1B

MID MCA 2 MN B MDM OF1	**MID MCA 2 MN B MDM OF1**
OP Stat 1 <V76X2221E>	**OP Stat 2 <V76X2222E>**
L Vent Door 3 Open 2A	L Vent Door 3 Open 2B
L Vent Door 3 Close 2A	L Vent Door 3 Close 2B
STBD RAD Latch 1-6 Latch 2	STBD RAD Latch 1-6 Release 2
R PLBD AFT Bulkhead Latch Latch 2	R PLBD AFT Bulkhead Latch Release 2
PLBD 13-16 C/L Latch Release 2	PLBD 13-16 C/L Latch Latch 2
L PLBD Open 2	L PLBD Close 2
STBD MRL AFT Latch Latch 2	STBD MRL AFT Latch Release 2
STBD MPM Stow 1	STBD MPM Deploy 1
PORT MRL FWD Latch Release 1	PORT MRL FWD Latch Latch 1
PORT MPM Deploy 2	PORT MPM Stow 2
(K18 Spare)	(K16 Spare)
MID MCA 2 MN C MDM OF3	**MID MCA 2 MN C MDM OF3**
OP Stat 3 <V76X2223E>	**OP Stat 4 <V76X2224E>**
L Vent Door 6 Close 2A	L Vent Door 6 Close 2B
L Vent Door 6 Open 2A	L Vent Door 6 Open 2B
STBD RAD Latch 7-12 Release 2	STBD RAD Stow Motor 2 Sys A
PLBD 1-4 C/L Latch Latch 2	PLBD 1-4 C/L Latch Release 2
STBD MRL MID Latch Release 2	
KU Ant Stow Motor 1 (Enable 1)	KU Ant Deploy Motor 1

MID MCA 2 MN C MDM OF3	**MID MCA 2 MN C MDM OF3**
OP Stat 5 <V76X2225E>	**OP Stat 6 <V76X2226E>**
STBD RAD Stow Motor 2 Sys A	STBD RAD Deploy Motor 2 Sys A
L PLBD AFT Bulkhead Latch Latch 2	L PLBD AFT Bhd Latch Release 2
	PORT MRL AFT Latch Release 1
KU Ant Deploy Motor 1	KU Ant Stow Motor 1 (Enable II)
MID MCA 2 MN C MDM OF3	**MID MCA 2 MN C MDM OF3**
OP Stat 7 <V76X2227E>	**OP Stat 8 <V76X2228E>**
L Vent Door 3 Open 1A	L Vent Door 3 Close 1B
L Vent Door 3 Close 1A	L Vent Door 3 Open 1B
STBD RAD Deploy Motor 2 Sys A	STBD RAD Latch 7-12 Latch 2
PLBD 5-8 C/L Latch Latch 2	PLBD 5-8 C/L Latch Release 2
STBD MRL MID Latch Latch 2	STBD MRL AFT Latch Latch 1
MID MCA 2 MN B MDM OA2	**MID MCA 2 MN B MDM OA2**
OP Stat 9 <V76X2171E>	**OP Stat 10 <V76X2172E>**
PLB MECH AC-2 Enable Sys 1	PLB MECH AC-2 Enable Sys 1
PLBD AC-2 Sys 1 Enable 3B	PLBD AC-2 Sys 1 Enable 3A
MID MCA 2 MN C MDM OA2	**MID MCA 2 MN C MDM OA2**
OP Stat 11 <V76X2173E>	**OP Stat 12 <V76X2174E>**
PLB MECH AC-3 Enable Sys 1	PLB MECH AC-3 Enable Sys 1
PLBD AC-3 Sys 1 Enable 2A	PLBD AC-3 Sys 1 Enable 2B

MID MCA 3 MN A MDM OF1	**MID MCA 3 MN A MDM OF1**
OP Stat 1 <V76X2231E>	**OP Stat 2 <V76X2232E>**
L Vent Door 5 Close 1A	L Vent Door 5 Close 1B
STBD RAD Latch 7-12 Latch 1	STBD RAD Latch 7-12 Release 1
STBD RAD Deploy Motor 1 Sys B	STBD RAD Stow Motor 1 Sys B
PLD Select Pos 1 Latch 1 Latch 2	PLD Select Pos 1 Latch 1 Release 2
PLD Select Pos 1 Latch 2 Release 2	PLD Select Pos 1 Latch 2 Latch 2
PLD Select Pos 3 Latch 3 Release 2	PLD Select Pos 2 Latch 5 Release 2
PLD Select Pos 3 Latch 4 Latch 2	PLD Select Pos 3 Latch 3 Latch 2
L PLBD AFT Bhd Latch Latch 1	L PLBD AFT Bhd Latch Release 1
MID MCA 3 MN A MDM OF1	**MID MCA 3 MN A MDM OF1**
OP Stat 3 <V76X2233E>	**OP Stat 4 <V76X2234E>**
L Vent Door 6 Open 1A	L Vent Door 6 Open 1B
STBD RAD Deploy Motor 1 Sys B	STBD RAD Stow Motor 1 Sys B
STBD MRL AFT Latch Release 1	STBD MRL AFT Latch Latch 1
PLD Select Pos 1 Latch 4 Release 2	PLD Select Pos 1 Latch 5 Latch 2
PLD Select Pos 2 Latch 1 Release 2	PLD Select Pos 2 Latch 4 Release 2
PLD Select Pos 2 Latch 2 Latch 2	PLD Select Pos 3 Latch 1 Release 2
PLD Select Pos 2 Latch 5 Latch 2	PLD Select Pos 3 Latch 2 Latch 2
PLBD 1-4 C/L Latch Latch 1	PLBD 1-4 C/L Latch Release 1

MID MCA 3 MN A MDM OF2	**MID MCA 3 MN A MDM OF2**
OP Stat 5 <V76X2235E>	**OP Stat 6 <V76X2236E>**
L Vent Door 5 Open 1A	L Vent Door 5 Open 1B
L Vent Door 6 Close 1A	L Vent Door 6 Close 1B
STBD RAD Latch 1-6 Release 1	STBD RAD Latch 1-6 Latch 1
PLBD 5-8 C/L Latch Latch 1	PLBD 5-8 C/L Latch Release 1
PORT MRL AFT Latch Release 2	PORT MRL AFT Latch Latch 2
PLD Select Pos 1 Latch 3 Release 2	PLD Select Pos 2 Latch 3 Release 2
PLD Select Pos 1 Latch 4 Latch 2	PLD Select Pos 2 Latch 4 Latch 2
PLD Select Pos 3 Latch 5 Release 2	
MID MCA 3 MN B MDM OF2	**MID MCA 3 MN B MDM OF2**
OP Stat 7 <V76X2237E>	**OP Stat 8 <V76X2238E>**
PLD Select Pos 1 Latch 3 Latch 2	PLD Select Pos 1 Latch 5 Release 2
PLD Select Pos 2 Latch 2 Release 2	PLD Select Pos 2 Latch 1 Latch 2
PLD Select Pos 3 Latch 1 Latch 2	PLD Select Pos 2 Latch 3 Latch 2
PLD Select Pos 3 Latch 4 Release 2	PLD Select Pos 3 Latch 2 Release 2
PLD Select Pos 3 Latch 5 Latch 2	
MID MCA 3 MN A MDM OA1	**MID MCA 3 MN A MDM OA1**
OP Stat 9 <V76X2181E>	**OP Stat 10 <V76X2182E>**
PLB MECH AC-1 Enable Sys 2	PLB MECH AC-1 Enable Sys 2
PLBD AC-1 Sys 2 Enable 4A	PLBD AC-1 Sys 2 Enable 4B
MID MCA 3 MN B MDM OA1	**MID MCA 3 MN B MDM OA1**
OP Stat 11 <V76X2183E>	**OP Stat 12 <V76X2184E>**
PLB MECH AC-2 Enable Sys 2	PLB MECH AC-2 Enable Sys 2

MID MCA 4 MN B MDM OF1	**MID MCA 4 MN B MDM OF1**
OP Stat 1 <V76X2241E>	**OP Stat 2 <V76X2242E>**
R Vent Door 6 Open 2A	R Vent Door 6 Open 2B
R PLBD Open 2	L PLBD FWD Bulkhead Latch Latch 2
R PLBD FWD Bulkhead Latch Latch 2	
	PORT RAD Latch 1-6 Release 2
STBD MRL MID Latch Latch 1	PORT MRL MID Latch Release 2
KU Ant Stow Motor 2 (Enable I)	KU Ant Deploy Motor 2
MID MCA 4 MN B MDM OF1	**MID MCA 4 MN B MDM OF1**
OP Stat 3 <V76X2243E>	**OP Stat 4 <V76X2244E>**
R Vent Door 6 Close 2A	R Vent Door 6 Close 2B
PORT RAD Latch 1-6 Latch 2	
L PLBD FWD Bulkhead Latch Release 2	R PLBD Close 2
	R PLBD FWD Bulkhead Latch Release 2
PORT MRL MID Latch Latch 2	STBD MRL MID Latch Release 1
KU Ant Deploy Motor 2	KU Ant Stow Motor 2 (Enable II)

MID MCA 4 MN C MDM OA2	**MID MCA 4 MN C MDM OA2**
OP Stat 5 <V76X2245E>	**OP Stat 6 <V76X2246E>**
R Vent Door 5 Open 2A	R Vent Door 5 Open 2B
R Vent Door 3 Close 2A	R Vent Door 3 Close 2B
PORT RAD Deploy Motor 2 Sys B	PORT RAD Stow Motor 2 Sys B
PORT RAD Latch 7-12 Latch 2	PORT RAD Latch 7-12 Release 2
L PLBD Open 1	R PLBD AFT Bulkhead Latch Latch 1
PLBD 9-12 C/L Latch Latch 2	PLBD 13-16 C/L Latch Release 1
STBD MPM Deploy 2	STBD MRL FWD Latch Release 1
STBD MRL FWD Latch Latch 1	STBD MPM Stow 2
(K4 Spare)	(K56 Spare)
MID MCA 4 MN C MDM OA2	**MID MCA 4 MN C MDM OA2**
OP Stat 7 <V76X2247E>	**OP Stat 8 <V76X2248E>**
R Vent Door 5 Close 2A	R Vent Door 5 Close 2B
R Vent Door 3 Open 2A	R Vent Door 3 Open 2B
PORT RAD Deploy Motor 2 Sys B	PORT RAD Stow Motor 2 Sys B
PLBD 13-16 C/L Latch Latch 1	L PLBD Close 1
R PLBD AFT Bulkhead Latch Release 1	PLBD 9-12 C/L Latch Release 2
PORT MRL FWD Latch Latch 2	PORT MPM Deploy 1
PORT MPM Stow 1	PORT MRL FWD Latch Release 2
MID MCA 4 MN B MDM OA1	**MID MCA 4 MN B MDM OA1**
OP Stat 9 <V76X2191E>	**OP Stat 10 <V76X2192E>**
PLB MECH AC-2 Enable Sys 2	PLB MECH AC-2 Enable Sys 2
PLBD AC-2 Sys 2 Enable 5A	PLBD AC-2 Sys 2 Enable 5B

MID MCA 4 MN C MDM OA1	MID MCA 4 MN C MDM OA1
OP Stat 11 <V76X2193E>	**OP Stat 12 <V76X2194E>**
PLB MECH AC-3 Enable Sys 2	PLB MECH AC-3 Enable Sys 2
PLBD AC-3 Sys 2 Enable 6A	PLBD AC-3 Sys 2 Enable 6B

AFT MCA 1 MN A MDM OA1	AFT MCA 1 MN A MDM OA1
OP Stat 1 <V76X2251E>	**OP Stat 2 <V76X2252E>**
ET Door AFT C/L Latch Lock 1A	L ET Door Latch Release 1B
L ET Door Close 1	ET Door FWD C/L Latch Stow 1A
L ET Door Latch Release 1A	ET Door AFT C/L Latch Lock 1B
ET Door FWD C/L Latch Stow 1B	
L Vent Door 8/9 Open 1A	L Vent Door 8/9 Open 1B
R RCS Oxid Tank Iso Valve 3/4/5 A Close	L RCS Oxid Tank Iso Valve 3/4/5 A Close
L RCS Oxid Tank Iso Valve 3/4/5 A Open	R RCS Oxid XFeed Valve 3/4/5 Close
R RCS Oxid XFeed Valve 3/4/5 Close	L OMS Fuel XFeed Valve A Open A
L OMS Fuel XFeed Valve A Open B	L OMS Oxid XFeed Valve A Close B
L OMS Oxid XFeed Valve A Close	R OMS Oxid Tank Iso Valve A Close B
R OMS Oxid Tank Iso Valve A Close A	R OMS Fuel Tank Iso Valve A Open B
R OMS Fuel Tank Iso Valve A Open A	L OMS Oxid Tank Iso Valve A Close B
L OMS Oxid Tank Iso Valve A Close A	L OMS Fuel Tank Iso Valve A Open B
L OMS Fuel Tank Iso Valve A Open A	R RCS Fuel XFeed Valve 3/4/5 Open
R RCS Fuel XFeed Valve 3/4/5 Open	R RCS Manif 2 Iso Valves Close
R RCS Manif 2 Iso Valves Open	R RCS Oxid Tank Iso Valve 3/4/5 A Open
L RCS Fuel XFeed Valve 3/4/5 Open A	L RCS Fuel XFeed Valve 3/4/5 Open B
L RCS Oxid XFeed Valve 3/4/5 Close A	L RCS Oxid XFeed Valve 3/4/5 Close B

AFT MCA 1 MN A MDM OA1	AFT MCA 1 MN A MDM OA1
OP Stat 3 <V76X2253E>	**OP Stat 4 <V76X2254E>**
L ET Door Open 1	ET Door FWD C/L Latch Lock 1B
ET Door AFT C/L Latch Stow 1A	L ET Door Latch Latch 1B
ET Door FWD C/L Latch Lock 1A	ET Door AFT C/L Latch Stow 1B
L ET Door Latch Latch 1A	
L Vent Door 8/9 Close 1A	L Vent Door 8/9 Close 1B
R RCS Fuel Tank Iso Valve 3/4/5 A Close	R OMS Fuel Tank Iso Valve A Close B
R RCS Oxid XFeed Valve 3/4/5 Open	L OMS Oxid XFeed Valve A Open A
L OMS Fuel Tank Iso Valve A Close	L OMS Oxid Tank Iso Valve A Open B
L OMS Fuel XFeed Valve A Close A	R RCS Fuel XFeed Valve 3/4/5 Close
R OMS Oxid Tank Iso Valve A Open A	L RCS Fuel Tank Iso Valve 3/4/5 A Close
R OMS Fuel Tank Iso Valve A Close A	L RCS Manif 2 Iso Valves Close
L OMS Oxid XFeed Valve A Open B	R RCS Oxid XFeed Valve 3/4/5 Open
L OMS Oxid Tank Iso Valve A Open A	L OMS Fuel Tank Iso Valve A Close B
R RCS Fuel XFeed Valve 3/4/5 Close	L OMS Fuel XFeed Valve A Close B
L RCS Fuel Tank Iso Valve 3/4/5 A Open	R OMS Oxid Tank Iso Valve A Open B
L RCS Manif 2 Iso Valves Open	R RCS Fuel Tank Iso Valve 3/4/5 A Open
L RCS Fuel XFeed Valve 3/4/5 Close A	L RCS Fuel XFeed Valve 3/4/5 Close B
L RCS Oxid XFeed Valve 3/4/5 Open A	L RCS Oxid XFeed Valve 3/4/5 Open B

AFT MCA 2 MN B MDM OA2	AFT MCA 2 MN B MDM OA2
OP Stat 1 <V76X2261E>	**OP Stat 2 <V76X2262E>**
R ET Door Latch Latch 2A	R ET Door Latch Latch 2B
L ET Door Latch Release 2A	L ET Door Latch Latch 2B
ET Door FWD C/L Latch Lock 2A	ET Door FWD C/L Latch Lock 2B
R ET Door Open 2	
R Vent Door 8/9 Open 2A	R Vent Door 8/9 Open 2B
L Vent Door 8/9 Close 2A	L Vent Door 8/9 Close 2B
L RCS Fuel Tank Iso Valve 3/4/5 B Open	R OMS Oxid XFeed Valve B Close B
R OMS Fuel XFeed Valve B Open A	L OMS Fuel XFeed Valve B Open B
R RCS Fuel Tank Iso Valve 3/4/5 B Close	R RCS Fuel Tank Iso Valve 3/4/5 B Open
L OMS Fuel XFeed Valve B Open A	L RCS Manif 1 Iso Valves Close
L OMS Oxid XFeed Valve B Close A	L OMS Oxid XFeed Valve B Close B
R OMS Oxid XFeed Valve B Close A	R OMS Fuel XFeed Valve B Open B
L RCS Manif 1 Iso Valves Open	L RCS Fuel Tank Iso Valve 3/4/5 B Close
(K39 Spare OV-103/104/105)	K38 Spare OV-103/104/105)
(K35 Spare OV-103/104/105)	K32 Spare OV-103/104/105)

AFT MCA 2 MN B MDM OA2	AFT MCA 2 MN B MDM OA2
OP Stat 3 <V76X2263E>	**OP Stat 4 <V76X2264E>**
R ET Door Latch Release 2A	R ET Door Latch Release 2B
L ET Door Latch Release 2B	L ET Door Latch Latch 2A
ET Door FWD C/L Latch Stow 2A	ET Door FWD C/L Latch Stow 2B
R ET Door Close 2	
R Vent Door 8/9 Close 2A	R Vent Door 8/9 Close 2B
L Vent Door 8/9 Open 2A	L Vent Door 8/9 Open 2B
R RCS Manif 1 Iso Valves Open	R RCS Oxid Tank Iso Valve 3/4/5 B Open
L OMS Oxid XFeed Valve B Open A	L OMS Oxid XFeed Valve B Open B
L RCS Oxid Tank Iso Valve 3/4/5 B Open	R RCS Manif 1 Iso Valves Close
R RCS Oxid Tank Iso Valve 3/4/5 B Close	R OMS Fuel XFeed Valve B Open B
L OMS Fuel XFeed Valve B Close A	R OMS Fuel XFeed Valve B Close B
R OMS Fuel XFeed Valve B Close A	L OMS Fuel XFeed Valve B Close B
R OMS Oxid XFeed Valve B Open A	L RCS Oxid Tank Iso Valve 3/4/5 B Close
(K36 Spare OV-103/104/105)	K37 Spare OV-103/104/105)
(K34 Spare OV-103/104/105)	K33 Spare OV-103/104/105)

AFT MCA 3 MN C MDM OA3	AFT MCA 3 MN C MDM OA3
OP Stat 1 <V76X2271E>	**OP Stat 2 <V76X2272E>**
R ET Door Close 1	L ET Door Close 2
ET Door AFT C/L Latch Lock 2A	R ET Door Latch Release 1B
R ET Door Latch Release 1A	ET Door AFT C/L Latch Lock 2B
R Vent Door 8/9 Open 1A	R Vent Door 8/9 Open 1B
L RCS Oxid Tank Iso Valve 1/2 Close	R OMS Oxid XFeed Valve A Close
L OMS Fuel Tank Iso Valve B Open	L OMS Oxid Tank Iso Valve B Close
L RCS Manif 3 Iso Valves Open	R RCS Fuel XFeed Valve 1/2 Close
R OMS Oxid XFeed Valve A Close	L RCS Fuel XFeed Valve 1/2 Close
R RCS Fuel XFeed Valve 1/2 Close	L RCS Manif 4 Iso Valves Open
L RCS Oxid XFeed Valve 1/2 Open	R OMS Oxid Tank Iso Valve B Close
L RCS Manif 4 Iso Valves Close	R RCS Oxid Tank Iso Valve 1/2 Close
R OMS Fuel XFeed Valve A Open	R OMS Fuel XFeed Valve A Open
L OMS Oxid Tank Iso Valve B Close	R RCS Oxid XFeed Valve 1/2 Open
R OMS Fuel Tank Iso Valve B Close	L RCS Fuel Tank Iso Valve 1/2 Open
R OMS Fuel Tank Iso Valve B Open	L OMS Fuel Tank Iso Valve B Open
R RCS Oxid XFeed Valve 1/2 Open	R OMS Fuel Tank Iso Valve B Open
L RCS Fuel XFeed Valve 1/2 Close	L RCS Oxid XFeed Valve 1/2 Open
R RCS Oxid Tank Iso Valve 1/2 Close	R RCS Fuel Tank Iso Valve 1/2 Open
L RCS Fuel Tank Iso Valve 1/2 Open	L RCS Oxid Tank Iso Valve 1/2 Close
R RCS Fuel Tank Iso Valve 1/2 Open	L RCS Manif 3 Iso Valves Close

AFT MCA 3 MN C MDM OA3	AFT MCA 3 MN C MDM OA3
OP Stat 3 <V76X2273E>	**OP Stat 4 <V76X2274E>**
R ET Door Latch Latch 1A	L ET Door Open 2
R ET Door Open 1	R ET Door Latch Latch 1B
ET Door AFT C/L Latch Stow 2A	ET Door AFT C/L Latch Stow 2B
R Vent Door 8/9 Close 1A	R Vent Door 8/9 Close 1B
L OMS Oxid Tank Iso Valve B Open	R OMS Fuel Tank Iso Valve B Close
L OMS Fuel Tank Iso Valve B Close	R RCS Fuel Tank Iso Valve 1/2 Close
R OMS Fuel Tank Iso Valve B Close	R RCS Manif 4 Iso Valves Open
L RCS Oxid XFeed Valve 1/2 Close	R OMS Fuel XFeed Valve A Close
L RCS Fuel XFeed Valve 1/2 Open	R RCS Oxid XFeed Valve 1/2 Close
R RCS Fuel Tank Iso Valve 1/2 Close	L RCS Oxid XFeed Valve 1/2 Close
R RCS Manif 3 Iso Valves Open	L RCS Fuel Tank Iso Valve 1/2 Close
R OMS Oxid XFeed Valve A Open	R OMS Oxid Tank Iso Valve B Open
R OMS Fuel XFeed Valve A Close	R RCS Oxid Tank Iso Valve 1/2 Open
R OMS Oxid Tank Iso Valve B Open	R OMS Oxid XFeed Valve A Open
R RCS Oxid XFeed Valve 1/2 Close	L OMS Oxid Tank Iso Valve B Open
R RCS Fuel XFeed Valve 1/2 Open	L OMS Fuel Tank Iso Valve B Close
R RCS Oxid Tank Iso Valve 1/2 Open	R RCS Fuel XFeed Valve 1/2 Open
L RCS Oxid Tank Iso Valve 1/2 Open	L RCS Fuel XFeed Valve 1/2 Open
L RCS Fuel Tank Iso Valve 1/2 Close	L RCS Oxid Tank Iso Valve 1/2 Open
R RCS Manif 4 Iso Valves Close	R RCS Manif 3 Iso Valves Close

STBD RMS Shoulder Stow Indication Failed Off Should Be On (SSID AFM-19)

NOTE

The following troubleshooting requires access to the AFT Flight Deck Panel. If access to the AFT panel is not available, then the preplanned contingency procedure cannot be completed. **LCC violation confirmed, No Go for Launch**.

1. LCC Requirement:

   2 of 2, Verify dual motor Deploy capability
   1 of 2, Verify Stowed position

   Position is verified by presence of single motor shoulder stow limit switch, either directly or inferred by inhibited MCA relay (OP status stays On).

   Dual motor Deploy capability is required. Connector integrity must be verified by either:

   - Demonstrating that limit switch is still present from PDU to MCA and inhibiting MCA relay (OP stat stays On)

   - Or if MCA relay is not inhibited, by demonstrating that the motor will draw A/C current when commanded in the Stow direction.

2. Crew Requirements:

   ASP access to Panel A8 and R13L

3. Time Requirements:

   3 minutes from Go Ahead with Crew at panel

NOTE

4. Troubleshooting Plan:

   A. PDU's already isolated from A/C power by P/L Bay MECH Power SW Panel R13L (Crew) issue switch command to Stow.

   B. Monitor MCA OP status, if OP status stays On MECH is Go for Launch.

   C. If OP status goes Off, (ASP) apply A/C power for 5 seconds max.

   D. If limit switch is picked up, or if motor draws current, MECH is Go for Launch.

   E. (ASP) Return switches to Launch configuration.

116-571 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
PORT/STBD MPM/MRLS
XMIT CURSOR KEY - PRESS

DISPLAY STBD MPM/MRLS
XMIT CURSOR KEY - PRESS

VERIFY VWK06 IS DISPLAYED
```

116-572 **ASP**

```
PANEL A8L
STBD RMS DEPLOY/STOW SW - STOW
```

116-573 **CAFM**

CRT (VWK06, PG-B)

RECORD MCA OP STATUS STATE
(INVERT - OFF / NORMAL = ON)

MTR 1	MTR 2
2/2 _____	4/6 _____

AC Current Check

NOTE
If MCA OP status inverted in previous step, perform this option. Apply MECH power for minimum required time, 5 seconds maximum.

AC Current Check Not Performed:_____

116-574 **CAFM** **CEPD**

Begin monitoring AC currents (AC2 - MTR 1)
(AC3 - MTR 2)

116-575 **CAFM** **ASP**

PANEL R13L

(MTR 1)
PL BAY MECH PWR
SYS 1 SW - ON (NOT MORE THAN 5 SECONDS)

(MTR 2)
PL BAY MECH PWR
SYS 2 SW - ON (NOT MORE THAN 5 SECONDS)

116-576 CAFM ASP

```
PANEL R13L
PL BAY MECH PWR
   SYS 1 SW - OFF
PL BAY MECH PWR
   SYS 2 SW - OFF
```

116-577 CAFM

Record if failed "Off" limit switch was picked up (Yes/No)

SHLD_____

FWD_____

AFT_____

116-578 CAFM

Record if currents increased (Yes/No)

AC2 - MTR 1_____

AC3 - MTR 2_____

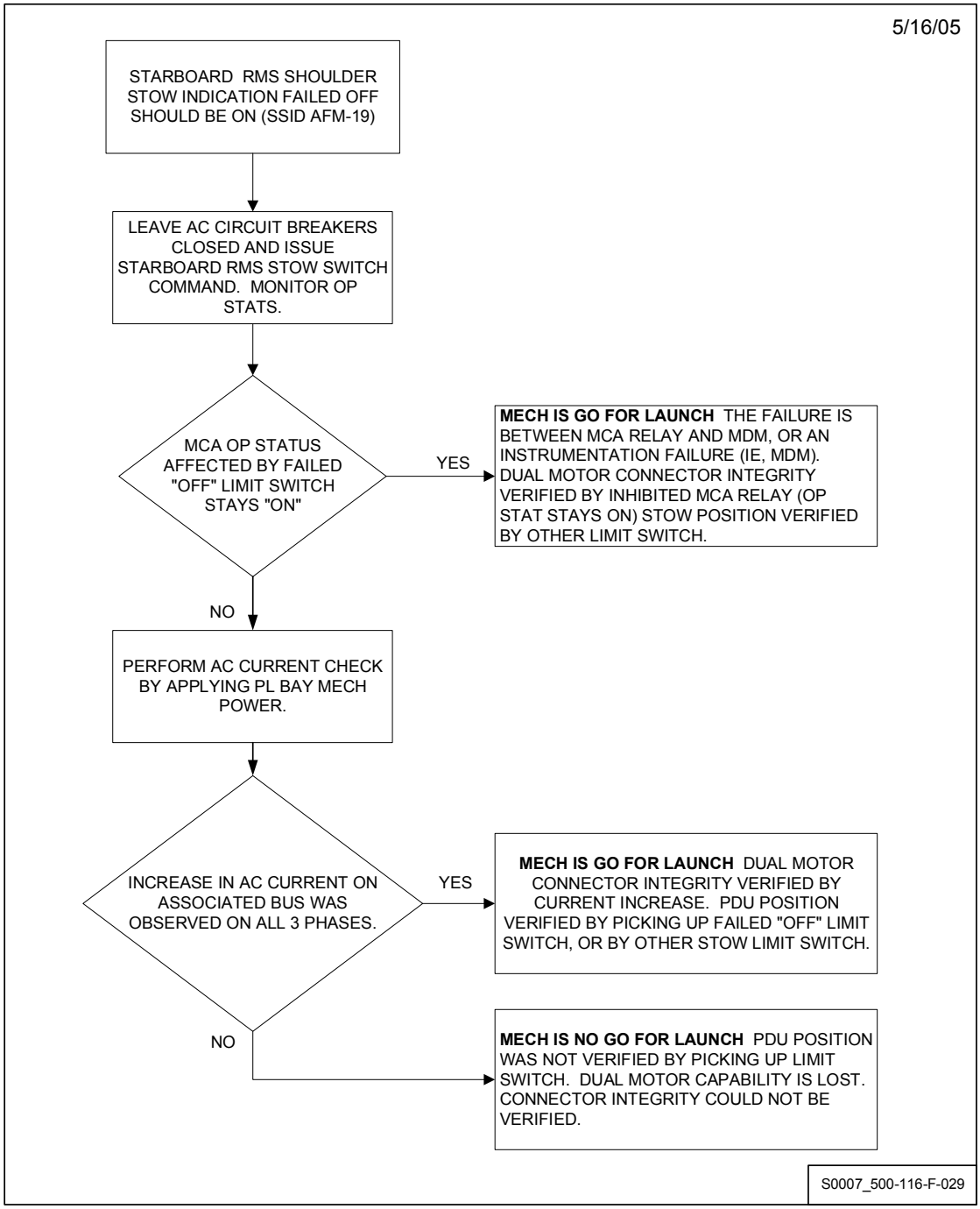
***** End of AC Current Check *****

116-579 CAFM ASP

```
PANEL A8L
STBD RMS DEPLOY/STOW SW - OFF
```

Troubleshooting Steps

STBD RMS Shoulder Stow Indication Failed Off Should Be On (SSID AFM-19) Conclusion/Recommendation:



NOTE

Position is verified by presence of single motor shoulder limit switch, either directly or inferred by inhibited MCA relay.

116-580 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OP STAT stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. PDU position was NOT verified by picking up limit switch. Dual motor connector integrity is lost. Dual motor drive capability lost. ☐
LCC violation confirmed. NO GO for Launch.

116-581 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-582 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind_____

Not Performed:_____

***** End of STBD RMS Shoulder Stow Indication Failed Off Should Be On (SSID AFM-19) *****

STBD RMS Shoulder Deploy Indication Failed On Should Be Off (SSID AFM-19)

NOTE

Perform this option only for missions that require OBSS deployment.

Not Performed:_____

NOTE

The following troubleshooting requires access to the AFT Flight Deck Panel. If access to the AFT panel is not available then the preplanned contingency procedure cannot be completed. **LCC violated confirmed, No Go for Launch**.

1. LCC Requirements:

   2 of 2, Deploy capability required for missions requiring deployment of MPMs only, dual motor deployment capability required. If an "On" limit switch inhibits MCA relay (OP status stays On), motor cannot deploy. If MCA OP status changes state motor capability verified.

2. Crew Requirements:

   Access to Panel A8.

3. Time Requirements:

   2 min (from Go Ahead with ASP at panel)

NOTE

4. Troubleshooting Plan:

   A. PDUs are already isolated from AC power by P/L Bay MECH Power Switch Panel R13L.

   B. (ASP) Issue STBD RMS switch command to Deploy.

   C. Monitor MCA operational statues.
      If MCA OP status goes Off (inverts) - MECH is Go for Launch.

   D. Return switches to Launch configuration.

116-583 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
PORT/STBD MPM/MRLS
XMIT CURSOR KEY - PRESS

DISPLAY STARBOARD MPM/MRLS
XMIT CURSOR KEY - PRESS

VERIFY VWK06 IS DISPLAYED
```

116-584 **CAFM** **ASP**

```
PANEL R13L

P/L BAY MECH POWER
VERIFY
SYSTEM 1 SW - OFF
SYSTEM 2 SW - OFF
```

116-585 **CAFM** **ASP**

```
PANEL A8L
STBD RMS DEPL/STOW SW - DEPLOY
```

116-586 **CAFM**

CRT (VWK06, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF / NORMAL = ON)

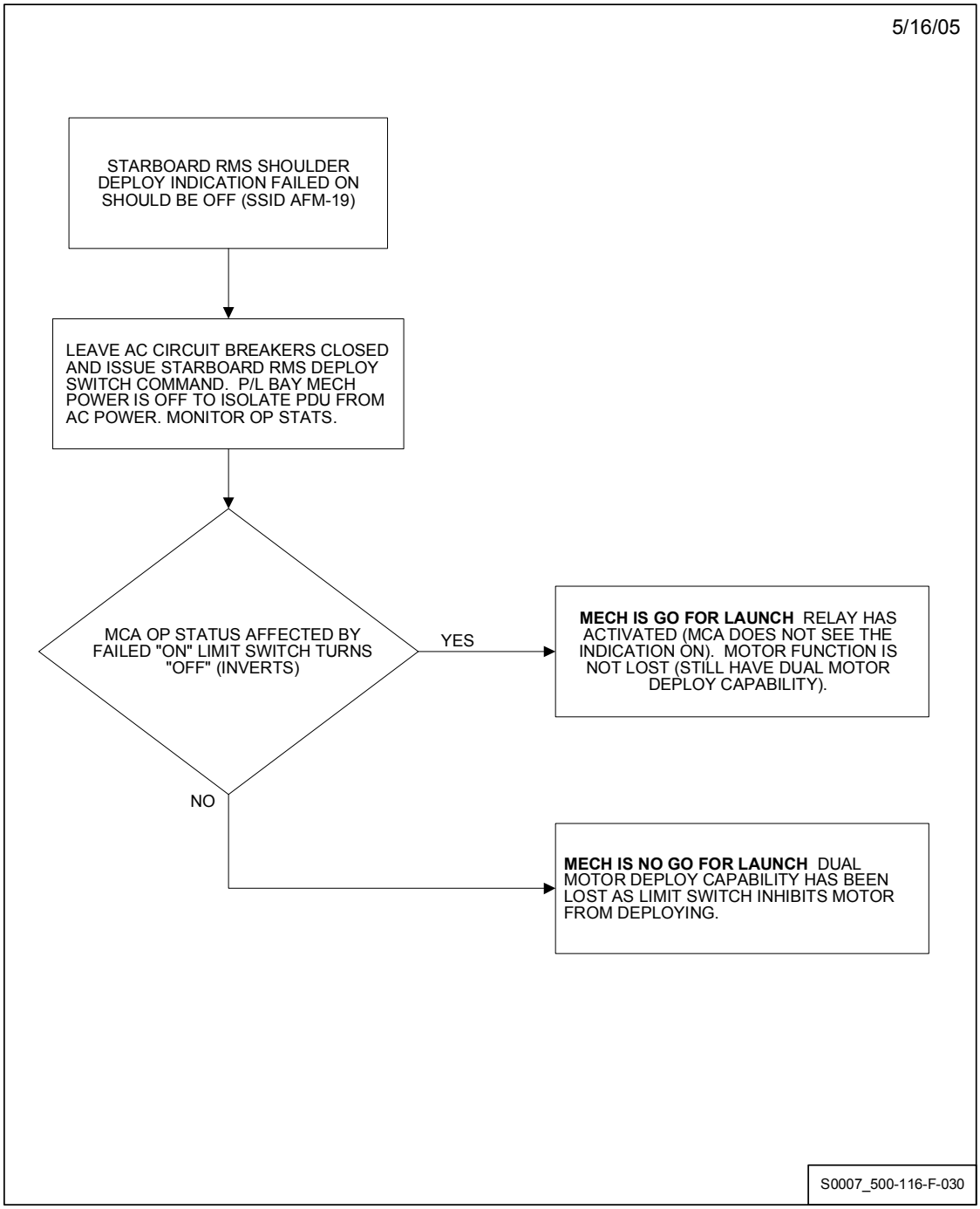
	MTR 1		MTR 2
2/2	_____	4/5	_____

116-587 **CAFM** **ASP**

PANEL A8L
STBD RMS DEPLOY/STOW SW - OFF

Troubleshooting Safing Steps

STBD RMS Shoulder Deploy Indication Failed On Should Be Off (SSID AFM-19) Conclusion/Recommendation:



116-588 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure. (i.e., MDM). Dual motor deploy capability still exists. ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor connector integrity is lost as limit switch inhibits motor from deploying ☐
LCC violation confirmed. NO GO for Launch.

116-589 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-590 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind_____

Not Performed:_____

***** End of STBD RMS Shoulder Deploy Indication Failed On Should Be Off (SSID AFM-19) *****

STBD RMS Retention Latch - Release Indication Failed On Should Be Off (SSID AFM-20)

NOTE

Perform this option only for missions that require OBSS deployment.

Not Performed:_____

NOTE

The following troubleshooting requires access to the AFT Flight Deck Panel. If access to the AFT panel is not available then the preplanned contingency procedure cannot be completed. **LCC violated confirmed, No Go for Launch**.

1. LCC Requirements:

   2 of 2, Verify dual motor capability (mission dependent). Dual motor capability to release required. If an "On" limit switch inhibits MCA relay (OP status stays On), motor cannot release. Motor capability verified if MCA OP status changes state.

2. Crew Requirements:

   Access to Panel A8.

3. Time Requirements:

   2 min (from Go Ahead with ASP at panel)

NOTE

4. Troubleshooting Plan:

A. PDUs are already isolated from AC power by P/L Bay MECH Power Switch Panel R13L.

B. (Crew) issue switch command to Release.

C. CAFM monitor MCA operational statuses
If MCA OP status stays On - MECH is No Go
If MCA OP status goes Off - MECH is Go for Launch

D. Return switches to Launch configuration.

116-591 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
PORT/STBD MPM/MRLS
XMIT CURSOR KEY - PRESS

DISPLAY STARBOARD MPM/MRLS
XMIT CURSOR KEY - PRESS

VERIFY VWK06 IS DISPLAYED
```

116-592 **CAFM ASP**

```
PANEL R13L

P/L BAY MECH POWER
VERIFY
SYSTEM 1 SW - OFF
SYSTEM 2 SW - OFF
```

116-593 **CAFM ASP**

```
PANEL A8L
STBD RMS RETENTION LATCH SW - REL
```

116-594 **CAFM**

CRT (VWK06, PG-B)

RECORD MCA OP STATUS STATE
(INVERT = OFF / NORMAL = ON)

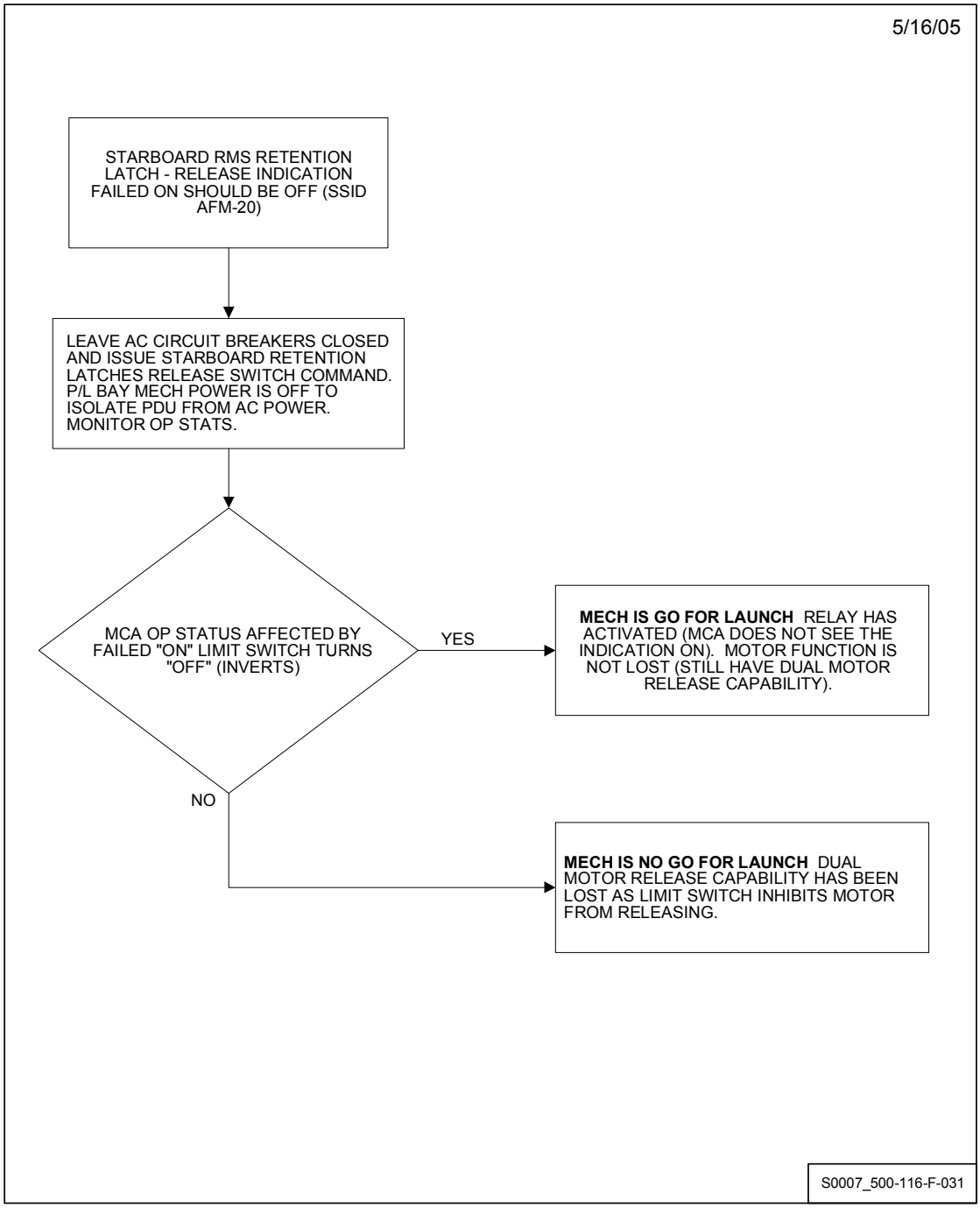
	MTR 1		MTR 2
FWD 4/6	_____	1/2	_____
MID 4/4	_____	2/3	_____
AFT 3/3	_____	2/2	_____

116-595 **CAFM** **ASP**

PANEL A8
STBD RMS RETENTION LATCH SW - OFF

Troubleshooting Safing Steps

STBD RMS Retention Latch - Release Indication Failed On Should Be Off (SSID AFM-20) Conclusion/Recommendation:



116-596 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "On" limit switch changed state to Off. The failure is between MCA relay and MDM, or an instrumentation failure. (i.e., MDM). Dual motor release capability still exists. ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "On" limit switch stayed On. Dual motor connector integrity is lost as limit switch inhibits motor from releasing ☐
LCC violation confirmed. NO GO for Launch.

116-597 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-598 **CAFM** **CSPE**

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind_____

Not Performed:_____

***** End of STBD RMS Retention Latch - Release Indication Failed On Should Be Off (SSID AFM-20) *****

STBD RMS Retention Latch - Latch Indication Failed Off Should Be On (SSID AFM-20)

NOTE

Perform this option only for missions with Starboard OBSS installed.

Not Performed:_____

NOTE

The following troubleshooting requires access to the AFT Flight Deck Panel. If access to the AFT panel is not available, then the preplanned contingency procedure cannot be completed. **LCC violation confirmed, No Go for Launch**.

1. LCC Requirement:

   2 of 2, Verify dual motor Release capability
   1 of 2, Verify position

   Position is verified by presence of single motor latch limit switch, either directly or inferred by inhibited MCA relay (OP status stays On).

   Dual motor Release capability is required. Connector integrity must be verified by either:

   - Demonstrating that limit switch is still present from PDU to MCA and inhibiting MCA relay (OP stat stays On)

   - Or if MCA relay is not inhibited, by demonstrating that the motor will draw A/C current when commanded in the Latch direction.

2. Crew Requirements:

   ASP access to Panel A8 and R13L

NOTE

3. Time Requirements:

   2 minutes (from Go Ahead with Crew at panel)

4. Troubleshooting Plan:

   A. PDU's already isolated from A/C power by P/L Bay MECH Power Switch Panel R13L.

   B. (ASP) Issue Starboard RMS switch command to latch MRLs.

   C. Monitor MCA operation statuses
      If MCA OP status stays On - MECH is Go for Launch

   D. If MCA OP status goes Off, (ASP) apply A/C power for 5 seconds max.

   E. Monitor AC Busses for current increase and/or return of limit switch. MECH is Go for Launch. Else MECH is NO GO.

   F. (ASP) Return switches to Launch configuration.

116-599 **CAFM**

```
CURSOR CNTL (VWK04, PG-B)
PORT/STBD MPM/MRLS
XMIT CURSOR KEY - PRESS

DISPLAY STBD MPM/MRLS
XMIT CURSOR KEY - PRESS

VERIFY VWK06 IS DISPLAYED
```

116-600 ASP

PANEL A8L
STBD RMS RETENTION LATCH SW - LATCH

116-601 CAFM

CRT (VWK06, PG-B)

RECORD MCA OP STATUS STATE
(INVERT - OFF / NORMAL = ON)

	MTR 1		MTR 2
FWD 4/5	_____	1/1	_____
MID 4/1	_____	2/7	_____
AFT 3/4	_____	2/1	_____

Motor 1 AC Test

NOTE
If expected MCA OP status is inverted (Off), perform AC test for appropriate motor. Apply MECH Power for minimum required time, 5 seconds maximum.

Motor 1 AC Test Not Performed:_____

116-602 CAFM CEPD

Begin monitoring AC currents:

MTR 1

FWD AC-3
MID AC-2
AFT AC-1

116-603 CAFM ASP

```
PANEL R13L
(MTR 1)
PL BAY MECH PWR
   SYS 2 SW - ON (NO LONGER THAN 5 SECONDS)
```

116-604 CAFM ASP

```
PANEL R13L
PL BAY MECH PWR
   SYS 2 SW - OFF
```

116-605 **CAFM**

Record if current increases with MECH Power On (Yes/No):

	MTR 1
FWD AC-3	_____
MID AC-2	_____
AFT AC-1	_____

116-606 **CAFM**

Record if failed "Off" limit switch was picked up (Yes/No):

	MTR 1
FWD	_____
MID	_____
AFT	_____

***** End of Motor 1 AC Test *****

Motor 2 AC Test

NOTE
If expected MCA OP status is inverted (Off), perform AC test for appropriate motor. Apply MECH Power for minimum required time, 5 seconds maximum.

Motor 2 AC Test Not Performed:_____

116-607 CAFM CEPD

Begin monitoring AC currents:

MTR 2

FWD AC-1
MID AC-3
AFT AC-2

116-608 CAFM ASP

```
PANEL R13L
(MTR 2)
PL BAY MECH PWR
   SYS 1 SW - ON (NO LONGER THAN 5 SECONDS)
```

116-609 CAFM ASP

```
PANEL R13L
PL BAY MECH PWR
   SYS 1 SW - OFF
```

116-610 **CAFM**

Record if current increases with MECH Power On (Yes/No):

	MTR 2
FWD AC-1	_____
MID AC-3	_____
AFT AC-2	_____

116-611 **CAFM**

Record if failed "Off" limit switch was picked up (Yes/No):

	MTR 2
FWD	_____
MID	_____
AFT	_____

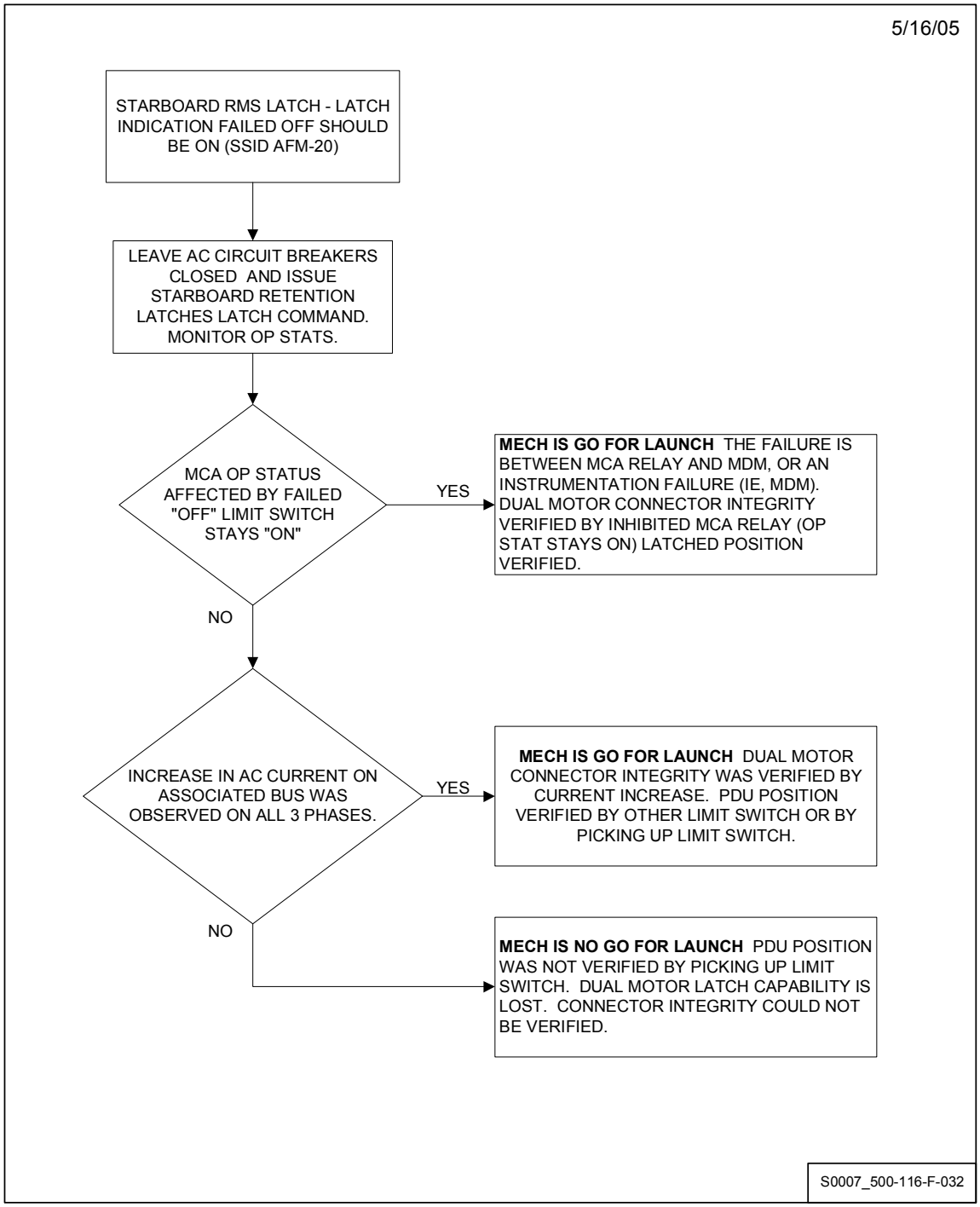
***** End of Motor 2 AC Test *****

Troubleshooting Safing Steps

116-612 CAFM ASP

PANEL A8
STBD RMS RETENTION LATCH SW - OFF

STBD RMS Retention Latch - Latch Indication Failed Off Should Be On (SSID AFM-20) Conclusion/Recommendation:



NOTE

Position is verified by at least one limit switch. If at least one MCA relay inhibited (OP status remains On) position verified.

116-613 **CAFM**

For troubleshooting conclusion select (check) one of the following:

1. MCA OP Status associated with failed "Off" limit switch stayed On. No change in AC current expected. The failure is between MCA relay and MDM, or an instrumentation failure (i.e., MDM). Dual motor connector integrity verified by inhibited MCA relay (OP stat stays ON). ☐
LCC violation cleared. Continue Countdown.

2. MCA OP Status associated with failed "Off" limit switch changed state to Off. AC current increase on associated Bus was observed on all 3 phases. PDU position verified by picking up limit switch, or by other limit switch. Dual motor connector integrity was verified by AC current increase. ☐
LCC violation cleared. Continue Countdown.

3. MCA OP Status associated with failed "Off" limit switch changed state to Off. NO AC current increase on associated Bus was observed. PDU position was NOT verified by picking up limit switch. Dual motor latching capability is lost. ☐
LCC violation confirmed. NO GO for Launch.

116-614 **CAFM** **CSPE**
OTC
NTD

Report troubleshooting conclusion from previous step.

***** End of Troubleshooting Safing Steps *****

116-615 CAFM CSPE

IF previous troubleshooting has confirmed instrumentation failure,

THEN it is concluded that an MDM failure may exist.
Record:

Ref Ind_____

Not Performed:_____

***** End of STBD RMS Retention Latch - Latch Indication Failed Off Should Be On (SSID AFM-20) *****

Hatch Limit Switch Failure Troubleshooting (Contingency)

NOTE

Perform this option as directed by USA MEQ Engineering, if a continuity problem develops in standard hatch closing for flight (S0007.100, Op 267).

Hatch Limit Switch Failure Troubleshooting (Contingency) Not Performed:_____

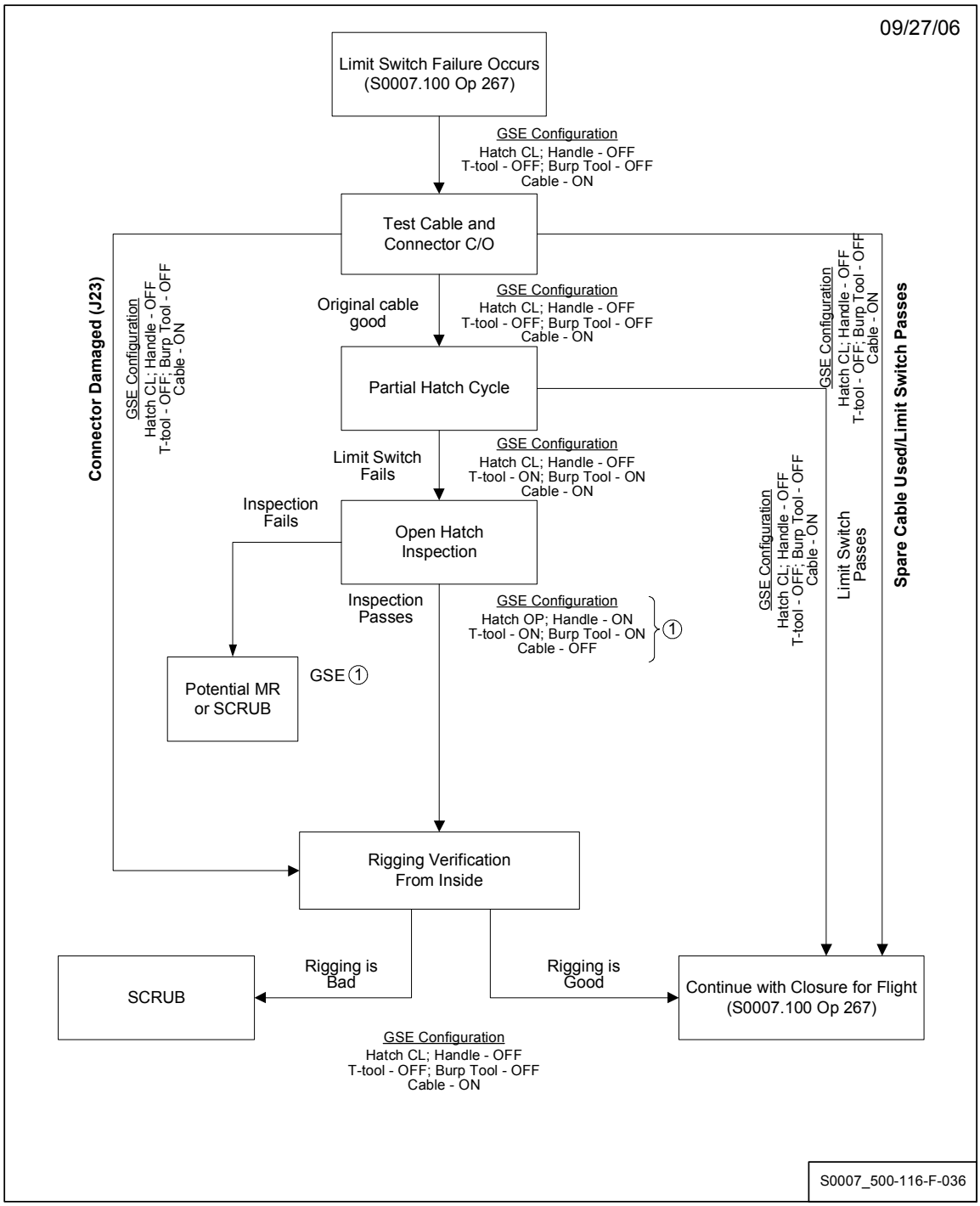
NOTE

Successful completion of this troubleshooting will require MRB concurrence for flight with 1 of 2 limit switches prior to Launch (see V33AH0.010 Remark R-7).

NOTE

Steps involving Crit 1, 1R and/or 1S items are contained in the following operation.

Limit Switch Failure Troubleshooting Flowchart



Test Cable and Connector Checkout

Test Cable and Connector Checkout Not Performed:_____

116-616 **OVCC**

CSR-028

Demate A70-0788-04 test cable from connector J23. Visually inspect vehicle connector and test cable connector for any signs of damage.

Record results:_____

_____

T:_____ N:_____

116-617 **OVCC**

CSR-403
CSR-028

Mate S/A02K3-030 shorting plug to A70-0788-04 test cable. Using (1) 8020B Fluke multimeter (or equivalent), check for continuity between pins C/D and E/F (S/B <2.0 Ohms). **Manually manipulate** test cable while performing continuity checks to ensure no loose connections exist. **Remove** S/A-2K3-030 shorting plug when complete.

Record: C/D (yellow plug) _____ E/F (blue plug)_____

Cal No._____

T:_____ N:_____

Attach Multimeter to Yellow and Blue Plugs

NOTE
Perform this option with the spare A70-0788-04 test cable if continuity between pins C/D and E/F was greater than 2.0 Ohms. If not, continue with additional troubleshooting per CAFM direction.

Attach Multimeter to Yellow and Blue Plugs Not Performed:_____

116-618 **OVCC**

CSR-028

OK To Install N:_____

Mate spare A70-0788-04 test cable to connector J23.

T:_____ N:_____

116-619 **OVCC**

CSR-403

Attach yellow plug to Fluke 8020B (or equivalent) multimeter and measure circuit resistance between pins C and D.
Verify resistance is less than 2.0 Ohms.

Cal No._____

Record _____Ohms less than 2.0

T:_____ N:_____

116-620 **OVCC**

CSR-403

Attach blue plug to Fluke 8020B (or equivalent) multimeter and measure circuit resistance between pins E and F.
Verify resistance is less than 2.0 Ohms.

Cal No._____

Record _____Ohms less than 2.0

T:_____ N:_____

***** End of Attach Multimeter to Yellow and Blue Plugs *****

***** End of Test Cable and Connector Checkout *****

Partial Hatch Cycle

Partial Hatch Cycle Not Performed:_____

116-621 **OVCC**

CSR-099

OK To Install N:_____

Connect SA-2K5-018 "Hatch Burping Tool" to vehicle hatch seal leak test port QD coupling.

T:_____ N:_____

116-622 **OVCC**

CSR-099

OK To Install N:_____

A70-0788 T-Tool (Locking)

1. T-tool locking lever - **Lock**
2. Ball detent release slide - **Release** (away from handle) and hold.
3. **Install** ME182-0019-0001, -0002, -0005 locking T-tool into hatch actuator.

   S/N_____
4. Ball detent release slide - **Engage** (toward handle)
5. **Pull and apply** slight rotation to T-tool and verify proper tool engagement.

T:_____ N:_____

CAUTION

Do not force T-tool locking lever or it could be damaged. If lever does not release easily from detent locked position, apply steady light unlocking force on lever while slowly rotating T-handle (CW/CCW) until locking lever releases from locked detent.

NOTE

Following five steps will operate latches using T-tool to attempt to obtain both limit switches.

116-623 **OVCC**

CSR-099

Rotate T-tool locking lever 180 degrees to unlock position.

T:_____ **N:**_____

116-624 **OVCC**

CSR-099

Rotate A70-0788 T-tool approximately 45 degrees in the unlatch direction (CW-DO NOT PASS DETENT) then back fully latched.

T:_____ **N:**_____

116-625 **OVCC**

CSR-099

Rotate T-tool locking lever 180 degrees to the locked position. Do not force. Some slight rotation of T-tool may be necessary to find matching position of hatch locking lever tab detent.

T:_____ **N:**_____

116-626 **OVCC**

CSR-028

OK To Install N:_____

IF A70-0788-04 is not mated,

THEN mate A70-0788-04 test cable to connector J23.

Not Performed:_____

T:_____ N:_____

116-627 **OVCC**

CSR-403

Attach yellow plug to Fluke 8020B (or equivalent), and measure circuit resistance between pins C and D.
Record:

_____Ohms LT 2.0

Cal No._____

T:_____ N:_____

116-628 **OVCC**

CSR-403

Attach blue plug to Fluke 8020B (or equivalent), and measure circuit resistance between pins E and F.
Record:

_____Ohms LT 2.0

Cal No._____

T:_____ N:_____

Remove T-tool and Lock Hatch

NOTE

Perform this option if micro switch check was successful (both readings less than 2.0 Ohms). If not successful, continue with additional troubleshooting per CAFM direction.

Remove T-tool and Lock Hatch Not Performed:_____

116-629 **OVCC**

CSR-099

On A70-0788 T-tool,
Push ball detent release slide away from handle (toward hatch) and **remove** T-tool from hatch actuator.

T:_____ N:_____

116-630 **OVCC**

CSR-099

Using Borescope or small inspection mirror,
Visually verify through hatch test port that hatch actuator locking lever is in "Locked" detent position.

T:_____ N:_____

116-631 **OVCC**

CSR-099

Disconnect SA-2K5-018 "Hatch Burping Tool" from vehicle hatch seal leak test port QD coupling (**DO NOT** reinstall tethered dust cap at this time).

T:_____ N:_____

***** End of Remove T-tool and Lock Hatch *****

***** End of Partial Hatch Closure *****

Open Hatch Inspection

NOTE
Perform this option ONLY if previous steps did NOT obtain both limit switches.

Open Hatch Inspection Not Performed:_____

116-632 **OVCC**

CSR-028

Demate A70-0788-04 test cable from connector J23.

T:_____ N:_____

116-633 **OVCC**

CSR-099

On A70-0788 T-tool,
Push ball detent release slide away from handle (toward hatch) and **remove** T-tool from hatch actuator.

T:_____ N:_____

116-634 **OVCC**

CSR-099

OK To Install N:_____

Install G070-300422-001 hatch handle by engaging four clips.

T:_____ N:_____

116-635 **OVCC**

CSR-099

OK To Install N:_____

A70-0788 T-tool (Locking)

1. T-tool lock lever - **Lock**

2. Ball detent release slide - **Release** (away from handle) and hold.

3. **Install** ME182-0019-0001, -0002, -0005 locking T-tool onto hatch actuator.

   S/N_____

4. Ball detent release slide - **Engage** (toward handle)

5. **Pull and apply** slight rotation to T-tool and verify proper tool engagement.

T:_____ N:_____

116-636 **OVCC**

CSR-099

Rotate T-tool locking lever 180 degrees to unlock position.

T:_____ N:_____

116-637 **OVCC**

CSR-099

Rotate A70-0788 T-tool approximately 240 degrees (CW) until vent detent is contacted.

T:_____ N:_____

116-638 **OVCC**

Verify area swept by hatch is clear of any obstructions.

T:_____ **N:**_____

116-639 **OVCC**

CSR-099

Rotate T-tool approximately 210 additional degrees (CW) until hard stop is felt (kicker latches will slightly open hatch).

T:_____ **N:**_____

CAUTION

During hatch opening, to prevent damage, apply an upward force on G070-300422-001 handle to compensate for hatch weight. Maintain upward force until hatch no longer contacts thermal barrier seal near hinge line.

116-640 **OVCC**

CSR-099

Open hatch while applying an upward force to G070-300422-001 handle to compensate for hatch weight.
Position hatch to full open with hold open pawl latched.
Monitor area while opening for any falling debris from hatch/collar interface that may have contributed to failure.

T:_____ **N:**_____

116-641 **OVCC**

CSR-099

Visually inspect I/E hatch latch mechanism for loose or failed link and latch assemblies, etc.

T:_____ **N:**_____

116-642 **OVCC**

CSR-099

Visually inspect hatch/collar seal interface for any debris that may have contributed to failure.

T:_____ **N:**_____

116-643 **OVCC**

CSR-099

Latch/unlatch latch actuator to verify normal latch movement. When complete, leave actuator latched and locked.

T:_____ **N:**_____

116-644 **OVCC**

CSR-099

With hatch latched,
Check that 17 of 18 latches overcenter arrows are within acceptable band (latches are number 1 through 18 starting at upper end of chain at approximately 4 o'clock position).

Record latch assemblies outside of band (if any)_____

T:_____ **N:**_____

116-645 **OVCC**

CSR-099

With latches latched and locked,
Manually manipulate latch pedestals and verify latch assemblies are securely attached to hatch structure (no loose hardware).

T:_____ **N:**_____

116-646 **OVCC**

CSR-099

Unlock and rotate hatch actuator 450 degrees (CCW) to unlatch latches.

T:_____ N:_____

NOTE
If the limit switches both successfully passed continuity testing in steps 116-606 and 116-607, the switch failure is most likely the result of additional latching loads resulting from outer hatch misalignment or an obstruction between hatch and collar (i.e., Armalon, debris, other equipment, etc.). If a limit switch failed continuity testing in S0007.100 Op267 and both steps 116-606 and 116-607 of this operation, the switch failure is most likely a result of rigging anomaly. Troubleshooting will continue per option “Rigging Verification from Inside”.

***** End of Open Hatch Inspection *****

Rigging Verification from Inside

NOTE

Perform this option if resistance through either switch was greater than 2.0 Ohms in option "Partial Hatch Cycle" and "Open Hatch Inspection" reveals no anomalies.

Rigging Verification from Inside Not Performed:_____

WARNING

Isopropyl Alcohol (IPA) is flammable and is an irritant.

Usage near heat, sparks or open flame may result in fire. Exposure may cause eye and skin irritation.

Wear **white nitrile gloves** and **safety glasses** .

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116-647 **OVCC**

CSR-099

Wipe hatch seals and sealing surfaces using low lint cloth and (1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .

T:_____ N:_____

116-648 **OVCC**

CSR-099

Visually inspect hatch seals for cleanliness and damage.

T:_____ N:_____

116-649	**OVCC**	**OTC**	**212**
	OTC	**NTD**	**232**
	NTD	***SCC**	**232**
		***PAC**	

Technician and NASA QC will **ingress** Crew Module to verify latch overcenter position of 17 latches when hatch is closed (flashlight and ELSA will be required).

116-650 **OVCC**

Verify OK to close hatch.

T:_____ N:_____

CAUTION

To maintain proper alignment of hatch guides during closing, two personnel lift outer hatch at hinge line and at G070-300422-001 handle, maintaining lift at G070-300422-001 handle until hatch is closed.

116-651 **OVCC**

CSR-099

Release hold-open pawl at hinge line and pull outer hatch outboard away from hinges. Two personnel lift outer hatch at inside hinge line and G070-300422-001 handle and slide hatch upward.
Maintain lift and outboard force at G070-300422-001 handle during closure.
Monitor thermal seal near hinge line during closure to ensure proper seating.

T:_____ N:_____

116-652 **OVCC**

CSR-099

From outside,
Verify latches are fully released. Close (do not latch) hatch.

From inside,
Rotate latch actuator handle 450 degrees (CW) to fully latch hatch.

T:_____ N:_____

116-653 **OVCC**

CSR-099

From inside,
Rotate T-handle locking lever 180 degrees to Locked position. **Do not force**. Some slight rotation of T-handle may be necessary to find matching position of hatch locking lever tab detent.

T:_____ N:_____

116-654 **OVCC**

CSR-099

From inside,
Visually verify latch overcenter arrows on 17 of 18 latches are in acceptable band (latches are number 1 through 18 starting at upper end of chain at approximately 4 o'clock position) and report results to CAFM.

Record latch assemblies outside of band (if any) _____

T:_____ N:_____

116-655 **OVCC**

CSR-099

From inside,
Rotate locking lever 180 degrees to Unlock position.

T:_____ N:_____

116-656 **OVCC**

CSR-099

From inside,
Rotate actuator handle approximately 240 degrees (CW) until vent detent is contacted.

T:_____ N:_____

116-657 **OVCC**

Verify area to be swept by hatch is clear of any obstructions.

T:_____

116-658 **OVCC**

CSR-099

From inside,
Rotate actuator handle approximately 210 additional degrees (CW) until hard stop is felt (kicker latches will slightly open hatch).

T:_____ N:_____

CAUTION

During hatch opening, to prevent damage, apply an upward force on G070-300422-001 handle to compensate for hatch weight. Maintain upward force until hatch no longer contacts thermal barrier seal near hinge line.

116-659 **OVCC**

CSR-099

Open hatch approximately 60 degrees while applying an upward force to G070-300422-001 handle to compensate for hatch weight.

T:_____ **N:**_____

116-660 **OVCC**

Carefully position hatch to full Open position with hold open pawl latched.

T:_____ **N:**_____

116-661

OVCC	**OTC**	**212**
OTC	**NTD**	**232**
NTD	***SCC**	**232**
	***PAC**	

Technician and NASA QC will egress Crew Module.

116-662 **OVCC**

Verify all cables, ECS/PVD ducts, etc., are cleared from hatch opening and no obstructions to hatch closing. All non-Flight items removed.

T:_____ **N:**_____

WARNING

Isopropyl Alcohol (IPA) is flammable and is an irritant.

Usage near heat, sparks or open flame may result in fire. Exposure may cause eye and skin irritation.

Wear **white nitrile gloves** and **safety glasses** **.**

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116-663 **OVCC**

CSR-099

Wipe hatch seals and sealing surfaces using low lint cloth and (1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .

T:_____ **N:**_____

116-664 **OVCC**

CSR-099

Visually inspect hatch seals for cleanliness and damage.

T:_____ **N:**_____

116-665 **OVCC**

Verify OK to close hatch for Flight.

T:_____ **N:**_____

CAUTION

To maintain proper alignment of hatch guides during closing, two personnel lift outer hatch at hinge line and at G070-300422-001 handle, maintaining lift at G070-300422-001 handle until hatch is closed.

116-666 **OVCC**

CSR-099

Release hold-open pawl at hinge line and pull outer hatch outboard away from hinges. Two personnel lift outer hatch at inside hinge line and G070-300422-001 handle and slide hatch upward.
Maintain lift and outboard force at G070-300422-001 handle during closure.
Monitor thermal seal near hinge line during closure to ensure proper seating.

T:_____ **N:**_____

116-667 **OVCC**

CSR-099

Close hatch and rotate A70-0788 T-tool 450 degrees (CW) to fully latch hatch.

T:_____ **N:**_____

116-668 **OVCC**

CSR-099

Rotate T-handle locking lever 180 degrees to Locked position. **Do not force**. Some slight rotation of T-handle may be necessary to find matching position of hatch locking lever tab detent.

T:_____ **N:**_____

116-669 **OVCC**

CSR-099

Visually verify through test port that hatch actuator locking lever is in the "Locked" position, using borescope or inspection mirror.

T:_____ **N:**_____

116-670 **OVCC**

CSR-099

On T-tool,
Push ball detent release slide away from handle (toward hatch) and **remove** T-tool from hatch actuator.

T:_____ **N:**_____

116-671 **OVCC**

CSR-099

Remove G070-300422-001 hatch handle by releasing four clips.

T:_____ **N:**_____

116-672 **OVCC**

CSR-028

OK To Install N:_____

Mate A70-0788-04 test cable to connector J23.

T:_____ **N:**_____

116-673 **OVCC**

CSR-403

Attach yellow plug to Fluke 8020B (or equivalent) meter and measure circuit resistance between pins C and D.

Record _____ Ohms BD

Cal No._____

T:_____ **N:**_____

116-674 **OVCC**

CSR-403

Attach blue plug to Fluke 8020B (or equivalent) meter and measure circuit resistance between pins E and F.

Record _____ Ohms BD

Cal No._____

T:_____ **N:**_____

116-675 **OVCC**

CSR-099

Disconnect SA-2K5-018 "Hatch Burping Tool" from vehicle hatch seal leak test port QD coupling (DO NOT reinstall tethered dust cap at this time).

T:_____ **N:**_____

116-676 **OVCC**

Verify at least one resistance measurement in previous two steps was less than 2.0 Ohms and that overcenter arrows on 17 or 18 latches were within acceptable bands.
Report results to CAFM for final recommendation.

T:_____ N:_____

***** End of Rigging Verification from Inside *****

116-677 **OVCC** **OTC**

Orbiter Contingency Operation I/E Hatch Limit Switch Failure complete.

***** End of Hatch Limit Switch Failure Troubleshooting (Contingency) *****

Hatch Leak Check Failure Troubeshooting (Contingency)

NOTE

Perform this option as directed by USA MEQ Engineering, if a hatch seal leak problem develops in standard hatch closing for flight (ref S0007.100, Op 267).

Hatch Leak Check Failure Troubleshooting (Contingency) Not Performed:_____

NOTE

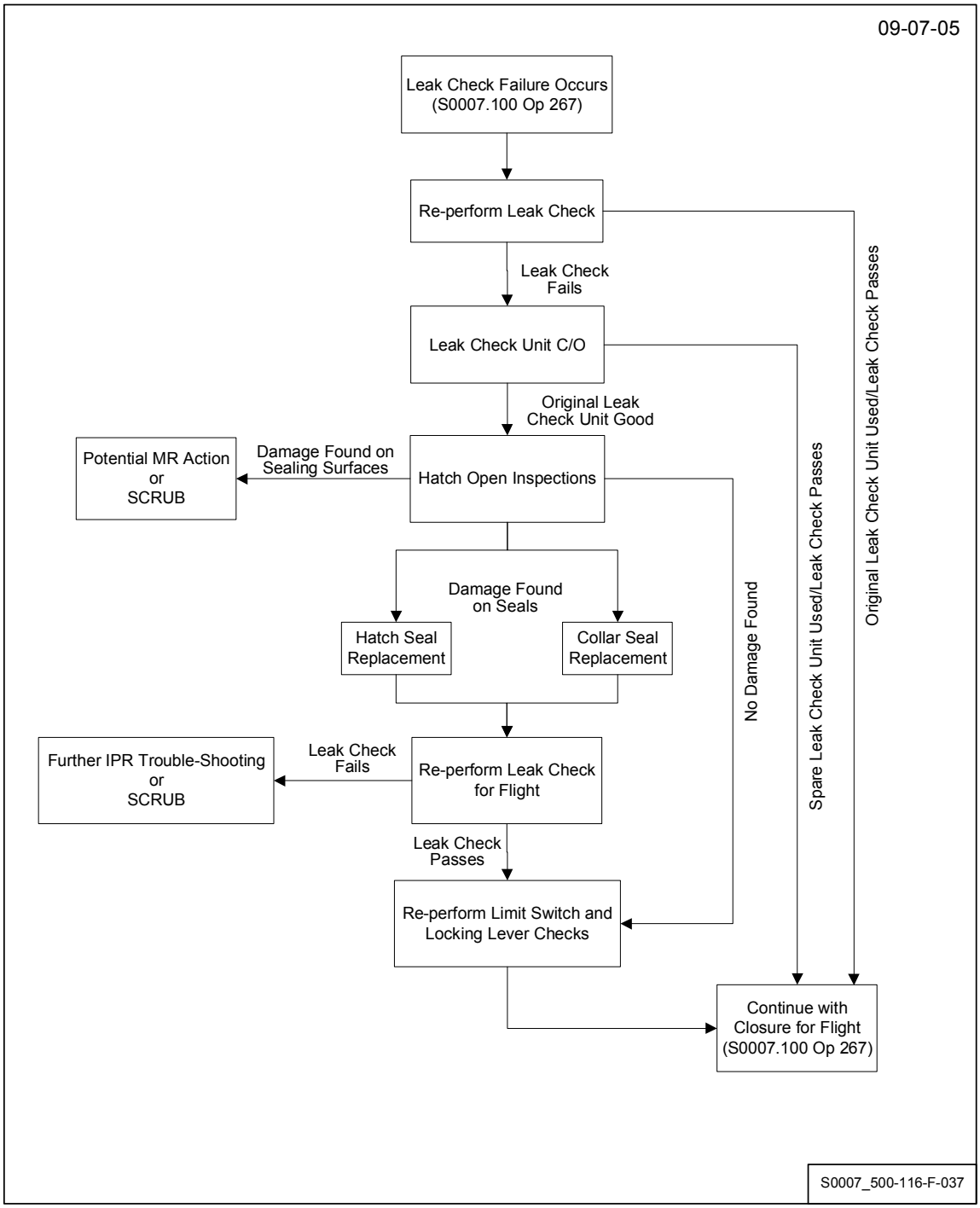
Steps involving Crit 1, 1R and/or 1S items are contained in the following operation.

NOTE

Noted requirement is satisfied by the following series of steps.

OMRS V33AH0.010

Hatch Leak Check Failure Troubleshooting Flowchart



Re-perform Leak Check

Re-perform Leak Check Not Performed:_____

116-678 **OVCC**

CSR-099

Disconnect C70-0749 outlet hose QD from I/E hatch seal leak check port.

Record S/N_____

T:_____ N:_____

116-679 **OVCC**

CSR-099

Visually inspect QD and test port for debris and/or damage.

Record results:_____

_____

T:_____ N:_____

NOTE

If the C70-0749 leak check unit is damaged, use spare leak check unit as directed by CAFM in the following steps.

116-680 **OVCC**

CSR-099

OK To Install N:_____

Connect C70-0749 outlet hose QD to I/E hatch seal leak check port (Ref Des 80V61TP39).

Record S/N_____

T:_____ N:_____

CAUTION

In the following step, do not exceed 16 psig on C70-0749 outlet pressure gage or damage to hardware could occur. If pressure reaches 16 psig, immediately close On-Off hand valve.

NOTE

In the following leak check, the allowable leakage of 0.91 psig loss in 1 minute is the value for leakage of the combined Flight H/W & GSE volumes.

Exceedance of 0.91 psig in 1 minute indicates a leakage of the Flight H/W volume which is greater than the OMRS allowable limit of 1.0 psi in 1 minute.

If more than 0.91 psig is lost in the following test, contact MEQ engineering for troubleshooting options. (Ref requirement V33AH0.110)
(Ref. SEPAR SPOC-2752)

116-681 OVCC

IF using GN_2 bottle,

THEN
C70-0749 S/N -001 or -002 (GN_2 bottle)

1. On-Off hand valve - **Slowly On** (CW)

2. **Verify** outlet pressure gage indicates 15 +/-1 psig

3. On-Off hand valve - **Off** (CCW)

4. **Record**:

Time_____

Outlet pressure gage_____psig 15 +/-1

5. After 1 minute,
Record:

Time_____

Outlet pressure gage_____psig BD

6. **Verify** pressure decrease on outlet pressure gage no more than 0.91 psig per minute.

Cal No._____

OMRSD V33AH0.110-1R

Not Performed:_____

T:_____ N:_____

CAUTION

Do not exceed 16 psig on G070-320074 unit pressure gage. If pressure reaches 16 psig, activate pressure relief valve to vent pressure.

During the following leak check, DO NOT hold G070-320074 test unit by grasping hardware fittings plumbed into the digital gage. Slight temperature changes can affect the digital readout value.

NOTE

In the following leak check, the allowable leakage of 0.90 psig loss in 1 minute is the value for leakage of the combined Flight H/W & GSE volumes.

Exceedance of 0.90 psig in 1 minute indicates a leakage of the Flight H/W volume which is greater than the OMRS allowable limit of 1.0 psi in 1 minute.

If more than 0.90 psig is lost in the following test, contact MEQ engineering for troubleshooting options.
(Ref. SEPAR SPOC-2752)

116-682 **OVCC**

CSR-099

OK to Install N:_____

IF using G070-320074 Test Unit for Side Hatch Leak Check,

THEN Perform following substeps:

1. **Verify/Install** the QTHA-HOS-3FT flexhose to the outlet port (P1) on the G070-320074 Hand Pump Assembly. **Tighten** hand tight.

2. **Verify/Connect** the G070-320076-001 QD/Filter Assy to the free end of the QTHA-HOS-3FT flexhose. **Tighten** hand tight.

3. **Open/Verify** open (flip up) MV1.

4. **Turn on** digital pressure gage. **Wait** 10 seconds for gage reading to stabilize and **verify** PG1 reads between -1 and +1 psig.

5. **Remove** tethered dust cap of QD coupling half from hatch seal leak test port.

6. **Remove** QD protective bags and/or dust cap form outlet QD of (1) G070-320074 leak check unit

Record S/N_____

7. **Connect** leak check unit outlet QD to vehicle seal leak test port.

8. **Activate** hand pump, **pressurize** test cavity to 14 to 16 pisg. **Activate** pressure relief valve if pressure range is exceeded.

9. **Allow** pressure gage indication to stabilize.

10. **Verify** pressure gage indicates 14 to 16 psig.

11. Shut-off valve MV1 - **Close** (flip down)

12. **Wait** 10-15 seconds prior to start of decay period.

13. **Record**

Time _____ Pressure _____ psig (14 to 16)

14. **Record** after 1 minute:

Time _____ Pressure _____ psig

15. **Verify** seal cavity pressure loss (seal leakage) is no more than 0.90 psig..

16. **Disconnect** leak check unit outlet QD from hatch seal leak test port.

17. **Disconnect** QTHA-HOS-3 flexhose and G070-320076 filter assy from leak check unit outlet port.

18. **Install** tethered dust caps on hatch seal leak test port and filter assy.

19. Digital pressure gage PB - **PRESS** and **RELEASE**

20. **Verify** pressure gage is OFF.

21. **Double bag and seal** leak check unit outlet port, flexhose ends, and filter assy open end..

OMRSD V33AH0.110-1R

Not Performed:_____

T:_____ N:_____

116-683 **OVCC**

CSR-099

OK To Install N:_____

IF leak check failure no longer exists,

THEN disconnect ME276-0040-0002 outlet hose QD from ME276-0040-0001 I/E hatch seal leak test port 80V61TP39 and install dust cap on test port.

Not Performed:_____

T:_____ N:_____

***** End of Re-perform Leak Check *****

Leak Check Unit Checkout

NOTE
Perform this option if previous leak check per option "Re-perform Leak Check" was unsuccessful.

Leak Check Unit Checkout Not Performed:_____

116-684 **OVCC**

CSR-099

Disconnect C70-0749 outlet hose QD from I/E hatch seal leak test port.

Record S/N_____

T:_____ N:_____

116-685 **OVCC**

Connect ME276-0040-0002 QD (dead head) to C70-0749 outlet hose QD.

T:_____ N:_____

116-686 OVCC

IF using GN_2 bottle,

THEN
C70-0749 S/N -001 or -002 (GN_2 bottle)

1. On-Off hand valve - **Slowly On** (CW)

2. **Verify** outlet pressure gage indicates 15 +/-1 psig

3. On-Off hand valve - **Off** (CCW)

4. **Record**:

   Time_____

   Outlet pressure gage_____psig 15 +/-1

5. After 1 minute,
   Record:

   Time_____

   Outlet pressure gage_____psig BD

6. **Verify** pressure decrease on outlet pressure gage no more than 1 psig per minute.

   Cal No._____

Not Performed:_____

T:_____ N:_____

116-687 OVCC

IF using hand pump,

THEN
G070-320074 Test Unit

1. Shutoff valve - MV1 - **Open** (Flip up)

2. Digital gage PB - **press and release**

3. **Verify** digital gage On.

4. **Allow** 10 second unit warm up.

5. **Pressurize** cavity to 15 +/-1 psig using T-handle.

6. **Allow** pressure gage to stabilize.

7. **Verify** pressure gage indicates 15 +/-1 psig.

8. Shutoff valve -MV1 - **Close** (Flip down)

9. **Record**:

Time_____

Pressure gage_____ psig 15 +/-1

10. After 1 minute,
Record:

Time_____

Pressure gage_____psig BD

11. **Verify** pressure decrease on digital gage no more than 1 psig per minute.

Cal No._____

Not Performed:_____

T:_____ N:_____

116-688 **OVCC**

Disconnect ME276-0040-0002 QD (dead head) from C70-0749 outlet hose QD.

T:_____ N:_____

Re-perform Leak Check using Spare C70-0749

NOTE
Perform this option, using spare C70-0749 leak check unit, if original C70-0749 leak check unit failed checkout test in previous steps. If not, continue with additional troubleshooting per option "Hatch Open Inspections" with CAFM direction.

Re-perform Leak Check using Spare C70-0749 Not Performed:_____

116-689 **OVCC**

CSR-099

OK To Install N:_____

Connect spare C70-0749 outlet hose QD to I/E hatch seal leak test port (Ref Des 80V61TP39).

Record S/N_____

T:_____ N:_____

CAUTION

In the following step, do not exceed 16 psig on C70-0749 outlet pressure gage or damage to hardware could occur. If pressure reaches 16 psig, demate QD to vent pressure and remate.

NOTE

In the following leak check, the allowable leakage of 0.91 psig loss in 1 minute is the value for leakage of the combined Flight H/W & GSE volumes.

Exceedance of 0.91 psig in 1 minute indicates a leakage of the Flight H/W volume which is greater than the OMRS allowable limit of 1.0 psi in 1 minute.

If more than 0.91 psig is lost in the following test, contact MEQ engineering for troubleshooting options. (Ref requirement V33AH0.110)
(Ref. SEPAR SPOC-2752)

116-690 OVCC

IF using GN_2 bottle,

THEN
C70-0749 S/N -001 or -002 (GN_2 bottle)

1. On-Off hand valve - **Slowly On** (CW)

2. **Verify** outlet pressure gage indicates 15 +/-1 psig

3. On-Off hand valve - **Off** (CCW)

4. **Record**:

Time_____

Outlet pressure gage_____psig 15 +/-1

5. After 1 minute,
Record:

Time_____

Outlet pressure gage_____psig BD

6. **Verify** pressure decrease on outlet pressure gage no more than 0.91 psig per minute.

Cal No._____

OMRSD V33AH0.110-1R

Not Performed:_____

T:_____ N:_____

CAUTION

Do not exceed 16 psig on G070-320074 unit pressure gage. If pressure reaches 16 psig, activate pressure relief valve to vent pressure.

During the following leak check, DO NOT hold G070-320074 test unit by grasping hardware fittings plumbed into the digital gage. Slight temperature changes can affect the digital readout value.

NOTE

In the following leak check, the allowable leakage of 0.90 psig loss in 1 minute is the value for leakage of the combined Flight H/W & GSE volumes.

Exceedance of 0.90 psig in 1 minute indicates a leakage of the Flight H/W volume which is greater than the OMRS allowable limit of 1.0 psi in 1 minute.

If more than 0.90 psig is lost in the following test, contact MEQ engineering for troubleshooting options.
(Ref. SEPAR SPOC-2752)

116-691 **OVCC**

CSR-099

OK to Install N:_____

IF using G070-320074 Test Unit for Side Hatch Leak Check,

THEN Perform following substeps:

1. **Verify/Install** the QTHA-HOS-3FT flexhose to the outlet port (P1) on the G070-320074 Hand Pump Assembly. **Tighten** hand tight.

2. **Verify/Connect** the G070-320076-001 QD/Filter Assy to the free end of the QTHA-HOS-3FT flexhose. **Tighten** hand tight.

3. **Open/Verify** open (flip up) MV1.

4. **Turn on** digital pressure gage. **Wait** 10 seconds for gage reading to stabilize and **verify** PG1 reads between -1 and +1 psig.

5. **Remove** tethered dust cap of QD coupling half from hatch seal leak test port.

6. **Remove** QD protective bags and/or dust cap form outlet QD of (1) G070-320074 leak check unit

Record S/N_____

7. **Connect** leak check unit outlet QD to vehicle seal leak test port.

8. **Activate** hand pump, **pressurize** test cavity to 14 to 16 pisg. **Activate** pressure relief valve if pressure range is exceeded.

9. **Allow** pressure gage indication to stabilize.

10. **Verify** pressure gage indicates 14 to 16 psig.

11. Shut-off valve MV1 - **Close** (flip down)

12. **Wait** 10-15 seconds prior to start of decay period.

13. **Record**

Time _____ Pressure _____ psig (14 to 16)

14. **Record** after 1 minute:

Time _____ Pressure _____ psig

15. **Verify** seal cavity pressure loss (seal leakage) is no more than 0.90 psig..

16. **Disconnect** leak check unit outlet QD from hatch seal leak test port.

17. **Disconnect** QTHA-HOS-3 flexhose and G070-320076 filter assy from leak check unit outlet port.

18. **Install** tethered dust caps on hatch seal leak test port and filter assy.

19. Digital pressure gage PB - **PRESS** and **RELEASE**

20. **Verify** pressure gage is OFF.

21. **Double bag and seal** leak check unit outlet port, flexhose ends, and filter assy open end..

OMRSD V33AH0.110-1R

Not Performed:_____

T:_____ N:_____

116-692 **OVCC**

CSR-099

OK To Install N:_____

IF leak check failure no longer exists,

THEN disconnect ME276-0040-0002 outlet hose QD from ME276-0040-0001 I/E hatch seal leak test port 80V61TP39 and install dust cap on test port.

Not Performed:_____

T:_____ N:_____

***** End of Re-perform Leak Check using Spare C70-0749 *****

***** End of Leak Check Unit Checkout *****

Hatch Open Inspections

NOTE
Perform this option if C70-0749 checkout was successful or hatch leak check failed in option "Leak Check Unit Checkout".

Hatch Open Inspections Not Performed:_____

116-693 **OVCC**

CSR-099

OK To Install N:_____

Connect SA-2K5-018 "Hatch Burping Tool" to vehicle hatch seal leak test port QD coupling.

T:_____ N:_____

116-694 **OVCC**

CSR-099

OK To Install N:_____

Install G070-300422-001 hatch handle by engaging four clips.

T:_____ N:_____

116-695 **OVCC**

CSR-099

OK To Install N:_____

A70-0788 T-tool (Locking)

1. T-tool locking lever - **Lock**

2. Ball detent release slide - **Release** (away from handle) and hold.

3. **Install** ME182-0019-0001, -0002, -0005 locking T-tool into hatch actuator.

   S/N_____

4. Ball detent release slide - **Engage** (toward handle)

5. **Pull and apply** slight rotation to T-tool and verify proper tool engagement.

T:_____ N:_____

CAUTION

Do not force T-tool lever or damage could occur. If locking lever does not release easily from detent locked position, apply steady light unlocking force on lever while slowly rotating T-tool (CW/CCW) until locking lever releases from locked detent.

116-696 **OVCC**

CSR-099

Rotate T-tool locking lever 180 degrees to unlock position.

T:_____ N:_____

116-697 **OVCC**

CSR-099

Rotate ME182-0019-0001, -0002, -0005 locking T-tool approximately 240 degrees (2/3 of a turn) (CW) until vent detent is contacted.

T:_____ N:_____

CAUTION
To avoid damage to hardware allow any cabin venting to complete prior to proceeding.

116-698 **OVCC**

Verify area swept by hatch is clear of any obstructions.

T:_____ N:_____

116-699 **OVCC**

CSR-099

Rotate MD182-0019-0001, -0002, -0005 locking T-tool approximately 210 additional degrees (CW) until hard stop is felt (kicker latches will slightly open hatch).

T:_____ N:_____

CAUTION

During hatch opening, to prevent damage, apply an upward force on G070-300422-001 handle to compensate for hatch weight. Maintain upward force until hatch no longer contacts thermal barrier seal near hinge line.

116-700 **OVCC**

CSR-099

Open hatch approximately 60 degrees while applying an upward force to G070-300422-001 handle to compensate for hatch weight.

T:_____ **N:**_____

116-701 **OVCC**

Carefully position hatch to full Open position and verify hold open pawl engages.

T:_____ **N:**_____

116-702 **OVCC**

CSR-099

Visually inspect the hatch collar seal (Orbiter side) and adjacent sealing surface for nicks, cuts, scratches or other damage.

Record results:_____

_____

T:_____ **N:**_____

116-703 **OVCC**

CSR-099

Visually inspect the hatch seal and adjacent sealing surface for nicks, cuts, scratches or other damage.

Record results:_____

_____

T:_____ N:_____

***** End of Hatch Open Inspections *****

Hatch Collar Seal Replacement (Orbiter Side)

NOTE
Perform this option if collar seal (Orbiter side) is damaged.

Hatch Collar Seal Replacement (Orbiter Side) Not Performed:_____

NOTE
Wear clean white gloves when handling hatch seal in following steps.

116-704 **OVCC**

CSR-099

Using hands or a non-metallic (e.g., rigid nylon) tool,
Carefully wedge out a section of the seal and then lift out and away removing the seal from the collar.

T:_____ N:_____

116-705 **OVCC**

Bag and seal with completed ID tag (P/N V070-332504-004).
Write PR/IPR No. on the tag.

T:_____ N:_____

WARNING

Isopropyl Alcohol (IPA) is flammable and is an irritant.

Usage near heat, sparks or open flame may result in fire. Exposure may cause eye and skin irritation.

Wear **white nitrile gloves** and **safety glasses** **.**

WS002.e 09-14-2007

116-706 **OVCC**

CSR-099

Clean out collar side seal groove with low-lint wipe and
(1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .

T:_____ **N:**_____

116-707 **OVCC**

Obtain (1) EA V070-332504-004 seal

T:_____

116-708 **OVCC**

Clean the new V070-332504-004 seal using a low-lint wipe dampened with (1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .

T:_____ **N:**_____

NOTE
Avoid any twisting, stretching or bunching of the seal in the next step.

116-709 **OVCC**

CSR-099

OK To Install N:_____

V070-332504-004 Seal

Install V070-332504-004 seal in groove per Doc: MA0106-328 (LI) Installation/Protection of Seals , which states that seal should be installed in a manner that will minimize a stretched or bunched condition after installation.
Record:

CMID No._____

T:_____ N:_____

116-710 **OVCC** **CAFM**

V070-332504-004 I/E hatch collar seal (Orbiter side) removal and replacement complete.

***** End of Hatch Collar Seal Replacement (Orbiter Side) *****

Hatch Seal Replacement (Hatch Side)

NOTE
Perform this option if hatch seal (Hatch side) is damaged.

Hatch Seal Replacement (Hatch Side) Not Performed:_____

NOTE
Wear clean white gloves when handling hatch seal in following steps.

116-711 **OVCC**

CSR-099

Using hands or a non-metallic (e.g., rigid nylon) tool,
Carefully wedge out a section of the seal and then lift out and away removing the seal from the hatch.

T:_____ N:_____

116-712 **OVCC**

Bag and seal with completed ID tag (P/N V070-332504-003).
Write PR/IPR No. on the tag.

T:_____ N:_____

WARNING

Isopropyl Alcohol (IPA) is flammable and is an irritant.

Usage near heat, sparks or open flame may result in fire. Exposure may cause eye and skin irritation.

Wear **white nitrile gloves** and **safety glasses** **.**

WS002.e 09-14-2007

116-713 **OVCC**

CSR-099

Clean out hatch side seal groove with low-lint wipe and
(1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .

T:_____ **N:**_____

116-714 **OVCC**

Obtain (1) EA V070-332504-003 seal

T:_____

116-715 **OVCC**

Clean the new V070-332504-003 seal using a low-lint wipe dampened with (1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .

T:_____ **N:**_____

NOTE
Avoid any twisting, stretching or bunching of the seal in the next step.

116-716 OVCC

CSR-099

OK To Install N:_____

V070-332504-004 Seal

Install V070-332504-003 seal in groove per Doc: MA0106-328 (LI) Installation/Protection of Seals , which states that seal should be installed in a manner that will minimize a stretched or bunched condition after installation.
Record:

CMID No._____

T:_____ N:_____

116-717 OVCC CAFM

V070-332504-003 I/E hatch seal (Hatch side) removal and replacement complete.

***** End of Hatch Seal Replacement (Hatch Side) *****

Close Hatch and Re-perform Leak Check

NOTE

Perform this option if no damage was found in option "Hatch Open Inspections" or if either hatch seal was replaced in option "Hatch Collar Seal Replacement (Orbiter Side)" or "Hatch Seal Replacement (Hatch Side)".

Close Hatch and Re-perform Leak Check Not Performed:_____

WARNING

Isopropyl Alcohol (IPA) is flammable and is an irritant.

Usage near heat, sparks or open flame may result in fire. Exposure may cause eye and skin irritation.

Wear **white nitrile gloves** and **safety glasses** .

WS002.e 09-14-2007

116-718 **OVCC**

CSR-099

Clean hatch side and Orbiter side seals with low-lint wipe dampened with (1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .

T:_____ N:_____

116-719 **OVCC**

Verify OK to close.

T:_____ N:_____

CAUTION

To maintain proper alignment of hatch guides during closing, two personnel lift outer hatch at hinge line and at G070-300422-001 handle, maintaining lift at G070-300422-001 handle until hatch is closed.

116-720 **OVCC**

CSR-099

Release hold-open pawl at hinge line and pull outer hatch outboard away from hinges. Two personnel lift outer hatch at inside hinge line and G070-300422-001 handle an slide hatch upward.
Maintain lift and outboard force at G070-300422-001 handle during closure.
Monitor thermal seal near hinge line during closure to ensure proper seating.

T:_____ N:_____

116-721 **OVCC**

CSR-099

Verify hatch actuator is unlocked and latches released (450 degrees (CCW)).
Close hatch (DO NOT latch at this time.

T:_____ N:_____

NOTE
Perform one of the next two steps.

116-722 **OVCC**

CSR-242
CSR-099

IF hatch and/or collar seals were replaced,

THEN rotate T-tool slowly with a steady, continuous motion 450 degrees (CW) using a dial torque wrench and ME182-0019-0004 adapter (P/O A70-0788) to latch hatch. DO NOT EXCEED 500 in. lbs.
Record max torque

Latching torque_____in. lbs. 400 max

Cal No._____

OMRSD V33AA0.035

Not Performed:_____

T:_____ N:_____

116-723 **OVCC**

IF hatch and/or collar seal were not replaced,

THEN rotate T-tool 450 degrees (CCW) until a hard stop is felt and hatch is fully latched.

Not Performed:_____

T:_____ N:_____

CAUTION

In next step, do not force locking lever or damage could occur. Some slight rotation of T-tool may be necessary to find matching position of actuator locking lever tab detent.

116-724 **OVCC**

CSR-099

Rotate T-tool locking lever 180 degrees to the "Lock" position.

T:_____ **N:**_____

116-725 **OVCC**

CSR-099

On T-tool,
Push ball detent release slide away from handle (toward hatch) and **remove** T-tool from hatch actuator.

T:_____ **N:**_____

116-726 **OVCC**

CSR-099

Visually verify through hatch test port hatch actuator locking lever in "Locked" detent position, using borescope or small inspection mirror.

T:_____ **N:**_____

116-727 **OVCC**

CSR-099

Remove G070-300422-001 hatch handle by releasing four clips.

T:_____ N:_____

116-728 **OVCC**

CSR-099

Disconnect SA-2K5-018 'Hatch Burping Tool" from vehicle hatch seal leak test port QD coupling.

T:_____ N:_____

NOTE
The next four steps will perform Hatch Leak Check.

116-729 **OVCC**

OK To Install N:_____

C70-0749
ME276-0040-0002 QD

Connect ME276-0040-002 outlet hose quick disconnect to I/E hatch seal leak test port (Ref Des 80V61TP39).

T:_____ N:_____

CAUTION

Do not exceed 16 psig on G070-320074 unit pressure gage. If pressure reaches 16 psig, activate pressure relief valve to vent pressure.

During the following leak check, DO NOT hold G070-320074 test unit by grasping hardware fittings plumbed into the digital gage. Slight temperature changes can affect the digital readout value.

NOTE

In the following leak check, the allowable leakage of 0.90 psig loss in 1 minute is the value for leakage of the combined Flight H/W & GSE volumes.

Exceedance of 0.90 psig in 1 minute indicates a leakage of the Flight H/W volume which is greater than the OMRS allowable limit of 1.0 psi in 1 minute.

If more than 0.90 psig is lost in the following test, contact MEQ engineering for troubleshooting options.
(Ref. SEPAR SPOC-2752)

116-730 **OVCC**

CSR-099

OK to Install N:_____

IF using G070-320074 Test Unit for Side Hatch Leak Check,

THEN Perform following substeps:

1. **Verify/Install** the QTHA-HOS-3FT flexhose to the outlet port (P1) on the G070-320074 Hand Pump Assembly. **Tighten** hand tight.

2. **Verify/Connect** the G070-320076-001 QD/Filter Assy to the free end of the QTHA-HOS-3FT flexhose. **Tighten** hand tight.

3. **Open/Verify** open (flip up) MV1.

4. **Turn on** digital pressure gage. **Wait** 10 seconds for gage reading to stabilize and **verify** PG1 reads between -1 and +1 psig.

5. **Remove** tethered dust cap of QD coupling half from hatch seal leak test port.

6. **Remove** QD protective bags and/or dust cap form outlet QD of (1) G070-320074 leak check unit

Record S/N_____

7. **Connect** leak check unit outlet QD to vehicle seal leak test port.

8. **Activate** hand pump, **pressurize** test cavity to 14 to 16 pisg. **Activate** pressure relief valve if pressure range is exceeded.

9. **Allow** pressure gage indication to stabilize.

10. **Verify** pressure gage indicates 14 to 16 psig.

11. Shut-off valve MV1 - **Close** (flip down)

12. **Wait** 10-15 seconds prior to start of decay period.

13. **Record**

Time _____ Pressure _____ psig (14 to 16)

14. **Record** after 1 minute:

Time _____ Pressure _____ psig

15. **Verify** seal cavity pressure loss (seal leakage) is no more than 0.90 psig..

16. **Disconnect** leak check unit outlet QD from hatch seal leak test port.

17. **Disconnect** QTHA-HOS-3 flexhose and G070-320076 filter assy from leak check unit outlet port.

18. **Install** tethered dust caps on hatch seal leak test port and filter assy.

19. Digital pressure gage PB - **PRESS** and **RELEASE**

20. **Verify** pressure gage is OFF.

21. **Double bag and seal** leak check unit outlet port, flexhose ends, and filter assy open end..

OMRSD V33AH0.110-1R

Not Performed:_____

T:_____ N:_____

CAUTION

In the following step, do not exceed 16 psig on C70-0749 outlet pressure gage or damage to hardware could occur. If pressure reaches 16 psig, immediately close On-Off hand valve.

NOTE

In the following leak check, the allowable leakage of 0.91 psig loss in 1 minute is the value for leakage of the combined Flight H/W & GSE volumes.

Exceedance of 0.91 psig in 1 minute indicates a leakage of the Flight H/W volume which is greater than the OMRS allowable limit of 1.0 psi in 1 minute.

If more than 0.91 psig is lost in the following test, contact MEQ engineering for troubleshooting options. (Ref requirement V33AH0.110)
(Ref. SEPAR SPOC-2752)

116-731 OMTO

IF using C70-0749 (S/N -001, -002, -003, or -004) GN_2 bottle assembly,

THEN perform the following:

1. On-Off hand valve - **Slowly On** (CW)
2. **Verify** outlet pressure gage indicates 15 +/-1 psig
3. On-Off hand valve - **Off** (CCW)

4. **Record**:

Time_____

Outlet pressure gage_____psig 15 +/-1

5. After 1 minute,
Record:

Time_____

Outlet pressure gage_____psig BD

6. **Verify** pressure decrease on outlet pressure gage no more than 0.91 psig per minute.

Cal No._____

OMRSD V33AH0.110-1R

Not Performed:_____

T:_____ N:_____

116-732 **OMTO**

OK To Install N:_____

C70-0749
Dust Cap to ME276-0040-0001 Coupling

Disconnect ME276-0040-0002 outlet hose QD from MD276-0040-0001 I/E hatch seal leak test port 80V61TP39 and install dust cap on test port.

***** End of Close Hatch and Re-perform Leak Check *****

Re-perform Limit Switch Verification

NOTE
Perform this option if hatch closure and leak check was successful in option "Close Hatch and Re-perform Leak Check".

Re-perform Limit Switch Verification Not Performed:_____

116-733 **OVCC**

Remove tethered dust cap from electrical connector J23 near actuator opening.

T:_____ N:_____

116-734 **OVCC**

CSR-028

OK To Install N:_____

A70-0788-04 Test Cable

Attach (1) A70-0788-04 test cable to connector J23.

T:_____ N:_____

116-735 **OVCC**

CSR-403

Attach yellow plug to (1) Fluke 8020B multimeter (or equivalent) and measure circuit resistance between pins C and D.

Verify resistance is less than 2.0 Ohms.

Cal No._____

Record _____Ohms less than 2.0

T:_____ **N:**_____

116-736 **OVCC**

CSR-403

Attach blue plug to (1) Fluke 8020B multimeter (or equivalent) and measure circuit resistance between pins E and F.

Verify resistance is less than 2.0 Ohms.

Cal No._____

Record _____Ohms less than 2.0

T:_____ **N:**_____

116-737 **OVCC** **CAFM** **142**

CSR-028

I/E hatch microswitch continuity test verified nominal.

116-738 **OVCC**

CSR-028

Remove A70-0788-04 test cable from connector J23.

T:_____ N:_____

116-739 **OVCC**

OK To Install N:_____

Tethered Dust Cap

Install tethered dust cap on connector J23.

T:_____ N:_____

***** End of Re-perform Limit Switch Verifications *****

116-740 **OVCC** **OTC**

I/E Hatch Leak Check Failure Contingency operation complete.

116-741 Noted requirement complete.

OMRSD V33AH0.010

Hatch Actuator Locking Lever Overcenter Verification Failure

NOTE
Perform this option if unable to verify hatch actuator locking lever overcenter.

Hatch Actuator Locking Lever Overcenter Verification Failure
Not Performed:_____

NOTE
Steps involving Crit 1, 1R and/or 1S items are contained in the following Operation.

116-742 **OMTO**

CSR-099

Rotate T-tool locking lever 180 degrees to unlock position.

T:_____ Qw:_____ N:_____

116-743 **OMTO**

CSR-099

Rotate ME182-0019-0001, -0002, -0005 T-tool approx 240 degrees (CW) until vent detent contacted.

T:_____ Qw:_____ N:_____

116-744 **OMTO**

Verify area swept by hatch is clear of any obstructions.

T:_____ Qw:_____ N:_____

116-745 **OMTO**

CSR-099

Rotate T-tool approx 210 additional degrees (CW) until hard stop is felt. (kicker latches will slightly open hatch).

T:_____ Qw:_____ N:_____

CAUTION

During hatch opening, to prevent damage, apply an upward force on base to compensate for hatch weight. Maintain upward force until hatch no longer contacts thermal barrier seal near hinge line.

116-746 **OMTO**

CSR-099

Open hatch approx 60 degrees while applying an upward force to A70-0719 base to compensate for hatch weight.

T:_____ Qw:_____ N:_____

116-747 **OMTO**

CSR-099

Rotate hatch latch actuator 450 degrees (CCW) to fully latch latches.

T:_____ Qw:_____ N:_____

116-748 **OMTO**

CSR-099

Position hatch latch actuator locking lever to the “Lock” position.

T:_____ Qw:_____ N:_____

116-749 **OMTO**

CSR-099

On T-tool,

Push ball detent release slide away from handle (toward hatch) and remove T-tool from hatch actuator.

T:_____ Qw:_____ N:_____

116-750 **OMTO**

Visually inspect T-tool for damage.

Record T-tool S/N_____

Record results_____

_____

T:_____ Qw:_____ N:_____

116-751 **OMTO**

Obtain backup ME182-0019-0001,-0002, -0005 locking T-tool.
Record:

T-tool S/N:_____

T:_____ Qw:_____ N:_____

116-752 **OMTO**

CSR-099

OK To Install Qw:_____ N:_____

A70-0788 T-Tool (Locking)

1. T-tool locking lever - **Lock**
2. Ball detent release slide - **Release** (away from handle) and hold.
3. **Install** ME182-0019-0001, -0002, -0005 locking T-tool into hatch actuator
4. Ball detent release slide - **Engage** (toward handle)
5. **Pull and apply** slight rotation to T-tool and verify proper tool engagement.

T:_____ Qw:_____ N:_____

116-753 **OMTO**

CSR-099

Rotate T-tool actuator locking lever 180 degrees to "Unlock" position.

T:_____ Qw:_____ N:_____

116-754 **OMTO**

CSR-099

Rotate locking T-tool approx 450 degrees (CW) to fully unlatch latches.

T:_____ Qw:_____ N:_____

116-755 **OMTO**

CSR-099

Rotate locking T-tool approx 450 degrees (CW) to fully latch latches.

T:_____ Qw:_____ N:_____

116-756 **OMTO**

CSR-099

Rotate T-tool locking lever 180 degrees to locked position. Do not force. Some slight rotation of T-handle may be necessary to find matching position of hatch locking lever tab detent.

116-757 **OMTO**

CSR-099

Visually verify that hatch actuator locking lever is in "Lock" detent position.

T:_____ Qw:_____ N:_____

116-758 **OMTO**

CSR-099

Rotate T-tool locking lever 180 degrees to Unlock position.

T:_____ Qw:_____ N:_____

116-759 **OMTO**

CSR-099

Rotate T-tool approx 450 degrees (CW) until latches fully release.

T:_____ Qw:_____ N:_____

WARNING

Isopropyl Alcohol (IPA) is flammable and is an irritant.

Usage near heat, sparks or open flame may result in fire. Exposure may cause eye and skin irritation.

Wear **nitrile (N-Dex) gloves .**

Wear **industrial goggles** when work is at eye level or above.

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116-760 **OMTO**

CSR-099

Clean both hatch seals with Texwipe and
(1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .

T:_____ Qw:_____ N:_____

116-761 **OMTO**

Verify area to be swept by hatch is clear of obstructions.

T:_____ Qw:_____ N:_____

116-762 **OMTO**

Verify OK to close hatch.

T:_____ Qw:_____ N:_____

CAUTION

To maintain proper alignment of hatch guides during closing, two personnel lift outer hatch at hingeline and at milkstool, maintaining lift at milkstool until hatch is closed.

116-763 **OMTO**

CSR-099

IF not released,

THEN release hold-open pawl at hinge line and pull outer hatch outboard away from hinges. Two personnel lift outer hatch at inside hingeline and milkstool and slide hatch upward.
Maintain lift and outboard force at milkstool during closure.
Monitor thermal seal near hingeline during closure to ensure proper seating.

Not Performed:_____

T:_____ Qw:_____ N:_____

116-764 **OMTO**

CSR-099

Rotate ME182-0019, -0002, -0005 T-tool 450 degrees (CCW) to latch latches.

T:_____ Qw:_____ N:_____

116-765 **OMTO**

CSR-099

Rotate T-tool locking lever 180 degrees to locked position. Do not force. Some slight rotation of T-tool may be necessary to find matching position of hatch locking lever tab detent.

T:_____ Qw:_____ N:_____

116-766 **OMTO**

CSR-099

Visually verify through hatch test port that hatch actuator locking lever in "Lock" detent position, using borescope or small inspection mirror.

T:_____ Qw:_____ N:_____

116-767 **OMTO**

CSR-099

On T-tool,

Push ball detent release slide away from handle (toward hatch) and remove T-tool from hatch actuator.

T:_____ Qw:_____ N:_____

116-768 **OVCC** **OTC**

Hatch Actuator Locking Lever Overcenter Verification Contingency steps complete.

***** End of Hatch Actuator Locking Lever Overcenter Verification Failure *****

Hatch Pawl Failure (Contingency)

NOTE
Perform this option if a problem develops in standard hatch closing.

Hatch Pawl Failure (Contingency) Not Performed:_____

NOTE
Successful completion of this troubleshooting will require MRB concurrence for flight with broken pawl prior to Launch.

NOTE
Steps involving Crit 1, 1R and/or 1S items are contained in the following operation.

116-769 **OMTO**

CSR-099

Position I/E hatch to allow access for visual inspection of hinge assembly.

T:_____ Qw:_____ N:_____

116-770 **OMTO**

CSR-099

Inspect V070-593279-001 hinge pawl for damage (I.E., bent, broken or damaged) and record findings.

Record results:_____

_____

_____

T:_____ Qw:_____ N:_____

116-771 **OMTO**

IF pawl is fractured,

THEN bag and ID portion which has broken off.

Not Performed:_____

T:_____ Qw:_____ N:_____

116-772 **OMTO**

CSR-099

Inspect V070-593278 hatch hold open assembly for any broken or damaged components.

Record results:_____

_____

T:_____ Qw:_____ N:_____

116-773 **OMTO**

CSR-099

Verify there are no obstructions or damage which may hinder proper operation of hatch mechanism.

T:_____ Qw:_____ N:_____

116-774 **OVCC** **OTC**

Technician and/or NASA QC ingress Crew Module to observe operation of hinge mechanism.

116-775 **OMTO**

CSR-099

Slowly swing hatch towards closure and then back to full open.

Record results:_____

_____

_____

T:_____ Qw:_____ N:_____

116-776 **OVCC** **OTC**

Technician and/or NASA QC exit Crew Module.

116-777 **OMTO**

CSR-099

Verify failure of hatch pawl will not affect the closing of hatch.

T:_____ Qw:_____ N:_____

116-778 **OVCC** **OTC**

Hatch Pawl Failure Contingency Steps complete.

***** End of Hatch Pawl Failure (Contingency) *****

I/E Hatch Carrier Panel (Contingency)

NOTE

Perform this option if problems develop in standard hatch closing.

I/E Hatch Carrier Panel (Contingency) Not Performed:_____

NOTE

Successful completion of this troubleshooting will require MRB concurrence for flight of damaged hatch carrier panel attaching hardware prior to Launch.

Only work steps appropriate to failure condition:

Condition 1.0: Galled nutplate threads (fastener cannot be installed), or low running torque.

Condition 2.0: One fastener partially installed into a seized or spinning nutplate element.

Condition 3.0: One fastener intentionally left off due to a discrepancy.

Condition 4.0: Two or more fasteners partially installed and unable to be removed due to a nutplate discrepancy.

NOTE

Steps involving Crit 1, 1R and/or 1S items are contained in the following operation.

Contingency Plan for V070-390441-002

Condition 1.0

Condition 1.0 Not Performed:_____

WARNING

Isopropyl Alcohol (IPA) is flammable and is an irritant.

Usage near heat, sparks or open flame may result in fire. Exposure may cause eye and skin irritation.

Wear **nitrile (N-Dex) gloves .**

Wear **industrial goggles** when work is at eye level or above.

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NOTE

Multiple decrepit locations meeting Condition 1.0 should be worked in parallel.

NOTE

For Condition 1.0 with low running torque only, do not perform substeps 2 through 5 of the following step.

Substeps 2 through 5 Not Performed:_____

116-779 CSR-242

OK To Install N:_____

IF fastener cannot be installed due to galled nutplate threads

THEN perform the following:

1. **Remove** discrepant MD112-1002-0305 screw and MD153-1002-0003 washer.

2. **Clean** nutplate threads with a Beasley tap. Care should be taken to prevent removal of nutplate locking feature.

3. **Clean** internal threads with cotton or foam Q-tip dampened with (1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A . (Ref: MA0110-303 (B) Solvent Cleaned Surfaces .)
Repeat cleaning until no residue is observed on Q-tip.

NOTE
Running torque is torque required to turn bolt through locking feature of nut while in motion, in either installation or removal direction, without preload on fastener.

4. Using a new (1) MD112-1002-0305 screw and (1) MD153-1002-0003 washer , **check** locking torque of nutplate. Acceptable range of locking torque is 2.0 to 18.0 in. lbs.

5. **IF** running torque is acceptable,

   THEN install a new MD112-1002-0305 screw and MD153-1002-0003 washer per Doc: MA0101-301 (LI) Installation of Threaded & Collared Fasteners
   Corrosion protect per Doc: MA0608-301 (LI) Application of Corrosion Protection (Code OO-AA-28-XX).
   Torque fastener: (1) Torque To 20-30 in. lbs.

Cal No._____

Not Performed:_____
SS5

T:_____ **N:**_____
SS5

6. **IF** running torque exceeds maximum,

THEN repeat substeps 1-5.

Not Performed:_____
SS6

T:_____ **N:**_____
SS6

Entire Step Not Performed:_____

T:_____ **N:**_____

WARNING

Loctite Locking/Sealing Compound is a sensitizer and an irritant.

Exposure may cause severe eye, skin and respiratory system irritation, and skin sensitization.

Wear **nitrile (Sol-Vex) gloves** and **safety glasses or industrial goggles .**

Wear a **face shield** over goggles when work is at eye level or above.

Wear **long sleeve coveralls or shop coat ,**

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OK To Install N:_____

IF locking torque is below minimum,

THEN apply loctite and **install** fastener(s) as follows:

1. **Verify** pre-primed screws to which locking compound will be applied are within the range of 15 minutes to 5 days since primer application. (ref S0007.100, Op 202).

   T:_____ N:_____

2. **Verify** locking compound is MIL-S-22473 Grade H and that the shelf life has not expired.

   T:_____ N:_____

NOTE

Fastener must be torqued **within 5 minutes** of locking compound application.

If sealant comes in contact with locking compound it can inhibit loctite's proper cure. Use minimum amount of sealant as possible to prevent sealant from running onto shank and threads.

3. **Install** locking compound and pre-primed fastener(s) as follows:

A. **Apply** one or two drops of (1) BT MIL-S-22473 GR H loctite 78-31 locking compound to the external threads only of new pre-primed MD112-1002-0305 screw(s). (Ref. Figure 116-1 - Locking Compound Application)
Record:

Application Time/Date_____/_____

Exp Date_____

B. **Apply** (1) OZ MB0120-083TY3 sealant aeroglaze 9741, 4 oz. brushtop in accordance with Doc: MA0608-301 (LI) Application of Corrosion Protection (Code OO-AA-23-XX) to the underside of the flight fastener heads only. Use the minimum amount of sealant to meet the intent of the specification. Do not apply sealant to the fastener shanks.

Install MD112-1002-0305 screw(s) and MD153-1002-0003 washer(s) in accordance with Doc: MA0101-301 (LI) Installation of Threaded & Collared Fasteners .
(1) Torque To 20-30 in. lbs.

Cal No. _____

Torque Time/Date _____/_____

T:_____ **N:**_____
SS3B

C. **Verify** torque applied within 5 minutes of locking compound application.

T:_____ **N:**_____
SS3C

Entire Step Not Performed:_____

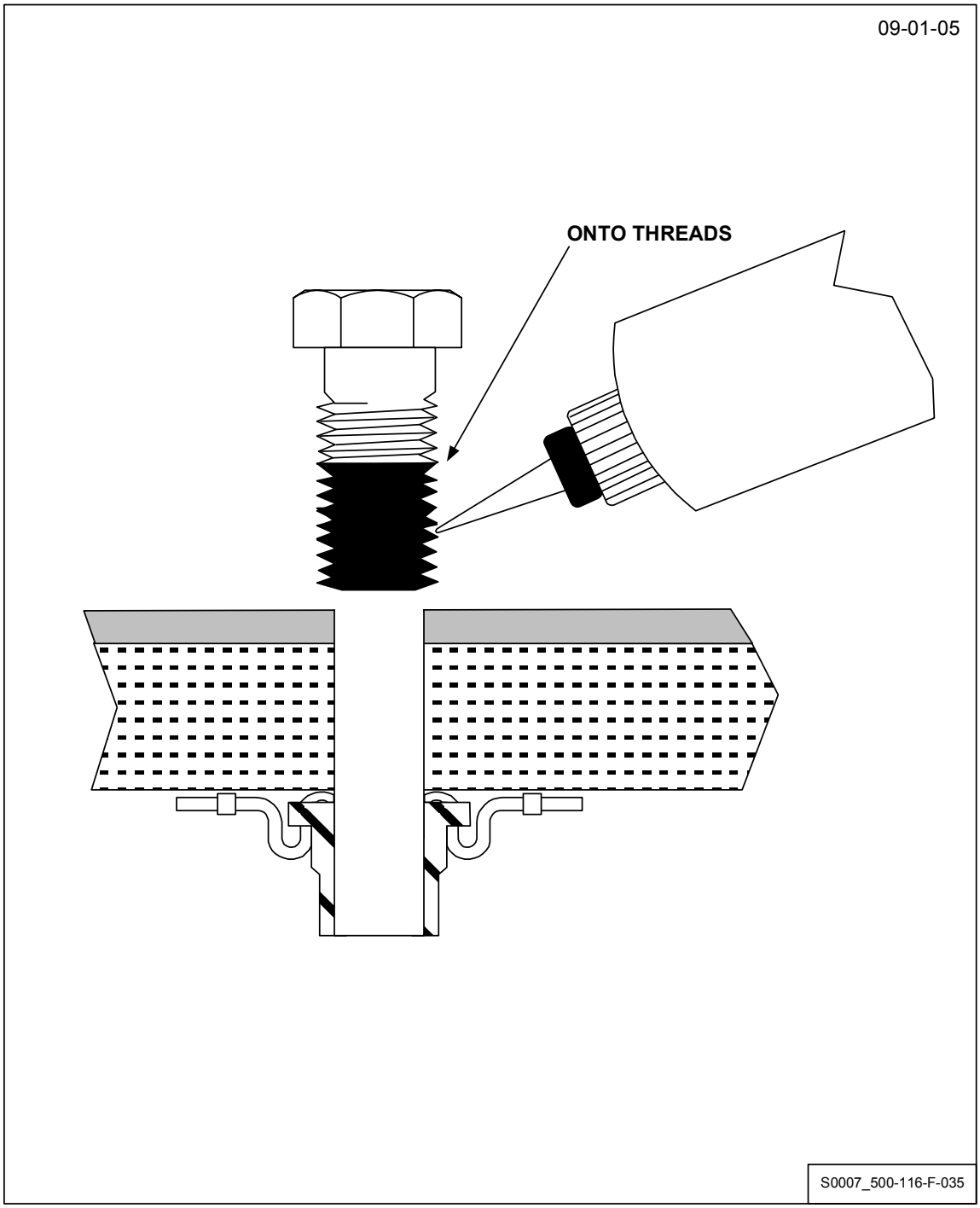

Figure 116-1 - Locking Compound Application
(For Reference Only)

***** End of Condition 1.0 *****

Condition 2.0

116-781 **IF** one fastener is partially installed, and nut element is turning freely in cage,

THEN continue with MD263-0009-0002 FRSI plug installation per standard Crew Hatch closeout procedure in OMI S0007.100, Operation 267.

Not Performed:_____

T:_____ N:_____

***** End of Condition 2.0 *****

Condition 3.0

116-782 **IF** a carrier panel fastener is going to be intentionally left off due to a discrepancy,

THEN continue with MD263-0009-0002 FRSI plug installation per standard Crew Hatch closeout procedure in OMI S0007.100, Operation 267.

Not Performed:_____

T:_____ N:_____

***** End of Condition 3.0 *****

Condition 4.0

Condition 4.0 Not Performed:_____

WARNING

Isopropyl Alcohol (IPA) is flammable and is an irritant.

Usage near heat, sparks or open flame may result in fire. Exposure may cause eye and skin irritation.

Wear **nitrile (N-Dex) gloves .**

Wear **industrial goggles** when work is at eye level or above.

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OK To Install Qw:_____ N:_____

IF two or more fasteners are partially installed, and nut elements are seized and/or spinning freely in cage,

THEN perform the following:

1. **Remove** fastener heads and remove carrier panel using Fastractor Tool. Care should be taken to prevent nutplate assemblies from dropping into hatch cavity.

   V070-390441-002 carrier panel assembly
   CMID:_____

2. **Remove** discrepant adapter plate(s) by removing four NAS1581C3T2 screws. Discard removed screws.

   V070-332416-001 CMID:_____

   V070-332417-001 CMID:_____

3. **Clean** any debris in all of hatch inserts using a cotton or foam swab dampened with (1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .

4. **IF** spare adapter plates are available and to be installed instead of immediate repair and reinstallation of plates with discrepant nutplates,

THEN install new adapter plate(s) using (4) NAS1581C3T2 screw in accordance with Doc: MA0101-301 (LI) Installation of Threaded & Collared Fasteners .
Corrosion protect per Doc: MA0608-301 (LI) Application of Corrosion Protection , (code OO-AA-28-XX).
(1) Torque To 20-30 in. lbs.

Cal No._____

V070-332416-001 CMID:_____

V070-332417-001 CMID:_____

Not Performed:_____
SS4

T:_____ **N:**_____
SS4

NOTE
Perform next three substeps to repair (and reinstall if required) discrepant adapter plate(s).

5. **Remove** nut elements and screws by compressing the open end of the retainer clips until the clips disengage from the side slots in the nutplate baskets.

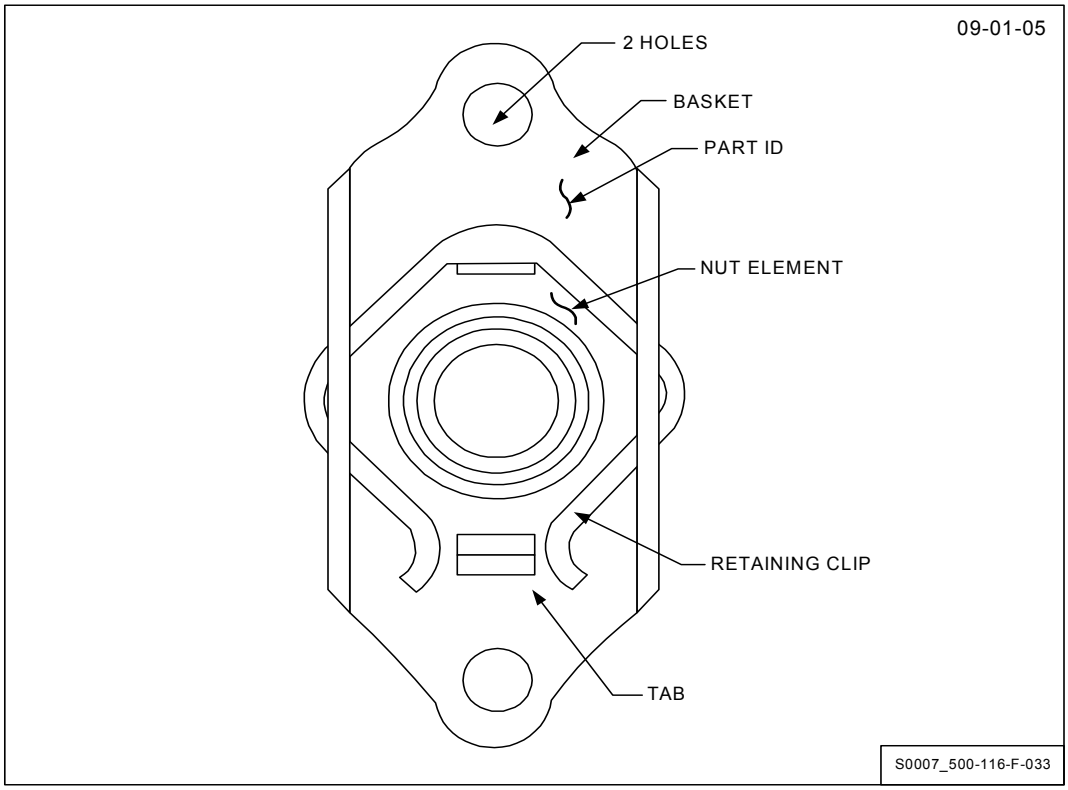
Not Performed:_____
SS5

T:_____
SS5

6. **Obtain** new MD114-1004-0301 nut element(s) and MD126-0005-0003 retainer clip(s) from closeout crew spares.
Install nut element(s) and retainer clip(s) in existing basket.
Verify nut element is free floating and retainer clip is engaged in basket slots. (Ref Figure 116-2).

Not Performed:_____
SS6

T:_____
SS6



Assembly Part No.	Basket Part No.	Nut Element Part No.	Retainer Clip Part No.
Two Lug Floating			
MD114-5020-03 (XX)	MD114-5020-0003	MD114-1004-030(X)	MD126-0005-0003

Figure 116-2 - Nut Plate and Part Numbers
(For Reference Only)

7. **IF** repaired adapter plates are to be reinstalled,

THEN Install repaired adapter plate(s) using new
(4) NAS1581C3T2 screw . **Install** per MA0101-302.
Corrosion protect per MA0608-301, code OO-AA-28-XX.
(1) Torque To 20-30 in. lbs.

Cal No._____

V070-332416-001 CMID:_____

V070-332417-001 CMID:_____

Not Performed:_____
SS7

T:_____ **N:**_____
SS7

8. **IF** repaired adapter plates are not to be reinstalled,

THEN route repaired adapter plates to closeout crew spares.

Not Performed:_____
SS8

T:_____ **N:**_____
SS8

9. **IF** threads of any insert become galled during installation or removal of adapter plate fasteners,

THEN Clean nutplate threads with a Beasley Tap. Care should be taken to prevent removal of nutplate locking feature.
Clean internal threads with cotton or foam Q-tip dampened with (1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .
(Ref: MA0110-303 (B) Solvent Cleaned Surfaces)
Repeat cleaning until no residue is observed on Q-tip.

Not Performed:_____
SS9

T:_____
SS9

Entire Step Not Performed:_____

WARNING

Loctite Locking/Sealing Compound is a sensitizer and an irritant.

Exposure may cause severe eye, skin and respiratory system irritation, and skin sensitization.

Wear **nitrile (Sol-Vex) gloves** and **safety glasses or industrial goggles .**

Wear a **face shield** over goggles when work is at eye level or above.

Wear **long sleeve coveralls or shop coat ,**

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OK To Install N:_____

IF threads of any insert become galled during installation or removal of adapter plate fasteners,

THEN apply loctite and **install** fastener(s) as follows:

1. **Verify** pre-primed screws to which locking compound will be applied are within the range of 15 minutes to 5 days since primer application. (ref S0007.100, Op 204).

   T:_____ N:_____

2. **Verify** locking compound is MIL-S-22473 Grade H and that the shelf life has not expired.

   T:_____ N:_____

NOTE

Fastener must be torqued **within 5 minutes** of locking compound application.

If sealant comes in contact with locking compound it can inhibit loctite's proper cure. Use minimum amount of sealant as possible to prevent sealant from running onto shank and threads.

3. **Install** locking compound and pre-primed fastener(s) as follows:

A. **Apply** one or two drops of (1) BT MIL-S-22473 GR H loctite 78-31 locking compound to the external threads only of new pre-primed NAS1581C3T2 screw(s).
(Ref. Figure 116-3 - Locking Compound Application)
Record:

Application Time/Date_____/_____

Exp Date_____

B. **Apply** (1) OZ MB0120-083TY3 sealant aeroglaze 9741 in accordance with Doc: MA0608-301 (LI) Application of Corrosion Protection (Code OO-AA-23-XX) to the underside of the flight fastener heads only. Use the minimum amount of sealant to meet the intent of the specification. Do not apply sealant to the fastener shanks.

Install NAS1581C3T2 screw(s) in accordance with Doc: MA0101-301 (LI) Installation of Threaded & Collared Fasteners .

(1) Torque To 20-30 in. lbs.

Cal No. _____

Torque Time/Date _____/_____

T:_____ **N:**_____
SS3B

C. **Verify** torque applied within 5 minutes of locking compound application.

T:_____ **N:**_____
SS3C

Entire Step Not Performed:_____

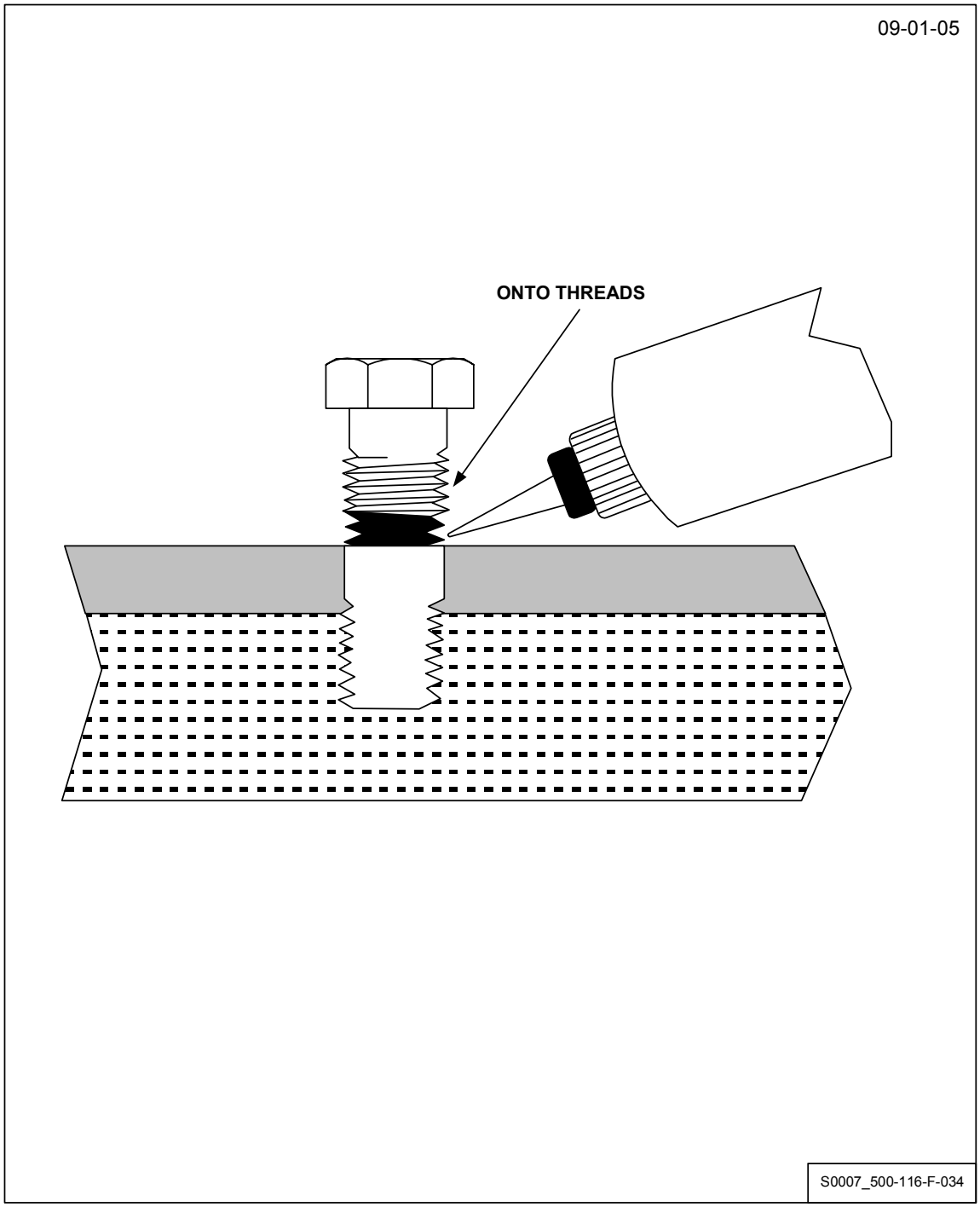

Figure 116-3 - Locking Compound Application
(For Reference Only)

116-785 CSR-242

OK To Install N:_____

Carrier Panel

Install V070-390441-002 carrier panel by installing
(6) MD112-1002-0305 screw and (6) MD153-1002-0003 washer . **Install** fasteners per Doc: MA0101-301 (LI) Installation of Threaded & Collared Fasteners .
Corrosion protect per Doc: MA0608-301 (LI) Application of Corrosion Protection , (code OO-AA-28-XX).
(1) Torque To 20-30 in. lbs.

Cal No._____

V070-390441-002 carrier panel

OCN:_____

T:_____ N:_____

***** End of Condition 4.0 *****

I/E Hatch Cycle for Crew Module Access (Contingency)

NOTE
Perform this option as directed by Test Team to gain access to Crew Module after hatch has been closed for Flight per steps in S0007.100.

I/E Hatch Cycle for Crew Module Access (Contingency) Not Performed:_____

NOTE
Noted requirement is satisfied by the following series of steps.

OMRS V33AH0.010

I/E Hatch Opening

116-786 **OVCC**

IF installed,

THEN remove V070-390441-002 TPS carrier panel by removing the following hardware:

(6) MD263-0009-0002 FRSI plugs
(6) MD112-1002-0305 Screws
(6) MD153-1002-0003 Washers

CMID_____

Retain hardware. **Place** carrier panels in storage container.

Not Performed:_____

T:_____ N:_____

116-787 **OVCC**

CSR-099

OK To Install N:_____

Remove tethered dust cap from ME276-0040-0001 hatch leak check port QD and **connect** SA-2K5-018 hatch burping tool.

T:_____ N:_____

116-788 **OVCC**

CSR-099

OK To Install N:_____

Attach G070-300422-001 hatch handle to I/E hatch by engaging four clips.

T:_____ N:_____

116-789 **OVCC**

CSR-099

OK To Install N:_____

A70-0788 T-Tool (Locking)

1. T-Tool locking lever - **Lock**

2. Ball detent release slide - **Release** (away from handle) and hold.

3. **Install** MD182-0019-0001, -0002, -0005 locking T-tool into hatch actuator.

S/N_____

4. Ball detent release slide - **Engage** (toward handle)

5. **Pull and apply** slight rotation to T-tool and verify proper tool engagement.

T:_____ N:_____

116-790 **OVCC**

CSR-099

Rotate T-tool locking lever 180 degrees to unlock position.

T:_____ N:_____

116-791 **OVCC**

CSR-099

Open I/E hatch per the following:

1. **Rotate** A70-0788 T-tool approximately 240 degrees (CW) until vent detent is contacted.

2. **Verify** area swept by hatch is clear of any obstructions.

3. **Rotate** T-tool approximately 210 additional degrees (CW) until hard stop is felt (kicker latches will slightly open hatch).

4. **Open** hatch while applying an upward force to G070-300422-001 handle to compensate for hatch weight. **Position** hatch to full open with hold open pawl latched.

T:_____ N:_____

***** End of I/E Hatch Opening *****

I/E Hatch Re-closure for Flight

NOTE

Perform this section after access to the Crew Module is complete and concurrence has been given to close hatch for Flight.

116-792 **OVCC**

Verify all non-flight items removed. **Verify** all cables, ECS/PVD ducts, etc., are cleared from hatch opening and no obstructions to hatch closing.

T:_____ N:_____

116-793 **OVCC**

Visually inspect exterior of both inner and outer side hatch WCCS vent ports (30V38WV305 & 30V38WV306) and verify free of obstructions (Ref Dwg: V070-383121 (LI) Purge & Vent Installation, Egress Hatch, Window , Zone 4D)

OMRSD V05AD0.010-B
OMRSD V05AD0.010-C

T:_____ N:_____

116-794 **OVCC**

CSR-099

OK to Install T:_____

Armalon

IF not installed,

THEN install (1) yd 8305-00-K30-2243 armalon over hatch thermal barrier.

Not Performed: _____

T:_____ N:_____

116-795 **OVCC**

Verify OK to close.

N:_____

WARNING

Isopropyl Alcohol (IPA) is flammable and is an irritant.

Usage near heat, sparks or open flame may result in fire. Exposure may cause eye and skin irritation.

Wear **nitrile (N-Dex) gloves .**

Wear **industrial goggles** when work is at eye level or above.

WS002.a 10-17-2007

116-796 **OVCC**

Perform the following:

1. **Wipe** hatch seals and sealing surfaces using a low-lint cloth and (1) OZ 6810005437915 Alcohol,Isopropyl,TT-I-735,Grade A .

2. **Visually inspect** seals for cleanliness and absence of damage.

T:_____ N:_____

116-797 **OVCC**

CSR-099

Verify latch mechanism is in the fully unlatched position.

T:_____ N:_____

WARNING

Oxygen deficient atmosphere may be present in confined space.

Exposure may result in dizziness, unconsciousness, and in extreme cases could cause death.

Do not enter prior to ventilation

Do not enter unless monitoring for oxygen and /or toxic vapor levels exist and adequate oxygen levels are maintained.

WCS001 06-09-2005

CAUTION

Maintain an upward and outboard force on hatch during closure or hatch may not close properly and thermal barrier damage may occur.

NOTE

To prevent oxygen deficiency in I/E hatch area during hatch closure, hold ECS/PVD flexduct open end in close proximity of hatch area where TPS carrier panels are to be installed.

116-798 **OVCC**

CSR-099

Close the I/E hatch per the following:

1. **IF** not released,

   THEN release hold open pawl at hingeline.

   Sub step 1 Not Performed:_____

2. **Pull** outer hatch upward and outboard away from hinges.
   At hingeline, lift outer hatch using alignment guides.
   At outboard edge lift outer hatch using G070-300422-001 hatch handle.

3. **Maintain** upward and outboard force during closure.

4. **Monitor** thermal barrier near hingeline and lower perimeter to ensure proper seating.

T:_____ N:_____

116-799 **OVCC**

CSR-099

Close hatch and **rotate** A70-0788 T-handle 450 degrees (CCW) to latch hatch.

T:_____ N:_____

CAUTION

Do not force T-handle locking lever. If locking lever does not go easily to detent locked position, apply steady light locking force on lever while slowly rotating T-handle (CW/CCW) until locking lever goes to locked detent.

116-800 **OVCC**

CSR-099

Rotate T-handle locking lever 180 degrees to locked position. Do not force. Some slight rotation of T-handle may be necessary to find matching position of hatch locking lever tab detent.

T:_____ N:_____

116-801 **OVCC**

CSR-099

Slide ball detent release button on T-handle away from handle (toward hatch) to release ball lock.

T:_____ N:_____

116-802 **OVCC**

CSR-099

Remove ME182-0019-0001, -0002, or -0005 (A70-0788) hatch operating T-handle from actuator gear box.

T:_____ N:_____

116-803 **OVCC**

Remove G070-300422-001 hatch handle from hatch surface by releasing four clips.

T:_____ N:_____

116-804 **OVCC**

CSR-099

Disconnect "Hatch Burping Tool" Shop Aid # SA-ZK5-018 from vehicle hatch seal leak test port QD coupling (**DO NOT** reinstall tethered dust cap at this time).

T:_____ N:_____

116-805 **OVCC**

CSR-099

IF installed,

THEN remove V070-332629-001 cap from 80V61TP38 hatch test port.

CMID:_____

Not Performed:_____

T:_____ N:_____

116-806 **OVCC**

CSR-099

Using borescope or small inspection mirror:

Visually verify through hatch test port that hatch actuator locking lever is in “locked” detent position.

T:_____ N:_____

Latch Microswitch Continuity Test

116-807 **OVCC**

Remove tethered dust cap from electrical connector J23 near actuator opening.

T:_____ N:_____

116-808 **OVCC**

CSR-028

OK to Install N:_____

A70-0788-04 Test Cable

Attach (1) A70-0788-04 Test cable to connector J23.

T:_____ N:_____

116-809 **OVCC**

CSR-403

Attach yellow plug to (1) 6625-00-T00-1306 DMM, Fluke 8020B or Equivalent meter and measure circuit resistance between pins C and D.

Verify resistance is less than 2.0 Ohms.

Cal No._____

Record _____ Ohms less than 2.0

T:_____ N:_____

116-810 **OVCC**

CSR-403

Attach blue plug to Fluke 8020B or equivalent meter and measure circuit resistance between pins E and F.

Verify resistance is less than 2.0 Ohms.

Cal No._____

Record _____ Ohms less than 2.0

T:_____ **N:**_____

116-811 **CAFM** **CMQC**

Noted requirement complete.

OMRSD V33AH0.010

116-812 **OVCC** **CAFM** **142**

CSR-028

I/E hatch verified latched and locked and latched microswitch continuity test verified nominal.

116-813 **OVCC**

CSR-028

Remove A70-0788-04 test cable from connector J23.

T:_____ N:_____

***** End of Latch Microswitch Continuity Test *****

116-814 **OVCC**

OK to Install N:_____

Tethered Dust Cap

Install tethered dust cap on connector J23.

T:_____ N:_____

Ingress/Egress Hatch Seal Leak Check

CAUTION

Do not exceed 16 psig on C70-0749 unit pressure gage. If pressure reaches 16 psig, immediately close On/Off hand valve (CCW) or damage could occur.

NOTE

In the following leak check, the allowable leakage of 0.91 psig loss in 1 minute is the value for leakage of the combined Flight H/W & GSE volumes.

Exceedance of 0.91 psig in 1 minute indicates a leakage of the Flight H/W volume which is greater than the OMRS allowable limit of 1.0 psi in 1 minute.

If more than 0.91 psig is lost in the following test, contact MEQ engineering for troubleshooting options. (Ref Requirement V33AH0.110)

(Ref. SEPAR SPOC-2752)

116-815 **OVCC**

CSR-099

OK to Install N:_____

C70-0749 Leak Check Unit

IF using C70-0749 S/N -001, -002 or -004 GN_2 bottle units,

THEN Perform leak check per following substeps:

1. **Verify** current validation of C70-0749 unit and record

   S/N _____.

2. **Remove** dust cap from outlet QD of (1) C70-0749-01 leak check unit (S/N -001, -002 or -004).

3. **Connect** leak check unit outlet QD to vehicle seal leak test port.

4. **Position** On/Off hand valve - Slowly On (CW)

5. **Allow** outlet pressure gage indication to stabilize.

6. **Verify** outlet pressure gage indicates 14-16 psig.

7. **Position** On/Off hand valve - Off (CCW)

8. **Verify** outlet pressure gage indicates 14-16 psig.

9. **Record** beginning

   Time_____ Pressure _____ psig (14-16)

10. **Record** after 1 minute

    Time_____ Pressure _____ psig

11. **Verify** pressure decrease on outlet pressure gage is no more than 0.91 psig per minute.

12. **Disconnect** leak check unit outlet QD from hatch seal leak test port.

13. **Install** tethered dust cap on hatch seal leak test port.

14. **Double bag and seal** outlet hose QD.

    OMRSD V33AH0.110-1R

Not Performed:_____

T:_____ N:_____

CAUTION

Do not exceed 16 psig on G070-320074 unit pressure gage. If pressure reaches 16 psig, activate pressure relief valve to vent pressure.

During the following leak check, DO NOT hold G070-320074 test unit by grasping hardware fittings plumbed into the digital gage. Slight temperature changes can affect the digital readout value.

NOTE

In the following leak check, the allowable leakage of 0.90 psig loss in 1 minute is the value for leakage of the combined Flight H/W & GSE volumes.

Exceedance of 0.90 psig in 1 minute indicates a leakage of the Flight H/W volume which is greater than the OMRS allowable limit of 1.0 psi in 1 minute.

If more than 0.90 psig is lost in the following test, contact MEQ engineering for troubleshooting options.
(Ref. SEPAR SPOC-2752)

116-816 OVCC

CSR-099

OK to Install N:_____

IF using G070-320074 Test Unit for Side Hatch Leak Check,

THEN Perform following substeps:

1. **Verify/Install** the QTHA-HOS-3FT flexhose to the outlet port (P1) on the G070-320074 Hand Pump Assembly. **Tighten** hand tight.

2. **Verify/Connect** the G070-320076-001 QD/Filter Assy to the free end of the QTHA-HOS-3FT flexhose. **Tighten** hand tight.

3. **Open/Verify** open (flip up) MV1.

4. **Turn on** digital pressure gage. **Wait** 10 seconds for gage reading to stabilize and **verify** PG1 reads between -1 and +1 psig.

5. **Remove** tethered dust cap of QD coupling half from hatch seal leak test port.

6. **Remove** QD protective bags and/or dust cap form outlet QD of (1) G070-320074 leak check unit

Record S/N_____

7. **Connect** leak check unit outlet QD to vehicle seal leak test port.

8. **Activate** hand pump, **pressurize** test cavity to 14 to 16 pisg. **Activate** pressure relief valve if pressure range is exceeded.

9. **Allow** pressure gage indication to stabilize.

10. **Verify** pressure gage indicates 14 to 16 psig.

11. Shut-off valve MV1 - **Close** (flip down)

12. **Wait** 10-15 seconds prior to start of decay period.

13. **Record**

Time _____ Pressure _____ psig (14 to 16)

14. **Record** after 1 minute:

Time _____ Pressure _____ psig

15. **Verify** seal cavity pressure loss (seal leakage) is no more than 0.90 psig..

16. **Disconnect** leak check unit outlet QD from hatch seal leak test port.

17. **Disconnect** QTHA-HOS-3 flexhose and G070-320076 filter assy from leak check unit outlet port.

18. **Install** tethered dust caps on hatch seal leak test port and filter assy.

19. Digital pressure gage PB - **PRESS** and **RELEASE**

20. **Verify** pressure gage is OFF.

21. **Double bag and seal** leak check unit outlet port, flexhose ends, and filter assy open end..

OMRSD V33AH0.110-1R

Not Performed:_____

T:_____ N:_____

116-817 OVCC CAFM 142

I/E hatch seal leak check verification requirement complete.

***** End of Ingress/Egress Hatch Seal Leak Check *****

116-818 OVCC OTC 212

Hatch closed and latched for flight. Ready for Cabin Leak Check.

TPS Upper Carrier Panel Installation

NOTE

Do not perform this section if the original carrier panel installation steps in S0007.100 have not been worked.

TPS Upper Carrier Panel Installation Not Performed _____

CAUTION

Due to the fragile nature of TPS tile, extreme care should be exercised. Do not apply any force directly on tile surfaces. Clean, white gloves are required for any task that requires contact with tile.

NOTE

In the following step, upper carrier panel should be initially installed without fasteners to verify proper alignment of carrier panel with nut plates. Fasteners shall not be torqued until carrier panel has been installed and properly aligned.

116-819 **OVCC**

OK to Install N:_____

V070-390441-002 Carrier Panel Assembly

CMID_____

NOTE

For OV-104, the CMID is AV8175.

Install TPS Carrier Panel and verify proper alignment.

Install (6) MD112-1002-0305 screw and (6) MD153-1002-0003 washer

T:_____ **N:**_____

116-820 **OVCC**

CSR-242

Torque six MD112-1002-0305 screws securing V070-390441-002 (upper) carrier panel.
(1) Torque to 20-30 in. lbs.

Cal No._____

T:_____ N:_____

CAUTION
Care must be taken during use of tweezers or SA-2-038 (0.040-in. diameter needle tool) to avoid damage to adjacent tile material.

NOTE
Do not perform the following step if using previously trimmed FRSI plugs. Measure depth and trim plugs only if new plugs are being used.

NOTE
The preferred orientation of FRSI plugs is with the uncoated side facing the OML. However, white (elastomer-coated) side facing the OML is acceptable.

116-821 **OVCC**

Measure hole depths from top of carrier panel fasteners to OML at (6) FRSI plug locations.

Trim (6) MD263-0009-0002 FRSI plugs (as required) to hole depths +0.00/-0.12 in.

Not Performed:_____

T:_____ N:_____

116-822 **OVCC**

CSR-179

OK to Install N:_____

MD263-0009-0002 FRSI Plug

Install (6) MD263-0009-0002 FRSI plug assy into V070-390441-002 (upper) carrier panel by rotating plugs clockwise into inserts using a gloved hand. **Complete** plug installations, if required, by using tweezers or SA-2-038 (0.040-in. diameter needle tool) by continuing to rotate FRSI plugs until installed flush to 0.25 in. below tile OML.

T:_____ N:_____

***** End of TPS Upper Carrier Panel Installation *****

***** End of I/E Hatch Re-closure for Flight *****

***** End of I/E Hatch Cycle for Crew Module Access (Contingency) *****

***** End of Contingency Plan for V070-390441-002 *****

***** End of I/E Hatch Carrier Panel (Contingency) *****

*** End of Operation **116** ***

OPERATION 117 Integrated Control Bus Drops

Shop: **TPE**
Cntrl Rm Console: **ALL**
OPR: **TPE**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.5**

NOTE

This Operation is applicable only in the LCD time-frame from completion of ET cryo tanking (stable replenish) until T-20 minutes. All other Firing Room testing/configuration, including GSE, Facilities and Payloads, will be suspended during Control Bus drops.

No Control Bus drops will be performed during ET cryo tanking.

No Control Bus drops permitted after OPS 101 transition (T-20 min).

SCO or ASP is required to support this operation due to manipulation of Control Bus circuit breakers. Side hatch is assumed to be open.

When Control Bus drops are imminent, ensure that:

Vehicle is in nominal Control Bus configuration and vehicle is in quiescent state prior to initiating troubleshooting that includes Control Bus drops.

OMRS (general) S00GEN.780

This Operation configures various Orbiter subsystems in preparation for individual and serial Control Bus drops, as well as configuring the affected subsystem back to Countdown baseline after Control Bus power is restored.

Only the option required to support troubleshooting will be performed. If more than one Control Bus deactivation option is required, the options will be performed serially.

If a Control Bus is dropped after GLS initialization, CGLS should expect to see various interrupts for measurements monitored by the GLS software. These interrupts should be verified against the expected failures for the Control Bus drop and any discrepancies should be reported to the Test Team. When the Control Bus is reactivated, the interrupts received will need to be reset.

NOTE

Hydraulic circ pump maximum down time after start of Cryo Load is 15 minutes. This time protects LO_2 and LH_2 umbilical return actuator line temp minimum of 35 deg F and hydraulic systems fluid HTR inlet and outlet maximum temperature of 135 deg F and reservoir temperature of 35-100 deg F. (Ref Requirement S00FC0.071-1R)

OMS helium and vapor ISO valves are "powered open" but are only open for a short period of time at T-6 hrs. Valves are LPS- operated and therefore not affected unless manipulation via cockpit switch is required.

Control Bus:
Left OMS: BC1, CA1
Right OMS: AB1, BC1

OMS arming valves are "powered open" and are open T-30 min through Launch. Since they are redundantly powered, individual Control Bus drops are not an impact.

Control Bus:
Left OMS: AB1, AB2
Right OMS: CA1, CA2

Options	Control Bus
A	AB1
B	AB2
C	AB3
D	BC1
E	BC2
F	BC3
G	CA1
H	CA2
I	CA3

Control Bus Drop Impact Matrix

	AB1	AB2	AB3	BC1	BC2	BC3	CA1	CA2	CA3	
CEPD	X	X	X	X	X	X	X	X	X	(MEC Core B Pwr)
CEPD	X			X						(MEC Core A Pwr)
CDPS	X	X	X	X	X	X	X	X	X	
CHYD	X	X	X	X	X	X	X	X	X	
CCSE				X	X			X		
CNSE				X						
COFC				X			X			
CMPS						X			X	
CMPL						X			X	
CCME					X	X			X	
CISL										
CPVD	X	X	X	X	X	X		X	X	
CECL	X	X	X	X	X	X	X			

X Indicates a loss of functionality for noted system. Other systems may notice changes in visibility during particular Bus drops but will not lose functionality.

Option A

Control Bus Drop Contingency - AB1
Impacted Systems: CDPS, CHYD, CEPD, and CECL

NOTE

Deactivation of Control Bus AB1 will result in a loss of MEC 1 core A switch scan FD V76S4601E.

CECL will lose FES HI/LO duct nozzle heaters and FES topping duct/nozzle heaters.

NOTE

This option contains steps to switch power source on hydraulic circ pumps. Hydraulic circ pump maximum down time after start of ET Cryo Load is 15 minutes.

Not Performed:_____

117-1 **NTD** **OTC**
TBC
PTC
***FLT**

Configure all elements, as required, to deactivate Control Bus AB1.
Notify console operators that some system indications may be lost.

117-2 **OTC** **CHYD**

Perform system reconfiguration to support deactivation of Control Bus AB1.

NOTE

Circulation pump maximum down time after start of ET Cryo Load is 15 minutes. (Ref Requirement S00FC0.071-1R.)

117-3 **CHYD OTC**
OTC CEPD

Monitor MN A and MN B Bus voltages during pump reconfiguration.

117-4 **CHYD**

```
CURSOR CNTL (VWF19)
  HYD CIRCULATION PUMP 1 - OFF
```

117-5 **CHYD ASP**

```
PANEL A12
  HYD CIRC PUMP POWER 1 SW - MN B
```

117-6 **CHYD**

```
CURSOR CNTL (VWF19)
  HYDRAULIC CIRCULATION PUMP 1 - ON
```

VERIFY

```
CIRC PRESSURE SYS 1 IS 330 PSIA MIN.
CIRC INHIBIT A-I   B- (BUS A POWER INHIBITED)
```

117-7 **CHYD OTC**

HYD system is configured for Control Bus drop.

117-8 **OTC** **NTD**

All elements ready to support AB1 Bus drop.

117-9 **NTD** **TBC**
PTC
***FLT**

Verify ready to support Bus drop.

117-10 **NTD** **OTC**
OTC **CEPD**

Deactivate Control Bus AB1 per OMI S9001.104 .

117-11 **CEPD** **OTC**
OTC **NTD**

Control Bus AB1 deactivation is complete.

117-12 **NTD** **OTC**

Perform appropriate systems troubleshooting with Control Bus AB1 powered down.

117-13 **OTC** **NTD**

Orbiter systems ready for reapplication of Control Bus AB1.

117-14 **NTD** **OTC**
TBC
PTC
***FLT**

Verify ready for application of Control Bus AB1.

117-15 **NTD** **OTC**
OTC **CEPD**

Activate Control Bus AB1 per OMI S9001.104 .

117-16 **CEPD** **OTC**
OTC **NTD**

Control Bus AB1 activation is complete.

117-17 **NTD** **OTC**
TBC
PTC
***FLT**

Reconfigure all elements from AB1 Control Bus drop.

117-18 **OTC** **CHYD**

Reconfigure from AB1 Control Bus drop.

117-19 **CHYD** **OTC**
OTC **CEPD**

Monitor MN A and MN B Bus voltages during pump reconfiguration.

117-20 **CHYD**

```
CURSOR CNTL (VWF19)
  HYDRAULIC CIRCULATION PUMP 1 - OFF
```

117-21 **ASP**

```
PANEL A12
  HYD CIRC PUMP POWER 1 SW - MN A
```

117-22 CHYD

```
CURSOR CNTL (VWF19)
  HYD CIRCULATION PUMP 1 - ON
  VERIFY
  CIRC PRESSURE SYS 1 IS 330 PSIA MIN.
  CIRC INHIBIT A-   B-I  (BUS B POWER INHIBITED)
```

117-23 CHYD OTC

HYD system is reconfigured from Control Bus drop.

117-24 OTC CDPS

Reconfigure from AB1 Control Bus drop.

117-25 CDPS

```
CURSOR CNTL (SAS05, PG-B)
FC & PL MDM BSR READ
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS

CRT (VAS93, PG-A)
NO UNEXPLAINED BSRS
```

117-26 CDPS

```
CURSOR CNTL (SAS01, PG-B)
FAULT SUMMARY PAGE DISPLAY (VASE2)
XMIT CURSOR KEY - PRESS

CRT (SAS01, PG-B)

VERIFY NO UNEXPLAINED FAULT MESSAGES

APPL PAGE (SAS01, PG-B)
PFK 2 KEY - PRESS
```

117-27 **CDPS**

IF FAULT SUMMARY PAGE IS NOT CLEAR,

THEN PERFORM THE FOLLOWING:

```
CONSOLE KYBD
  DEUE DEST,GN,1,LDBA
  XMIT CMD KEY - PRESS

  DEUE SPEC 99 PRO
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS59, PG-B)
  CRT 1 DISP ID = 990

  DEUE RESUME
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

117-28 **CDPS** **ASP**

IF NO BFS CRT ASSIGNED,

THEN

```
PANEL C3
BFC CRT
  SELECT SW - 3+1
  DISPLAY SW - ON
```

Not Performed:_____

117-29 **CDPS** **ASP**

IF CRT 3 ASSIGNED TO BFS,

THEN

```
PANEL C2
  LEFT CRT SEL SW - 3
```

Not Performed:_____

117-30 **CDPS** **ASP**

_____KYBD (BFS KYBD)
FAULT SUMM

CRT_____

REPORT BFS FAULT SUMMARY MESSAGES.

117-31 **CDPS** **ASP**

_____KYBD (BFS KYBD)
SPEC 99 PRO
RESUME

117-32 **CDPS** **ASP**

IF CRT 3 WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C3
BFC CRT
DISPLAY SW - OFF

Not Performed:_____

117-33 **CDPS** **ASP**

IF L KYBD WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C2
LEFT CRT SEL SW - 1

Not Performed:_____

117-34 CDPS ASP

IF MFD2 AUTO SWITCHED TO SECONDARY PORT DUE TO BUS DROP,

THEN PERFORM THE FOLLOWING:
PANEL F7
MFD2 MDU
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS SUBSYS STATUS EDGE KEY
PRESS PORT SELECT EDGE KEY

MFD2

VERIFY PRIMARY PORT SELECTED:
P1*

SELECT FLIGHT DISPLAY AND EDGE KEY MENU,
(REFERENCE S0007.100, OPERATION 272).

Not Performed:_____

117-35 CDPS ASP

IF CDR2 AUTO SWITCHED TO SECONDARY PORT DUE TO BUS DROP,

THEN PERFORM THE FOLLOWING:
PANEL F6
CDR2 MDU
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS SUBSYS STATUS EDGE KEY
PRESS PORT SELECT EDGE KEY

CDR2

VERIFY PRIMARY PORT SELECTED:
P1*

SELECT FLIGHT DISPLAY AND EDGE KEY MENU,
(REFERENCE S0007.100 OPERATION 272).

Not Performed:_____

117-36 CDPS ASP

PANEL F7
CRT1 MDU
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS MEDS MAINT EDGE KEY
PRESS FAULT SUMM EDGE KEY

CRT1
REPORT MEDS FAULT SUMMARY MESSAGES.

117-37 **CDPS** **ASP**

```
PANEL F7
CRT1 MDU
PRESS CLEAR MSGES EDGE KEY (AS REQUIRED)
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS DPS EDGE KEY

CRT1
DPS DISPLAY ACTIVE
```

117-38 **CDPS** **OTC**

DPS Reconfigure From Control Bus AB1 Drop complete.

117-39 **OTC** **CGLS**

Perform masks/resets as required per S0007.500, Operation 124.
Report complete.

117-40 **OTC** **NTD**
NTD **TBC**
PTC
***FLT**

Reconfigure from Control Bus AB1 drop complete. Notify console operators that all systems indications should be restored. Report any discrepancies.

***** End of AB1 Control Bus Drop Contingency *****

Option B

Control Bus Drop Contingency - AB2
Impacted Systems: CDPS, CHYD, CEPD

NOTE

Deactivation of Control Bus AB2 will result in a loss of MEC 1 core B switch scan FD V76X4396E.

CCME will lose EIU C-R switch scan (V72S0097E1).

CECL will lose FES HI/LO nozzle heater and FES topping duct/nozzle heaters.

NOTE

This option contains steps to switch power source on hydraulic circ pumps. Hydraulic circ pump maximum down time after start of ET Cryo Load is 15 minutes.

Not Performed:_____

117-41 **NTD** **OTC**
TBC
PTC
***FLT**

Configure all elements, as required, to deactivate Control Bus AB2.
Notify console operators that some system indications may be lost.

117-42 **OTC** **CHYD**

Perform system reconfiguration to support deactivation of Control Bus AB2.

NOTE

Circulation pump maximum down time after start of ET Cryo Load is 15 minutes. (Ref Requirement S00FC0.071-1R.)

117-43 **CHYD** **OTC**
OTC **CEPD**

Monitor MN A and MN B Bus voltages during pump reconfiguration.

117-44 **CHYD**

```
CURSOR CNTL (VWF19)
HYD CIRCULATION PUMP 1 - OFF
```

117-45 **CHYD** **ASP**

```
PANEL A12
  HYD CIRC PUMP POWER 1 SW - MN B
```

117-46 **CHYD**

```
CURSOR CNTL (VWF19)
  HYDRAULIC CIRCULATION PUMP 1 - ON
```

VERIFY

```
  CIRC PRESSURE SYS 1 IS 330 PSIA MIN.
  CIRC INHIBIT A-I   B- (BUS A POWER INHIBITED)
```

117-47 **CHYD** **OTC**

HYD system is configured for Control Bus drop.

117-48 **OTC** **NTD**

All elements ready to support AB2 Bus drop.

117-49 **NTD** **TBC**
PTC
***FLT**

Verify ready to support Bus Drop.

117-50 **NTD** **OTC**
OTC **CEPD**

Deactivate Control Bus AB2 per OMI S9001.104

117-51 **CEPD** **OTC**
OTC **NTD**

Control Bus AB2 Deactivation is complete.

117-52 **NTD** **OTC**

Perform appropriate systems troubleshooting with Control Bus AB2 powered down.

117-53 **OTC** **NTD**

Orbiter systems ready for reapplication of Control Bus AB2.

117-54 **NTD** **OTC**
TBC
PTC
***FLT**

Verify ready for application of Control Bus AB2.

117-55 **NTD** **OTC**
OTC **CEPD**

Activate Control Bus AB2 per OMI S9001.104

117-56 **CEPD** **OTC**
OTC **NTD**

Control Bus AB2 Activation is complete.

117-57 **NTD** **OTC**
TBC
PTC
***FLT**

Reconfigure all elements from AB2 Control Bus drop.

117-58 **OTC** **CHYD**

Reconfigure from AB2 Control Bus drop.

117-59 **CHYD** **OTC**
OTC **CEPD**

Monitor MN A and MN B Bus voltages during pump reconfiguration.

117-60 **CHYD**

```
CURSOR CNTL (VWF19)
  HYDRAULIC CIRCULATION PUMP 1 - OFF
```

117-61 **CHYD** **ASP**

```
PANEL A12
  HYD CIRC PUMP POWER 1 SW - MN A
```

117-62 CHYD

```
CURSOR CNTL (VWF19)
  HYD CIRCULATION PUMP 1 - ON

  VERIFY

  CIRC PRESSURE SYS 1 IS 330 PSIA MIN.
  CIRC INHIBIT A-  B-I  (BUS B POWER INHIBITED)
```

117-63 CHYD OTC

HYD system is reconfigured from Control Bus drop.

117-64 OTC CDPS

Reconfigure from AB2 Control Bus drop.

117-65 CDPS

```
CURSOR CNTL (SAS05, PG-B)
  FC & PL MDM BSR READ
  XMIT CURSOR KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS93, PG-A)
  NO UNEXPLAINED BSRS
```

117-66 CDPS

```
CURSOR CNTL (SAS01, PG-B)
  FAULT SUMMARY PAGE DISPLAY (VASE2)
  XMIT CURSOR KEY - PRESS

  CRT (SAS01, PG-B)

  VERIFY NO UNEXPLAINED FAULT MESSAGES

  APPL PAGE (SAS01, PG-B)
  PFK 2 KEY - PRESS
```

117-67 CDPS

```
IF FAULT SUMMARY PAGE IS NOT CLEAR,

THEN PERFORM THE FOLLOWING:
CONSOLE KYBD
  DEUE DEST,GN,1,LDBA
  XMIT CMD KEY - PRESS

  DEUE SPEC 99 PRO
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS59, PG-B)
  CRT 1 DISP ID = 990

  DEUE RESUME
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

117-68 CDPS ASP

```
IF NO BFS CRT ASSIGNED,

THEN
PANEL C3
BFC CRT
  SELECT SW - 3+1
  DISPLAY SW - ON
```

Not Performed:_____

117-69 CDPS ASP

```
IF CRT 3 ASSIGNED TO BFS,

THEN
PANEL C2
  LEFT CRT SEL SW - 3
```

Not Performed:_____

117-70 **CDPS** **ASP**

_____KYBD (BFS KYBD)
FAULT SUMM

CRT _____

REPORT BFS FAULT SUMMARY MESSAGES.

117-71 **CDPS** **ASP**

_____KYBD (BFS KYBD)
SPEC 99 PRO
RESUME

117-72 **CDPS** **ASP**

IF CRT 3 WASS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C3
BFC CRT
DISPLAY SW - OFF

Not Performed:_____

117-73 **CDPS** **ASP**

IF LEFT KYBD WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C2
LEFT CRT SEL SW - 1

Not Performed:_____

117-74 **CDPS** **OTC**

DPS reconfigure from Control Bus AB2 drop complete.

117-75 **OTC** **CGLS**

Perform masks/resets as required per S0007.500, Operation 124.
Report complete.

117-76 **OTC** **NTD**
NTD **TBC**
PTC
***FLT**

Reconfigure From Control Bus AB2 Drop complete. Notify console operators that all systems indications should be restored. Report any discrepancies.

***** End of AB2 Control Bus Drop Contingency *****

Option C

Control Bus Drop Contingency - AB3
Impacted Systems: CHYD, CEPD

NOTE
CECL will lose FES HI/LO duct nozzle heaters and FES topping nozzle heater.

Not Performed:_____

117-77 **NTD** **OTC**
TBC
PTC
***FLT**

Configure all elements, as required, to deactivate Control Bus AB3. Notify console operations that some system indications may be lost.

117-78 **OTC** **CHYD**

Perform system reconfiguration to support deactivation of Control Bus AB3.

NOTE
Loss of Control Bus AB3 will cause HYD Body Flap A auto switch scan to indicate off. No action required.

117-79 **CHYD** **ASP**

```
PANEL R2
  APU/HYD
  BOILER CNTLR/HTR  1 SW - B
                    3 SW - B
```

117-80 **CHYD**

CRT (VWF19)

VERIFY C/H SW 1 AND 3 - B.

117-81 **CHYD** **OTC**

HYD system is configured for Control Bus drop.

117-82 **OTC** **NTD**

All elements ready to support AB3 Bus drop.

117-83 **NTD** **TBC**
PTC
***FLT**

Verify ready to support Bus drop.

117-84 **NTD** **OTC**
OTC **CEPD**

Deactivate Control Bus AB3 per OMI S9001.104

117-85 **CEPD** **OTC**
OTC **NTD**

Control Bus AB3 Deactivation is complete.

117-86 **NTD** **OTC**

Perform appropriate systems troubleshooting with Control Bus AB3 powered down.

117-87 **OTC** **NTD**

Orbiter systems ready for reapplication of Control Bus AB3.

117-88 **NTD** **OTC**
TBC
PTC
***FLT**

Verify ready for application of Control Bus AB3.

117-89 **NTD** **OTC**
OTC **CEPD**

Activate Control Bus AB3 per OMI S9001.104 .

117-90 **CEPD** **OTC**
OTC **NTD**

Control Bus AB3 Activation is complete.

117-91 **NTD** **OTC**
TBC
PTC
***FLT**

Reconfigure all elements from AB3 Control Bus drop.

117-92 **OTC** **CHYD**

Reconfigure from AB3 Control Bus drop.

117-93 CHYD ASP

```
PANEL R2
APU/HYD
  BOILER CNTLR/HTR 1 SW - A
                   3 SW - A
```

117-94 CHYD

```
CRT (VWF19)

VERIFY
  C/H SW 1 AND 3 - A.
```

117-95 CHYD OTC

HYD system is reconfigured from Control Bus drop.

117-96 OTC CDPS

Reconfigure from AB3 Control Bus drop.

117-97 CDPS

```
CURSOR CNTL (SAS05, PG-B)
  FC & PL MDM BSR READ
  XMIT CURSOR KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS93, PG-A)
  NO UNEXPLAINED BSRS
```

117-98 CDPS

```
CURSOR CNTL (SAS01, PG-B)
  FAULT SUMMARY PAGE DISPLAY (VASE2)
  XMIT CURSOR KEY - PRESS

  CRT (SAS01, PG-B)

  VERIFY NO UNEXPLAINED FAULT MESSAGES.

  APPL PAGE (SAS01, PG-B)
  PFK 2 KEY - PRESS
```

117-99 CDPS

```
IF FAULT SUMMARY PAGE IS NOT CLEAR,

THEN PERFORM THE FOLLOWING:
CONSOLE KYBD
  DEUE DEST,GN,1,LDBA
  XMIT CMD KEY - PRESS

  DEUE SPEC 99 PRO
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS59, PG-B)
  CRT 1 DISP ID = 990

  DEUE RESUME
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

117-100 CDPS ASP

IF NO BFS CRT ASSIGNED,

THEN
PANEL C3
BFC CRT
SELECT SW - 3+1
DISPLAY SW - ON

Not Performed:_____

117-101 CDPS ASP

IF CRT 3 ASSIGNED TO BFS,

THEN
PANEL C2
  LEFT CRT SEL SW - 3

Not Performed:_____

117-102 CDPS ASP

_____KYBD (BFS KYBD)
     FAULT SUMM

CRT _____

REPORT BFS FAULT SUMMARY MESSAGES

117-103 CDPS ASP

_____KYBD (BFS KYBD)
     SPEC 99 PRO
     RESUME

117-104 **CDPS** **ASP**

```
IF CRT 3 WAS ASSIGNED TO BFS FOR FAULT SUMM
CLEAR,

THEN
PANEL C3
BFC CRT
DISPLAY SW - OFF
```

Not Performed:_____

117-105 **CDPS** **ASP**

```
IF LEFT KYBD WAS ASSIGNED TO BFS FOR FAULT SUMM
CLEAR,

THEN
PANEL C2
  LEFT CRT SEL SW - 1
```

Not Performed:_____

117-106 **CDPS** **OTC**

DPS reconfigure from Control Bus AB3 complete.

117-107 **OTC** **CGLS**

Perform masks/resets as required per S0007.500, Operation 124.
Report complete.

117-108 **OTC** **NTD**
NTD **TBC**
PTC
***FLT**

Reconfigure from Control Bus AB3 drop complete.
Notify console operators that all systems indications should be restored.
Report any discrepancies.

***** End of AB3 Control Bus Drop Contingency *****

Option D

Control Bus Drop Contingency - BC1
Impacted Systems: CCSE, CHYD, CNSE, COFC, and CEPD

NOTE

Deactivation of Control Bus BC1 will result in a loss of MEC 2 core A switch scan FD V76S4605E.

For Control Bus BC1 drop the following MPS measurements will not be available due to loss of telemetry.

PD1 closed position A - V41X1530X1
PD2 closed position A - V41X1430X1
PD1 latch unlocked A - V41X1893X1
PD2 latch unlocked A - V41X1993X1

CCME will lose EIU L-C switch scan (V72S0099E1).

CECL will lose FES left topping nozzle heater.

CNSE will only be impacted by a BC1 control bus on OV-103 and OV-104.

This option contains steps to switch power source on hydraulic circ pumps. Hydraulic circ pump maximum down time after start of ET Cryo Load is 15 minutes.

Not Performed:_____

117-109 **NTD** **OTC**
TBC
PTC
***FLT**

Configure all elements, as required, to deactivate Control Bus BC1.
Notify console operators that some system indications may be lost.

GPS Configure for Control Bus BC1 Drop

NOTE

Do not perform "GPS Configure for Control Bus BC1 Drop" on OV-105.
3-string GPS receivers do not use control busses.

GPS Configure for Control Bus BC1 Drop Not Performed:_____

117-110 OTC CNSE

Perform system reconfiguration to support deactivation of Control Bus BC1.

NOTE

Powering Off MAGR GPS in the following step will cause I/O errors. In G9, MAGR GPS I/O can be disabled and re-enabled using SPEC 55, item 10.

117-111 CNSE ASP

```
PANEL A13
GPS
  POWER SW - OFF
```

117-112 CNSE OTC

NAV system reconfigured for Control Bus drop.

***** End of GPS Configure for Control Bus BC1 Drop *****

117-113 OTC CHYD

Perform system reconfiguration to support deactivation of Control Bus BC1.

NOTE

Circulation pump maximum down time after start of ET Cryo Load is 15 minutes. (Ref. Requirement S00FC0.071-1R.)

117-114 **CHYD** **OTC**
OTC **CEPD**

Monitor MN A and MN B Bus voltages during pump reconfiguration.

117-115 **CHYD**

```
CURSOR CNTL(VWF19)
  HYDRAULIC CIRCULATION PUMP 2 - OFF
```

117-116 **CHYD** **ASP**

```
PANEL A12
  HYD CIRC PUMP POWER 2 SW - MN C
```

117-117 **CHYD**

```
CURSOR CNTL(VWF19)
  HYD CIRC PUMP 2 - ON
```

VERIFY

```
  CIRC PRESSURE SYS 2 IS 330 PSIA MIN.
  CIRC INHIBIT B-I   C-  (BUS B POWER INHIBITED)
```

117-118 **CHYD** **OTC**

HYD system is configured for Control Bus drop.

117-119 **OTC** **CCSE**

Perform system reconfiguration to support deactivation of Control Bus BC1.

NOTE

Control Bus BC1 controls the S-band PM system string 1, which is not active during the effectivity of this procedure.

117-120 CCSE *FLT

IF FM System 1 is active,

THEN transmit DSM 4782 (FM System 2 On)

Not Performed:_____

117-121 CCSE

```
IF PREVIOUS STEP WAS PERFORMED,

THEN PERFORM THE FOLLOWING:
CRT (VWA40, PG-B)
VERIFY

  FM SYSTEM
  XMTR 2 - ON
  SP SRCE - ME DATA
```

Not Performed:_____

NOTE

The S-band quad antenna measurements will be disabled while Control Bus BC1 is off.

117-122 CCSE OTC

COM system is configured for Control Bus drop.

117-123 OTC NTD

All elements ready to support BC1 Bus drop.

117-124 **NTD** **TBC**
PTC
***FLT**

Verify ready to support Bus drop.

117-125 **NTD** **OTC**
OTC **CEPD**

Deactivate Control Bus BC1 per OMI S9001.104 .

117-126 **CEPD** **OTC**
OTC **NTD**

Control Bus BC1 deactivation is complete.

117-127 **NTD** **OTC**

Perform appropriate systems troubleshooting with Control Bus BC1 powered down.

117-128 **OTC** **NTD**

Orbiter systems ready for reapplication of Control Bus BC1.

117-129 **NTD** **OTC**
TBC
PTC
***FLT**

Verify ready for application of Control Bus BC1.

117-130 **NTD** **OTC**
OTC **CEPD**

Activate Control Bus BC1 per OMI S9001.104 .

117-131 **CEPD** **OTC**
OTC **NTD**

Control Bus BC1 activation is complete.

117-132 **NTD** **OTC**
TBC
PTC
***FLT**

Reconfigure all elements from BC1 Control Bus drop.

117-133 **OTC** **CCSE**

Reconfigure from BC1 Control Bus drop.

117-134 **CCSE**

```
CRT (VWA40)
PM SYSTEM
  QUAD - ULA GPC
```

117-135 **CCSE** ***FLT**

IF FM SYSTEM 2 IS ACTIVE,

THEN PERFORM THE FOLLOWING:

XMIT DSM 4780 (S-BAND FM SYS 1 POWER ON)

Not Performed:_____

117-136 **CCSE**

IF PREVIOUS STEP WAS PERFORMED,

THEN PERFORM THE FOLLOWING:

```
CRT (VAA19)
FM OI XMTR 1 ON
FM SP SRCE ME DATA
______WATTS (RECORD)
```

Not Performed:_____

GPS Reconfigure from Control Bus BC1 Drop

NOTE

Do not perform "GPS Reconfigure from Control Bus BC1 Drop" on OV-105. 3-string GPS receivers do not use control busses.

GPS Reconfigure from Control Bus BC1 Drop Not Performed:_____

117-137 **OTC** **CNSE**

Reconfigure from BC1 Control Bus drop.

117-138 **CNSE** **OTC**
OTC **CDPS**

Request KYBD and CRT to bring up SPEC 55 for GPS power up.

CRT _____ KYBD _____

117-139 **CNSE** **ASP**

```
PANEL A13
  GPS POWER SWITCH - ON
```

NOTE

Following step performs an I/O reset. CDPS should expect associated messages.

Wait at least 45 seconds between MAGR power up and I/O reset.

117-140 **CNSE** **ASP**

```
_____KYBD
     I/O RESET
     EXECUTE
     MESSAGE RESET
```

117-141 **CNSE ASP**

```
_____KYBD
     SPEC 55
     PRO

CRT __________
VERIFY
SPEC 55
2 BY ITEM 10
```

117-142 **CNSE ASP**

```
_____KYBD
     ITEM 15 (GPS 2 INIT)
     EXECUTE

CRT __________

VERIFY * BY ITEM 15.
```

117-143 **CNSE**

```
_____KYBD
     ITEM 18 (GPS 2 NAV)
     EXECUTE

CRT __________

VERIFY * BY ITEM 18.
```

117-144 **CNSE**

Verify receiver transitioned from INIT to NAV.

117-145 CNSE ASP

```
______KYBD
      RESUME
```

117-146 CNSE OTC

NAV system is reconfigured from Control Bus drop.

***** End of GPS Reconfigure from Control Bus BC1 Drop *****

117-147 **OTC** **CHYD**

Reconfigure from BC1 Control Bus drop.

117-148 **CHYD** **OTC**
OTC **CEPD**

Monitor MN B and MN C Bus voltages during pump reconfiguration.

117-149 **CHYD**

```
CURSOR CNTL(VWF19)
  HYD CIRCULATION PUMP 2 - OFF
```

117-150 **CHYD** **ASP**

```
PANEL A12
  HYD CIRC PUMP POWER 2 SW - MN B
```

117-151 **CHYD**

```
CURSOR CNTL (VWF19)
  HYD CIRCULATION PUMP 2 - ON

  VERIFY

  CIRC PRESSURE SYS 2 IS 330 PSIA MIN.
  CIRC INHIBIT B-  C-I  (BUS C POWER INHIBITED)
```

117-152 **CHYD** **OTC**

HYD system is reconfigured from Control Bus drop.

117-153 **OTC** **COFC**

Perform RGA2 Turnaround Self Test.

117-154 **COFC**

```
CURSOR CNTL (VABM3/VWB25, PG-B)
RATE GYRO SELECT - TURNAROUND SELF TEST
XMIT CURSOR KEY - PRESS
```

117-155 **COFC**

```
CURSOR CNTL (VABM3/VSB41, PG-B)
RGA2 ALL
XMIT CURSOR KEY - PRESS

START TEST
XMIT CURSOR KEY - PRESS
```

117-156 **COFC**

```
CRT (VABM3/VSB41, PG-B)

RGA2 TEST COMPLETED SUCCESSFULLY
```

117-157 **COFC** **OTC**

RGA test completed successfully

117-158 **OTC** **CDPS**

Reconfigure from BC1 Control Bus drop.

117-159 **CDPS**

```
CURSOR CNTL (SAS05, PG-B)
  FC & PL MDM BSR READ
  XMIT CURSOR KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS93, PG-A)

  NO UNEXPLAINED BSRS
```

117-160 CDPS

```
CURSOR CNTL (SAS01, PG-B)
  FAULT SUMMARY PAGE DISPLAY (VASE2)
  XMIT CURSOR KEY - PRESS

  CRT (SAS01, PG-B)

  VERIFY NO UNEXPLAINED FAULT MESSAGES.

  APPL PAGE (SAS01, PG-B)
  PFK 2 KEY - PRESS
```

117-161 CDPS

```
IF FAULT SUMMARY PAGE IS NOT CLEAR,

THEN PERFORM THE FOLLOWING:
CONSOLE KYBD
  DEUE DEST,GN,1,LDBA
  XMIT CMD KEY - PRESS

  DEUE SPEC 99 PRO
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS59, PG-B)
  CRT 1 DISP ID = 990

  DEUE RESUME
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

117-162 **CDPS** **ASP**

IF NO BFS CRT ASSIGNED,

THEN PERFORM THE FOLLOWING:
PANEL C3
BFC CRT
  SELECT SW - 3+1
  DISPLAY SW - ON

Not Performed:_____

117-163 **CDPS** **ASP**

IF CRT 3 ASSIGNED TO BFS,

THEN PERFORM THE FOLLOWING:
PANEL C2
  LEFT CRT SEL SW - 3

Not Performed:_____

117-164 **CDPS** **ASP**

_____KYBD (BFS KYBD)
     FAULT SUMM

CRT _____

REPORT BFS FAULT SUMMARY MESSAGES.

117-165 **CDPS** **ASP**

_____KYBD (BFS KYBD)
     SPEC 99 PRO
     RESUME

117-166 **CDPS** **ASP**

IF CRT 3 WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C3
BFC CRT
DISPLAY SW - OFF

Not Performed:_____

117-167 **CDPS** **ASP**

IF LEFT KYBD WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C2
  LEFT CRT SEL SW - 1

Not Performed:_____

117-168 **CDPS** **OTC**

DPS reconfigure from Control Bus BC1 drop complete.

117-169 **OTC** **CGLS**

Perform masks/resets as required per S0007.500, Operation 124.
Report complete.

117-170 **OTC** **NTD**
NTD **TBC**
PTC
***FLT**

Reconfigure from Control Bus BC1 drop complete.
Notify console operators that all systems indications should be restored.
Report any discrepancies.

***** End of BC1 Control Bus Drop Contingency *****

Option E

Control Bus Drop Contingency - BC2
Impacted Systems: CDPS, CCSE, CHYD, CEPD, and CCME

NOTE

Deactivation of Control Bus BC2 will result in a loss of MEC 2 core B RPC discrete FD V76X4398E.

CCME will lose E-1 limit control auto output (V72K0071X1)

CECL will lose FES feedline A supply.

Not Performed:_____

117-171 **NTD** **OTC**
TBC
PTC
***FLT**

Configure all elements, as required, to deactivate Control Bus BC2.
Notify console operators that some system indications may be lost.

117-172 **OTC** **CCSE**

Perform system reconfiguration to support deactivation of Control Bus BC2.

117-173 **CCSE** ***FLT**

Transmit DSM 4760 (NSP 1 On)

117-174 **CCSE**

CRT (VWA40)

VERIFY
NSP 1 - ON

STDN HI Mode Option

NOTE
Perform this option if in STDN HI Mode.

STDN HI Mode Option Not Performed:_____

117-175 **CCSE** ***FLT**

Transmit DSM 4722 (Preamp 1 On)

117-176 **CCSE**

CRT (VWA40)

VERIFY
PREAMP 1 - ON.

117-177 **CCSE** ***FLT**

Transmit DSM 4754 (Power Amp 1 On).

117-178 **CCSE**

CRT (VWA40)

VERIFY
POWER AMP 1 - ON.

***** End of STDN HI Mode Option *****

117-179 **CCSE** ***FLT**

Transmit DSM 4709 (S-Band ANT Elec SW 1 On)

117-180 **CCSE**

CRT (VWA40)

VERIFY
ANTENNA SW 1 - ON.

117-181 **CCSE** ***FLT**

Transmit DSM 4730 (Xpndr 1 On)

117-182 **CCSE**

CRT (VWA40)

VERIFY
XPNDR 1 - ON.

117-183 **CCSE** ***MIL**

Reacquire two way RF lock.

117-184 **CCSE**

CRT (VWA40)
VERIFY

NSP 1 ON
SYNC - BIT+FRAME

NOTE

Control Bus BC2 controls the S-band FM system string 2, which is not active during the effectivity of this procedure.

117-185 CCSE OTC

COM system is configured for Control Bus drop.

117-186 OTC CHYD

Perform system reconfiguration to support deactivation of Control Bus BC2.

NOTE

Circulation pump maximum down time after start of ET Cryo Load is 15 minutes. (Ref. Requirement S00FC0.071-1R.)

117-187 CHYD OTC
OTC CEPD

Monitor MN B and MN C Bus voltages during pump reconfiguration.

117-188 CHYD

```
CURSOR CNTL (VWF19)
  HYD CIRC PUMP 2 - OFF
```

117-189 CHYD ASP

```
PANEL A12
  HYD CIRC PUMP POWER 2 SW - MN C
```

117-190 **CHYD**

```
CURSOR CNTL (VWF19)
  HYD CIRC PUMP 2 - ON

  VERIFY
  CIRC PRESSURE SYS 2 IS 330 PSIA MIN.
  CIRC INHIBIT B-I  C-   (BUS B POWER INHIBITED)
```

117-191 **CHYD** **OTC**

Systems configured for BC2 Bus drop.

117-192 **OTC** **NTD**

All elements ready to support BC2 Bus drop.

117-193 **NTD** **TBC**
PTC
***FLT**

Verify ready to support Bus drop.

117-194 **NTD** **OTC**
OTC **CEPD**

Deactivate Control Bus BC2 per OMI S9001.104

117-195 **CEPD** **OTC**
OTC **NTD**

Control Bus BC2 deactivation is complete.

117-196 **NTD** **OTC**

Perform appropriate systems troubleshooting with Control Bus BC2 powered down.

117-197 **OTC** **NTD**

Orbiter systems ready for reapplication of Control Bus BC2.

117-198 **NTD** **OTC**
TBC
PTC
***FLT**

Verify ready for application of Control Bus BC2.

117-199 **NTD** **OTC**
OTC **CEPD**

Activate Control Bus BC2 per OMI S9001.104

117-200 **CEPD** **OTC**
OTC **NTD**

Control Bus BC2 activation is complete.

117-201 **NTD** **OTC**
TBC
PTC
***FLT**

Reconfigure all elements from BC2 Control Bus drop.

117-202 **OTC** **CCSE**

Reconfigure from Control Bus drop BC2.

117-203 **CCSE** ***FLT**

Transmit DSM 4762 (NSP 2 On)

117-204 **CCSE**

CRT (VWA40)

VERIFY
NSP 2 - ON.

PreAmp 1/Power Amp 1 Active

NOTE
Perform this option if Preamp 1 and Power Amp 1 are active.

PreAmp 1/Power Amp 1 Active Not Performed:_____

117-205 **CCSE** ***FLT**

Transmit DSM 4724 (Preamp 2 On)

117-206 **CCSE**

```
CRT (VWA40)

VERIFY
  PRE AMP 2 - ON.
```

117-207 **CCSE** ***FLT**

Transmit DSM 4756 (Power Amp 2 On)

117-208 **CCSE**

```
CRT (VWA40)

VERIFY
  PWR AMP 2 - ON.
```

***** End of PreAmp 1/Power Amp 1 Active *****

117-209 **CCSE** ***FLT**

Transmit DSM 4711 (S-Band ANT Elec SW 2 On)

117-210 **CCSE**

CRT (VWA40)

VERIFY
ANTENNA SW 2 - ON.

117-211 **CCSE** ***FLT**

Transmit DSM 4732 (Xpndr 2 On)

117-212 **CCSE**

CRT (VWA40)

VERIFY
XPNDR 2 - ON.

117-213 **CCSE** ***MIL**

Reacquire two-way RF lock.

117-214 **CCSE**

CRT (VWA40, PG-B)
VERIFY

NSP2 ON
SYNC - BIT+FRAME

117-215 CCSE OTC

COM system is reconfigured from Control Bus drop.

117-216 OTC CHYD

Reconfigure from BC2 Control Bus drop.

117-217 CHYD OTC
OTC CEPD

Monitor MN B and MN C Bus voltages during pump reconfiguration.

117-218 CHYD

```
CURSOR CNTL (VWF19)
  HYD CIRC PUMP 2 - OFF
```

117-219 CHYD ASP

```
PANEL A12
  HYD CIRC PUMP POWER 2 SW - MN B
```

117-220 CHYD

```
CURSOR CNTL (VWF19)
  HYD CIRCULATION PUMP 2 - ON

  VERIFY
  CIRC PRESSURE SYS 2 IS 330 PSIA MIN.
  CIRC INHIBIT B-   C-I  (BUS POWER C INHIBITED)
```

117-221 CHYD OTC

HYD system is reconfigured from Control Bus drop.

117-222 OTC CCME

Reconfigure from BC2 Control Bus drop.

117-223 CCME

```
PFPK PANEL (VWE01A)
  PFPK 1 (RE-INITIALIZE) - PRESS
```

117-224 CCME OTC

System is reconfigured from Control Bus drop.

117-225 OTC CDPS

Reconfigure from BC2 Control Bus drop.

117-226 CDPS

```
CURSOR CNTL (SAS05, PG-B)
  FC & PL MDM BSR READ
  XMIT CURSOR KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS93, PG-A)
  NO UNEXPLAINED BSRS
```

117-227 CDPS

```
CURSOR CNTL (SAS01, PG-B)
  FAULT SUMMARY PAGE DISPLAY (VASE2)
  XMIT CURSOR KEY - PRESS

  CRT (SAS01, PG-B)
  VERIFY NO UNEXPLAINED FAULT MESSAGES.

  APPL PAGE (SAS01, PG-B)
  PFK 2 KEY - PRESS
```

117-228 **CDPS**

```
IF FAULT SUMMARY PAGE IS NOT CLEAR,

THEN PERFORM THE FOLLOWING:
CONSOLE KYBD
  DEUE DEST,GN,1,LDBA
  XMIT CMD KEY - PRESS

  DEUE SPEC 99 PRO
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS59, PG-B)
  CRT 1 DISP ID = 990

  DEUE RESUME
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

117-229 **CDPS** **ASP**

```
IF NO BFS CRT ASSIGNED,

THEN PERFORM THE FOLLOWING:
PANEL C3
BFC CRT
  SELECT SW - 3+1
  DISPLAY SW - ON
```

Not Performed:_____

117-230 **CDPS** **ASP**

```
IF CRT 3 ASSIGNED TO BFS,

THEN PERFORM THE FOLLOWING:
PANEL C2
  LEFT CRT SEL SW - 3
```

Not Performed:_____

117-231 **CDPS** **ASP**

_____KYBD (BFS KYBD)
FAULT SUMM

CRT _____

REPORT BFS FAULT SUMMARY MESSAGES.

117-232 **CDPS** **ASP**

_____KYBD (BFS KYBD)
SPEC 99 PRO
RESUME

117-233 **CDPS** **ASP**

IF CRT 3 WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN PERFORM THE FOLLOWING:
PANEL C3
BFC CRT
DISPLAY SW - OFF

Not Performed:_____

117-234 **CDPS** **ASP**

IF LEFT KYBD WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN PERFORM THE FOLLOWING:
PANEL C2
LEFT CRT SEL SW - 1

Not Performed:_____

117-235 CDPS ASP

IF MFD1 AUTO SWITCHED TO SECONDARY PORT DUE TO BUS DROP,

THEN PERFORM THE FOLLOWING:
PANEL F7
MFD1 MDU
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS SUBSYS STATUS EDGE KEY
PRESS PORT SELECT EDGE KEY

MFD1

VERIFY PRIMARY PORT SELECTED:
P2*

SELECT FLIGHT DISPLAY AND EDGE KEY MENU,
(REFERENCE S0007.100 OPERATION 272).

Not Performed:_____

117-236 CDPS ASP

IF PLT1 AUTO SWITCHED TO SECONDARY PORT DUE TO BUS DROP,

THEN PERFORM THE FOLLOWING:
PANEL F8
PLT1 MDU
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS SUBSYS STATUS EDGE KEY
PRESS PORT SELECT EDGE KEY

PLT1

VERIFY PRIMARY PORT SELECTED:
P2*

SELECT FLIGHT DISPLAY AND EDGE KEY MENU,
(REFERENCE S0007.100 OPERATION 272).

Not Performed:_____

117-237 CDPS ASP

```
PANEL F7
CRT2 MDU
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS MEDS MAINT EDGE KEY
PRESS FAULT SUMM EDGE KEY

CRT2

REPORT MEDS FAULT SUMMARY MESSAGES.
```

117-238 CDPS ASP

```
PANEL F7
CRT2 MDU
PRESS CLEAR MSGS EDGE KEY (AS REQUIRED)
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS DPS EDGE KEY

CRT2
DPS DISPLAY ACTIVE
```

117-239 CDPS OTC

DPS reconfigure from Control Bus BC2 drop complete.

117-240 OTC CGLS

Perform masks/resets as required per S0007.500, Operation 124.
Report complete.

117-241 OTC NTD
NTD TBC
PTC
***FLT**

Reconfigure from Control Bus BC2 drop complete. Notify console operators that all systems indications should be restored. Report any discrepancies.

***** End of BC2 Control Bus Drop Contingency *****

Option F

Control Bus Drop Contingency - BC3
Impacted Systems: CMPS, CMPL, CHYD, CCME, and CEPD

Not Performed:_____

NOTE
CECL will lose FES right topping nozzle heater.

117-242 **NTD** **OTC**
TBC
PTC
***FLT**

Configure all elements, as required, to deactivate Control Bus BC3. Notify console operators that some system indications may be lost.

117-243 **OTC** **CMPL**
CMPS

Perform system reconfiguration to support deactivation of Control Bus BC3.

NOTE

For Control Bus BC3 drop the LO_2 17 inch disconnect open position indicator A (V41X1529X1) and the LH_2 17 inch disconnect open position indicator A (V41X1429X1) will be lost. Control logic notification for these measurements should be inhibited during troubleshooting with Control Bus BC3 down. Additionally, with BC3 down the following MPS measurements will be lost:

PD1 latch locked A - V41X1891X1
PD2 latch locked A - V41X1991X1

CCME will lose E-3 limit control auto output (V72K0073X1).

117-244 CMPL

```
CONSOLE KYBD C-3

I_CX_V41X1529X1
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

117-245 CMPL

```
CONSOLE KYBD C-3

SET _N41X1529X1_ON
XMIT CMD KEY - PRESS
```

117-246 CMPS

```
CONSOLE KYBD C-4

I_CX_V41X1429X1
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

117-247 CMPS OTC
CMPL

MPS and MPL systems are configured for BC3 Bus drop.

117-248 **OTC** **CHYD**

Perform system reconfiguration to support deactivation of Control Bus BC3.

117-249 **CHYD** **ASP**

```
PANEL R2
  APU/HYD
  BOILER CNTLR/HTR  1 SW - B
                    2 SW - B
```

117-250 **CHYD**

```
CRT (VWF19)

VERIFY
  C/H SW 1 AND 2 SW - B.
```

117-251 **CHYD** **OTC**

HYD system is reconfigured for BC3 Bus drop.

117-252 **OTC** **NTD**

All elements ready to support BC3 Bus drop.

117-253 **NTD** **TBC**
PTC
***FLT**

Verify ready to support Bus drop.

117-254 **NTD** **OTC**
OTC **CEPD**

Deactivate Control Bus BC3 per OMI S9001.104

117-255 **CEPD** **OTC**
OTC **NTD**

Control Bus BC3 deactivation is complete.

117-256 OTC CMPL

Perform system status with Control Bus BC3 down.

117-257 CMPL

```
CONSOLE KYBD C3

S_FD_THE FOLLOWING AND VERIFY GOAL NOTIFICATION
INHIBITED FOR:

  V41X1529X1
  V41X1891X1

VERIFY EMONS RECEIVED FOR ABOVE TWO FD'S "OFF"
SHOULD BE "ON".
```

117-258 CMPL

```
CONSOLE KYBD C4

S_FD_THE FOLLOWING AND VERIFY GOAL NOTIFICATION
INHIBITED FOR:

  V41X1429X1
  V41X1991X1

VERIFY EMONS RECEIVED FOR ABOVE TWO FD'S "OFF"
SHOULD BE "ON"
```

117-259 NTD OTC

Perform appropriate systems troubleshooting with Control Bus BC3 powered down.

117-260 OTC NTD

Orbiter systems ready for reapplication of Control Bus BC3.

117-261 **NTD** **OTC**
TBC
PTC
***FLT**

Verify ready for application of Control Bus BC3.

117-262 **NTD** **OTC**
OTC **CEPD**

Activate Control Bus BC3 per OMI S9001.104

117-263 **CEPD** **OTC**
OTC **NTD**

Control Bus BC3 activation is complete.

117-264 **NTD** **OTC**
TBC
PTC
***FLT**

Reconfigure all elements from BC3 Control Bus drop.

117-265 **OTC** **CHYD**

Reconfigure from BC3 Control Bus drop.

117-266 **CHYD** **ASP**

```
PANEL R2
APH/HYD
  BOILER CNTLR/HTR  1 SW - A
                    2 SW - A
```

117-267 CHYD

```
CRT (VWF19)

VERIFY C/H SW 1 AND 2 SW - A.
```

117-268 CHYD OTC

HYD system is reconfigured from Control Bus drop.

117-269 OTC CDPS

Reconfigure from BC3 Control Bus drop.

117-270 CDPS

```
CURSOR CNTL (SAS05, PG-B)
  FC & PL MDM BSR READ
  XMIT CURSOR KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS93, PG-A)
  NO UNEXPLAINED BSRS
```

117-271 CDPS

```
CURSOR CNTL (SAS01, PG-B)
  FAULT SUMMARY PAGE DISPLAY (VASE2)
  XMIT CURSOR KEY - PRESS

  CRT (SAS01, PG-B)

  VERIFY NO UNEXPLAINED FAULT MESSAGES.

  APPL PAGE (SAS01, PG-B)
  PFK 2 KEY - PRESS
```

117-272 **CDPS**

IF FAULT SUMMARY PAGE IS NOT CLEAR,

THEN PERFORM THE FOLLOWING:

```
CONSOLE KYBD
  DEUE DEST,GN,1,LDBA
  XMIT CMD KEY - PRESS

  DEUE SPEC 99 PRO
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS59, PG-B)
  CRT 1 DISP ID = 990

  DEUE RESUME
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

117-273 **CDPS** **ASP**

IF BFS CRT ASSIGNED,

THEN

```
PANEL C3
BFC CRT
  SELECT SW - 3+1
  DISPLAY SW - ON
```

Not Performed:_____

117-274 **CDPS** **ASP**

IF CRT 3 ASSIGNED TO BFS,

THEN

```
PANEL C2
  LEFT CRT SEL SW - 3
```

Not Performed:_____

117-275 CDPS ASP

```
_____KYBD (BFS KYBD)
     FAULT SUMM

CRT __________
```

REPORT BFS FAULT SUMMARY MESSAGES.

117-276 CDPS ASP

```
_____KYBD (BFS KYBD)
     SPEC 99 PRO
     RESUME
```

117-277 CDPS ASP

IF CRT 3 WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C3
BFC CRT
  DISPLAY SW - OFF

Not Performed:_____

117-278 CDPS ASP

IF LEFT KYBD WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C2
  LEFT CRT SEL SW - 1

Not Performed:_____

117-279 CDPS OTC

DPS reconfigure from Control Bus BC3 drop complete.

117-280 **OTC** **CMPS**
CMPL

Perform reconfigure after Control Bus BC3 active.

117-281 **CMPL**

```
CONSOLE KYBD C-3

A_CX_V41X1529X1
XMIT CMD KEY - PRESS
```

117-282 **CMPL**

```
CONSOLE KYBD C-3

SET_N41X1529X1_OFF
XMIT CMD KEY - PRESS
```

117-283 **CMPS**

```
CONSOLE KYBD C-4

A_CX_V41X1429X1
XMIT CMD KEY - PRESS
```

117-284 **CMPL**

```
CONSOLE KYBD C3
S_FD_THE FOLLOWING AND VERIFY GOAL NOTIFICATION
ACTIVE FOR:

  V41X1529X1
  V41X1891X1
```

117-285 **CMPS**

```
CONSOLE KYBD C4
S_FD_THE FOLLOWING AND VERIFY GOAL NOTIFICATION
ACTIVE FOR:

  V41X1429X1
  V41X1991X1
```

117-286 **CMPL** **OTC**

System is reconfigured from Control Bus drop.

117-287 **OTC** **CCME**

Reconfigure from BC3 Control Bus drop.

117-288 **CCME**

```
PFPK PANEL (VWE01A)
  PFPK 1 (RE-INITIALIZE) - PRESS
```

117-289 **CCME** **OTC**

System is reconfigured from Control Bus drop.

117-290 **OTC** **CGLS**

Perform masks/resets as required per S0007.500, Operation 124.
Report complete.

117-291 **OTC** **NTD**
NTD **TBC**
PTC
***FLT**

Reconfigure from Control Bus BC3 drop complete. Notify console operators that all systems indications should be restored. Report any discrepancies.

***** End of BC3 Control Bus Drop Contingency *****

Option G

Control Bus Drop Contingency - CA1
Impacted Systems: CDPS, CHYD, COFC and CEPD

NOTE

Deactivation of Control Bus CA1 will result in a loss of MEC 1 core B RPC discrete FD V76X4395E.

For Control Bus CA1 drop the following MPS measurements will be lost:

PD1 closed position B - V41X1534X1
PD2 closed position B - V41X1434X1
PD1 latch unlocked B - V41X1894X1
PD2 latch unlocked B - V41X1994X1

The UHF power amp measurement will be disabled while Control Bus CA1 is down.

CECL will lose FES feedline B supply.

This option contains steps to switch Bus sources to Orbiter hydraulic circ pumps. Hydraulic circ pump maximum down time after start of ET Cryo Load is 15 minutes.

Not Performed:_____

117-292 **NTD** **OTC**
TBC
PTC
***FLT**

Configure all elements, as required, to deactivate Control Bus CA1.
Notify console operators that some system indications may be lost.

117-293 **OTC** **CHYD**

Perform system reconfiguration to support deactivation of Control Bus CA1.

NOTE
Circulation pump maximum down time after start of ET Cryo Load is 15 minutes. (Ref. Requirement S00FC0.071-1R.)

117-294 **CHYD** **OTC**
OTC **CEPD**

Monitor MN A and MN C Bus voltages during pump reconfiguration.

117-295 **CHYD**

```
CURSOR CNTL (VWF19)
  HYD CIRCULATION PUMP 3 - OFF
```

117-296 **CHYD** **ASP**

```
PANEL A12
  HYD CIRC PUMP POWER 3 SW - MN A
```

117-297 **CHYD**

```
CURSOR CNTL (VWF19)
  HYD CIRC PUMP 3 - ON

  VERIFY
  CIRC PRESSURE SYS 3 IS 330 PSIA MIN.
  CIRC INHIBIT A-  C-I  (BUS C POWER INHIBITED)
```

117-298 **CHYD** **OTC**

HYD system is configured for CA1 Bus drop.

117-299 **OTC** **NTD**

All elements ready to support CA1 Bus drop.

117-300 **NTD** **TBC**
PTC
***FLT**

Verify ready to support Bus drop.

117-301 **NTD** **OTC**
OTC **CEPD**

Deactivate Control Bus CA1 per OMI S9001.104

117-302 **CEPD** **OTC**
OTC **NTD**

Control Bus CA1 deactivation is complete.

117-303 **NTD** **OTC**

Perform appropriate systems troubleshooting with Control Bus CA1 powered down.

117-304 **OTC** **NTD**

Orbiter systems ready for reapplication of Control Bus CA1.

117-305 **NTD** **OTC**
TBC
PTC
***FLT**

Verify ready for application of Control Bus CA1.

117-306 **NTD** **OTC**
OTC **CEPD**

Activate Control Bus CA1 per OMI S9001.104

117-307 **CEPD** **OTC**
OTC **NTD**

Control Bus CA1 activation is complete.

117-308 **NTD** **OTC**
TBC
PTC
***FLT**

Reconfigure all elements from CA1 Control Bus drop.

117-309 **OTC** **CHYD**

Reconfigure from CA1 Control Bus drop.

NOTE
Circulation pump maximum down time after start of ET Cryo Load is 15 minutes. (Ref. Requirement S00FC0.071-1R.)

117-310 **CHYD** **OTC**
OTC **CEPD**

Monitor MN A and MN C Bus voltages during pump reconfiguration.

117-311 **CHYD**

```
CURSOR CNTL (VWF19)
  HYD CIRC PUMP 3 - OFF
```

117-312 **CHYD** **ASP**

```
PANEL A12
  HYD CIRC PUMP POWER 3 SW - MN C
```

117-313 **CHYD**

```
CURSOR CNTL (VWF19)
  HYD CIRCULATION PUMP 3 - ON

  VERIFY
  CIRC PRESSURE SYS 3 IS 330 PSIA MIN.
  CIRC INHIBT C-   A-I  (BUS A POWER INHIBITED)
```

117-314 **CHYD** **OTC**

HYD system is reconfigured from Control Bus drop.

117-315 **OTC** **COFC**

Perform RGA3 turnaround self test.

117-316 **COFC**

```
CURSOR CNTL (VABM3/VWB25, PG-B)
RATE GYRO SELECT - TURNAROUND SELF TEST
XMIT CURSOR KEY - PRESS
```

117-317 **COFC**

```
CURSOR CNTL (VABM3/VSB41, PG-B)
RGA3 ALL
XMIT CURSOR KEY - PRESS

START TEST
XMIT CURSOR KEY - PRESS
```

117-318 **COFC**

```
CRT (VABM3/VSB41, PG-B)

RGA3 TEST COMPLETED SUCCESSFULLY
```

117-319 **COFC** **OTC**

RGA test completed successfully.

117-320 OTC CDPS

Reconfigure from CA1 Control Bus drop.

117-321 CDPS

```
CURSOR CNTL (SAS05, PG-B)
  FC & PL MDM BSR READ
  XMIT CURSOR KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS93, PG-A)

  NO UNEXPLAINED BSRS
```

117-322 CDPS

```
CURSOR CNTL (SAS01, PG-B)
  FAULT SUMMARY PAGE DISPLAY (VASE2)
  XMIT CURSOR KEY - PRESS

  CRT (SAS01, PG-B)

  VERIFY NO UNEXPLAINED FAULT MESSAGES.

  APPL PAGE (SAS01, PG-B)
  PFK 2 KEY - PRESS
```

117-323 CDPS

```
IF FAULT SUMMARY PAGE IS NOT CLEAR,

THEN PERFORM THE FOLLOWING:
CONSOLE KYBD
  DEUE DEST,GN,1,LDBA
  XMIT CMD KEY - PRESS

  DEUE SPEC 99 PRO
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS59, PG-B)
  CRT 1 DISP ID = 990

  DEUE RESUME
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

117-324 CDPS ASP

```
IF NO BFS CRT ASSIGNED,

THEN
PANEL C3
BFC CRT
  SELECT SW - 3+1
  DISPLAY SW - ON
```

Not Performed:_____

117-325 CDPS ASP

IF CRT 3 ASSIGNED TO BFS,

THEN
PANEL C2
  LEFT CRT SEL SW - 3

Not Performed:_____

117-326 CDPS ASP

_____KYBD (BFS KYBD)
     FAULT SUMM

CRT _____

REPORT BFS FAULT SUMMARY MESSAGES

117-327 CDPS ASP

_____KYBD (BFS KYBD)
     SPEC 99 PRO
     RESUME

117-328 CDPS ASP

IF CRT 3 WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C3
BFC CRT
  DISPLAY SW - OFF

Not Performed:_____

117-329 CDPS ASP

IF LEFT KYBD WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C2
  LEFT CRT SEL SW - 1

Not Performed:_____

117-330 CDPS ASP

IF PLT2 AUTO SWITCHED TO SECONDARY PORT DUE TO BUS DROP,

THEN PERFORM THE FOLLOWING:
PANEL F8
PLT2 MDU
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS SUBSYS STATUS EDGE KEY
PRESS PORT SELECT EDGE KEY

PLT2

VERIFY PRIMARY PORT SELECTED:
P3*

SELECT FLIGHT DISPLAY AND EDGE KEY MENU, (REFERENCE S0007.100 OPERATION 272).

Not Performed:_____

117-331 CDPS ASP

IF CDR1 AUTO SWITCHED TO SECONDARY PORT DUE TO BUS DROP,

THEN PERFORM THE FOLLOWING:
PANEL F6
CDR1 MDU
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS SUBSYS STATUS EDGE KEY
PRESS PORT SELECT EDGE KEY

CDR1

VERIFY PRIMARY PORT SELECTED:
P3*

SELECT FLIGHT DISPLAY AND EDGE KEY MENU,
(REFERENCE S0007.100 OPERATION 272).

Not Performed:_____

117-332 CDPS ASP

PANEL F7
CRT3 MDU
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS MEDS MAINT EDGE KEY
PRESS FAULT SUMM EDGE KEY

CRT3

REPORT MEDS FAULT SUMMARY MESSAGES.

117-333 CDPS ASP

```
PANEL F7
CRT3 MDU
PRESS CLEAR MSGES EDGE KEY (AS REQUIRED)
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS DPS EDGE KEY

CRT3

DPS DISPLAY ACTIVE
```

117-334 CDPS OTC

DPS reconfigure from Control Bus CA1 drop complete.

117-335 OTC CGLS

Perform masks/resets as required per S0007.500, Operation 124. Report complete.

117-336 OTC NTD
NTD TBC
PTC
***FLT**

Reconfigure from Control Bus CA1 drop complete. Notify console operators that all systems indications should be restored. Report any discrepancies.

***** End of CA1 Control Bus Drop Contingency *****

Option H

Control Bus Drop Contingency - CA2
Impacted Systems: CDPS, CHYD, CEPD and CCSE

NOTE

Deactivation of Control Bus CA2 will result in a loss of MEC 2 core B RPC discrete FD V76X4397E and UHF Mode FD V74S2034E.

CCME will lose EIU R-L switch scan (V72S0102E1).

The UHF mode measurements will be disabled while Control Bus CA2 is down.

Not Performed:_____

117-337 **NTD** **OTC**
TBC
PTC
***FLT**

Configure all elements, as required, to deactivate Control Bus CA2.
Notify console operators that some system indications may be lost.

117-338 **OTC** **CHYD**

Perform system reconfiguration to support deactivation of Control Bus CA2.

NOTE

Circulation pump maximum down time after start of ET Cryo Load is 15 minutes. (Ref. Requirement S00FC0.071-1R.)

117-339 **CHYD** **OTC**
OTC **CEPD**

Monitor MN A and MN C Bus voltages during pump reconfiguration.

117-340 CHYD

```
CURSOR CNTL (VWF19)
  HYD CIRCULATION PUMP 3 - OFF
```

117-341 CHYD ASP

```
PANEL A12
  HYD CIRC PUMP POWER 3 SW - MN A
```

117-342 CHYD

```
CURSOR CNTL (VWF19)
  HYD CIRC PUMP 3 - ON

  VERIFY

  CIRC PRESSURE SYS 3 IS 330 PSIA MIN.
  CIRC INHIBIT A-   C-I  (BUS C POWER INHIBITED)
```

117-343 CHYD OTC

HYD system is configured for CA2 Bus drop.

117-344 OTC NTD

All elements ready to support CA2 Bus drop.

117-345 NTD TBC
PTC
***FLT**

Verify ready to support Bus drop.

117-346 NTD OTC
OTC CEPD

Deactivate Control Bus CA2 per OMI S9001.104 .

117-347 **CEPD** **OTC**
OTC **NTD**

Control Bus CA2 deactivation is complete.

117-348 **NTD** **OTC**

Perform appropriate systems troubleshooting with Control Bus CA2 powered down.

117-349 **OTC** **NTD**

Orbiter systems ready for reapplication of Control Bus CA2.

117-350 **NTD** **OTC**
TBC
PTC
***FLT**

Verify ready for application of Control Bus CA2.

117-351 **NTD** **OTC**
OTC **CEPD**

Activate Control Bus CA2 per OMI S9001.104 .

117-352 **CEPD** **OTC**
OTC **NTD**

Control Bus CA2 activation is complete.

117-353 **NTD** **OTC**
TBC
PTC
***FLT**

Reconfigure all elements from CA2 Control Bus drop.

117-354 **OTC** **CCSE**

Verify UHF mode measurements.

117-355 **CCSE**

```
CRT (VWA40)

VERIFY
  UHF ATC SYSTEM ACTIVE ON COMM DISPLAY.
```

117-356 **OTC** **CHYD**

Reconfigure from CA2 Control Bus drop.

117-357 **CHYD** **OTC**
OTC **CEPD**

Monitor MN A and MN C Bus voltages during pump reconfiguration.

117-358 **CHYD**

```
CURSOR CNTL (VWF19)
  HYDRAULIC CIRCULATION PUMP 3 - OFF
```

117-359 **CHYD** **ASP**

```
PANEL A12
  HYD CIRC PUMP POWER 3 SW - MN C
```

117-360 **CHYD**

```
CURSOR CNTL (VWF19)
  HYD CIRCULATION PUMP 3 - ON

  VERIFY
  CIRC PRESSURE SYS 1 IS 330 PSIA MIN.
  IRC INHIBIT A-I  C-  (BUS A POWER INHIBITED)
```

117-361 **CHYD** **OTC**

HYD system is reconfigured from Control Bus drop.

117-362 OTC CDPS

Reconfigure from CA2 Control Bus drop.

117-363 CDPS

```
CURSOR CNTL (SAS05, PG-B)
  FC & PL MDM BSR READ
  XMIT CURSOR KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS93, PG-A)

  NO UNEXPLAINED BSRS
```

117-364 CDPS

```
CURSOR CNTL (SAS01, PG-B)
  FAULT SUMMARY PAGE DISPLAY (VASE2)
  XMIT CURSOR KEY - PRESS

  CRT (SAS01, PG-B)

  VERIFY NO UNEXPLAINED FAULT MESSAGES.

  APPL PAGE (SAS01, PG-B)
  PFK 2 KEY - PRESS
```

117-365 CDPS

```
IF FAULT SUMMARY PAGE IS NOT CLEAR,

THEN PERFORM THE FOLLOWING:
CONSOLE KYBD
  DEUE DEST,GN,1,LDBA
  XMIT CMD KEY - PRESS

  DEUE SPEC 99 PRO
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS59, PG-B)
  CRT 1 DISP ID = 990

  DEUE RESUME
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

117-366 CDPS ASP

```
IF NO BFS CRT ASSIGNED,

THEN
PANEL C3
BFC CRT
  SELECT SW - 3+1
  DISPLAY SW - ON
```

Not Performed:_____

117-367 **CDPS** **ASP**

IF CRT 3 ASSIGNED TO BFS,

THEN
PANEL C2
  LEFT CRT SEL SW - 3

Not Performed:_____

117-368 **CDPS** **ASP**

_____KYBD (BFS KYBD)
     FAULT SUMM

CRT _____

REPORT BFS FAULT SUMMARY MESSAGES.

117-369 **CDPS** **ASP**

_____KYBD (BFS KYBD)
     SPEC 99 PRO
     RESUME

117-370 **CDPS** **ASP**

IF CRT 3 WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C3
BFC CRT
DISPLAY SW - OFF

Not Performed:_____

117-371 CDPS ASP

IF LEFT KYBD WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C2
  LEFT CRT SEL SW - 1

Not Performed:_____

117-372 CDPS ASP

PANEL R11U
CRT4 MDU
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS MEDS MAINT EDGE KEY
PRESS FAULT SUM EDGE KEY

CRT4

REPORT MEDS FAULT SUMMARY MESSAGES.

117-373 CDPS ASP

PANEL R11U
CRT4 MDU
PRESS CLEAR MSGS EDGE KEY (AS REQUIRED)
PRESS UP ARROW EDGE KEY TO MAIN MENU
PRESS DPS EDGE KEY

CRT4

DPS DISPLAY ACTIVE

117-374 **CDPS** **OTC**

DPS reconfigure from Control Bus CA2 drop complete.

117-375 **OTC** **CGLS**

Perform masks/resets as required per S0007.500, Operation 124.
Report complete.

117-376 **OTC** **NTD**
NTD **TBC**
PTC
***FLT**

Reconfigure from Control Bus CA2 drop complete. Notify console operators that all systems indications should be restored. Report any discrepancies.

***** End Of CA2 Control Bus Drop Contingency ******

Option I

Control Bus Drop Contingency - CA3
Impacted Systems: CMPL, CMPS, CHYD, CEPD, CCME

Not Performed:_____

117-377 **NTD** **OTC**
TBC
PTC
***FLT**

Configure all elements, as required, to deactivate Control Bus CA3.
Notify console operators that some system indications may be lost.

117-378 **OTC** **CMPL**
CMPS

Perform system reconfiguration to support deactivation of Control Bus CA3.

NOTE

For Control Bus CA3 drop the LO_2 17 inch disconnect open position indicator B (V41X1545X1) and the LH_2 17 inch disconnect open position indicator B (V41X1445X1) will be lost. Control logic notification for these measurements should be inhibited during troubleshooting with Control Bus CA3 down. Additionally, with CA3 down the following MPS measurements will be lost:

PD1 latch locked B - V41X1892X1
PD2 latch locked B - V41X1992X1

CCME will lose E-2 limit control auto output (V72K0072X1).

117-379 CMPL

```
CONSOLE KYBD C-3

I_CX_V41X1545X1
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

117-380 CMPL

```
CONSOLE KYBD C-3

SET _N41X1545X1_ON
XMIT CMD KEY - PRESS
```

117-381 CMPS

```
CONSOLE KYBD C-4

I_CX_V41X1445X1
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

117-382 CMPS OTC
CMPL

MPS and MPL systems are configured for CA3 Bus drop.

117-383 **OTC** **CHYD**

Perform system reconfiguration to support deactivation of Control Bus CA3.

117-384 **CHYD** **ASP**

```
PANEL R2
  APU/HYD
  BOILER CNTLR/HTR 2 SW - B
                   3 SW - B
```

117-385 **CHYD**

```
CRT (VWF19)

VERIFY
  C/H SW 2 AND 3 SW - B.
```

117-386 **CHYD** **OTC**

HYD system is reconfigured for CA3 Bus drop.

117-387 **OTC** **NTD**

All elements ready to support CA3 Bus drop.

117-388 **NTD** **TBC**
PTC
***FLT**

Verify ready to support Bus drop.

117-389 **NTD** **OTC**
OTC **CEPD**

Deactivate Control Bus CA3 per OMI S9001.104

117-390 **OTC** **CMPL**

Perform system status with Control Bus CA3 down.

117-391 **CMPL**

```
CONSOLE KYBD C3
S_FD_THE FOLLOWING AND VERIFY GOAL NOTIFICATION
INHIBITED FOR:

  V41X1545X1
  V41X1892X1

VERIFY EMONS RECEIVED FOR ABOVE TWO FD'S "OFF"
SHOULD BE "ON"
```

117-392 **CMPL**

```
CONSOLE KYBD C4
S_FD_THE FOLLOWING AND VERIFY GOAL NOTIFICATION
INHIBITED FOR:

  V41X1445X1
  V41X1992X1

VERIFY EMONS RECEIVED FOR ABOVE TWO FD'S "OFF"
SHOULD BE "ON"
```

117-393 **NTD** **OTC**

Perform appropriate systems troubleshooting with Control Bus CA3 powered down.

117-394 **OTC** **NTD**

Orbiter systems ready for reapplication of Control Bus CA3.

117-395 **NTD** **OTC**
TBC
PTC
***FLT**

Verify ready for application of Control Bus CA3.

117-396 **NTD** **OTC**
OTC **CEPD**

Activate Control Bus CA3 per OMI S9001.104

117-397 **CEPD** **OTC**
OTC **NTD**

Control Bus CA3 activation is complete.

117-398 **NTD** **OTC**
TBC
PTC
***FLT**

Reconfigure all elements from CA3 Control Bus drop.

117-399 **OTC** **CHYD**

Reconfigure from CA3 Control Bus drop.

117-400 **CHYD** **ASP**

```
PANEL R2
APH/HYD
  BOILER CNTLR/HTR 2 SW - A
                   3 SW - A
```

117-401 **CHYD**

```
CRT (VWF19)

VERIFY
  C/H SW 2 AND 3 SW - A.
```

117-402 CHYD OTC

HYD system is reconfigured from Control Bus drop.

117-403 OTC CDPS

Reconfigure from CA3 Control Bus drop.

117-404 CDPS

```
CURSOR CNTL (SAS05, PG-B)
  FC & PL MDM BSR READ
  XMIT CURSOR KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS93, PG-A)

  NO UNEXPLAINED BSRS
```

117-405 CDPS

```
CURSOR CNTL (SAS01, PG-B)
  FAULT SUMMARY PAGE DISPLAY (VASE2)
  XMIT CURSOR KEY - PRESS

  CRT (SAS01, PG-B)

  VERIFY NO UNEXPLAINED FAULT MESSAGES.

  APPL PAGE (SAS01, PG-B)
  PFK 2 KEY - PRESS
```

117-406 CDPS

IF FAULT SUMMARY PAGE IS NOT CLEAR,

THEN PERFORM THE FOLLOWING:

```
CONSOLE KYBD
  DEUE DEST,GN,1,LDBA
  XMIT CMD KEY - PRESS

  DEUE SPEC 99 PRO
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS

  CRT (VAS59, PG-B)
  CRT 1 DISP ID = 990

  DEUE RESUME
  XMIT CMD KEY - PRESS
  EXEC CMD KEY - PRESS
```

Not Performed:_____

117-407 CDPS ASP

IF NO BFS CRT ASSIGNED,

THEN

```
PANEL C3
BFC CRT
  SELECT SW - 3+1
  DISPLAY SW - ON
```

Not Performed:_____

117-408 CDPS ASP

IF CRT 3 ASSIGNED TO BFS,

THEN

```
PANEL C2
  LEFT CRT SEL SW - 3
```

Not Performed:_____

117-409 **CDPS** **ASP**

```
_____KYBD (BFS KYBD)
     FAULT SUMM

CRT __________
```

REPORT BFS FAULT SUMMARY MESSAGES.

117-410 **CDPS** **ASP**

```
_____KYBD (BFS KYBD)
     SPEC 99 PRO
     RESUME
```

117-411 **CDPS** **ASP**

IF CRT 3 WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C3
BFC CRT
  DISPLAY SW - OFF

Not Performed:_____

117-412 **CDPS** **ASP**

IF LEFT KYBD WAS ASSIGNED TO BFS FOR FAULT SUMM CLEAR,

THEN
PANEL C2
  LEFT CRT SEL SW - 1

Not Performed:_____

117-413 **CDPS** **OTC**

DPS reconfigure from Control Bus CA3 drop complete.

117-414 **OTC** **CMPS**
CMPL

Perform reconfigure after Control Bus CA3 active.

117-415 **CMPL**

```
CONSOLE KYBD C-3

A_CX_V41X1545X1
XMIT CMD KEY - PRESS
```

117-416 **CMPL**

```
CONSOLE KYBD C-3

SET_N41X1545X1_OFF
XMIT CMD KEY - PRESS
```

117-417 **CMPS**

```
CONSOLE KYBD C-4

A_CX_V41X1445X1
XMIT CMD KEY - PRESS
```

117-418 **CMPL**

```
CONSOLE KYBD C3
S_FD_THE FOLLOWING AND VERIFY GOAL NOTIFICATION
ACTIVE FOR:

  V41X1545X1
  V41X1892X1
```

117-419 **CMPS**

```
CONSOLE KYBD C4
S_FD_THE FOLLOWING AND VERIFY GOAL NOTIFICATION
ACTIVE FOR:

  V41X1445X1
  V41X1992X1
```

117-420 **OTC** **CCME**

Reconfigure from CA3 Control Bus drop.

117-421 **CCME**

```
PFPK PANEL (VWE01A)
  PFPK 1 (RE-INITIALIZE) - PRESS
```

117-422 **CCME** **OTC**

CCME is reconfigured from Control Bus drop.

117-423 **OTC** **CGLS**

Perform masks/resets as required per S0007.500, Operation 124.
Report complete.

117-424 **OTC** **NTD**
NTD **TBC**
PTC
***FLT**

Reconfigure from Control Bus CA3 drop complete. Notify console operators that all systems indications should be restored. Report any discrepancies.

***** End Of CA3 Control Bus Drop Contingency *****

117-425

Integrated Control Bus Drops complete.

*** End of Operation **117** ***

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OPERATION 118 Payload Electrical and ROEU Contingencies

Shop: **PLE**
Cntrl Rm Console: **C5**
OPR: **PLE**
Zone: **40**
Hazard (Y/N): **N**
Duration (Hrs): **1.0**

Payload Retention Latches

Option A PRLA Indication Failed On Should Be Off

NOTE
Perform Option A for PRLA indication Failed On should be Off.

Option A Not Performed:_____

NOTE
Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC requirement
   2 of 2, Verify dual motor capability

   For missions using active latches, dual motor operating capability is required. Presence of release indication inhibits release relay logic, presence of latch indication inhibits latch relay logic and results in loss of dual motor capability to operate latch.

2. ASP requirements:
   Access to Panel A6U and R13L.

3. Time requirements:
   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting plan:

   A. Verify P/L Bay MECH Power switches are Off

   B. (ASP) issue switch command to latch in direction of failure.
      Latch is isolated from AC power by P/L Bay MECH Power switch.

   C. (CPLE) monitor MCA operational statuses of failed latch(es)

      If MCA OP status stays normal - no command capability exists, LCC violation confirmed, No Go for Launch.

      If MCA OP status goes invert - command capability does exist, LCC violation cleared, Go for Launch.

   D. Return switches to Launch configuration

118-1 **CPLE**

```
CRT (VWT33)

VERIFY MCA OP STATUS
  1/1 - 1/6 (NORMAL)
  3/1 - 3/8 (NORMAL)
```

118-2 CPLE OTC

Latch troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to payload retention latches. Coordinate with CPLE any other operation:

CAFM
CPVD
CSKU/CNSE

Systems Affected:

Payload Bay doors
Manipulator positioning mechanism
Manipulator retention latches
Vent doors
Radiator latches and deployment
Ku-band antenna deployment

118-3 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN PERFORM
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-4 **CPLE**

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9  (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-5 **CPLE OTC**
OTC CAFM

MID MCA 1 or 3 OP stats may change in following step.

118-6 **CPLE ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___ (LOCATION OF FAILED
                           LATCH,1-3)

PAYLOAD RETENTION LATCH
  ___ SW - ** ___ (LATCH THAT FAILED, 1 )
                  (** DIRECTION OF FAILURE)
PAYLOAD RETENTION
  LOGIC POWER
  SYS ___ SW - ON (FAILED SYSTEM, 1 OR 2)
```

118-7 **CPLE**

CRT (VWT33)

VERIFY SWITCH THROWS IN PREVIOUS STEP.

PAYLOAD SELECT

SW POS _____

LATCH/RELEASE

SWITCH _____- * * _____

LOGIC POWER
SYS ___ SW ON

118-8 **CPLE**

Refer to Table 118-4 at end of Option B for MCA OP statuses to monitor for failed latch(es). **Record** MCA OP status state in Table 118-1 below (invert = Off, normal = On) for failed indicator.

Table 118-1	
System 1	**System 2**
1/1_____	3/1_____
1/2_____	3/2_____
1/3_____	3/3_____
1/4_____	3/4_____
1/5_____	3/5_____
1/6_____	3/6_____
	3/7_____
	3/8_____

118-9 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___ (LAUNCH POSITION)
  LOGIC POWER
    SYS ___ SW - OFF (FAILED SYSTEM)

PAYLOAD RETENTION LATCHES
  ___ SW - OFF (FAILED LATCH SWITCH)
```

118-10 CPLE NTD

Conclusions

1. **IF** MCA OP status goes invert,

   THEN Failure is between MCA relay and MDM or an instrumentation failure. MCA OP status state change verifies "On" limit switch does not inhibit motor capability. Dual motor capability still exists.
   LCC violation cleared. Continue Countdown.

   Not Performed:_____

2. **IF** MCA OP status does not invert,

   THEN dual motor capability has been lost. Limit switch inhibits motor from operating.
   LCC violation confirmed. NO GO for Launch.

   Not Performed:_____

118-11 CPLE OTC

Payload Retention Latch Troubleshooting complete.

***** End of Option A PRLA Indication Failed On Should Be Off *****

Option B PRLA Indication Failed Off Should Be On

NOTE

Perform Option B for PRLA indication Off should be On.

Option B Not Performed:_____

NOTE

This troubleshooting will attempt to determine if a Multiplexer/Demultiplexer (MDM), limit switch, or copper path failure exists. If this anomaly cannot be attributed to an instrumentation failure, access to Panel A6U and Panel R13L may be required. If this anomaly occurs after hatch closure and access to Panel A6U and R13L is not available, the corresponding Ready-For-Latch (R-F-L) indication may be used to verify connector integrity is good.

1. LCC Requirement

   1 of 2, Verify instrumentation failure

   1 of 2, Verify position via MCA OP status

   1 of 2, Very corresponding R-F-L indication

   2 of 2, Verify dual motor capability

   MDM Channelization failure verified by CISL.

   For missions using active latches, position verified by presence of either single motor latch limit switch, either directly or inferred by inhibited MCA relay (OP status stays normal).

   Dual motor capability required, connector integrity verified by one of the following:

   (1) demonstrating latch limit switch still present from latch to MCA and inhibiting MCA relay (OP status stays normal); or if MCA relay not inhibited, then by

   (2) demonstrating motor will draw current when commanded to operate.

   Connector integrity can be verified if the R-F-L indication that corresponds to the failed indication remains ON.

NOTE

2. ASP requirements:
   Access to Panel A6U and R13L.

3. Time requirements:
   2 minutes with go ahead from ASP at panel.

4. Troubleshooting plan:

   A. If the loss of the latch indication can be attributed to a MDM failure then instrumentation failure can be confirmed.
      LCC violation cleared, Go for Launch.

   B. If the loss of the latch indication cannot be attributed to a MDM failure and access to Aft Flight Deck Panels (Panel A6U and Panel R13L) is available, then perform the following. Else, Go to C.
      1. Position P/L Bay MECH Power Switches OFF.
      2. (ASP) with AC Power Off,
         Issue switch command to latch in direction of failure.
      3. Monitor MCA operational statues of failed latch(es).

         If MCA OP status stays normal - Connector integrity is good,
         LCC violation cleared, Go for Launch.

         If MCA OP status goes invert, perform next substeps to configure and monitor AC currents.

      4. ASP configure P/L Bay MECH Power to On (Panel R13L) and issue switch command to drive in direction of failure for 5 seconds maximum.

      5. Monitor AC currents:

         If current increases and/or return of limit switch,
         LCC violation cleared, CPLE is Go.

         If current does not increase - no command capability exists,
         LCC violation confirmed, CPLE is No Go.

      6. (ASP) return switches to Launch configuration.

NOTE

C. If the loss of the latch indication cannot be attributed to a MDM failure and access to Aft Flight Deck Panels (Panel A6U and Panel R13L) is not available, then check the corresponding Ready-For-Latch (R-F-L) indication.

If R-F-L indication has remained ON, then connector integrity is confirmed and dual motor function is maintained and latch position is verified by the other limit switch.
LCC violation is cleared, Go for Launch.

AC distribution

	Motor 1	Motor 2
PRLA SEL 1-3		
Latch 1-5	AC-1	AC-2

Use hard copy or EPD/TPE to record currents before, during and after motor operation.

118-12 **CPLE**

Refer to Table 118-5 at end of Option B for MDM, Card, and Channel of failed latch indication. **Record** below.

MDM_____/ Card_____/ Channel_____

118-13 **CPLE** **OTC**
OTC **CISL**

Check health status of the MDM in the previous step. **Report** status when complete.

Record results_____

118-14 **CPLE**

IF an MDM failure was verified in the previous step,

THEN LCC PAY01 violation is cleared and latch position verified by other limit switch. **CLPE is GO for Launch**.
Not perform the remaining steps in Option B.

Not Performed:_____

118-15 **CPLE** **OTC**

IF CPLE is Go for Launch in previous step,

THEN Verify if access to Panel A6U and R13L is available.

Results:_____

Not Performed:_____

118-16 **CPLE**

IF access to Panel A6U and R13L is NOT available **AND** corresponding Ready-For-Launch indication is ON, **Verify**

THEN Connector integrity is verified, Dual Motor Capability is confirmed, PAY01 LCC violation is cleared and **CPLE is GO for Launch**. Panel Access Steps will be Not Performed. ☐

ELSE Connector Integrity is not verified, LCC PAY01 violation is confirmed, and **CPLE is NO GO for Launch**. ☐

118-17 CPLE OTC

Latch troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to payload retention latches. Coordinate with CPLE any other operation:

CAFM
CPVD
CSKU/CNSE

Systems Affected:

Payload Bay doors
Manipulator positioning mechanism
Manipulator retention latches
Vent doors
Radiator latches and deployment
Ku-band antenna deployment

Panel Access Steps

NOTE

Perform the following Panel Access Steps access to Panels A6U and R13L is available.

Panel Access Steps Not Performed:_____

118-18 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURRS,

THEN PERFORM
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-19 CPLE

```
CRT (SAT01/VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9  (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

NOTE

Use retention latch switch to command MCA relay in direction of failure. If latch indicator failed Off, move retention latch switch to latch position.

118-20 **CPLE** **OTC**
CAFM

MID MCA ___ OP status may change in next step.

118-21 **CPLE** **ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PLD SELECT SW - ____ (LOCATION OF FAILED
                         LATCH, 1-3)

PAYLOAD RETENTION LATCH SW - ____ (LATCH THAT
                                   FAILED, 1-5)
_____(DIRECTION OF FAILURE)

PAYLOAD RETENTION
  LOGIC POWER
  SYS ___ SW - ON (FAILED SYSTEM, 1 OR 2)
```

118-22 **CPLE**

CRT (SAT01/VWT33)

VERIFY SWITCH THROWS IN PREVIOUS STEP.

PAYLOAD SELECT

SW POS _____

LATCH/RELEASE

SWITCH _____ - (1-5)
_____ (DIRECTION OF FAILURE)

LOGIC POWER
  SYS ___ SW ON

118-23 CPLE

Refer to Table 118-4 at end of Option B for MCA OP statuses to monitor for failed latch(es). **Record** MCA OP status state in Table 118-2 below (invert = Off, normal = On) for failed indicator.

Table 118-2	
System 1	**System 2**
1/1_____	3/1_____
1/2_____	3/2_____
1/3_____	3/3_____
1/4_____	3/4_____
1/5_____	3/5_____
1/6_____	3/6_____
	3/7_____
	3/8_____

118-24 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  LOGIC POWER SYS ___ SW - OFF (FAILED SYSTEM)

PAYLOAD RETENTION LATCHES
  ___ SW - OFF (FAILED LATCH SWITCH)
```

118-25 CPLE

```
CRT (SAT01/VWT33)
VERIFY

LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF

PLBM PWR OP STAT
  1/9 (NORMAL) 3/4 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

Contingency for MCA OP Status Did Invert

NOTE

If expected MCA OP status did invert, the MCA relay is not inhibited.
Perform this option to check for current increases or to pick up the limit switch.

Apply logic power for minimum time required to verify current increase:
5 seconds maximum.

Contingency for MCA OP Status Did Invert Not Performed:_____

118-26 CPLE OTC

Request concurrence to power On P/L Bay MECH Power.

Systems Affected

Payload Bay doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

NOTE

Next three steps are verifications only. Reposition switches only with responsible system concurrence.

118-27 **CPLE OTC**
OTC CAFM
CAFM ASP

IF PANEL A8 IS INSTALLED,

THEN VERIFY
PANEL A8
PORT RMS
  DEPLOY/STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

STARBOARD RMS
  DEPLOY/STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

Not Performed:_____

118-28 **CPLE OTC**
OTC CAFM
CAFM ASP

VERIFY
PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - OFF
RADIATOR CONTROL
  SYS A SW - OFF
  SYS B SW - OFF
PL BAY DOOR SW - STOP
PL BAY DOOR ENABLE/DISABLE
  SYS 1 SW - DISABLE
  SYS 2 SW - DISABLE

Not Performed:_____

118-29 **CPLE OTC**
OTC CSKU
CSKU ASP

VERIFY
PANEL R13L
KU ANTENNA
DEPLOY/GND/STOW SW - GND
DIRECT STOW SW - OFF

Not Performed:_____

118-30 **CPLE ASP**

PANEL R13L
PL BAY MECH PWR
SYS _ SW - ON (FAILED SYSTEM)

118-31 **CPLE**

CRT (SAT01/VWT33)
VERIFY

PANEL R13L
PNL BAY MECH PWR
SYS _ SW ON (FAILED SYSTEM)
PLBM PWR OP STAT
___ (INVERT) ____ (INVERT)(FAILED SYS)

NOTE

Use retention latch switch to command MCA relay in direction of failure. If latch indicator failed Off, move retention latch switch to latch position.

118-32 CPLE OTC
CAFM

MID MCA ___ OP status may change in next step.

NOTE

Allow commands to be on for minimum time required to check currents (5 seconds maximum).

118-33 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
PAYLOAD RETENTION LATCH
  _____ SW (LATCH THAT FAILED, 1-5)
  _____ (DIRECTION OF FAILURE)

PAYLOAD RETENTION
  LOGIC POWER
  SYS ___ SW - ON (FAILED SYSTEM, 1 OR 2)
                  (5 SEC MAX, THEN OFF)
```

118-34 CPLE

```
CRT (SAT01/VWT33)
VERIFY

PAYLOAD SELECT

SW POS _____ (LOCATION OF FAILED LATCH, 1-3)

LATCH/RELEASE

SWITCH _____ (LATCH THAT FAILED 1-5)
  _____ (DIRECTION OF FAILURE LAT OR REL)

LOGIC POWER
  SYS ___ SW ON (FAILED SYSTEM 1 OR 2)
                (5 SEC MAX, THEN OFF)
```

118-35 CPLE

Refer to Table 118-4 at end of Option B for MCA OP statuses to monitor for failed latch(es). **Record** MCA OP status state in Table 118-3 below (invert = Off, normal = On) for failed indicator.

Table 118-3	
System 1	**System 2**
1/1_____	3/1_____
1/2_____	3/2_____
1/3_____	3/3_____
1/4_____	3/4_____
1/5_____	3/5_____
1/6_____	3/6_____
	3/7_____
	3/8_____

118-36 **CPLE**

CRT (SAT01/VWT33)

RECORD DELTA CURRENT FOR FAILED SYSTEM (AC1 OR AC2).

	A	B	C
AC -			

118-37 **CPLE** **ASP**

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF

***** End of Contingency for MCA OP Status Did Invert *****

118-38 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___ (LAUNCH POSITION)

PAYLOAD RETENTION LATCHES
  ___ SW - OFF (FAILED LATCH SWITCH)
```

118-39 CPLE

CRT (SAT01/VWT33)
VERIFY

```
PAYLOAD SELECT
  SW POS ___ (LAUNCH POSITION)
LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF

PLBM PWR OP STAT
  1/9 (NORMAL) 3/4 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-40 CPLE

Conclusions:

1. **IF** MCA OP status did not invert,

   THEN the relay is being inhibited by the limit switch indication in the MCA, which confirms instrumentation failure. Connector integrity is good, dual motor function maintained and latch position is verified by the other limit switch.
   LCC violation cleared. Continue Countdown.

   Not Performed:_____

2. **IF** MCA OP status did invert, and the limit switch is picked up by operating the latch,
   THEN LCC violation cleared. Continue Countdown.

   Not Performed:_____

3. **IF** the MCA OP status did invert, and the limit switch is not picked up but AC current increases on all 3 phases,

   THEN connector integrity is good, dual motor function is maintained and latch position is verified by the other limit switch.
   LCC violation cleared. Continue Countdown.

   Not Performed:_____

4. **IF** the MCA OP status did invert, and AC current did not increase,

   THEN hold and evaluate. There may be a demated connector and loss of dual motor latch capability.
   LCC violation confirmed. NO GO for Launch

   Not Performed:_____

118-41 CPLE OTC

Payload Retention Latch Troubleshooting complete.

***** End of Panel Access Steps *****

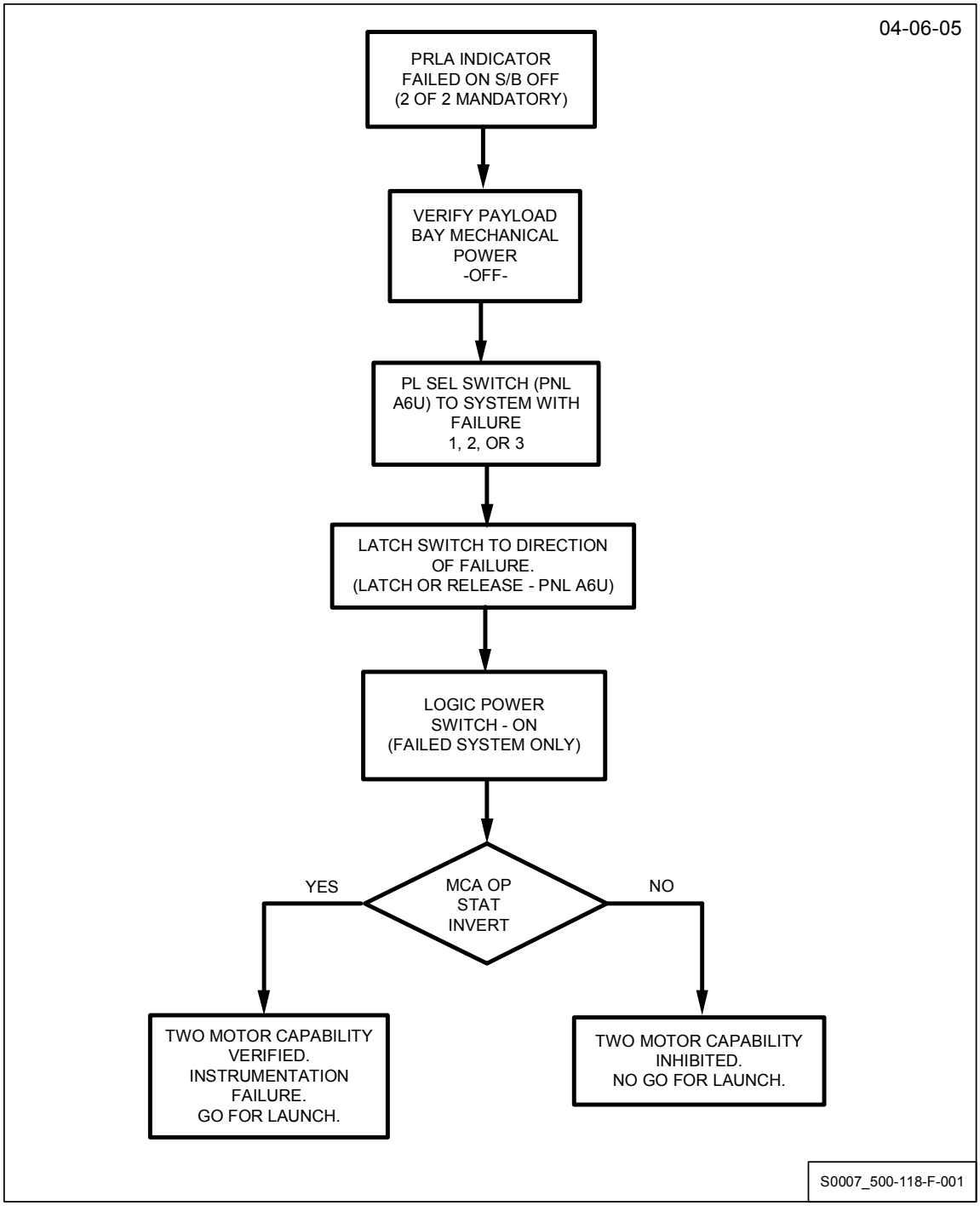
***** End of Option B PRLA Indication Failed Off Should Be On *****

Table 118-4 MID MCA Op Status						
	Latch			Release		
	Sel 1	Sel 2	Sel 3	Sel 1	Sel 2	Sel 3
Latch 1 Sys 1	1/6	1/2	1/4	1/5	1/1	1/3
Latch 1 Sys 2	3/1	3/8	3/7	3/2	3/3	3/4
Latch 2 Sys 1	1/5	1/1	1/3	1/6	1/2	1/4
Latch 2 Sys 2	3/2	3/3	3/4	3/1	3/7	3/8
Latch 3 Sys 1	1/6	1/2	1/4	1/5	1/1	1/3
Latch 3 Sys 2	3/7	3/8	3/2	3/5	3/6	3/1
Latch 4 Sys 1	1/5	1/1	1/3	1/6	1/2	1/4
Latch 4 Sys 2	3/5	3/6	3/1	3/3	3/4	3/7
Latch 5 Sys 1	1/6	1/2	1/4	1/5	1/1	1/3
Latch 5 Sys 2	3/4	3/3	3/7	3/8	3/2	3/5

Table 118-5 MDM Status						
	Latch			Release		
	Sel 1	Sel 2	Sel 3	Sel 1	Sel 2	Sel 3
Latch 1 Sys 1	OA3 CD05 CH01 SB11	OA3 CD01 CH02 SB09	OF2 CD04 CH01 SB08	OA3 CD01 CH02 SB00	OA3 CD12 CH01 SB11	OF2 CD14 CH00 SB03
Latch 1 Sys 2	OF2 CD06 CH01 SB02	OF2 CD12 CH02 SB10	OF1 CD04 CH02 SB07	OF2 CD04 CH01 SB09	OF2 CD14 CH02 SB10	OF1 CD14 CH00 SB05
Latch 2 Sys 1	OA3 CD10 CH01 SB12	OF4 CD07 CH02 SB05	OF2 CD14 CH02 SB09	OA3 CD05 CH00 SB15	OF4 CD05 CH02 SB08	OF2 CD12 CH00 SB08
Latch 2 Sys 2	OF2 CD04 CH01 SB05	OF1 CD04 CH01 SB04	OF1 CD06 CH01 SB02	OF2 CD14 CH00 SB05	OF1 CD14 CH00 SB04	OF1 CD12 CH00 SB05
Latch 3 Sys 1	OA3 CD12 CH02 SB10	OF4 CD13 CH02 SB06	OF2 CD12 CH01 SB04	OA3 CD12 CH01 SB08	OF4 CD12 CH02 SB06	OF2 CD06 CH01 SB05
Latch 3 Sys 2	OF2 CD14 CH01 SB04	OF1 CD14 CH00 SB06	OF1 CD14 CH00 SB01	OF2 CD12 CH00 SB03	OF1 CD12 CH01 SB03	OF1 CD12 CH02 SB00
Latch 4 Sys 1	OA3 CD10 CH01 SB14	OF4 CD04 CH02 SB05	OF2 CD06 CH02 SB10	OA3 CD07 CH02 SB13	OF4 CD02 CH00 SB09	OF2 CD04 CH01 SB10
Latch 4 Sys 2	OF2 CD12 CH02 SB08	OF1 CD12 CH00 SB04	OF1 CD06 CH01 SB04	OF2 CD06 CH01 SB03	OF1 CD06 CH02 SB03	OF1 CD04 CH02 SB03
Latch 5 Sys 1	OA3 CD10 CH02 SB14	OF2 CD06 CH01 SB04	OF2 CD14 CH02 SB12	OA3 CD10 CH02 SB06	OF2 CD04 CH02 SB10	OF2 CD14 CH01 SB03
Latch 5 Sys 2	OF2 CD06 CH02 SB11	OF1 CD06 CH02 SB06	OF1 CD04 CH01 SB07	OF2 CD04 CH02 SB15	OF1 CD04 CH01 SB05	OF1 CD14 CH01 SB06

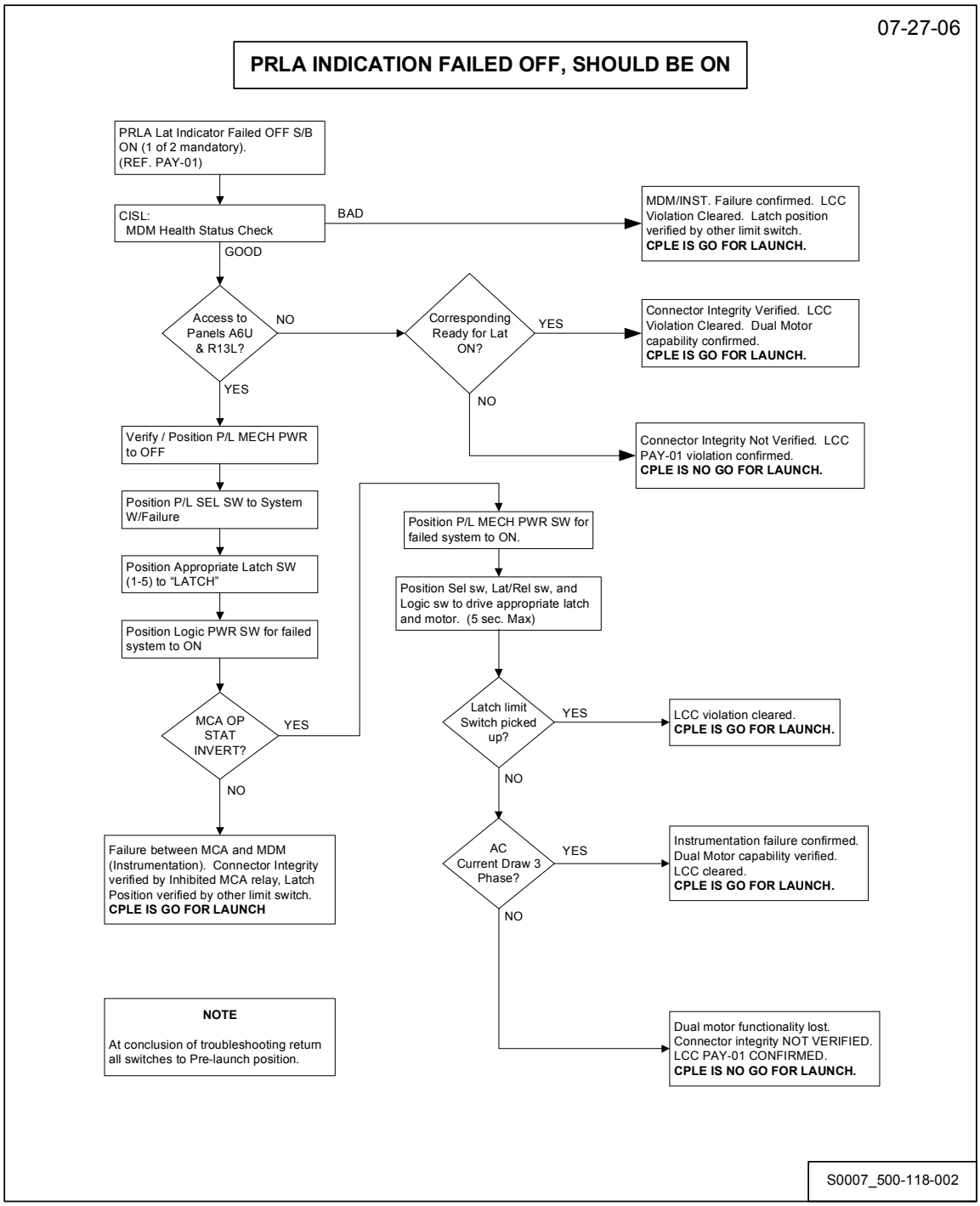
118-42

PRLA Indicator Failed On, Should Be Off



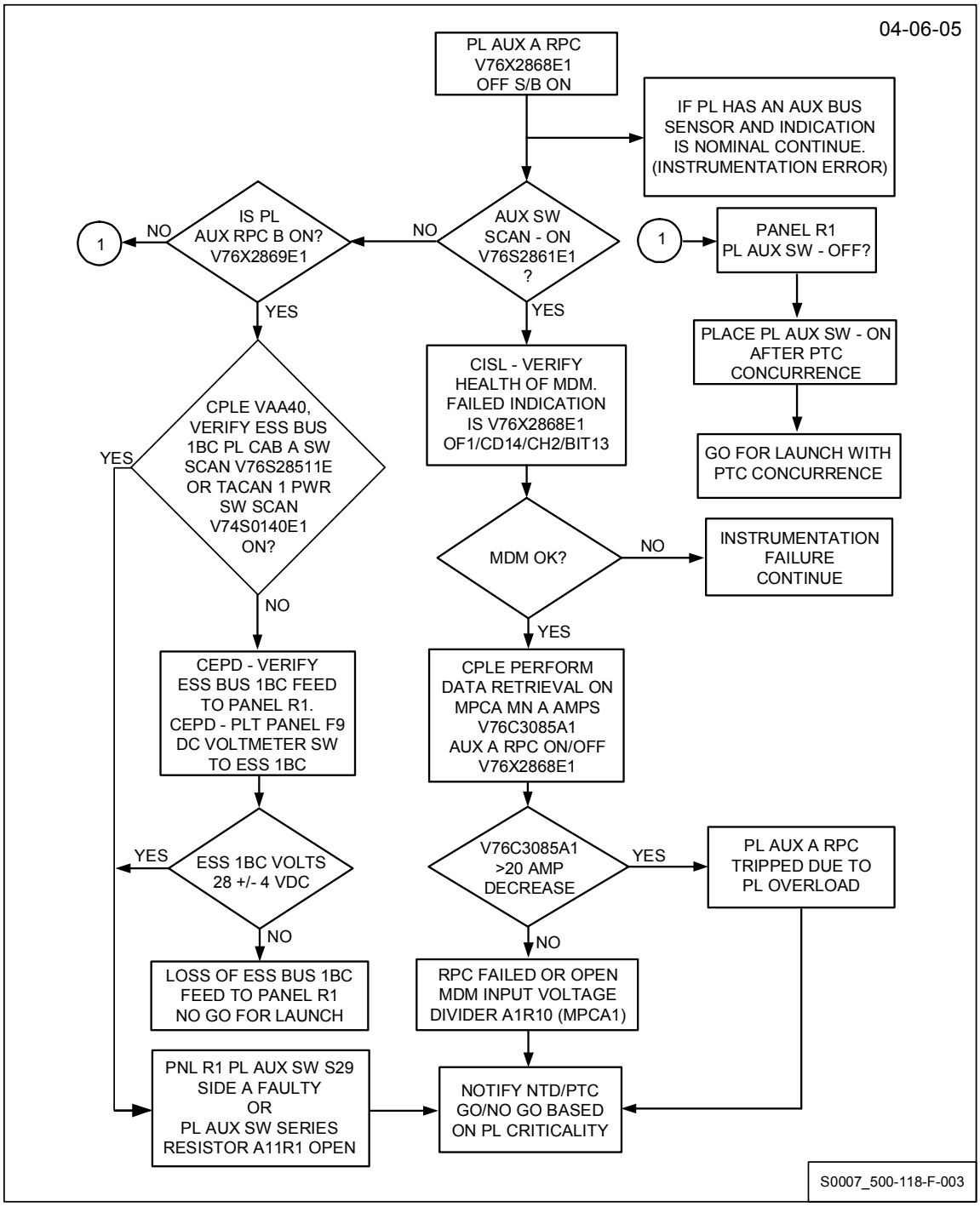
118-43

PRLA Indicator Failed Off, Should Be On



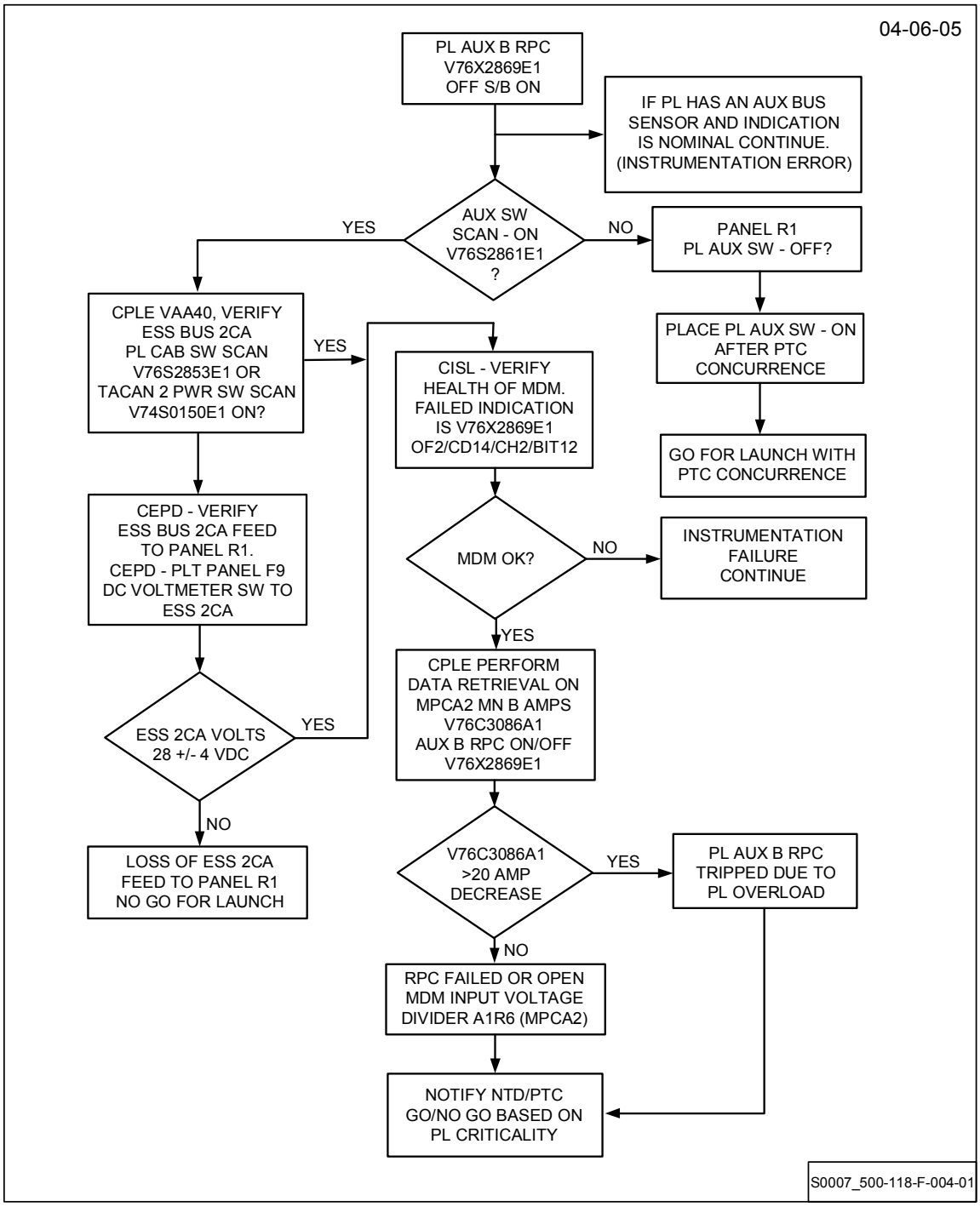
118-44

PL Aux A RPC Anomaly Troubleshooting Flow Chart (SSID PAY-02)

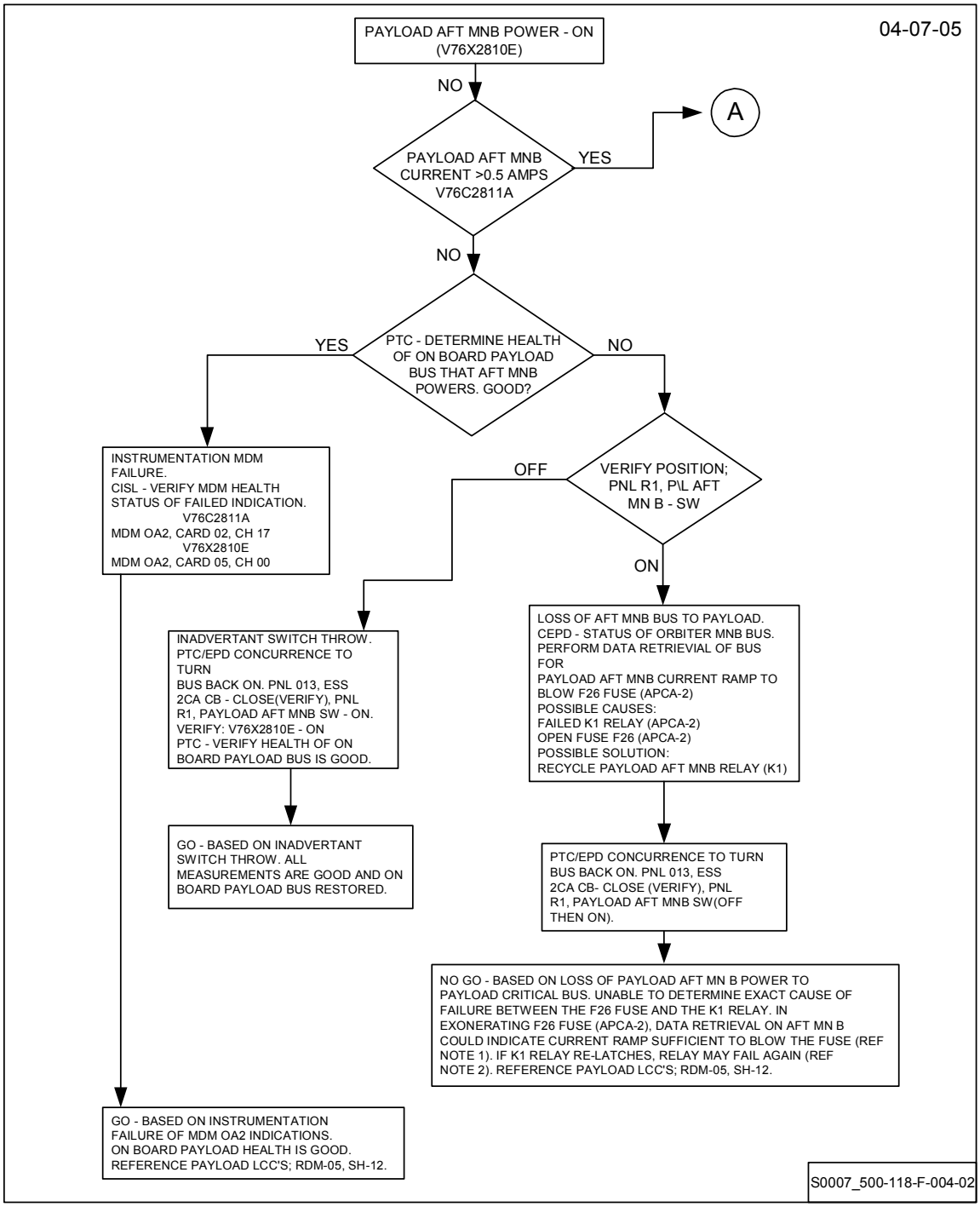


118-45

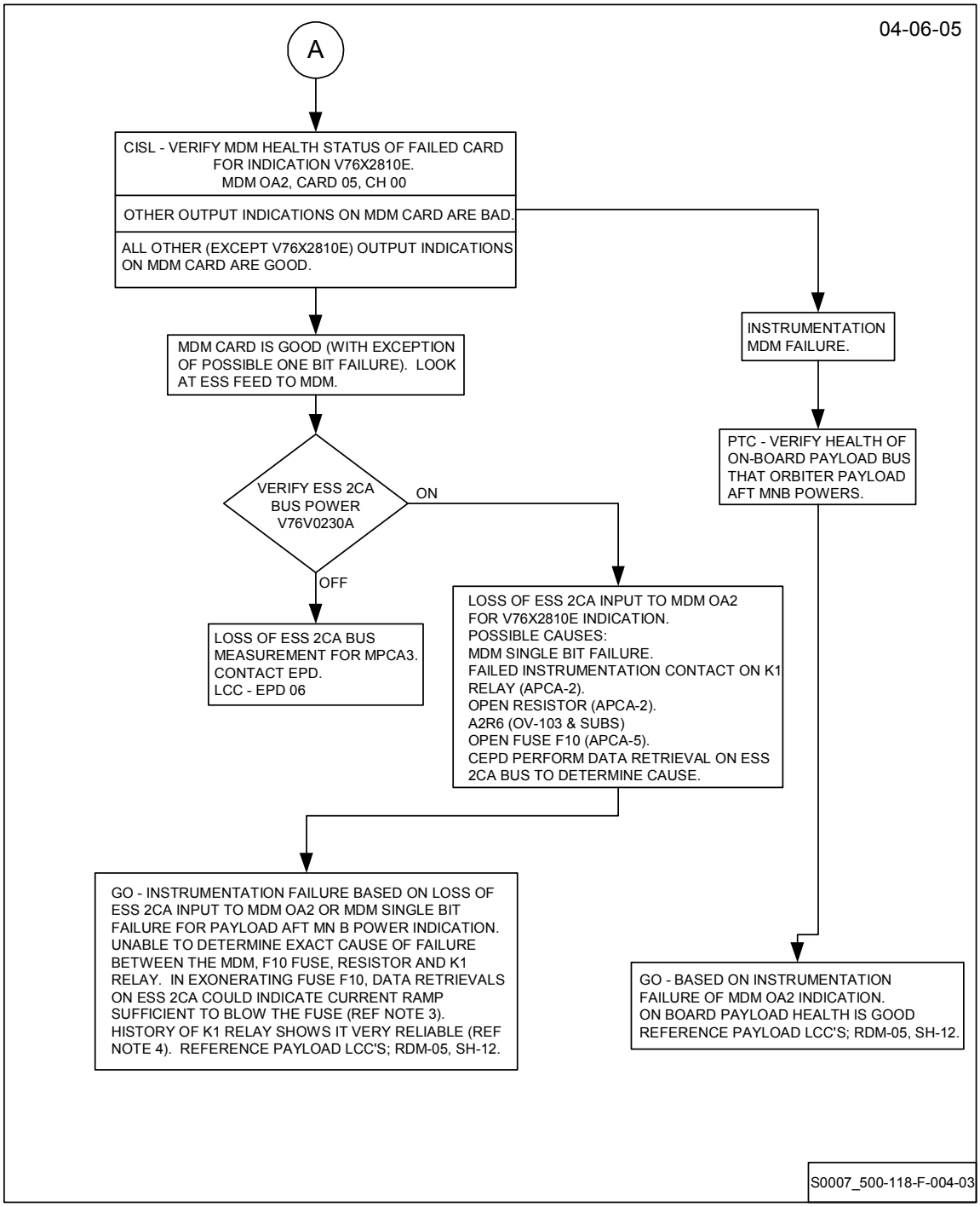
PL Aux B RPC Anomaly Troubleshooting Flow Chart (SSID PAY-02) (Page 1 of 4)



PL Aux B RPC Anomaly Troubleshooting Flow Chart (SSID PAY-02) (Page 2 of 4)



PL Aux B RPC Anomaly Troubleshooting Flow Chart (SSID PAY-02) (Page 3 of 4)



PL Aux B RPC Anomaly Troubleshooting Flow Chart (SSID PAY-02) (Page 4 of 4)

NOTE

A. F26 fuse (APCA-2) is inaccessible even if the increase is understood.

B. History of K1 relay shows it very reliable. CPLE not familiar with this failure mode.

C. Further confirmation of F10 fuse could be accomplished by statusing MPS valves being supplied by F10 fuse.
Status FD - MPS LH_2 FD DISC LOCK VLV RPC C ON (V76X4431E), if On, F10 verified good.

If Off, could indicate proper configuration for point in Countdown. Coordinate with MPS to command valve On with MDM command LH_2 17 in. (PD2) LATCH LOCK CMD B (V41K1982X).

After command, if FD - LH_2 FD DISC LOCK VLV PRC C ON (V76X4431E) in On, F10 fuse verified good.

D. If partial failure of K1 relay is suspect, complete failure of relay is possible, terminating Payload AFT MN B Power Bus to the payload. CPLE is not familiar with this failure mode and considers the possibility very remote.

***** End of Payload Retention Latches *****

ROEU Hook Anomaly (SSID ROEU-01)

Option A - ROEU Deployed - Hooks Released Indications Failed On Should Be Off

NOTE

Perform Option A if ROEU is in Deploy position and hooks released indications failed On should be Off.

Option A Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify single motor release capability. Presence of both release indications inhibits release relay logic and results in loss of ROEU hook release capability.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU hooks in release direction. ROEU hooks are isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If MCA OP status stays normal, no ROEU hook release capability exists, LCC violation confirmed, No Go for Launch.

*If MCA OP status inverts, ROEU hook release capability does exist; however, no limit switch shut off capability exists for the hook motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as queue for manual shut off of motors. LCC violation cleared, continue Countdown.

D. Return switches to Launch configuration.

118-46 **CPLE**

```
CRT (VWT33)

VERIFY MCA OP STAT

1/1 THRU 1/6 (NORMAL)
3/1 THRU 3/8 (NORMAL)
```

118-47 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-48 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-49 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-50 **CPLE** **OTC**
OTC **CAFM**

MID MCA 1 and 3 OP stats may change in following step.

118-51 **CPLE** **ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(1-3)

PAYLOAD RETENTION LATCH
  3 SW - RELEASE

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-52 **CPLE**

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS___(1-3)

LATCH RELEASE
  SWITCH 3 REL

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-53 **CPLE**

Record MCA OP status state (invert = Off, normal = On) for failed indicator.

	System 1		System 2
1/1		3/6	

118-54 **CPLE ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  3 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-55 Conclusions:

1. **IF** at least one MCA OP stat inverts,

THEN failure is between MCA relay and MDM or an instrumentation failure. MCA OP status state change verifies "On" release indication does not inhibit hook release capability. Single motor capability still exists; however, no limit switch shut off capability exists for the hook motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as queue for manual shut off of motors,
LCC violation cleared. Continue Countdown.

Not Performed:_____

2. **IF** both MCA OP stats stay normal,

THEN MCA relays are inhibited. No ROEU hook release capability exists,
LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-56 **CPLE OTC**

ROEU troubleshooting complete.

***** End of Option A - ROEU Deployed - Hooks Released Indications Failed On Should Be Off *****

Option B - ROEU Deployed Hooks Latched Indications Failed Off Should Be On

NOTE

Perform Option B if ROEU is in Deploy position and hooks latched indications failed Off should be On.

Option B Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify hooks are in latched position. Loss of both latched indications indicates ODA/PDA not latched for ascent. The ODA could become separated from PDA and damage could occur.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU hooks in latch direction. ROEU hooks are isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If at least one MCA OP status stays normal, hook motor is inhibited by limit switch indicating hooks latched,
LCC violation cleared, continue Countdown.

*If both MCA OP stats invert - perform next steps to configure and monitor AC currents.

D. ASP Configure P/L Bay MECH Power to On (Panel R13L) and issue command to drive ROEU hooks in latch direction for 5 seconds maximum.

E. (CPLE) Monitor AC currents:

* If current increases on at least one system and associated limit switch returns,
LCC violation cleared, continue Countdown.

* Else, if ROEU hooks have been driven without picking up either limit switch, ODA/PDA interface may not be latched and may separate during ascent. Damage may occur during Launch,
LCC violation confirmed, No Go for Launch.

F. (ASP) Return switches to Launch configuration.

118-57 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-58 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-59 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-60 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-61 **CPLE ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(1-3)

PAYLOAD RETENTION LATCH
  3 SW - LATCH

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-62 **CPLE**

CRT (VWT33)

VERIFY SWITCH THROWS IN PREVIOUS STEP

```
PAYLOAD SELECT
  SW POS___(1-3)

LATCH RELEASE
  SWITCH 3 LCH

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-63 CPLE

Record MCA OP status state (invert = Off, normal = On) for failed indicator.

	System 1		System 2
1/2		3/8	

118-64 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION LATCH
  3 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-65 CPLE

```
CRT (VWT33)
VERIFY

LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
  1/9 (NORMAL)  3/11 (NORMAL)
  1/10 (NORMAL)  3/12 (NORMAL)
```

Contingency for MCA OP Stat Did Invert

NOTE

If expected MCA OP stat did invert, the MCA relay is not inhibited. Perform this option to check for current increases and pick up the limit switch.

Apply logic power for minimum time required to verify increase: 5 seconds maximum.

Contingency for MCA OP Stat Did Invert Not Performed:_____

118-66 CPLE OTC

Request concurrence to power on P/L Bay MECH Power.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-67 **CPLE OTC**
OTC CAFM
CAFM ASP

IF PANEL A8 IS INSTALLED,

THEN
PANEL A8
PORT RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

STBD RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

Not Performed:_____

118-68 **CPLE OTC**
OTC CAFM
CAFM ASP

PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - OFF
  RADIATOR CONTROL
    SYS A SW - OFF
    SYS B SW - OFF

PL BAY DOOR SW - STOP
PL BAY DOOR ENABLE/DISABLE
  SYS 1 SW - DISABLE
  SYS 2 SW - DISABLE

118-69 **CPLE OTC**
OTC CSKU
CSKU ASP

```
PANEL R13L
KU ANTENNA
  DEPLOY/GND/STOW SW - GND
  DIRECT STOW SW - OFF
```

118-70 **CPLE ASP**

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-71 **CPLE**

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW ON
  SYS 2 SW ON
PLBM PWR OP ST
1/9 (INVERT)  3/11 (INVERT)
1/10 (INVERT)  3/12 (INVERT)
```

118-72 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-73 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION LATCHES
  3 SW - LATCH
PAYLOAD RETENTION
  LOGIC POWER
  (SIMULTANEOUSLY;5 SEC MAX, THEN OFF)
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-74 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS ___(1-3)
LATCH/RELEASE
  SWITCH 3 LCH
LOGIC POWER
  SYS 1 SW ON
  SYS 2 SW ON
```

118-75 CPLE

Record MCA OP status state (invert=Off, normal=On) for failed indicator.

	System 1		System 2
1/2		3/8	

118-76 **CPLE**

CRT (VWT33)

RECORD DELTA CURRENT FOR FAILED SYSTEMS.

	A	B	C
AC1	_____	_____	_____
AC2	_____	_____	_____

118-77 **CPLE** **ASP**

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF

***** End of Contingency for MCA OP Stat Did Invert *****

118-78 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - _____(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  3 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-79 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS___(LAUNCH POSITION)
LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
1/9 (NORMAL)  3/11 (NORMAL)
1/10 (NORMAL)  3/12 (NORMAL)
```

118-80 Conclusions:

1. **IF** at least one MCA OP stat does not invert,

THEN the relay is being inhibited by the limit switch indication in the MCA, which indicates hooks are latched,
LCC violation cleared. Continue Countdown.

Not Performed:_____

2. **IF** both MCA OP stats inverted, and at least one limit switch was picked up by operating the ROEU hooks,

THEN LCC violation cleared. Continue Countdown.

Not Performed:_____

3. **IF** both MCA OP stats inverted and neither limit switch was picked up,

THEN the ODA/PDA interface may not be latched and may separate during ascent. Damage may occur during Launch,
LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-81 **CPLE** **OTC**

ROEU troubleshooting complete.

***** End of Option B - ROEU Deployed Indications Failed Off Should Be On *****

Option C - ROEU Stowed - Hooks Latched Indications Failed On Should Be Off

NOTE

Perform Option C if ROEU is in Stowed position and hooks latched indications failed On should be Off.

Option C Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify single motor latch capability. Presence of both latch indications inhibits latch relay logic, and results in loss of single motor capability to latch ROEU hooks.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU hooks in latch direction. ROEU hooks are isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If MCA OP status stays normal, relays are inhibited by limit switches and ROEU hook latching capability is lost,
LCC violation confirmed, No Go for Launch

*If MCA OP status inverts, ROEU hook latching capability does exist; however, no limit switch shut off capability exists for the hook motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as queue for manual shut off of motors.
LCC violation cleared, continue Countdown.

D. Return switches to Launch configuration.

118-82 **CPLE**

```
CRT (VWT33)

VERIFY MCA OP STATUS:

1/1 THRU 1/6 (NORMAL)
3/1 THRU 3/8 (NORMAL)
```

118-83 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-84 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-85 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-86 **CPLE** **OTC**
OTC **CAFM**

MID MCA 1 and 3 OP stats may change in following step.

118-87 **CPLE** **ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - _______(1-3)

PAYLOAD RETENTION LATCH
  3 SW - LATCH

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-88 **CPLE**

```
CRT (VWT33)

VERIFY SWITCH THROWS IN PREVIOUS STEP

PAYLOAD SELECT
  SW POS_______(1-3)

LATCH RELEASE
  SWITCH 3 LCH

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-89 **CPLE**

Record MCA OP status state (invert = Off, normal = On) for failed indicator.

	System 1		System 2
1/2		3/8	

118-90 **CPLE ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  3 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-91 Conclusions:

1. **IF** at least one MCA OP stat inverts,

   THEN failure is between MCA relay and MDM or an instrumentation failure. MCA OP status state change verifies "On" latch indication does not inhibit hook latch capability. Single motor capability still exists; however, no limit switch shut off capability exists for the hook motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as queue for manual shut off of motors,
   LCC violation cleared. Continue Countdown.

   Not Performed:_____

2. **IF** both MCA OP stats stay normal,

   THEN MCA relays are inhibited by limit switches and ROEU hook latching capability has been lost,

   LCC violation confirmed. NO GO for Launch.

   Not Performed:_____

118-92 **CPLE OTC**

ROEU troubleshooting complete.

***** End of Option C - ROEU Stowed - Hooks Latched Indications Failed On Should Be Off *****

Option D - ROEU Stowed - Hook Released Indications Off Should Be On

NOTE

Perform Option D if ROEU is in Stowed position and hooks released indications failed Off should be On.

Option D Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify hooks are in released position. Loss of both released indications indicates ODA hooks are not fully released for ascent. Partially latched hooks may result in the loss of Deploy capability.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU hooks in release direction. ROEU hooks are isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If at least one MCA OP stat stays normal, hook motor is inhibited by limit switch indicating hooks are fully released,
LCC violation cleared, continue Countdown.

*If both MCA OP stats invert, perform next steps to configure and monitor AC currents.

D. ASP Configure P/L Bay MECH Power to On (Panel R13L) and issue switch command to drive ROEU hooks in release direction for 5 seconds maximum.

E. (CPLE) monitor AC currents

*If current increases on at least one system and the associated limit switch returns,
LCC violation cleared, continue Countdown.

*Else, if the ROEU hooks have been driven without picking up either limit switch, the ODA hooks may be partially released and result in the loss of Deploy capability,
LCC violation confirmed, No Go for Launch.

F. (ASP) Return switches to Launch configuration.

118-93 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-94 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-95 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-96 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-97 **CPLE ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(1-3)

PAYLOAD RETENTION LATCH
  3 SW - RELEASE

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-98 **CPLE**

CRT (VWT33)
VERIFY SWITCH THROWS IN PREVIOUS STEP

```
PAYLOAD SELECT
  SW POS___(1-3)

LATCH RELEASE
  SWITCH 3 REL

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-99 **CPLE**

Record MCA OP status state (invert = Off, normal = On) for failed indicator.

	System 1		System 2
1/1		3/6	

118-100 **CPLE** **ASP**

```
PANEL A6U
PAYLOAD RETENTION LATCH
  3 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-101 **CPLE**

```
CRT (VWT33)
VERIFY

LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
1/9 (NORMAL)  3/11 (NORMAL)
1/10 (NORMAL)  3/12 (NORMAL)
```

Contingency for MCA OP Stat Did Invert

NOTE

If expected MCA OP stat did invert the MCA relay is not inhibited. Perform this option to check for current increases and pick up the limit switch.

Apply logic power for minimum time required to verify increase: 5 seconds maximum.

Contingency for MCA OP Stat Did Invert Not Performed:_____

118-102 CPLE OTC

Request concurrence to power on P/L Bay MECH Power.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-103 **CPLE OTC**
OTC CAFM
CAFM ASP

IF PANEL A8 IS INSTALLED,

THEN
PANEL A8
PORT RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

STBD RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

Not Performed:_____

118-104 **CPLE OTC**
OTC CAFM
CAFM ASP

PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - OFF
  RADIATOR CONTROL
    SYS A SW - OFF
    SYS B SW - OFF

PL BAY DOOR SW - STOP
PL BAY DOOR ENABLE/DISABLE
  SYS 1 SW - DISABLE
  SYS 2 SW - DISABLE

118-105 **CPLE OTC**
OTC CSKU
CSKU ASP

```
PANEL R13L
KU ANTENNA
  DEPLOY/GND/STOW SW - GND
  DIRECT STOW SW - OFF
```

118-106 **CPLE ASP**

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-107 **CPLE**

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW ON
  SYS 2 SW ON
PLBM PWR OP ST
1/9 (INVERT)  3/11 (INVERT)
1/10 (INVERT)  3/12 (INVERT)
```

118-108 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-109 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION LATCHES
  3 SW - RELEASE
PAYLOAD RETENTION
  LOGIC POWER
  (SIMULTANEOUSLY;5 SEC MAX, THEN OFF)
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-110 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS _____(1-3)
LATCH/RELEASE
  SWITCH 3 REL
LOGIC POWER
  SYS 1 SW ON
  SYS 2 SW ON
```

118-111 CPLE

Record MCA OP stat state (invert=Off, normal=On) for failed indicator.

	System 1		System 2
1/1		3/6	

118-112 CPLE

CRT (VWT33)

RECORD DELTA CURRENT FOR FAILED SYSTEMS.

	A	B	C
AC1	_____	_____	_____
AC2	_____	_____	_____

118-113 CPLE ASP

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF

***** End of Contingency for MCA OP Stat Did Invert *****

118-114 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  3 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-115 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS___(LAUNCH POSITION)
LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
1/9 (NORMAL)  3/11 (NORMAL)
1/10 (NORMAL)  3/12 (NORMAL)
```

118-116 Conclusions:

1. **IF** at least one MCA OP stat stays normal,

THEN the relay is being inhibited by the limit switch indication in the MCA, which indicates hooks are fully released,
LCC violation cleared. Continue Countdown.

Not Performed:_____

2. **IF** both MCA OP stats inverted, and at least one limit switch was picked up by operating the ROEU hooks,

THEN LCC violation cleared. Continue Countdown.

Not Performed:_____

3. **IF** both MCA OP stats inverted and neither limit switch was picked up,

THEN the ODA hooks may be partially released and result in the loss of Deploy capability,
LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-117 **CPLE** **OTC**

ROEU troubleshooting complete.

***** End of Option D - ROEU Stowed - Hook Released Indications Off Should Be On *****

***** End of ROEU Hook Anomaly (SSID ROEU-01) *****

ROEU Relax Anomaly (SSID ROEU-02)

Option A - Deploy Indications Failed On Should Be Off

NOTE

Perform Option A if Deploy indications failed On should be Off and when ROEU is Mated or Stowed.

Option A Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify single motor Deploy capability. Presence of both latch indications inhibits latch relay logic, and results in loss of ROEU hook Deploy capability.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU in Deploy direction. ROEU is isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If MCA OP stat stays normal, no ROEU Deploy capability exists, LCC violation confirmed, No Go for Launch.

*If MCA OP stat inverts, ROEU Deploy capability does exist; however, no limit switch shut off capability exists for the deploy motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as queue for manual shut off of motors. LCC violation cleared, continue Countdown.

D. Return switches to Launch configuration.

118-118 **CPLE**

```
CRT (VWT33)

VERIFY MCA OP STAT

1/1 THRU 1/6 (NORMAL)
3/1 THRU 3/8 (NORMAL)
```

118-119 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-120 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-121 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-122 **CPLE** **OTC**
OTC **CAFM**

MID MCA 1 and 3 OP stats may change in following step.

118-123 **CPLE** **ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(1-3)

PAYLOAD RETENTION LATCH
  2 SW - LATCH

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-124 **CPLE**

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS___(1-3)

LATCH RELEASE
  SWITCH 2 LAT

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-125 **CPLE**

Record MCA OP status state (invert = Off, normal = On) for failed indicator.

	System 1		System 2
1/1		3/3	

118-126 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  2 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-127

Conclusions:

1. **IF** at least one MCA OP stat inverts,

   THEN failure is between MCA relay and MDM or an instrumentation failure. MCA OP status state change verifies "On" latch indication does not inhibit Deploy capability. Single motor capability still exists; however, no limit switch shut off capability exists for the deploy motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as queue for manual shut off of motors,
   LCC violation cleared. Continue Countdown.

   Not Performed:_____

2. **IF** both MCA OP stats stay normal,

   THEN MCA relays are inhibited. No ROEU Deploy capability exists,
   LCC violation confirmed. NO GO for Launch.

   Not Performed:_____

118-128 CPLE OTC

ROEU troubleshooting complete.

***** End of Option A - Deploy Indications Failed On Should Be Off *****

Option B - ROEU Relax Indications Failed Off Should Be On

NOTE

Perform Option B if ROEU relax indications failed Off should be On and when ROEU is Mated or Stowed.

Option B Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify ROEU is in relax position. At least one relax indication required to verify no load on ODA/PDA mate. Damage could occur to ROEU or payload during ascent/descent.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU in relax direction.
ROEU is isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If at least one MCA OP stat stays normal, relax motor is inhibited by limit switch indicating ROEU is in relax position,
LCC violation cleared, continue Countdown.

*If both MCA OP stats invert - perform next steps to configure and monitor AC currents.

D. ASP Configure P/L Bay MECH Power to On (Panel R13L) and issue command to drive ROEU in relax direction for 5 seconds maximum.

E. (CPLE) monitor AC currents

*If current increases on at least one system and the associated limit switch returns,
LCC violation cleared, continue Countdown.

*Else, if the ROEU has been driven without picking up either limit switch, ROEU relax position is unattainable. Loads on ODA/PDA mate may cause damage to occur during ascent/descent,
LCC violation confirmed, No Go for Launch.

F. (ASP) Return switches to Launch configuration.

118-129 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-130 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-131 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-132 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-133 **CPLE ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(1-3)

PAYLOAD RETENTION LATCH
  1 SW - RELEASE

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-134 **CPLE**

```
CRT (VWT33)

VERIFY SWITCH THROWS IN PREVIOUS STEP

PAYLOAD SELECT
  SW POS___(1-3)

LATCH RELEASE
  SWITCH 1 REL

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-135 CPLE

Record MCA OP stat state (invert = Off, normal = On) for failed indicator.

	System 1		System 2
1/1		3/3	

118-136 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION LATCH
  1 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-137 CPLE

```
CRT (VWT33)
VERIFY

LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
  1/9 (NORMAL)  3/11 (NORMAL)
  1/10 (NORMAL)  3/12 (NORMAL)
```

Contingency for MCA OP Stats Did Invert

NOTE

If expected MCA OP stats did invert the MCA relay is not inhibited. Perform this option to check for current increases and pick up the limit switch.

Apply logic power for minimum time required to verify increase: 5 seconds maximum.

Contingency for MCA OP Stats Did Invert Not Performed:_____

118-138 CPLE OTC

Request concurrence to power on P/L Bay MECH Power.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-139 **CPLE OTC**
OTC CAFM
CAFM ASP

IF PANEL A8 INSTALLED,

THEN
PANEL A8
PORT RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

STBD RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

Not Performed:_____

118-140 **CPLE OTC**
OTC CAFM
CAFM ASP

PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - OFF
  RADIATOR CONTROL
    SYS A SW - OFF
    SYS B SW - OFF

PL BAY DOOR SW - STOP
PL BAY DOOR ENABLE/DISABLE
  SYS 1 SW - DISABLE
  SYS 2 SW - DISABLE

118-141 **CPLE OTC**
OTC CSKU
CSKU ASP

```
PANEL R13L
KU ANTENNA
  DEPLOY/GND/STOW SW - GND
  DIRECT STOW SW - OFF
```

118-142 **CPLE ASP**

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-143 **CPLE**

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW ON
  SYS 2 SW ON
PLBM PWR OP ST
1/9 (INVERT)  3/11 (INVERT)
1/10 (INVERT)  3/12 (INVERT)
```

118-144 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-145 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION LATCHES
  1 SW - RELEASE
PAYLOAD RETENTION
  LOGIC POWER
  (SIMULTANEOUSLY;5 SEC MAX, THEN OFF)
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-146 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS ___(1-3)
LATCH/RELEASE
  SWITCH 1 REL
LOGIC POWER
  SYS 1 SW ON
  SYS 2 SW ON
```

118-147 CPLE

Record MCA OP status state (invert=Off, normal=On) for failed indicator.

	System 1		System 2
1/1		3/3	

118-148 **CPLE**

CRT (VWT33)

RECORD DELTA CURRENT FOR FAILED SYSTEMS.

	A	B	C
AC1	_____	_____	_____
AC2	_____	_____	_____

118-149 **CPLE** **ASP**

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF

***** End of Contingency for MCA OP Stat Did Invert *****

118-150 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  1 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-151 CPLE

CRT (VWT33)
VERIFY

```
PAYLOAD SELECT
  SW POS___(LAUNCH POSITION)
LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
1/9 (NORMAL)  3/11 (NORMAL)
1/10 (NORMAL)  3/12 (NORMAL)
```

118-152 Conclusions:

1. **IF** at least one MCA OP stat stays normal,

THEN the relay is being inhibited by the limit switch indication in the MCA, which indicates ROEU is in the relax position,
LCC violation cleared. Continue Countdown.

Not Performed:_____

2. **IF** both MCA OP stats invert, and at least one relax limit switch was picked up by operating the ROEU,

THEN LCC violation cleared. Continue Countdown.

Not Performed:_____

3. **IF** at least one limit switch was not picked up,

THEN ROEU relax position is unattainable using the limit switch stops. Loads may be induced on the ODA/PDA interface while trying to obtain the relax position. Damage may occur during Launch/landing,
LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-153 **CPLE** **OTC**

ROEU troubleshooting complete.

***** End of Option B - ROEU Relax Indications Failed Off Should Be On *****

***** End of ROEU Relax Anomaly (SSID ROEU-02) *****

ROEU Stow Anomaly (SSID ROEU-03)

Option A - ROEU Mated - Stow Indications Failed On Should Be Off

NOTE

Perform Option A if ROEU is mated to Payload and Stow indications failed On should be Off.

Option A Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify single motor Stow capability. Presence of both Stow indications inhibits latch relay logic, and results in loss of ROEU Stow capability.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU in Stow direction.
ROEU is isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If MCA OP status stays normal, no ROEU Stow capability exists, LCC violation confirmed, No Go for Launch.

*If MCA OP status inverts, ROEU Stow capability does exist; however, no limit switch shut off capability exists for the Stow motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as queue for manual shut off of motors. LCC violation cleared, continue Countdown.

D. Return switches to Launch configuration.

118-154 **CPLE**

CRT (VWT33)

VERIFY MCA OP STAT

1/1 THRU 1/6 (NORMAL)
3/1 THRU 3/8 (NORMAL)

118-155 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-156 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-157 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-158 **CPLE** **OTC**
OTC **CAFM**

MID MCA 1 and 3 OP stats may change in following step.

118-159 **CPLE** **ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(1-3)

PAYLOAD RETENTION LATCH
  2 SW - RELEASE

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-160 **CPLE**

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS___(1-3)

LATCH RELEASE
  SWITCH 2 REL

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-161 **CPLE**

Record MCA OP status state (invert = Off, normal = On) for failed indicator.

	System 1		System 2
1/2		3/7	

118-162 **CPLE** **ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  2 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-163 Conclusions:

1. **IF** at least one MCA OP stat inverts,

THEN failure is between MCA relay and MDM or an instrumentation failure. MCA OP status state change verifies "On" Stow indication and does not inhibit Stow capability. Single motor capability still exists; however, no limit switch shut off capability exists for the Stow motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as queue for manual shut off of motors,
LCC violation cleared. Continue Countdown.

Not Performed:_____

2. **IF** both MCA OP stats stay normal,

THEN MCA relays are inhibited. No ROEU Stow capability exists,

LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-164 **CPLE** **OTC**

ROEU troubleshooting complete.

***** End of Option A - ROEU Mated - Stow Indications Failed On Should Be Off *****

Option B - ROEU Stowed - Stow Indications Failed Off Should Be On

NOTE

Perform Option B when ROEU is Stowed and Stow indications failed Off should be On.

Option B Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify ROEU is in Stow position. At least one Stow indication required to verify ROEU is in Stow position. Damage could occur to ROEU during ascent if ROEU was not fully stowed.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU hooks in Stow direction. ROEU is isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If at least one MCA OP status stays normal, Stow motor is inhibited by limit switch indicating ROEU is in Stow position, LCC violation cleared, continue Countdown.

*If both MCA OP stats invert - perform next steps to configure and monitor AC currents.

D. ASP Configure P/L Bay MECH Power to On (Panel R13L) and issue command to drive ROEU in Stow direction for 5 seconds maximum.

E. (CPLE) Monitor AC currents:

* If current increases on at least one system and associated limit switch returns,
LCC violation cleared, continue Countdown.

* Else, if ROEU has been driven without picking up either limit switch, ROEU position is unknown. Damage may occur during ascent,
LCC violation confirmed, No Go for Launch.

F. (ASP) Return switches to Launch configuration.

118-165 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-166 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-167 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-168 **CPLE** **OTC**
OTC **CAFM**

MID MCA 1 and 3 OP stats may change in following step.

118-169 **CPLE** **ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - _____(1-3)

PAYLOAD RETENTION LATCH
  2 SW - RELEASE

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-170 **CPLE**

CRT (VWT33)

VERIFY SWITCH THROWS IN PREVIOUS STEP

```
PAYLOAD SELECT
  SW POS_____(1-3)

LATCH RELEASE
  SWITCH 2 REL

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-171 CPLE

Record MCA OP stat state (invert = Off, normal = On) for failed indicator.

	System 1		System 2
1/2		3/7	

118-172 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION LATCH
  2 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-173 CPLE

```
CRT (VWT33)
VERIFY

LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
  1/9 (NORMAL)  3/11 (NORMAL)
  1/10 (NORMAL)  3/12 (NORMAL)
```

Contingency for MCA OP Stats Did Invert

NOTE

If expected MCA OP stats did invert, the MCA relay is not inhibited. Perform this option to check for current increases and pick up the limit switch.

Apply logic power for minimum time required to verify increase: 5 seconds maximum.

Contingency for MCA OP Stats Did Invert Not Performed:_____

118-174 CPLE OTC

Request concurrence to power On P/L Bay MECH Power.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-175 **CPLE OTC**
OTC CAFM
CAFM ASP

IF PANEL A8 INSTALLED,

THEN

```
PANEL A8
PORT RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

STBD RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF
```

Not Performed:_____

118-176 **CPLE OTC**
OTC CAFM
CAFM ASP

```
PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - OFF
  RADIATOR CONTROL
    SYS A SW - OFF
    SYS B SW - OFF

PL BAY DOOR SW - STOP
PL BAY DOOR ENABLE/DISABLE
  SYS 1 SW - DISABLE
  SYS 2 SW - DISABLE
```

118-177 **CPLE OTC**
OTC CSKU
CSKU ASP

```
PANEL R13L
KU ANTENNA
  DEPLOY/GND/STOW SW - GND
  DIRECT STOW SW - OFF
```

118-178 **CPLE ASP**

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-179 **CPLE**

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW ON
  SYS 2 SW ON
PLBM PWR OP ST
1/9 (INVERT)  3/11 (INVERT)
1/10 (INVERT)  3/12 (INVERT)
```

118-180 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-181 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION LATCHES
  2 SW - RELEASE
PAYLOAD RETENTION
  LOGIC POWER
  (SIMULTANEOUSLY;5 SEC MAX, THEN OFF)
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-182 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS ___(1-3)
LATCH/RELEASE
  SWITCH 2 REL
LOGIC POWER
  SYS 1 SW ON
  SYS 2 SW ON
```

118-183 CPLE

Record MCA OP stat state (invert=Off, normal=On) for failed indicator.

	System 1		System 2
1/2		3/7	

118-184 **CPLE**

CRT (VWT33)

RECORD DELTA CURRENT FOR FAILED SYSTEMS.

	A	B	C
AC1	_____	_____	_____
AC2	_____	_____	_____

118-185 **CPLE** **ASP**

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF

***** End of Contingency for MCA OP Stat Did Invert *****

118-186 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  2 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-187 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS___(LAUNCH POSITION)
LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
1/9 (NORMAL)  3/11 (NORMAL)
1/10 (NORMAL)  3/12 (NORMAL)
```

118-188 Conclusions:

1. **IF** at least one MCA OP stat stays normal,

THEN the relay is being inhibited by the limit switch indication in the MCA, which indicates ROEU is in the Stow position, **LCC violation cleared. Continue Countdown**.

Not Performed:_____

2. **IF** both MCA OP stats invert, and at least one stow limit switch was picked up by operating the ROEU,

THEN LCC violation cleared. Continue Countdown.

Not Performed:_____

3. **IF** at least one limit switch was not picked up,

THEN ROEU position is unknown using the limit switch stops. Damage may occur during Launch if the ROEU is not fully stowed. LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-189 **CPLE** **OTC**

ROEU troubleshooting complete.

***** End of Option B - ROEU Stowed - Stow Indications Failed Off Should Be On *****

***** End of ROEU Stow Anomaly (SSID ROEU-03) *****

Dual ROEU Hooks Anomaly (SSID ROEU-04)

NOTE
Perform Dual ROEU Hooks Anomaly (SSID ROEU-4) for STS-129 only.

Dual ROEU Hooks Anomaly (SSID ROEU-04) Not Performed:_____

Option A - ROEU Deployed - Hooks Released Indications Failed On Should Be Off

NOTE
Perform Option A if Dual ROEU's are in Deploy position and hooks released indications failed On should be Off.

Option A Not Performed:_____

NOTE
Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify single motor release capability. Presence of both release indications inhibits release relay logic and results in loss of ROEU hook release capability.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU hooks in release direction. ROEU hooks are isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If MCA OP status stays normal, no ROEU hook release capability exists, LCC violation confirmed, No Go for Launch.

*If MCA OP status inverts, ROEU hook release capability does exist; however, no limit switch shut off capability exists for the hook motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as cue for manual shut off of motors. LCC violation cleared, continue Countdown.

D. Return switches to Launch configuration.

118-190 CPLE

```
CRT (VWT33)

VERIFY MCA OP STAT

1/1 THRU 1/6 (NORMAL)
3/1 THRU 3/8 (NORMAL)
```

118-191 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-192 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-193 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-194 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-195 **CPLE ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - 2

PAYLOAD RETENTION LATCH
  ____ SW - RELEASE (STBD=1 / PORT=3)

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-196 **CPLE**

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS 2

LATCH RELEASE
  SWITCH ____ REL (STBD=1 / PORT=3)

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-197 CPLE

Record MCA OP status state (invert = Off, normal = On) for failed indicator.

	System 1	On/Off	System 2	On/Off
STBD	1/1		3/3	
PORT	1/1		3/6	

118-198 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  ____ SW - OFF (STBD=1 / PORT=3)

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-199 Conclusions:

1. **IF** at least one MCA OP stat inverts,

THEN failure is between MCA relay and MDM or an instrumentation failure. MCA OP status state change verifies "On" release indication does not inhibit hook release capability. Single motor capability still exists; however, no limit switch shut off capability exists for the hook motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as cue for manual shut off of motors,
LCC violation cleared. Continue Countdown.

Not Performed:_____

2. **IF** both MCA OP stats stay normal,

THEN MCA relays are inhibited. No ROEU hook release capability exists,
LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-200 **CPLE** **OTC**

ROEU troubleshooting complete.

***** End of Option A - ROEU Deployed - Hooks Released Indications Failed On Should Be Off *****

Option B - ROEU Deployed Hooks Latched Indications Failed Off Should Be On

NOTE

Perform Option B if ROEU is in Deploy position and hooks latched indications failed Off should be On.

Option B Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify hooks are in latched position. Loss of both latched indications indicates ODA/PDA not latched for ascent. The ODA could become separated from PDA and damage could occur.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU hooks in latch direction. ROEU hooks are isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If at least one MCA OP status stays normal, hook motor is inhibited by limit switch indicating hooks latched,
LCC violation cleared, continue Countdown.

*If both MCA OP stats invert - perform next steps to configure and monitor AC currents.

D. ASP Configure P/L Bay MECH Power to On (Panel R13L) and issue command to drive ROEU hooks in latch direction for 5 seconds maximum.

E. (CPLE) Monitor AC currents:

* If current increases on at least one system and associated limit switch returns,
LCC violation cleared, continue Countdown.

* Else, if ROEU hooks have been driven without picking up either limit switch, ODA/PDA interface may not be latched and may separate during ascent. Damage may occur during Launch,
LCC violation confirmed, No Go for Launch.

F. (ASP) Return switches to Launch configuration.

118-201 **CPLE**

```
CRT (VWT33)

VERIFY MCA OP STAT

1/1 THRU 1/6 (NORMAL)
3/1 THRU 3/8 (NORMAL)
```

118-202 **CPLE** **OTC**

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-203 **CPLE** **ASP**

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-204 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-205 CPLE OTC
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-206 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - 2

PAYLOAD RETENTION LATCH
  ____ SW - LATCH (STBD=1 / PORT=3)

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-207 CPLE

```
CRT (VWT33)

VERIFY SWITCH THROWS IN PREVIOUS STEP

PAYLOAD SELECT
  SW POS  2

LATCH RELEASE
  SWITCH ____ LCH (STBD=1 / PORT=3)

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-208 CPLE

Record MCA OP status state (invert = Off, normal = On) for failed indicator.

	System 1	On/Off	System 2	On/Off
STBD	1/2		3/8	
PORT	1/2		3/8	

118-209 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION LATCH
  ____ SW - OFF (STBD=1 / PORT=3)

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-210 CPLE

```
CRT (VWT33)
VERIFY

LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
  1/9 (NORMAL)  3/11 (NORMAL)
  1/10 (NORMAL)  3/12 (NORMAL)
```

Contingency for MCA OP Stat Did Invert

NOTE

If expected MCA OP stat did invert, the MCA relay is not inhibited. Perform this option to check for current increases and pick up the limit switch.

Apply logic power for minimum time required to verify increase: 5 seconds maximum.

Contingency for MCA OP Stat Did Invert Not Performed:_____

118-211 CPLE OTC

Request concurrence to power on P/L Bay MECH Power.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-212 **CPLE OTC**
OTC CAFM
CAFM ASP

IF PANEL A8 IS INSTALLED,

THEN
PANEL A8
PORT RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

STBD RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

Not Performed:_____

118-213 **CPLE OTC**
OTC CAFM
CAFM ASP

PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - OFF
  RADIATOR CONTROL
    SYS A SW - OFF
    SYS B SW - OFF

PL BAY DOOR SW - STOP
PL BAY DOOR ENABLE/DISABLE
  SYS 1 SW - DISABLE
  SYS 2 SW - DISABLE

118-214 **CPLE OTC**
OTC CSKU
CSKU ASP

```
PANEL R13L
KU ANTENNA
  DEPLOY/GND/STOW SW - GND
  DIRECT STOW SW - OFF
```

118-215 **CPLE ASP**

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-216 **CPLE**

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW ON
  SYS 2 SW ON
PLBM PWR OP ST
1/9 (INVERT)  3/11 (INVERT)
1/10 (INVERT)  3/12 (INVERT)
```

118-217 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-218 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - 2

PAYLOAD RETENTION LATCHES
  ____ SW - LATCH  (STBD=1 / PORT=3)

PAYLOAD RETENTION
  LOGIC POWER
  (SIMULTANEOUSLY;5 SEC MAX, THEN OFF)
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-219 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS 2
LATCH/RELEASE
  SWITCH ____ LCH (STBD=1 / PORT=3)
LOGIC POWER
  SYS 1 SW ON
  SYS 2 SW ON
```

118-220 CPLE

Record MCA OP status state (invert=Off, normal=On) for failed indicator.

	System 1	On/Off	System 2	On/Off
STBD	1/2		3/8	
PORT	1/2		3/8	

118-221 **CPLE**

CRT (VWT33)

RECORD DELTA CURRENT FOR FAILED SYSTEMS.

	A	B	C
AC1	_____	_____	_____
AC2	_____	_____	_____

118-222 **CPLE** **ASP**

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF

***** End of Contingency for MCA OP Stat Did Invert *****

118-223 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - _____(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  ____ SW - OFF (STBD=1 / PORT=3)

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-224 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS___(LAUNCH POSITION)
LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
1/9 (NORMAL)  3/11 (NORMAL)
1/10 (NORMAL)  3/12 (NORMAL)
```

118-225 Conclusions:

1. **IF** at least one MCA OP stat does not invert,

THEN the relay is being inhibited by the limit switch indication in the MCA, which indicates hooks are latched,
LCC violation cleared. Continue Countdown.

Not Performed:_____

2. **IF** both MCA OP stats inverted, and at least one limit switch was picked up by operating the ROEU hooks,

THEN LCC violation cleared. Continue Countdown.

Not Performed:_____

3. **IF** both MCA OP stats inverted and neither limit switch was picked up,

THEN the ODA/PDA interface may not be latched and may separate during ascent. Damage may occur during Launch,
LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-226 **CPLE** **OTC**

ROEU troubleshooting complete.

***** End of Option B - ROEU Deployed Indications Failed Off Should Be On *****

***** End of ROEU Hook Anomaly (SSID ROEU-04) *****

Dual ROEU Relax Anomaly (SSID ROEU-05)

NOTE
Perform Dual ROEU Relax Anomaly (SSID ROEU-05) for STS-129 only.

Dual ROEU Relax Anomaly (SSID ROEU-05) Not Performed:_____

Option A - Deploy Indications Failed On Should Be Off

NOTE
Perform Option A if Deploy indications failed On should be Off and when ROEU is Mated.

Option A Not Performed:_____

NOTE
Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify single motor Deploy capability. Presence of both latch indications inhibits latch relay logic, and results in loss of ROEU hook Deploy capability.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU in Deploy direction. ROEU is isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If MCA OP stat stays normal, no ROEU Deploy capability exists, LCC violation confirmed, No Go for Launch.

*If MCA OP stat inverts, ROEU Deploy capability does exist; however, no limit switch shut off capability exists for the deploy motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as cue for manual shut off of motors. LCC violation cleared, continue Countdown.

D. Return switches to Launch configuration.

118-227 **CPLE**

```
CRT (VWT33)

VERIFY MCA OP STAT

1/1 THRU 1/6 (NORMAL)
3/1 THRU 3/8 (NORMAL)
```

118-228 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-229 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-230 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-231 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-232 **CPLE ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - 2

PAYLOAD RETENTION LATCH
  ____ SW - LATCH   (STBD=2 / PORT=4)

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-233 **CPLE**

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS 2

LATCH RELEASE
  SWITCH ____ LAT  (STBD=2 / PORT=4)

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-234 CPLE

Record MCA OP status state (invert = Off, normal = On) for failed indicator.

	System 1	On/Off	System 2	On/Off
STBD	1/1		3/3	
PORT	1/1		3/6	

118-235 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  ____ SW - OFF  (STBD=2 / PORT=4)

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-236

Conclusions:

1. **IF** at least one MCA OP stat inverts,

THEN failure is between MCA relay and MDM or an instrumentation failure. MCA OP status state change verifies "On" latch indication does not inhibit Deploy capability. Single motor capability still exists; however, no limit switch shut off capability exists for the deploy motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as cue for manual shut off of motors,
LCC violation cleared. Continue Countdown.

Not Performed:_____

2. **IF** both MCA OP stats stay normal,

THEN MCA relays are inhibited. No ROEU Deploy capability exists,
LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-237 **CPLE** **OTC**

ROEU troubleshooting complete.

***** End of Option A - Deploy Indications Failed On Should Be Off *****

Option B - ROEU Relax Indications Failed Off Should Be On

NOTE

Perform Option B if ROEU relax indications failed Off should be On and when ROEU is Mated.

Option B Not Performed:_____

NOTE

Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify ROEU is in relax position. At least one relax indication required to verify no load on ODA/PDA mate. Damage could occur to ROEU or payload during ascent/descent.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU in relax direction.
ROEU is isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If at least one MCA OP stat stays normal, relax motor is inhibited by limit switch indicating ROEU is in relax position,
LCC violation cleared, continue Countdown.

*If both MCA OP stats invert - perform next steps to configure and monitor AC currents.

D. ASP Configure P/L Bay MECH Power to On (Panel R13L) and issue command to drive ROEU in relax direction for 5 seconds maximum.

E. (CPLE) monitor AC currents

*If current increases on at least one system and the associated limit switch returns,
LCC violation cleared, continue Countdown.

*Else, if the ROEU has been driven without picking up either limit switch, ROEU relax position is unattainable. Loads on ODA/PDA mate may cause damage to occur during ascent/descent,
LCC violation confirmed, No Go for Launch.

F. (ASP) Return switches to Launch configuration.

118-47a **CPLE**

```
CRT (VWT33)

VERIFY MCA OP STAT

1/1 THRU 1/6 (NORMAL)
3/1 THRU 3/8 (NORMAL)
```

118-238 **CPLE** **OTC**

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-239 **CPLE** **ASP**

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-240 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-241 CPLE OTC
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-242 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___  (STBD=1 / PORT=3)

PAYLOAD RETENTION LATCH
  5 SW - RELEASE

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-243 CPLE

```
CRT (VWT33)

VERIFY SWITCH THROWS IN PREVIOUS STEP

PAYLOAD SELECT
  SW POS___  (STBD=1 / PORT=3)

LATCH RELEASE
  SWITCH 5 REL

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-244 CPLE

Record MCA OP stat state (invert = Off, normal = On) for failed indicator.

	System 1	On/Off	System 2	On/Off
STBD	1/5		3/8	
PORT	1/3		3/5	

118-245 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION LATCH
  5 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-246 CPLE

```
CRT (VWT33)
VERIFY

LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
  1/9 (NORMAL)  3/11 (NORMAL)
  1/10 (NORMAL)  3/12 (NORMAL)
```

Contingency for MCA OP Stats Did Invert

NOTE

If expected MCA OP stats did invert the MCA relay is not inhibited. Perform this option to check for current increases and pick up the limit switch.

Apply logic power for minimum time required to verify increase: 5 seconds maximum.

Contingency for MCA OP Stats Did Invert Not Performed:_____

118-247 CPLE OTC

Request concurrence to power on P/L Bay MECH Power.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-248 **CPLE OTC**
OTC CAFM
CAFM ASP

IF PANEL A8 INSTALLED,

THEN
PANEL A8
PORT RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

STBD RMS
  DEPLOY STOW SW - OFF (GUARDED)
  RETENTION LATCHES
    RELEASE/OFF/LATCH SW - OFF

Not Performed:_____

118-249 **CPLE OTC**
OTC CAFM
CAFM ASP

PANEL R13L
RADIATOR
  LATCH CONTROL
    SYS A SW - OFF
    SYS B SW - OFF
  RADIATOR CONTROL
    SYS A SW - OFF
    SYS B SW - OFF

PL BAY DOOR SW - STOP
PL BAY DOOR ENABLE/DISABLE
  SYS 1 SW - DISABLE
  SYS 2 SW - DISABLE

118-250 **CPLE OTC**
OTC CSKU
CSKU ASP

```
PANEL R13L
KU ANTENNA
  DEPLOY/GND/STOW SW - GND
  DIRECT STOW SW - OFF
```

118-251 **CPLE ASP**

```
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-252 **CPLE**

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW ON
  SYS 2 SW ON
PLBM PWR OP ST
1/9 (INVERT)  3/11 (INVERT)
1/10 (INVERT)  3/12 (INVERT)
```

118-253 **CPLE OTC**
OTC CAFM

MID MCA 1 and 3 OP stats may change in following step.

118-254 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___  (STBD=1 / PORT=3)

PAYLOAD RETENTION LATCHES
  5 SW - RELEASE
PAYLOAD RETENTION
  LOGIC POWER
  (SIMULTANEOUSLY;5 SEC MAX, THEN OFF)
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-255 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS ___  (STBD=1 / PORT=3)
LATCH/RELEASE
  SWITCH 5 REL
LOGIC POWER
  SYS 1 SW ON
  SYS 2 SW ON
```

118-256 CPLE

Record MCA OP status state (invert=Off, normal=On) for failed indicator.

	System 1	On/Off	System 2	On/Off
STBD	1/5		3/8	
PORT	1/3		3/5	

118-257 **CPLE**

CRT (VWT33)

RECORD DELTA CURRENT FOR FAILED SYSTEMS.

	A	B	C
AC1	_____	_____	_____
AC2	_____	_____	_____

118-258 **CPLE** **ASP**

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF

***** End of Contingency for MCA OP Stat Did Invert *****

118-259 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  5 SW - OFF

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-260 CPLE

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS___(LAUNCH POSITION)
LATCH/RELEASE SWITCHES
  1 SW OFF
  2 SW OFF
  3 SW OFF
  4 SW OFF
  5 SW OFF
LOGIC POWER
  SYS 1 SW OFF
  SYS 2 SW OFF

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
PLBM PWR OP ST
1/9 (NORMAL)  3/11 (NORMAL)
1/10 (NORMAL)  3/12 (NORMAL)
```

118-261 Conclusions:

1. **IF** at least one MCA OP stat stays normal,

THEN the relay is being inhibited by the limit switch indication in the MCA, which indicates ROEU is in the relax position,
LCC violation cleared. Continue Countdown.

Not Performed:_____

2. **IF** both MCA OP stats invert, and at least one relax limit switch was picked up by operating the ROEU,

THEN LCC violation cleared. Continue Countdown.

Not Performed:_____

3. **IF** at least one limit switch was not picked up,

THEN ROEU relax position is unattainable using the limit switch stops. Loads may be induced on the ODA/PDA interface while trying to obtain the relax position. Damage may occur during Launch/landing,
LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-262 **CPLE** **OTC**

ROEU troubleshooting complete.

***** End of Option B - ROEU Relax Indications Failed Off Should Be On *****

***** End of Dual ROEU Relax Anomaly (SSID ROEU-05) *****

Dual ROEU Stow Anomaly (SSID ROEU-06)

NOTE
Perform Dual ROEU Stow Anomaly (SSID ROEU-06) for STS-129 only.

Dual ROEU Stow Anomaly (SSID ROEU-06) Not Performed:_____

Option A - ROEU Mated - Stow Indications Failed On Should Be Off

NOTE
Perform Option A if ROEU is mated to Payload and Stow indications failed On should be Off.

Option A Not Performed:_____

NOTE
Troubleshooting this anomaly requires access to Panels A6U and R13L. If this anomaly occurs after hatch closure, the hatch must be reopened and the ASP must ingress the Crew Module to perform the necessary switch throws. NTD will determine if there is sufficient time to perform this procedure otherwise a scrub will be called.

1. LCC Requirement:

   1 of 2, verify single motor Stow capability. Presence of both Stow indications inhibits latch relay logic, and results in loss of ROEU Stow capability.

2. ASP Requirements

   Access to Panel A6U and R13L

3. Time Requirements

   2 minutes with go ahead from ASP at panel

NOTE

4. Troubleshooting Plan

A. Verify P/L Bay MECH Power switches are Off.

B. (ASP) Issue switch command to ROEU in Stow direction.
ROEU is isolated from AC power by P/L Bay MECH Power switch.

C. (CPLE) Monitor MCA operational statuses of failed motors.

*If MCA OP status stays normal, no ROEU Stow capability exists, LCC violation confirmed, No Go for Launch.

*If MCA OP status inverts, ROEU Stow capability does exist; however, no limit switch shut off capability exists for the Stow motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as cue for manual shut off of motors.
LCC violation cleared, continue Countdown.

D. Return switches to Launch configuration.

118-263 **CPLE**

```
CRT (VWT33)

VERIFY MCA OP STAT

1/1 THRU 1/6 (NORMAL)
3/1 THRU 3/8 (NORMAL)
```

118-264 CPLE OTC

ROEU troubleshooting requires P/L Bay MECH Power Off. Advise following Console Engineers that use of P/L Bay MECH Power, MCA 1 and 3 shall be restricted to ROEU. Coordinate with CPLE any other operation.

Systems Affected

Payload Bay Doors (CAFM)
Manipulator positioning mechanism (CAFM)
Manipulator retention latches (CAFM)
Vent doors (CPVD)
Radiator latches and deployment (CAFM)
Ku-band antenna deployment (CSKU)

118-265 CPLE ASP

```
IF P/L BAY MECH POWER IS ON
AND OTC CONCURS,

THEN
PANEL R13L
PL BAY MECH PWR
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

Not Performed:_____

118-266 CPLE

```
CRT (VWT33)
VERIFY

PANEL R13L
PL BAY MECH PWR
  SYS 1 SW OFF
  SYS 2 SW OFF
PLBM PWR OP ST
  1/9 (NORMAL) 3/11 (NORMAL)
  1/10 (NORMAL) 3/12 (NORMAL)
```

118-267 **CPLE** **OTC**
OTC **CAFM**

MID MCA 1 and 3 OP stats may change in following step.

118-268 **CPLE** **ASP**

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - 2

PAYLOAD RETENTION LATCH
  ____ SW - RELEASE  (STBD=2 / PORT=4)

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - ON
  SYS 2 SW - ON
```

118-269 **CPLE**

```
CRT (VWT33)
VERIFY

PAYLOAD SELECT
  SW POS 2

LATCH RELEASE
  SWITCH ____ REL  (STBD=2 / PORT=4)

LOGIC POWER
SYS 1 SW ON
SYS 2 SW ON
```

118-270 CPLE

Record MCA OP status state (invert = Off, normal = On) for failed indicator.

	System 1	On/Off	System 2	On/Off
STBD	1/2		3/7	
PORT	1/2		3/4	

118-271 CPLE ASP

```
PANEL A6U
PAYLOAD RETENTION
  PAYLOAD SELECT SW - ___(LAUNCH POSITION)

PAYLOAD RETENTION LATCH
  ____ SW - OFF  (STBD=2 / PORT=4)

PAYLOAD RETENTION
  LOGIC POWER
  SYS 1 SW - OFF
  SYS 2 SW - OFF
```

118-272 Conclusions:

1. **IF** at least one MCA OP stat inverts,

THEN failure is between MCA relay and MDM or an instrumentation failure. MCA OP status state change verifies "On" Stow indication and does not inhibit Stow capability. Single motor capability still exists; however, no limit switch shut off capability exists for the Stow motors. Motor shut off can be accomplished using known motor run times or presence of motor stall currents as cue for manual shut off of motors,
LCC violation cleared. Continue Countdown.

Not Performed:_____

2. **IF** both MCA OP stats stay normal,

THEN MCA relays are inhibited. No ROEU Stow capability exists,

LCC violation confirmed. NO GO for Launch.

Not Performed:_____

118-273 **CPLE** **OTC**

ROEU troubleshooting complete.

***** End of Option A - ROEU Mated - Stow Indications Failed On Should Be Off *****

***** End of Dual ROEU Stow Anomaly (SSID ROEU-06) *****

*** End of Operation **118** ***

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OPERATION 119 Range Safety and SRB Securing (Post G9 Transition)

Shop: **CBRS**
Cntrl Rm Console: **C2**
OPR: **CBRS**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **0.5**

NOTE
Transition to G9 must be complete prior to Safing RSS S&A device and powering down RSS due to the fact that they are MEC commands.

SRB RSS S&A Safing

NOTE
Perform this section if Range Safety S&As Armed.

Not Performed:_____

119-1 **CBRS NTD**
NTD DPS

Perform Transition to G9 per Operation 111 to allow for RSS S&A Safing and RSS Power down.

119-2 **NTD CBRS**

Transition to G9 is complete.

119-3 **TBC NTD 232**
NTD OTC 232

Perform SRB RSS S&A Safing.

119-4 **OTC CDPS 132**
CEPD

DEU equivalents and MEC critical commands will be issued momentarily.

119-5 **OTC CGLS 132**

Perform SRB RSS S&A Safing (Post G9 Recycle).

119-6 **CGLS OTC 132**
OTC NTD 232

SRB RSS S&As Safed and MEC critical commands are Disabled.

***** End of SRB RSS S&A Safing *****

NOTE

Following step must be performed in the order that it is written otherwise it will impact the results of the MEC Preflight Byte.

119-7 NTD CBRS 136

PERFORM SRB RANGE SAFETY VEHICLE POWER DOWN.

```
CURSOR CNTL (SWRB2)
LH A PWR OFF - OFF
LH B PWR OFF - OFF
RH A PWR OFF - OFF
RH B PWR OFF - OFF
CBC PWR DOWN
LH INST ON & TRAN OFF
XMIT CURSOR KEY - PRESS
RH INST ON & TRAN OFF
XMIT CURSOR KEY - PRESS
LH INST OFF & TRAN OFF
XMIT CURSOR KEY - PRESS
RH INST OFF & TRAN OFF
XMIT CURSOR KEY - PRESS
```

119-8 CBRS NTD 136

SRB Range Safety Vehicle Power Off complete.

SRB/MEC Power Down

NOTE
Do not perform following section if RSS S&A's were Safed successfully.

SRB/MEC Power Down Not Performed:_____

119-9 **NTD** **CPWR** **136**

Perform SRB and MEC Power Down. **Report** completion.

119-10 **CPWR** **NTD** **136**
NTD **OTC**
OTC **MS1** **232**

```
PANEL O17
ROW D
MEC
  1 SW - OFF
  2 SW - OFF
```

***** End of SRB/MEC Power Down *****

119-11

Range Safety and SRB Securing (Post G9 Transition) complete.

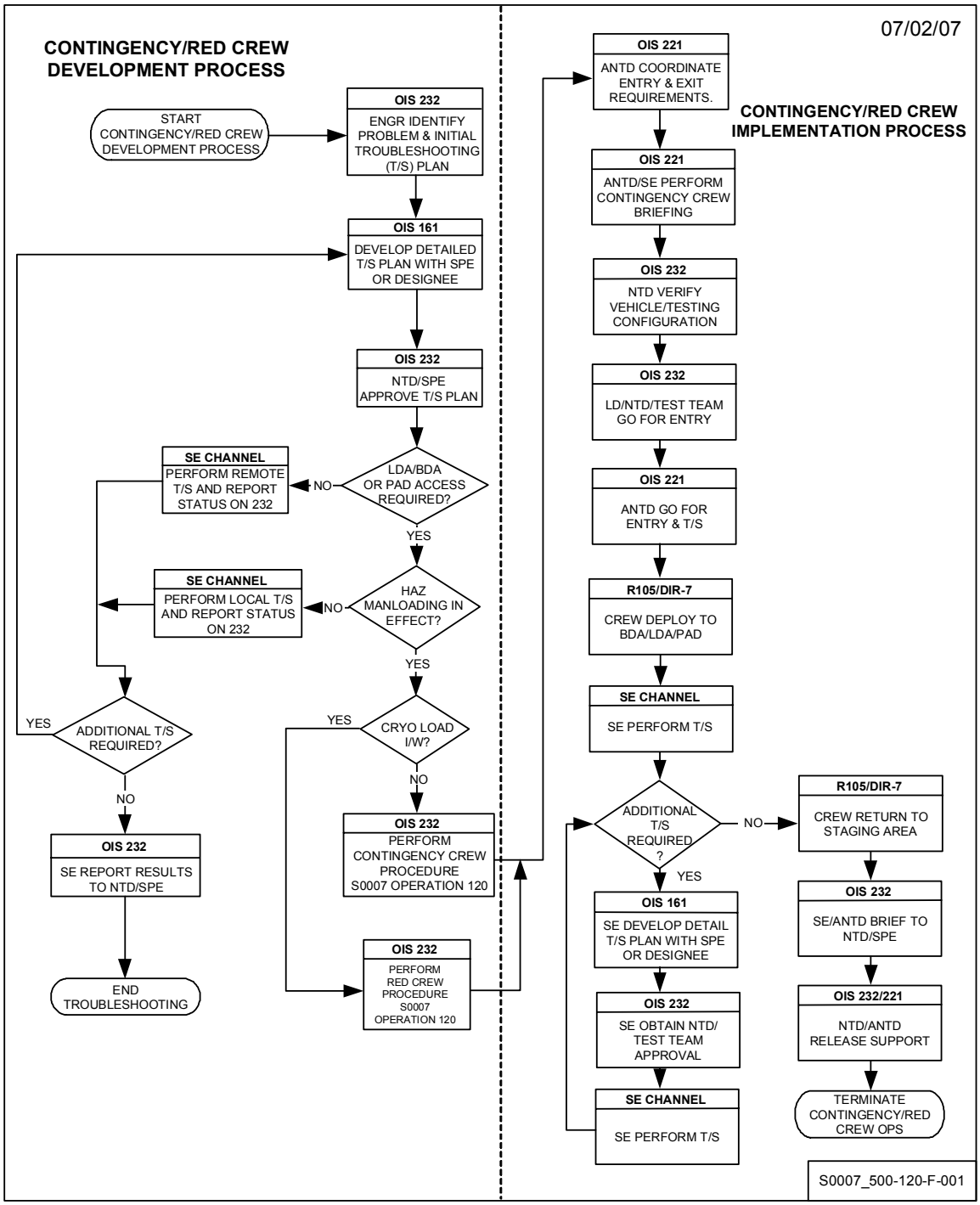
*** End of Operation **119** ***

OPERATION 120 Integrated

Shop: **NTD**
Cntrl Rm Console: **ALL**
OPR: **NTD**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **1.0**

120-1

Contingency/Red Crew Development and Implementation Process



Red Crew Contingency Operations Post Cryogenic Loading Pad Access

NOTE
Following steps contain contingency operations to support Red Crew access to Pad after ET Cryogenic Loading has been initiated.

Not Performed:_____

120-2	**NTD**	**NPM**	**232**
		OTC	
		TBC	
		***SCC**	
		PTC	
		LPS	
		STM	
		***PAC**	
	OTC	***PAD**	
	TBC		
	PTC	**YKTL**	
	STM	**PSTM**	**DIR 2**
	***SCC**	***PSE**	**DIR 7**

A Red Crew briefing will be conducted by the assistant Test Director on OIS channel 221. Assemble Red Crew for pre-entry briefing.

120-3	**NPM**	**ANTD**	**221**
	ANTD	**NTD**	**232**

Red Crew is fully assembled at briefing room, standing by for briefing on OIS 221.

120-4	**NTD**	**ALL**	**232**

All personnel involved in Red Crew troubleshooting plan development and briefing go to OIS 221.

120-5 NPM ANTD 221

Develop troubleshooting plan and verify following items:

1. **Document** Red Crew plan per Appendix A of KVT-PL-0008.
2. **Identify** Crew members.
3. Safety Rep will be Red Crew leader.
4. Location of task.
5. **Verify** current certification of all members.
6. **Establish** route into/out of area and parking.
7. Weather acceptable.
8. Responsible engineer provide verbal description and estimated duration of planned Red Crew activities.
9. **Perform** only one troubleshooting task at a time.
10. Planned action that alters system configuration or deviates from approved troubleshooting plan requires Test Director, SPE, and Safety concurrence.
11. Red Crew shall observe buddy system.
12. OIS net to be used _____.
13. Elevator usage.
14. **Identify/acquire** additional protective equipment/special tools needed. Remove all tools/equipment/FOD prior to final departure from Pad.
15. Red Crew will maintain communication with ANTD on DIR 7 during all personnel movement and/or when OIS not available.

16. **Brief** Red Crew of LCD situational status.

17. All personnel will evacuate the area immediately if they detect a critical situation or if Firing Room communicates a critical situation is developing.

18. Briefing is complete, proceed to vehicles, perform COMM check with ANTD on DIR 7 and standby for direction to proceed to BDA roadblock.

Pad Rescue Team/Support Operations

NOTE
If Red Crew does not require access above 135 foot level, do not perform entry of Pad Rescue Bunker Driver Team.

Pad Rescue Team/Support Operations Not Performed:_____

120-6	**NTD**	**STM**	**232**
	STM	**JSTC**	**111**
	JSTC	**JFIR**	**114**
		***SEC**	

Provide Pad rescue team to man M113 at BDA roadblock and standby to support Red Crew operations. Verify when Crew at A/B-11 and ready to proceed to BDA roadblock.

Task: Pad Rescue Team support of Red Crew

Support: FIRE
Support: SEC

Badge Board Req'd - Essential Personnel -	
	NPSC
Pad/Rescue	11
Pad/Rescue	3*
* Bunker M113 vehicle driver team if required	

***** End of Pad Rescue Team/Support Operations *****

120-7 **NTD** ***SCC** **232**

Request Safety concurrence to clear Pad Rescue Team and/or Red Crew to BDA roadblock for Red Crew operations.

120-8 **NTD** ***SEC** **232**

Clear Pad Rescue Team and/or Red Crew through LDA roadblock to BDA roadblock for Red Crew operations.

_____ Red Crew personnel in _____ Vehicles

Support: SEC

120-9 **ANTD** ***HT2** **DIR 7**

Perform M113 COMM check on DIR 7 with Pad Rescue Team and brief Crew on Red Crew operation, members, and location.

Support: FIRE

120-10 **NPM** **ANTD** **DIR 7**

Red Crew is in their vehicles and ready to proceed to BDA.

120-11 **ANTD** ***RED** **DIR 7**

Perform COMM check with Red Crew leader on DIR 7. Proceed to BDA roadblock and standby for final Go to Pad.

NOTE

Upon completion of previous Red Crew briefing, Red Crew move from OSB II to BDA roadblock may occur concurrently with Firing Room pre-entry briefing. Pre-entry briefing completion and Launch Director concurrence must be verified prior to sending Red Crew through BDA roadblock to Pad.

Firing Room Pre-entry Briefing

120-12	**ANTD**	**ALL**	**232**

Perform on Net Test Team Briefing per KVT-PL-0008. Include following:

1. **Describe** task.
2. Number of personnel/vehicles.
3. Location of task.
4. Entry/exit routes.

120-13	**NTD**	**TBC**	**232**
	TBC	**CLOX**	**136**
		CLHY	

Verify cryogenic propellants are in stable Replenish, Revert, or Stop Flow configuration.

120-14	**NTD**	**OTC**	**232**
		TBC	
	OTC	**CEPD**	**132**
		CHGD	**212**
	TBC	**CBRS**	**136**

Verify all PICS and S&A devices are not armed; Range Safety inhibits are On. Verify Shuttle and GSE detection systems operational.

120-15	**NTD**	**ALL**	**232**
	OTC	**ALL**	**132**
	TBC	**ALL**	

No LPS programs shall be run while Red Crew is within the BDA except as required to monitor and maintain vehicle and GSE in a safe configuration, controlled switching is in effect. NTD concurrence is required for all switch actions.

Support Operations

120-16	**NTD**	**STM**	**232**

Perform following and report completion:

1. OIS CH___ and/or DIR 7 will be used for Red Crew operations. Verify recording.

2. **IF** required and not active,

THEN activate Pad OIS.

Substep 2 Not Performed:_____

3. **Provide** video tracking and recording of Red Crew operations.

4. **IF** MLP/PTCR/ECS Room access required,

THEN verify ODMS indicates acceptable oxygen content for Red Crew entry.

Substep 4 Not Performed:_____

120-17 STM GYCC 111

Perform following and report completion:

Support: COMM

1. OIS CH___ or DIR 7 will be used for Red Crew operations. **Verify** recording.

2. **IF** required and not active

   THEN activate Pad___ OIS .

   Substep 2 Not Performed:_____

3. **Provide** video tracking and recording of Red Crew operations.

120-18 GYCC JYCD 117

IF required and not active,

THEN activate Pad OIS. **Report** completion.

Support: OISD

Not Performed:_____

120-19 GYCC JYVO PTP
JYVR

Provide video tracking and recording of Red Crew operations.

Support: OTV

120-20 STM JBEP

IF MLP/PTCR/ECS Room access is required,

THEN verify nominal O2 concentrations in MLP/PTCR/ECS Room via ODMS.

Support: PWR

Not Performed:_____

NOTE

Total number of personnel above FSS/RSS 135 ft level will not exceed 14 personnel (including Flight Crew), which provides a reserve capacity for 7 Fire/ Rescue if a contingency occurs. The nominal capacity of the slidewire system is 21.

Red Crew to Pad

120-21	**NTD**	**OTC**	**232**
		TBC	
		CSPE	
		STM	
		LPS	
		***PAC**	
		***SCC**	
	***SCC**	***PSE**	**DIR 7**

Verify ready for Red Crew entry to Pad

120-22	**NTD**	**LD**	**232**

Pre-entry briefing complete, Launch Team ready for Red Crew operations. Request your concurrence to proceed.

120-23	**ANTD**	***RED**	**DIR 7**
		***HT2**	

Proceed to Pad___ for Red Crew operations and report in on Net 105 or OIS channel ___. Provide verbal description of actions over OIS/radio as they occur. **Report** completion.

120-24	***RED**	**ANTD**	**DIR 7**
	ANTD	**NTD**	**232**
	NTD	***SCC**	
		***PAC**	

Red Crew contingency operations completed. Departing the Pad at this time, will report when Red Crew has reached the BDA roadblock and standing by there for possible further actions.

120-25 ***SCC** **NTD** **232**

Safety has verified all Red Crew personnel have cleared BDA.

***** Red Crew Contingency Operations Complete *****

120-26 **NTD** **ANTD** **232**
LD
ANTD ***RED** **DIR 7**

No further Red Crew operations required. Red Crew released and is proceeding to OSB II. **Report** when clear of the LDA.

120-27 **ANTD** ***HT2** **DIR 7**
NTD ***SCC** **232**

IF Pad Rescue Team to return to LDA roadblock,

THEN Red Crew released to OSB II. Pad Rescue Team and Bunker Team return to A/B-11. **Report** when teams are through A/B-11.

Not Performed:_____

120-28 **NTD** **OTC** **232**
TBC
PTC
CSPE
STM
LPS
***SCC**
***FLT**
LD

IF a Launch Countdown hold was initiated for Red Crew operations,

THEN Red Crew operations complete and Red Crew back at OSB II. **Verify** ready to resume count.

Not Performed:_____

120-29 **NTD STM 232**
STM GYCC 111

Perform following and report completion.

Support: COMM

1. **IF** activated,

   THEN disable Pad _____ OIS.

   Substep 1 Not Performed:_____

2. **IF** unassigned channel used,

   THEN OIS channel _____ recording no longer required.

   Substep 2 Not Performed:_____

3. **Terminate** video tracking and recording of Red Crew.

120-30 **GYCC JYCD 117**

IF activated,

THEN disable Pad _____ OIS. **Report** completion.

Support: OISD

Not Performed:_____

120-31 **GYCC** **GYCR** **117**

IF unassigned channel used,

THEN OIS channel _____ recording no longer required.

Support: VCE

Not Performed:_____

120-32 **GYCC** **JYVO** **PTP**
JYVR

Terminate video tracking and recording of Red Crew.

Support: OTV

120-33 **NTD**

Provide original Red Crew Troubleshooting Plan form (KVT-PL-0008, Appendix A) to CMQC for attachment to as-run copy of S0007.500.

Contingency Crew Entry after ECS Configured to GN_2 Flow Mode

NOTE

Following contingency option applies to the time period between MLP/PTCR/ECS room clear for ECS configuration to the GN_2 flow mode until ET Cryogenic Loading begins. This option is to be used to troubleshoot and resolve problems that are deemed critical to proceeding in the Launch Countdown as determined by the Test Director. It will only be exercised after all reasonable efforts have been expended to resolve the problem prior to configuring ECS to the standby GN_2 mode. Safety concurrence is required to exercise this option.

This Option may be performed multiple times. Record buys and data in Table 120-1 - Data Sheet and Verification Record at the end of this Operation.

(Not Performed:)

120-34 **NTD** ***SCC** **232**

Request Safety concurrence for Contingency Crew entry to (_____) for the following task:

(_____)

ECS system is in the (_____) mode.

120-35 **NTD** **OTC** **232**
TBC
LPS
STM
***SCC**
***SCC** ***PSE** **NET 105**

Send minimum number of certified personnel to support contingency operations and meet with Pad Safety at following location for pre-entry briefing (Pad Butler Bldg or OSB II) and report to ANTD on OIS 221:

(_____)

120-36	**NTD**	**NPM**	**232**
		OTC	
		TBC	
		***SCC**	
		PTC	
		LPS	
		STM	
		***PAC**	
	OTC	***PAD**	
	TBC		
	PTC	**YKTL**	
	STM	**PSTM**	**NET 104**
	***SCC**	***PSE**	**NET 105**

A Contingency Crew briefing will be conducted by the Assistant Test Director. Assemble Contingency Crew for pre-entry briefing.

120-37	**NPM**	**ANTD**	**221**
	ANTD	**NTD**	**232**

Contingency Crew fully assembled at briefing room, standing by for briefing on OIS 221.

120-38	**NTD**	**ALL**	**232**

All personnel involved in Contingency Crew troubleshooting plan development and briefing go to OIS 221.

NOTE

There are 10 each 30-minute SCBA with OISD COMM and 4 each 60-minute air packs staged at the Pad Butler Bldg. Additional SCBA packs are available on air pack truck if required.

120-39

ANTD	**STM**	**221**
STM	**JSTC**	**111**
JSTC	***SCB**	

IF access to MLP/PTCR/ECS room is required,

THEN deliver (_____) (number) fully serviced air packs to either of following locations (two per person):

MLP entry - Pad surface side 2 pedestal leading up to airlock.
PTCR/ECS room entry - Exterior lower surface blast doors.

Support: LS

(Not Performed:)

NOTE

Access to the MLP will be via the airlock and requires no support assistance.

120-40

ANTD	**STM**	**221**
STM	**JBAC**	**111**

IF access to the PTCR/ECS room is required,

THEN provide support to open and re-secure PTCR/ECS room exterior doors per Job Plan M3034.08, Contingency Crew or Red Crew Entry to PTCR/ECS Room. Site Safety will open and re-secure interior doors.

Support: HVAA

(Not Performed:)

120-41 ANTD ALL 221

Develop troubleshooting plan, verify and brief the Contingency Crew on following items:

1. **Identify** Crew members.

2. Safety rep will be Contingency Crew Leader.

3. Location of task.

4. **Verify** current certification of all members.

5. **Establish** route into/out of area.

6. Weather acceptable.

7. Responsible engineer provide verbal description and estimated duration of planned Contingency Crew activities.

8. Perform only one troubleshooting task at a time.

9. Planned action that alters system configuration or deviates from approved troubleshooting plan requires test director, SPE, and safety concurrence.

10. Contingency Crew shall observe buddy system

11. **Verify** personnel have required number of headsets.

OIS Net to be used (_____)

Call signs to be used(_____)
(Additional OIS CH available 233-238)

12. Contingency Crew will maintain communication with ANTD on radio Net 105 during all personnel movement and/or when OIS not available.

13. **Brief** Contingency Crew on LCD situational status.

14. **Identify/acquire** additional protective equipment/special tools needed.

120-42	**NTD**	**STM**	**232**
	STM	**JBEP**	**111**

IF MLP/PTCR/ECS Room access is required,

THEN verify nominal O_2 concentrations in MLP/PTCR/ECS room via ODMS.

Support: PWR

(Not Performed:)

120-43	**JBEP**	**STM**	**111**
	STM	**NTD**	**232**
	NTD	***SCC**	
	***SCC**	***PSE**	**NET 105**

IF MLP/PTCR/ECS Room access is required
AND previous step performed,

THEN
PTCR/MLP/ECS room O_2 concentrations nominal.

Support: PWR

(Not Performed:)

120-44	**NTD**	**OTC**	**232**
		TBC	
	OTC	**CEPD**	**132**
		CHGD	
	TBC	**CBRS**	**136**

Verify all PICS and S&A devices are not armed; Range Safety inhibits are On. **Verify** Shuttle and GSE detection systems operational.

120-45

ANTD	**STM**	**221**
STM	**GYCC**	**111**
GYCC	**JYCD**	**117**
	GYCR	

Perform following and report completion:

1. OIS CH___ and/or radio Net 105 will be used for Contingency Crew operations. **Verify** recording.

2. **IF** required and not active,

   THEN activate Pad OIS.

Support: OISD
Support: VCE

(Substep 2 Not Performed:)

120-46 ***PSE** ***SCC** **NET 105**

All personnel are present for Contingency Crew entry, personnel are certified, and properly attired. Request NTD/*SCC concurrence to enter (___) (location) and come up on OIS (___). *PSE will monitor O_2 level using portable O_2 meter(s) if Crew must enter MLP/PTCR/ECS room.

WARNING

GN_2 (Gaseous Nitrogen) is an asphyxiant and displaces oxygen.
Exposure may cause asphyxiation, and in extreme cases could cause death.

Use only in a well ventilated area.

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NOTE

During GN_2 hand valve opening and transition to GN_2 flow the MLP/PTCR will be cleared of all personnel. The ECS room will be clear of all nonessential personnel for GN_2 hand valve opening and clear of all personnel for the transition to GN_2 flow.

Once the transition to the GN_2 flow is completed and the system is verified stable, personnel may enter with safety escort. Scott air packs will be worn, air On, by individuals during entry into and exit from the MLP PTCR ECS room. Once the O_2 content is verified acceptable, Site Safety will give a Go for personnel to lower face mask from the face. A spare Scott air pack per individual will be available at the entrance of the actual work location.

120-47	**NTD**	**ANTD**	**232**
		OTC	
		TBC	
		LPS	
		PTC	
		***SCC**	
	***SCC**	***PSE**	**NET 105**
	ANTD	**NPM**	**221**

Contingency personnel have a Go to enter (_____) (location). Scott air packs, with air On, will be worn by users during entry and exit from MLP/PTCR/ECS room until Safety reverifies O_2 content. A minimum of one individual per location will come up on OIS channel (____) to communicate to Test Team.

120-48 **NTD** ***SCC** **232**

IF Contingency Crew access requires penetration of security established roadblocks,

THEN clear Contingency Crew through (_____) roadblocks for Contingency Crew operations.

(Not Performed:)

120-49 **NTD** ***SCC** **232**
***SCC** ***PSE** **NET 105**

Contingency operations complete. **Report** when all individuals have cleared area.

Re-secure MLP/PTCR/ECS Room and Doors

NOTE
Perform this option if MLP/PTCR/ECS room access was required.

Re-secure MLP/PTCR/ECS Room and Doors (Not Performed:)

120-50	**NTD**	***SCC**	**232**
	***SCC**	***PSE**	**NET 105**

MLP/PTCR/ECS room and doors can be re-secured for Launch. Site Safety to close and secure interior doors.

120-51	***PSE**	***SCC**	**NET 105**
	***SCC**	**NTD**	**232**

All personnel are clear PTCR/MLP/ ECS room. Exterior doors can be secured.

***** End of Re-secure MLP/PTCR/ECS Room and Doors *****

120-52 **NTD STM 232**
STM JBAC 111

IF access to the PTCR/ECS room was required,

THEN re-secure PTCR/ECS room exterior doors for Launch per Job Plan M3034.08, Contingency Crew or Red Crew Entry to PTCR/ECS Room. **Report** completion.

Support: HVAA

(Not Performed:)

120-53 **STM JSTC 111**
JSTC *SCB

Perform the following:

1. **Pick up** air packs from following location(s): (_____)

2. **Replace** used ones with fully charged ones, and return them to their normal Pre-Launch staging location(s).

Support: LS

(Not Performed:)

120-54 **NTD ALL 232**

Contingency re-entry operations completed, area secured for Launch.

***** End of Contingency Crew Entry after ECS Configured to GN_2 Flow Mode *****

Contingency Entry for MLP GN_2 Pressure Adjustment

(Not Performed:)

120-55 **JBPN STM 111**
STM NTD 232

MLP (__) at Pad (__) facility GN_2 pressure (_____psi) is out of tolerance. Request concurrence to perform re-entry to adjust pressure(s).

Support: PNSA

120-56 **NTD STM 232**
STM JBPN 111
JBPN GBPN

Assemble re-entry team at (____) to perform pressure adjustment, MLP (__) at Pad (__).

Support: PNSA

Essential Personnel	
	SPOC
Safety	1
Pneumatics Engineer	1
Pneumatic Mechanic	2

120-57 **NTD STM 232**
STM JBPN 111
JBPN GBPN

Perform facility GN_2 pressure adjustment.

Support: PNSA

NOTE

When performing next step, if ambient temperature in the compartment is greater than 100 deg F or projected to rise more than 30 deg prior to Launch, the pressure(s) must be set at the lower end of the tolerance. Perform substeps as required by Engineering.

120-58 **JBPN** **GBPN** **111**

Adjust MLP (__) GN_2 pressure(s) as required per OMI M3197

1. GN_2 regulation panel S72-1107-02, Compt 1B

(Substep 1 Not Performed:)

2. GN_2 tertiary panel S72-1107-02A, Compt 1B

(Substep 2 Not Performed:)

3. GN_2 purge panel S72-1107-08, Compt 44A

(Substep 3 Not Performed:)

Support: PNSA

120-59 **GBPN** **JBPN** **111**
JBPN **STM**
STM **NTD** **232**

Personnel clear of MLP (__) at Pad (__) GN_2 pressures adjusted.

Support: PNSA

120-60 **JBPN** **STM** **111**

MLP GN_2 pressure adjustment complete.

120-61	**ANTD**	**STM**	**221**
	STM	**GYCC**	**111**
	GYCC	**JYCD**	**117**
		GYCR	

Perform following and report completion.

Support: OISD
Support: VCE

1. **IF** activated for Contingency Crew operations,

THEN disable Pad (__) OIS.

(Substep 1 Not Performed:)

2. **IF** unassigned channel used for Contingency Crew operations,

THEN OIS channel (___) recording may be terminated.

(Substep 2 Not Performed:)

***** End of Contingency Entry for MLP GN_2 Pressure Adjustment *****

MLP Re-Entry During Post Launch Securing

(Not Performed:)

NOTE

The following ground rules apply for MLP entry with a GN_2 or GHe leak inside the MLP:

1. GN_2 to air changeover is complete with hand valves closed and locked.

2. Post Launch inspections and LO_2/LH_2 storage area safing may proceed in parallel with this operation.

3. Supplied air required until MLP O_2 checks and TVC's complete.

4. Minor GN_2 leaks (O_2 greater than 16.5 percent inside the breathing zone) may be secured locally with Test Team direction.

5. Major GN_2 leaks (O_2 less than 16.5 percent in multiple MLP Compartments or inside the breathing zone) require MLP GN_2 securing at the GN_2 storage battery.

6. MLP GN_2 securing should be implemented for gross GN_2 leaks as indicated by an O_2 deficient environment or by Test Team direction.

MLP Compartment Entry With Minor GN_2 Leak (Oxygen Level Greater Than 16.5 PCT)

NOTE

Perform MLP Compartment Entry With Minor GN_2 Leak (Oxygen Level Greater Than 16.5 PCT) for a minor GN_2 leak in the MLP as directed by the Test Team.

(Not Performed:)

WARNING

GN_2 (Gaseous Nitrogen) is an asphyxiant and displaces oxygen.

Exposure may cause dizziness, unconsciousness, and in extreme cases can result in death.

Do not enter prior to ventilation.

Do not enter unless monitoring for oxygen and adequate oxygen levels are maintained.

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NOTE

O_2 level less than 19.5 PCT inside the MLP requires personnel to be equipped with self-contained breathing apparatus with COMM and continuous communications with two Fire/Rescue personnel outside MLP.

120-62 ***PSE** ***SCC**
***SCC** **NTD**

IF O_2 level is less than 16.5 PCT in the breathing zone,

THEN GN_2 securing for minor GN_2 leak may not continue.

(Not Performed:)

120-63	**GBPN**	**JBPN**	**NET 105**
	JBPN	**STM**	**111**
	STM	**NTD**	
	NTD	***SCC**	**232**

Minor GN_2 leak has been discovered in MLP Compartment (____). O_2 level in the breathing zone is greater than 16.5 PCT. Request concurrence to isolate GN_2 leak and configure the GN_2 tertiary panel to support. Utilizing the tertiary panel will maintain full redundancy of the GN_2 system.

Support: PNSA

120-64	**NTD**	**JFIR**	**232**

Stage Fire/Rescue personnel at MLP "B" level airlock with SCBAs to support contingency MLP entry.

Support: FIRE

120-65	**NTD**	**STM**	**232**
	STM	**JBEP**	**111**

IF ODMS system indicates an O_2 condition between 19.5 and 16.5 PCT oxygen,

THEN report MLP Compartments with low O_2 levels and record corresponding ODMS readings.

MLP Compartment (_____) O_2 PCT (_____)

MLP Compartment (_____) O_2 PCT (_____)

(Not Performed:)

120-66	**NTD**	***SCC**	**232**
		JFIR	
	***SCC**	***PSE**	**NET 105**

Verify personnel are using SCBAs with COMM and perform COMM checks with Fire/Rescue personnel outside the MLP on radio Net 105.

Support: FIRE

120-67 ***PSE** ***SCC** **NET 105**
***SCC** **NTD** **232**

Personnel are in SCBAs and COMM checks verified with Fire/Rescue personnel outside the MLP. You have Safety concurrence to proceed.

120-68 **NTD** **STM** **232**
***SCC**
STM **JBPN** **111**
JBPN **GBPN**
***SCC** ***PSE** **NET 105**

You have concurrence to secure GN_2 leak and configure the GN_2 tertiary panel to support. **Report** completion.

Support: PNSA

120-69 ***PSE** ***SCC** **NET 105**
***SCC** **NTD**
NTD **STM** **232**

GN_2 leak has been isolated. O_2 levels in the compartment and breathing zone are increasing.

120-70 **NTD** **STM** **232**
STM **JBEP** **111**

IF ODMS unit in compartment with minor GN_2 leak is not in trouble,

THEN monitor O_2 levels in MLP and report when levels are greater than 19.5 PCT O_2.

Support: PWR

(Not Performed:)

120-71 **NTD** ***SCC** **232**
***SCC** ***PSE** **NET 105**

IF ODMS unit in compartment with minor GN_2 leak is in trouble,

THEN monitor O_2 levels in MLP and report when levels are greater than 19.5 PCT O_2.

(Not Performed:)

120-72	**NTD**	***SCC**	**232**
	***SCC**	***PSE**	**NET 105**

Continue MLP sweep/initial open up of remaining MLP Compartments. **Report** completion.

***** End of MLP Compartment Entry With Minor GN_2 Leak (Oxygen Level Greater Than 16.5 PCT) *****

MLP GN_2 Securing at GN_2 Battery (Oxygen Level Below 16.5 PCT)

WARNING

GN_2 (Gaseous Nitrogen) is an asphyxiant and displaces oxygen.

Exposure may cause dizziness, unconsciousness, and in extreme cases can result in death.

Do not enter prior to ventilation.

Do not enter unless monitoring for oxygen and adequate oxygen levels are maintained.

WCS006.c 06-09-2005

NOTE

Perform MLP GN_2 Securing at GN_2 Battery (Oxygen Level Below 16.5 PCT) for a major GN_2 leak inside the MLP as directed by the Test Team.

(Not Performed:)

120-73 **JBEP** **NTD**
NTD ***SCC**

O_2 level unacceptable in MLP (__) compartment (_____) Pad (___).
Current O_2 reading (__) percent.

120-74 ***PSE** ***SCC** **NET 105**
***SCC** **NTD** **232**

O_2 levels in breathing zone are below 16.5 PCT. Clearing MLP at this time.

120-75	**STM**	**NTD**
	NTD	**OTC**
		TBC
		STM
		***SCC**
	OTC	***PAD**
		CFCP
		CPVD
	TBC	**CLOX**
		CLHY
	STM	**JBPN**

Loud venting/low O_2 levels have been reported in MLP Compartment (__). Report when system securing will be complete to support facility GHe or GN_2 securing and identify any abnormal GHe/GN_2 usage.

Support: PNSA

120-76	**JBPN**	**STM**	**111**
	STM	**NTD**	**232**
	NTD	**OTC**	
		TBC	
	TBC	**CLOX**	**136**
		CLHY	
	OTC	**CFCP**	**132**

Verify ready for facility MLP GN_2 securing.

Support: PNSA

120-77	**CLOX**	**TBC**	**136**
	TBC	**NTD**	**232**

LO_2 system safing for GN_2 facility securing complete. LO_2 system ready for MLP GN_2 system to be secured.

120-78	**CLHY**	**TBC**	**136**
	TBC	**NTD**	**232**

LH_2 system ready for MLP GN_2 system to be secured.

120-79 **CFCP OTC 132**
OTC NTD 232

PRSD system ready for MLP GN_2 system to be secured.

120-80 **NTD STM 232**
STM JBPN 111
JBPN GBPN

You have a Go for facility MLP GN_2 securing.

Support: PNSA

120-81 **JBPN GBPN**
GBPN PBN_

Secure GN_2 valve A2735 at storage battery and monitor gage A2737.

Support: PNSA

120-82 **JBPN STM 111**
STM NTD 232
NTD *SCC

GN_2 valve A2735 at storage battery secured. Proceeding to vent by opening GN_2 vent valve A1559 on I/F tower.

Support: PNSA

120-83 **GBPN JBPN**
JBPN STM 111
STM NTD 232
NTD *SCC

GN_2 gage A2737 at storage battery reading zero psig. MLP GN_2 system depressurized.

Support: PNSA

120-84	**NTD**	**STM**	**232**
	STM	**JBEP**	**111**

Monitor O_2 levels and report when level above 19.5 percent in MLP Compartment (_____).

Support: PWR

120-85	**JBPN**	**STM**	**111**
	STM	**NTD**	**232**
		JBAC	**111**

IF MLP is pressurized,

THEN request HVAC to depressurize MLP per Job Plan M3079.08, MLP Depressurization at Pads.

Support: PNSA
Support: HVAA

(Not Performed:)

MLP O_2 Level Check

NOTE
Perform MLP O_2 Level Check if MLP entry is required.

(Not Performed:)

120-86

NTD	**STM**	**232**
STM	**JBEP**	**111**

Verify O_2 analyzer level indications in MLP.

Support: PWR

120-87

JBEP	**STM**	**111**
STM	**NTD**	**232**
NTD	***SCC**	
***SCC**	***PSE**	**NET 105**

O_2 analyzers indicate acceptable O_2 levels in MLP. Record any MLP Compartments indicating low O_2 levels or trouble mode.

(_____)

120-88

NTD	***SCC**	**232**
***SCC**	***PSE**	**NET 105**

Request SPOC Safety concurrence for MLP entry to repair GN_2 leak.

120-89

***PSE**	***SCC**	**NET 105**
***SCC**	**NTD**	
NTD	**STM**	**232**
STM	**JBPN**	**111**

Safety concurrence to enter the MLP.

Support: PNSA

***** End of MLP O_2 Level Check *****

120-90 ***PSE** ***SCC**
***SCC** **NTD**

IF O_2 level in suspect compartment goes below 19.5 percent,

THEN personnel shall exit MLP and require Safety concurrence to re-enter MLP compartment.

(Not Performed:)

120-91 **JBPN** **GBPN**
GBPN **PBN_**

IF GN_2 leakage suspected,

THEN close GN_2 valves A1258 and A538171 in Compartment 1B.

Support: PNSA

(Not Performed:)

120-92 **GBPN** **PBN_**

Secure all inlet and outlet valves on GN_2 panels S72-1107-02 and S72-1107-02A. Close/backoff (counter clockwise) on all six regulators.

Support: PNSA

(Not Performed:)

120-93 **GBPN** **JBPN**

GN_2 panels S72-1107-02 and S72-1107-02A secured.

Support: PNSA

(Not Performed:)

120-94 **GBPN** **PBN_**

Tighten all loose fittings/B-nuts as found on panels S72-1107-02 and S72-1107-02A.

Support: PNSA

120-95 **GBPN** **PBN_**

Perform panels S72-1107-02 and S72-1107-02A pressurization per OMI M3063 . Station personnel at valves A1258 and A538171 in case of additional leak(s) discovered.

Support: PNSA

120-96 **GBPN** **PBN_**

IF leak(s) exists,

THEN repair per OMI M3089

Support: PNSA

(Not Performed:)

120-97

GBPN	**JBPN**	
JBPN	**STM**	**111**
STM	**NTD**	**232**
NTD	***SCC**	
	OTC	
	TBC	
TBC	**CLHY**	**136**
	CLOX	
OTC	**CFCP**	**132**

GN_2 leak fixed and system ready for repressurization.
Verify ready to receive GN_2.

Support: PNSA

120-98

NTD	**STM**	**232**
STM	**JBPN**	**111**
JBPN	**GBPN**	

Perform GN_2 pressurization per OMI M3063 .
Report when GN_2 system up and ready to support.

Support: PNSA

***** End of MLP GN_2 Securing at GN_2 Battery (Oxygen Level Below 16.5 pct) *****

Secure GHe Supply to MLP

NOTE
Do not perform this option if leak is known to be GN_2.

Secure GHe Supply to MLP (Not Performed:)

CAUTION
LH_2 Transfer Line purging and inerting must be complete prior to securing facility MLP GHe system. Failure to do so could result in system over pressure, equipment damage and possible fire due to residual gaseous GH_2 in LH_2 Transfer Line.

NOTE
If O_2 levels are not above 19.5 percent in MLP Compartment 1B, proceed with GHe securing steps.

120-99	**JBPN**	**STM**	**111**
	STM	**NTD**	**232**
	NTD	**OTC**	
		TBC	
	TBC	**CLOX**	**136**
		CLHY	
	OTC	**CFCP**	**132**

Verify ready for facility MLP GHe securing.

Support: PNSA

120-100	**CLHY**	**TBC**	**136**
	TBC	**NTD**	**232**

LH_2 system ready for MLP GHe system to be secured.

120-101	**CLOX**	**TBC**	**136**
	TBC	**NTD**	**232**

LO_2 system ready for MLP GHe system to be secured.

120-102 **CFCP OTC 132**
OTC NTD 232

PRSD system ready for MLP GHe system to be secured.

120-103 **NTD STM 232**
STM JBPN 111
JBPN GBPN

You have a Go for facility MLP GHe securing.

Support: PNSA

120-104 **JBPN GBPN 111**
GBPN PBN_

Secure GHe valve A5114 in Pad storage battery and monitor gage A5118.

Support: PNSA

120-105 **JBPN STM 111**
STM NTD 232
NTD *SCC

GHe valve A5114 at storage battery secured. Proceeding to vent by opening GHe vent valve A1561 on I/F tower.

Support: PNSA

120-106 **GBPN JBPN**
JBPN STM 111
STM NTD 232
NTD *SCC

GHe gage A5118 at storage battery reading zero psig. MLP GHe system depressurized.

Support: PNSA

(Not Performed:)

120-107 **NTD STM 232**
STM JBEP 111

Monitor O_2 levels and report when level above 19.5 percent in MLP Compartment (___).

120-108 **JBPN STM 111**
STM NTD 232
JBAC 111

IF MLP is pressurized,

THEN request MLP be depressurized and opened per Job Plan M3079.08, MLP Depressurization at Pads.

Support: PNSA
Support: HVAA

(Not Performed:)

WARNING

Oxygen deficient atmosphere may exist inside the Mobile Launch Platform (MLP) when red light(s) are flashing.

Exposure may cause injury ranging from dizziness to unconsciousness and death.

Do not enter prior to ventilation

Do not enter unless monitoring for toxic vapor levels exist and adequate oxygen levels are maintained.

WCS018 01-06-04

120-109 ***PSE *SCC**
***SCC NTD**

IF O_2 level in suspect compartment goes below 19.5 percent,

THEN personnel shall exit MLP and require Safety concurrence to re-enter MLP compartment.

(Not Performed:)

120-110 **JBPN** **GBPN**

IF GHe leakage suspected,

THEN close GHe Calmec valves A1273 or A1276 in Compartment 1B.

Support: PNSA

(Not Performed:)

120-111 **GBPN** **PBN_**

Check all GHe mechanical joints in Compartment 1B for loose fittings. **Tighten** any loose fittings found.

Support: PNSA

(Not Performed:)

120-112

GBPN	**JBPN**	
JBPN	**STM**	**111**
STM	**NTD**	**232**
NTD	***SCC**	
	TBC	
TBC	**CLHY**	**136**
	CLOX	

GHe leak fixed and system ready for repressurization. Verify ready to receive GHe.

Support: PNSA

120-113

NTD	**STM**	**232**
STM	**JBPN**	**111**
JBPN	**GBPN**	

Perform GHe pressurization per OMI M3063 . Report when GHe system up and ready to support.

Support: PNSA

120-114	**JBEP**	**STM**	
	STM	**NTD**	
	NTD	**OTC**	
		TBC	
		***SCC**	
	***SCC**	***PSE**	**NET 105**

MLP compartment (___) O_2 level above 19.5 PCT. Ready to continue MLP post Launch securing OPS.

***** End of Secure GHe Supply to MLP *****

***** MLP Re-Entry During Post Launch Securing Complete *****

Pad Elevator Contingency Plan

(Not Performed:)

120-115

IF elevator car stops,

THEN notify NTD by Hot Dial phone.

(Not Performed:)

WARNING
Unexpected elevator car movement may occur.
Personnel may suffer serious bodily injury or death.
WEHP020 02-10-04

120-116 ***SCC**

To guard against inadvertent movement of the car and possible injury to personnel, the Emergency Stop Toggle Switch must be placed in the "Off" position before opening the car doors.

IF the car is more than 3 feet above the floor landing,

THEN do not exit without aid from the Elevator Red Crew, as open hoist way hazard may exist.

(Not Performed:)

120-117

IF previous steps failed to return elevator car to service,

THEN manually open car doors. If hoist way door opens with car doors, personnel may exit elevator with caution.

(Not Performed:)

Pad Elevator Red Crew Contingency Plan

NOTE

If the previous steps are unsuccessful, perform the following two steps to dispatch the Pad elevator Red Crew.

The primary objective of this contingency plan is to expedite the removal of personnel from an inoperative Pad elevator. The detailed steps are contained in Q3018. Red Crew will consist of one (1) Engineer, two (2) Technicians, and two (2) Pad Safety Reps.

120-118	**NTD**	**STM**	**232**
	STM	**JOCC**	**111**

Implement Pad elevator contingency plan per Doc: JOB PLAN Q3018.5 (LI) Pad Elevator Contingency Plan

Support: CDPD

(Not Performed:)

120-119	**JOCC**	**STM**	**111**
	STM	**NTD**	**232**

Pad elevator contingency plan completed. Elevator personnel leaving Pad.

(Not Performed:)

***** End of Pad Elevator Red Crew Contingency Plan *****

***** End of Pad Elevator Contingency Plan *****

Table 120-1 - Data Sheet and Verification Record				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
Contingency Crew Entry After ECS Configured to GN_2 Flow Mode				
Not Performed:				
120-33 To				
Task				
Mode				
120-34 Location				
120-35				
120-36				
120-37				
120-38 Number				
Not Performed:				
120-39				
Not Performed:				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
120-40 SS11 OIS				
Call Signs				
120-41				
Not Performed:				
120-42				
Not Performed:				
120-43				
120-44 SS1 OIS				
SS2 Not Performed:				
120-45 Location				
OIS				
120-46 Location				
OIS				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
120-47 Roadblocks				
Not Performed:				
120-48				
Re-secure MLP/PTCR/ECS Room and Doors				
Not Performed:				
120-49				
120-50				
End of Re-secure MLP/PTCR/ECS Room and Doors				
120-51				
Not Performed:				
120-52 SS1 Location(s)				
Not Performed:				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
120-53				
End of Contingency Crew Entry After ECS Configured to GN_2 Flow Mode				
Contingency Entry for MLP GN_2 Pressure Adjustment				
Not Performed:				
120-54 MLP				
Pad				
Pressure				
120-55 Location				
MLP				
Pad				
120-56				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
120-57 MLP				
SS1 Not Performed:				
SS2 Not Performed:				
SS3 Not Performed				
120-58 MLP				
Pad				
120-59				
120-60 SS1 Pad				
Not Performed:				
SS2 OIS				
Not Performed:				
End of Contingency Entry for MLP GN_2 Pressure Adjustment				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
MLP Re-Entry During Post Launch Securing				
Not Performed:				
MLP Compartment Entry with Minor GN_2 Leak (Oxygen Level Greater Than 16.5 PCT)				
Not Performed:				
120-61				
Not Performed:				
120-62 Compartment				
120-63				
120-64				
MLP Compt				
O_2 PCT				
MLP Compt				
O_2 PCT				
Not Performed:				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
120-65				
120-66				
120-67				
120-68				
120-69				
Not Performed:				
120-70				
Not Performed:				
120-71				
End of MLP Compartment Entry with Minor GN_2 Leak (Oxygen Level Greater Than 16.5 PCT)				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
MLP GN_2 Securing at GN_2 Battery (Oxygen Level Below 16.5 PCT)				
Not Performed:				
120-72 MLP				
Compt				
Pad				
O_2 PCT				
120-73				
120-74 MLP Compt				
120-75				
120-76				
120-77				
120-78				
120-79				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
120-80				
120-81				
120-82				
120-83 MLP Compt				
120-84				
Not Performed:				
MLP O_2 Level Check				
Not Performed:				
120-85				
120-86 MLP Compt				
120-87				
120-88				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
End of MLP O_2 Level Check				
120-89				
Not Performed:				
120-90				
Not Performed:				
120-91				
Not Performed:				
120-92				
Not Performed:				
120-93				
120-94				
120-95				
Not Performed:				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
120-96				
120-97				
End of MLP GN_2 Securing at GN_2 Battery (Oxygen Level Below 16.5 PCT)				
Secure GHe Supply to MLP				
Not Performed:				
120-98				
120-99				
120-100				
120-101				
120-102				
120-103				
120-104				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
120-105				
Not Performed:				
120-106 MLP Compt				
120-107				
Not Performed:				
120-108				
Not Performed:				
120-109				
Not Performed:				
120-110				
Not Performed:				
120-111				
120-112				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
120-113 MLP Compt				
End of Secure GHe Supply to MLP				
End of MLP Re-Entry During Post Launch Securing				
Pad Elevator Contingency Plan				
Not Performed:				
120-114				
Not Performed:				
120-115				
Not Performed:				
120-116				
Not Performed:				
Pad Elevator Red Crew Contingency Plan				
120-117				
Not Performed:				

Table 120-1 - Data Sheet and Verification Record (continued)				
Step	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly	Run _____ Date _____ IPR/Anomaly
120-118				
Not Performed:				
End of Pad Elevator Red Crew Contingency Plan				
End of Pad Elevator Contingency Plan				

*** End of Operation **120** ***

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OPERATION 121 LPS Console Failure Recovery Procedures

Shop: **LPS**
Cntrl Rm Console: **ALL**
OPR: **LPS**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.3**

NOTE

This operation contains contingency procedures to recover from CCMS hardware failures. These procedures may be performed at NTD/SPE direction in accordance with Launch Countdown time based matrix listed below. Failures prior to time listed in matrix will be recovered in accordance with CCMS Firing Room recovery procedure C4500.

CCMS Consoles	Recovery Time Span
C1,C2,C5,C6,C7,	T-6 hrs thru T-31 sec
C8,C9,C10,C11,C12	T-6 hrs thru T-31 sec
BKUP,MSTR,PDR	T-6 hrs thru T-31 sec
INTG	T-6 hrs thru T-31 sec
C3,C4	T-6 hrs thru T-31 sec

NOTE

For Console Recoveries:

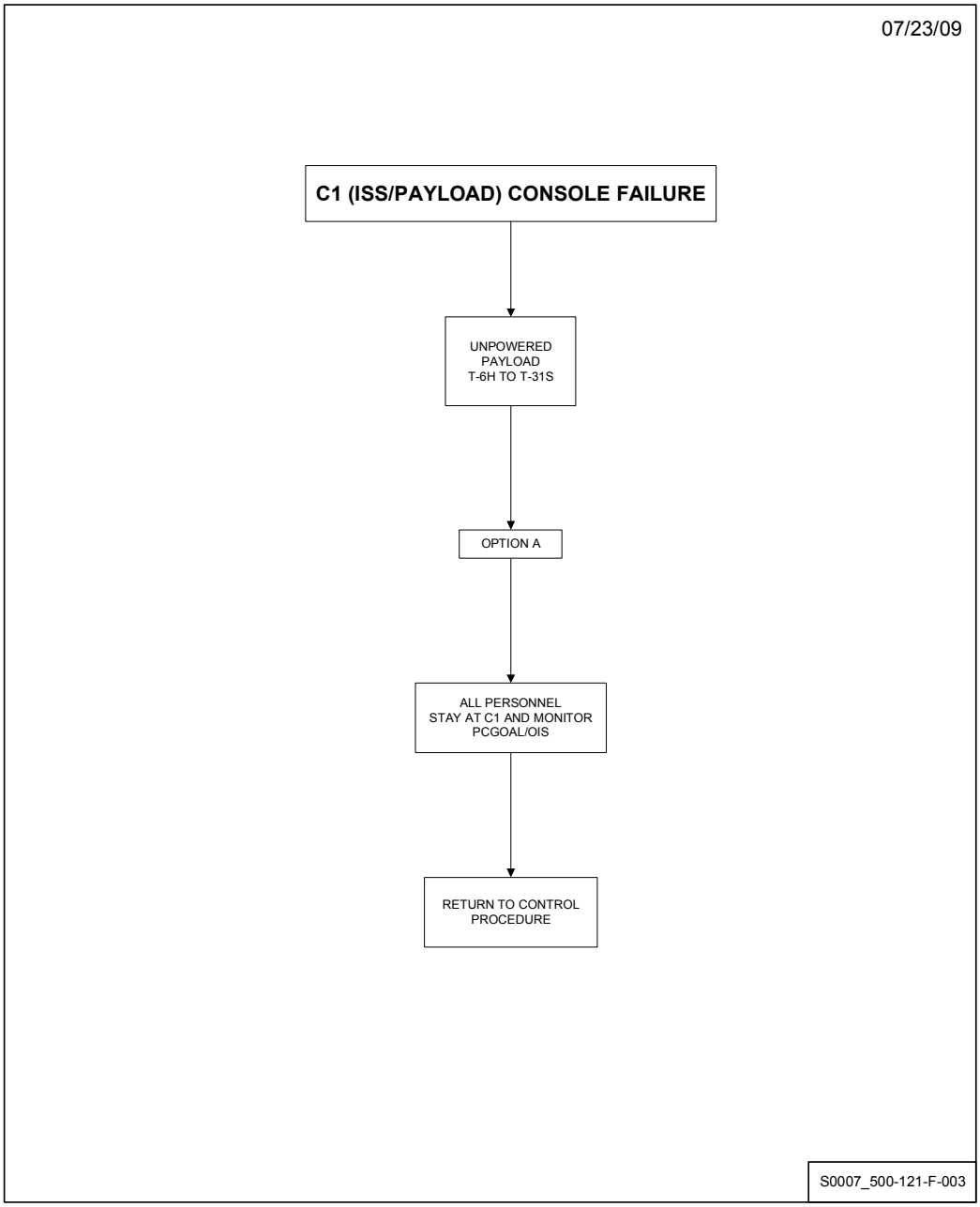
Firing Room 3: XX = 06
Firing Room 4: XX = 04

NOTE

If commanding capability is needed after a console has crashed due to an additional failure, the NTD will be notified and the console operator will move to BKUP.

Section 1

C1 (ISS/Payload Processing) Console Failure Recovery



C1 Console Failure Recovery Procedure

NOTE

C1 Console Failure Recovery Procedure is a contingency procedure that may be performed from T-6 hrs down to T-31 sec when a C1 Console failure occurs, as directed by NTD/SPE.

C1 Console Failure Recovery Procedure Not Performed:_____

NOTE

Console C1 has no requirement to perform any Application Programs at the Backup Console in support of Countdown operations or contingencies.

NOTE

This section contains the following options:

Option A - Console Recovery - Non-powered Payloads

Option A - Console Recovery - Non-powered Payloads

NOTE
Option A is the primary option after L-14 minutes for non-powered payload missions only.

Option A Not Performed:_____

121-1 **NTD** **PTC** **212**
PTC **DLES**
STC
NPI

Monitor OIS and available system parameters via PCGOAL (if available) for the remainder of the Countdown

121-2 **NTD** **LPS** **212**

Halt failed C1 Console.

121-3 **LPS** **C4SE** **127**

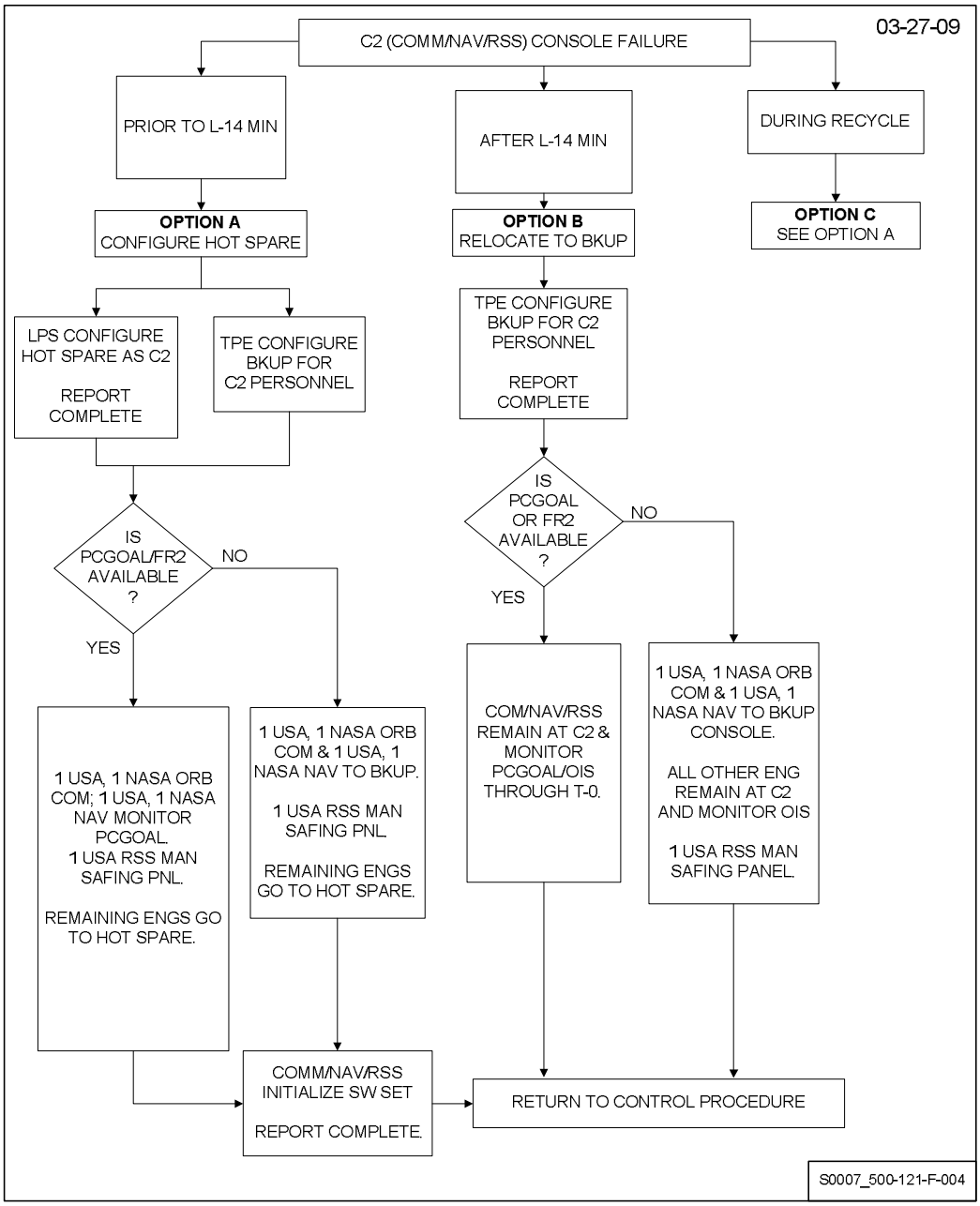
Halt failed C1 Console. (H/W XX40).
Report completion.

***** End of Option A - Console Recovery - Non-powered Payloads *****

***** End of C1 Console Failure Recovery Procedure *****

Section 2

C2 (COMM/NAV/RSS) Console Failure Recovery



C2 Console Failure Recovery Procedure

NOTE

C2 Console Failure Recovery Procedure is a contingency procedure that may be performed from T-6 hrs down to T-31 seconds when a C2 Console failure occurs, as directed by NTD/SPE.

C2 Console Failure Recovery Procedure Not Performed:_____

NOTE

This section contains the following options:

Option A - Console Recovery prior to L-14 (Relocate to Hot Spare)

Option B - Console Recovery after L-14 (Relocate to Backup Consoles as required)

Option C - Console Recovery during Recycle (relocate to Hot Spare)

The decision as to which option(s) to perform in event of a C2 Console Failure can be determined by referencing the C2 Console Failure Recovery Flow Chart.

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare)

NOTE
Option A is the primary option prior to L-14 minutes.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-4 **NTD** **LPS** **212**
CTPE

LPS

Reconfigure C2 software to Hot Spare Console.
Report completion (4 minutes).

CTPE

Configure BKUP console for C2 Personnel.
Report completion.

121-5 **CTPE**

Perform following at Backup Console:

1. **Verify/Provide** two open concurrencies or two program SEP03 Active and two CRT Positions (A1 and A2)

2. **Perform** Program VEA40 via "COMM SYS OVERVIEW" selection on Program SEP03 (Position A1)

121-6 **LPS** **C4SE** **127**

Halt failed C2 Console (H/W XX08).
Report completion.

121-7 **LPS**

IF PRIOR TO T-26 MINUTES (GLS DOES NOT HAVE CONTROL OF RSS FDS),

THEN
SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

BRS RCL RSYS CHANGE FOR CONSOLE C2 TO BKUP COMPLETE.

Not Performed:_____

121-8 **LPS** **NTD** **212**
CTPE

IF prior to T-26 minutes (GLS does not have control of RSS FDS),

THEN
C2 BRS RCL RSYS Transfer to Backup Console complete.

Not Performed:_____

121-9 **LPS**

IF AFTER T-26 MINUTES,

THEN
SLP50 PG-A

VERIFY FOLLOWING YELLOW MESSAGE:

GLS IN CONTROL OF RSS HOLD INDS - N03IS331D = 2
NO RSYS TRANSFER REQUIRED.

Not Performed:_____

121-10 **NTD** **CNSE**
CCSE
CBRS

RSS Engineer monitor system via PCGOAL (if available) until Hot Spare is ready.

One USA and one NASA Orbiter COMM Engineer monitor system via PCGOAL (if available) until Hot Spare is ready.

One USA and one NASA NAVAIDS Engineer monitor system via PCGOAL (if available) until Hot Spare is ready.

One USA RSS Engineer remain to man RSS Safing Panel

All other C2 personnel move to Hot Spare Console.
Prepare for initialization.

If PCGOAL/FR2 is not available, or for additional failures, then one USA, one NASA Orbiter COMM and one USA, one NASA NAV Engineer move to Backup console until software has been configured at Hot Spare.

121-11 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1

2. C PP C2 _ _

121-12 **LPS** **C4SE** **127**

AT HSP1 H/W _____

1. **PERFORM** $BMAP C2.

2. **HALT** HSP1.

121-13 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-14 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-15 **LPS** **C4MC** **127**

Transmit Limits.

121-16 LPS C4SE 127

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-17 LPS

IF PRIOR TO T-26 MINUTES (GLS DOES NOT HAVE CONTROL OF RSS FDS),

THEN
SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

BRS RCL RSYS CHANGE FOR CONSOLE BACKUP TO C2 COMPLETE.

Not Performed:_____

121-18 LPS NTD 212

IF prior to T-26 minutes (GLS does not have control of RSS FDS),

THEN
C2 BRS RCL RSYS transfer to C2 Hot Spare complete.

Not Performed:_____

121-19 **LPS**

IF AFTER T-26 MINUTES (GLS IS IN CONTROL OF RSS FDS),

THEN
SLP50 PG-A

VERIFY FOLLOWING YELLOW MESSAGE:

GLS IN CONTROL OF RSS HOLD INDS -
N03IS331D = 2
NO RSYS TRANSFER REQUIRED.

Not Performed:_____

121-20 **LPS** **NTD** **212**
NTD **CCSE**
CNSE
CBRS

C2 Console Hot Spare initialization complete. C2 Console is located in Console _____.

121-21 **NTD** **CCSE**
CNSE
CBRS

At Hot Spare Console, **Initiate** and **configure** C2 software set.

121-22 **CCSE** **NTD**
CNSE
CBRS

C2 Console software configuration complete at Hot Spare Console.

121-23 **NTD** **CCSE**
CNSE

Engineers at C2 Console and Backup Console (if applicable) **relocate** to Hot Spare Console.

121-24 **CTPE**

Terminate C2 Programs at Backup Console:

```
CONSOLE KYBD (SEP03)
PFK-15 PRESS TWICE
```

121-25 **CTPE** **NTD**

Backup Console Reconfiguration steps are complete.

121-26 **CCSE** **NTD**
CNSE
CBRS

Console configuration complete. All personnel are relocated to Hot Spare Console and are ready to support. Range Safety Safing Panel will remain manned by USA Range Safety Engineering.

***** End of Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare) *****

Option B - Console Recovery After L-14 (Relocate to Backup Console)

NOTE
Option B is the primary option after L-14 minutes.

Option B Not Performed:_____

CAUTION
CTPE is to ensure that the software is configured as directed below. Any other software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-27 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO OPEN CONCURRENCIES OR TWO PROGRAM SEP03 ACTIVE AND TWO CRT POSITIONS (A1 AND A2).

2. **PERFORM** PROGRAM VEA40 VIA "COMM SYS OVERVIEW" SELECTION ON PROGRAM SEP03. (POSITION A1)

121-28 **NTD** **CNSE**
CCSE
CBRS

RSS Engineer monitor system via PCGOAL (if available).

If PCGOAL/FR2 is not available, then one USA, one NASA Orbiter COMM, and one USA, one NASA NAV Engineer move to Backup console.

One USA RSS Engineer remain to man RSS Safing Panel

All other C2 personnel remain at C2 Console.

121-29 **NTD** **LPS** **212**

Halt failed C2 Console.

121-30 **LPS** **C4SE** **127**

Halt failed C2 Console. (H/W XX08)
Report completion.

121-31 **LPS**

```
SLP50 PG-A
VERIFY FOLLOWING YELLOW MESSAGE:

GLS IN CONTROL OF RSS HOLD INDS -
N03IS331D = 2
NO RSYS TRANSFER REQUIRED.
```

121-32 **CNSE** **NTD**
CCSE
CBRS

Console configuration complete. Personnel are relocated to Backup Console (as required) and are ready to support. Range Safety Safing Panel will remain manned by USA Engineering.

121-33 **CNSE** **NTD**
CCSE
CBRS

IF backup console not required,

THEN:
All personnel are ready to support remainder of the count.

Not Performed:_____

***** End of Option B - Console Recovery After L-14 (Relocate to Backup Console)*****

Option C - Console Recovery During Recycle (Relocate to Hot Spare)

NOTE
Option C is the primary option during any Recycle.

Option C Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-34 **NTD** **LPS** **212**
CTPE

LPS

Reconfigure C2 software to Hot Spare Console.
Report completion (4 minutes).

CTPE

Configure Backup Console for C2 personnel.
Report completion.

121-35 **CTPE**

Perform the following at Backup Console:

1. **Verify/Provide** two open concurrencies or two Program SEP03 Active and two CRT positions (A1 and A2).

2. **Perform** Program VEA40 via "COMM SYS OVERVIEW" selection on Program SEP03 (Position A1)

121-36 LPS C4SE 127

Halt failed C2 Console (H/W XX08).
Report completion.

121-37 LPS

IF PRIOR TO T-26 MINUTES (GLS DOES NOT HAVE CONTROL OF RSS FDS),

THEN
SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

BRS RCL RSYS CHANGE FOR CONSOLE C2 TO BKUP COMPLETE.

Not Performed:_____

121-38 **LPS** **NTD** **212**
CTPE

IF prior to T-26 minutes (GLS does not have control of RSS FDS),

THEN
C2 BRS RCL RSYS Transfer to Backup Console complete.

Not Performed:_____

121-39 **LPS**

IF AFTER T-26 MINUTES,

THEN
SLP50 PG-A

VERIFY FOLLOWING YELLOW MESSAGE:

GLS IN CONTROL OF RSS HOLD INDS - N03IS331D = 2
NO RSYS TRANSFER REQUIRED.

Not Performed:_____

121-40 **NTD** **CNSE**
CCSE
CBRS

RSS Engineer monitor system via PCGOAL (if available).

One USA and one NASA Orbiter COMM Engineer monitor system via PCGOAL (if available) until Hot Spare is ready.

One USA and one NASA NAVAIDS Engineer monitor system via PCGOAL (if available) until Hot Spare is ready.

One USA RSS Engineer remain to man RSS Safing Panel

All other C2 personnel move to Hot Spare Console.
Prepare for initialization.

If PCGOAL/FR2 is not available, then One USA, one NASA Orbiter COMM and one USA, one NASA NAV Engineer move to Backup Console until software has been configured at Hot Spare.

121-41 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1

2. C PP C2 _ _

121-42 **LPS** **C4SE** **127**

AT HSP1 H/W _____

1. **PERFORM** $BMAP C2.

2. **HALT** HSP1.

121-43 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-44 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-45 **LPS** **C4MC** **127**

Transmit Limits.

121-46 LPS C4SE 127

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-47 LPS

IF PRIOR TO T-26 MINUTES (GLS DOES NOT HAVE CONTROL OF RSS FDS),

THEN
SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

BRS RCL RSYS CHANGE FOR CONSOLE BACKUP TO C2 COMPLETE.

Not Performed:_____

121-48 LPS NTD 212

IF prior to T-26 minutes (GLS does not have control of RSS FDS),

THEN
C2 BRS RCL RSYS Transfer to C2 Hot Spare complete.

Not Performed:_____

121-49 **LPS**

IF AFTER T-26 MINUTES (GLS IS IN CONTROL OF RSS FDS),

THEN
SLP50 PG-A

VERIFY FOLLOWING YELLOW MESSAGE:

GLS IN CONTROL OF RSS HOLD INDS -
N03IS331D = 2
NO RSYS TRANSFER REQUIRED.

Not Performed:_____

121-50 **LPS** **NTD** **212**
NTD **CCSE**
CNSE
CBRS

C2 Console Hot Spare initialization complete. C2 is located in Console _____.

121-51 **NTD** **CCSE**
CNSE
CBRS

At Hot Spare Console, **Initiate** and **configure** C2 software set.

121-52 **CCSE** **NTD**
CNSE
CBRS

C2 Console software configuration complete at Hot Spare Console.

121-53 **NTD** **CCSE**
CNSE

Engineers at C2 Console and Backup Console (if applicable) **relocate** to Hot Spare Console.

121-54 **CCSE** **NTD**
CNSE
CBRS

Console configuration complete. All personnel are relocated to Hot Spare Console and are ready to support. Range Safety Safing Panel will remain manned by USA Range Safety Engineering.

121-55 **CTPE**

Terminate C2 Programs at Backup Console:

```
CONSOLE KYBD (SEP03)
PFK-15 PRESS TWICE
```

121-56 **CTPE** **NTD**

Backup Console Reconfiguration steps are complete.

***** End of Option C - Console Recovery During Recycle (Relocate to Hot Spare) *****

***** End of C2 Console Failure Recovery Procedure *****

Section 3

C3 Console Failure Recovery Procedure

NOTE

C3 Console Failure Recovery Procedure is a contingency procedure. Perform as directed by NTD/SPE from LO_2 System Power up through Post Launch Securing/completion of LO_2 Drain. (Ref. LCC LPS-06)

C3 Console Failure Recovery Procedure Not Performed:_____

NOTE

The following Application Programs may be performed at the Backup Console in support of console recovery operations. They have been verified compatible with the GLS software active during Terminal Count. No other programs are allowed after GLS initialization.

SEP03 and Subs, SAE02

NOTE

This section contains the following options:

Option A - ET LO_2 Loading
Option B - ET LO_2 Backup Replenish
Option C - ET LO_2 Drain
Option D - After T-4 Minutes 5 Seconds
Option E - ET LO_2 Pre-loading or Post Launch

CLOX will determine which option(s) to perform in the event of a C3 Console failure.

Option A - ET LO_2 Loading

NOTE
Perform this option if ET LO_2 Loading is in progress.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX43.
Secondary Hot Spare Console is Console XX34.

121-57 **CLOX** **NTD** **232**
NTD **LPS**
CTPE

Perform S0007.500 Op 121, C3 Console Failure Recovery Procedure, Option A: ET LO_2 Loading.

121-58 **NTD** **LPS** **232**

Support CLOX on OIS CH 156.

121-59 **NTD** **LPS** **232**

Reconfigure C3 software to Hot Spare Console.
Report completion. (4 minutes)

121-60 **LPS** **C4SE** **127**

Halt failed C3 Console (H/W XX16).
Report completion.

121-61 CLOX LPS 156

CRT (SA001 PG-A)

1. **VERIFY** LOX SAFING PGM (SAL06) EXECUTING OR COMPLETE.

2. **VERIFY** FOLLOWING MESSAGES:

   SAL06 - LOX CONSOLE IS NOT SUPPORTING (YELLOW)
   SAL06 - LOX LOADING/DRAIN IN PROGRESS, SAFING COMMANDS ISSUED.
   LOX ET ULLAGE PRESS RSYS TRANSFERRED. (RED)

3. **ANNUNCIATE** ANY OF THE FOLLOWING MESSAGES:

   SAL06 - U.T.V. TSM DRN AND VNT CLSD. PV10 WILL NOT BE CLSD. (RED)
   SAL06 - U.T.V. PV10 POSITION. TSM DRN/VNT WILL NOT BE OPND. (RED)
   SAL06 - U.T.V. PV10 CLSD. TSM DRN AND VNT WILL NOT BE OPND.
   LO2 ET ULLAGE PRESS RSYS TRANSFFERED. (RED)

C3 RSYS Transfer to Backup Console

121-62 **LPS**

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C3 TO BKUP BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO BKUP BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO BKUP COMPLETE.

SAL06 NOT PERFORMED - HANDLED BY SA001

RSYS/SAFING FOR CONSOLE C3 TO BKUP COMPLETE.

121-63 **LPS** **NTD** **232**
NTD **CLOX**
CMPL
CSME

C3 RSYS transfer to Backup Console complete.

121-64 **CLOX** **NTD** **232**

IF transfer of LO_2 measurements was not successful,

THEN perform Hardwire Safing per OMI S1003 Emergency Instruction E7.

Not Performed:_____

***** End of C3 RSYS Transfer to Backup Console *****

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-65 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE OPEN CONCURRENCY AND ONE CRT POSITION (A1).

2. SAE02 - TYPE
   PERF PGM KEY - **PRESS**

   VERIFY PROGRAM ACTIVE

121-66 **NTD** **CMPL** **232**
CPRP

Two USA MPS Engineers and one NASA MPS Engineer move to Backup Console (Position A1) and report on OIS CH 156.
Verify PGM SAE02 is active.

All other personnel remain at C3/C4 to monitor system configuration until Hot Spare is initialized.

Hot Spare Initialization

121-67 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP__(2 OR 3)

2. C PP C3 _ _

121-68 **LPS** **C4SE** **127**

AT HSP____ (2 OR 3) H/W _____

1. **PERFORM** $BMAP C3.

2. **HALT** HSP____.

121-69 **LPS** **C4MC** **127**

AT BUFFER H/W_____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-70 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-71 **LPS** **C4MC** **127**

Transmit Limits.

121-72 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-73 **LPS**

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C3 TO C3 BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO C3 BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO C3 COMPLETE.

SAL06 NOT PERFORMED - HANDLED BY SA001

RSYS/SAFING FOR CONSOLE C3 TO C3 COMPLETE.

121-74 **LPS**

CRT (SA001 PG-A)

VERIFY LOX SAFING PGM (SAL06) EXECUTING OR COMPLETE.

VERIFY FOLLOWING MESSAGES:

SAL06 - LOX CONSOLE SUPPORTING
SAL06 - LOX RSYS RETURNED TO LOX CONSOLE

121-75 **LPS** **NTD** **232**
NTD **CLOX**
CMPL
CSME

C3 Console Hot Spare initialization complete. C3 Console is located in Console _____.

121-76 **NTD** **CLOX** **232**
CMPL
CSME

C3 Engineers supporting at failed C3 Console and Backup Console relocate to Hot Spare Console. **Initiate** and **configure** C3 software set.

121-77 **CLOX** **NTD** **232**

C3 Console software configuration complete at Hot Spare Console.

***** End of Hot Spare Initialization *****

121-78 **CLOX** **NTD** **232**

Safing per OMI S1003 E1 - Console C3 Loss During Load or Drain complete.

Personnel are relocated to Hot Spare Console and are ready to support.

CLO3 and CPRP will remain at failed C3 Console to man Hardwire Safing panels.

121-79 **CTPE**

TERMINATE PROGRAMS

CONSOLE KYBD (SAE02 PG-B)
PFK-15 - **PRESS TWICE**

VERIFY SAE02 INACTIVE

121-80 **CTPE** **NTD** **232**

Backup Console reconfiguration steps are complete.

121-81 **NTD** **CLOX** **232**

Perform OMI S1003 , Operation 130 or 135, Reinitiation of Fill After Revert.

***** End of Option A - ET LO_2 Loading *****

Option B - ET LO_2 Backup Replenish

NOTE
Perform this option if LO_2 is in Backup Replenish.

Option B Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX43.
Secondary Hot Spare Console is Console XX34.

121-82 **CLOX** **NTD** **232**
NTD **LPS**
CTPE

Perform S0007.500 Op 121, C3 Console Failure Recovery Procedure, Option B - ET LO_2 Backup Replenish.

121-83 **NTD** **LPS** **232**

Support CLOX on OIS CH 156.

121-84 **CLOX** **LPS** **156**

LO_2 Backup Replenish control has been performed by PGM SA001 at Master Console.
Monitor for any exception and notify CLOX immediately.

121-85 **NTD** **LPS** **232**

Reconfigure C3 software to Hot Spare Console.
Report completion. (4 minutes)

121-86 **LPS** **C4SE** **127**

Halt failed C3 Console (H/W XX16).
Report completion.

C3 RSYS Transfer to Backup Console

121-87 **LPS**

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C3 TO BKUP BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO BKUP BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO BKUP COMPLETE.

SAL06 NOT PERFORMED - HANDLED BY SA001

RSYS/SAFING FOR CONSOLE C3 TO BKUP COMPLETE

121-88 **LPS** **NTD** **232**
NTD **CLOX**
CMPL
CSME

C3 RSYS transfer to Backup Console complete.

121-89 **CLOX** **NTD** **232**

IF transfer of LO_2 measurements was not successful,

THEN perform Hardwire Safing per OMI S1003 Emergency Instruction E7.

Not Performed:_____

***** End of C3 RSYS Transfer to Backup Console *****

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-90 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE OPEN CONCURRENCY ONE CRT POSITION (A1).

2. SAE02 - TYPE
   PERF PGM KEY - **PRESS**

   VERIFY PROGRAM ACTIVE

121-91 NTD CMPL 232
CPRP

Two USA MPS Engineers and one NASA MPS Engineer move to Backup Console (Position A1) and report OIS CH 156.
Verify PGM SAE02 is active.

All other personnel remain at C3/C4 to monitor system configuration until Hot Spare is initialized.

Unable to Maintain Stable Replenish

121-92 **CLOX NTD 232**

IF unable to maintain LO_2 in Stable Replenish,

THEN perform LO_2 Safing.
Proceeding to C3 Console Failure Option A - ET LO_2 Loading.

Not Performed:_____

***** End of Unable to Maintain Stable Replenish *****

Hot Spare Initialization

121-93 **LPS C4MC 127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP__(2 OR 3)
2. C PP C3 _ _

121-94 **LPS C4SE 127**

AT HSP___(2 OR 3) H/W_____

1. **PERFORM** $BMAP C3
2. **HALT** HSP___

121-95 **LPS C4MC 127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-96 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-97 **LPS** **C4MC** **127**

Transmit Limits.

121-98 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION

121-99 **LPS**

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C3 TO C3 BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO C3 BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO C3 COMPLETE.

SAL06 NOT PERFORMED - HANDLED BY SA001

RSYS/SAFING FOR CONSOLE C3 TO C3 COMPLETE.

121-100 **LPS** **NTD** **232**
NTD **CLOX**
CMPL
CSME

C3 Console Hot Spare initialization complete. C3 Console is located in Console_____.

121-101 **NTD** **CLOX** **232**
CMPL
CSME

C3 Engineers supporting at failed C3 Console and Backup Console relocate to Hot Spare Console. **Initiate** and **configure** C3 software set.

121-102 **CLOX** **NTD** **232**

C3 Console software configuration complete at Hot Spare Console.

121-103 **CLOX** **LPS**

CRT (SA001 PG-A)

AFTER CLOX ACTIVATES PROGRAM GAL01 AT C3,
VERIFY MESSAGE:

SA001 - RECEIVED N003LO2 REMCOM FROM C3

***** End of Hot Spare Initialization *****

121-104 **CLOX** **NTD** **232**

LO_2 replenish control has been transferred back to C3 Hot Spare Console. LO_2 system is in Stable Replenish.

Safing per OMI S1003 E2 - Console C3 Loss - LO_2 in Backup Replenish complete.

Personnel are relocated to Hot Spare Console and are ready to support.

CLO3 and CPRP will remain at failed C3 Console to man Hardwire Safing panels.

121-105 CTPE

TERMINATE PROGRAMS

CONSOLE KYBD (SAE02 PG-B)
PFK-15 - **PRESS TWICE**

VERIFY SAE02 INACTIVE

121-106 CTPE NTD 232

Backup Console reconfiguration steps are complete.

121-107 NTD CLOX 232

Return to OMI S1003 Operation 50 - LOX Replenish at 100 PCT.

***** End of Option B - ET LO_2 Backup Replenish *****

Option C - ET LO_2 Drain

NOTE
Perform this option if C3 Console fails during ET LO_2 Drain.

Option C Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX43.
Secondary Hot Spare Console is Console XX34.

121-108 **CLOX** **NTD** **232**
NTD **LPS**
CTPE

Perform S0007.500 Op 121, C3 Console Failure Recovery Procedure, Option C - ET LO_2 Drain.

121-109 **NTD** **LPS** **232**

Support CLOX on OIS CH 156.

121-110 **NTD** **LPS** **232**

Reconfigure C3 software to Hot Spare Console.
Report completion. (4 minutes)

121-111 **LPS** **C4SE** **127**

Halt failed C3 Console (H/W XX16).
Report completion.

C3 RSYS Transfer to Backup Console

121-112 CLOX LPS 156

CRT (SLP50 PG-A)

1. **VERIFY** LOX SAFING PGM (SAL06) EXECUTING OR COMPLETE.

2. **VERIFY** FOLLOWING MESSAGES:

   SAL06 - LOX CONSOLE IS NOT SUPPORTING (YELLOW)
   SAL06 - LOX LOADING/DRAIN IN PROGRESS, SAFING COMMANDS ISSUED.
   LOX ET ULLAGE PRESS RSYS TRANSFERRED. (RED)

3. **ANNUNCIATE** ANY OF THE FOLLOWING MESSAGES:

   SAL06 - U.T.V. TSM DRN AND VNT CLSD. PV10 WILL NOT BE CLSD. (RED)
   SAL06 - U.T.V. PV10 POSITION. TSM DRN/VNT WILL NOT BE OPND. (RED)
   SAL06 - U.T.V. PV10 CLSD. TSM DRN AND VNT WILL NOT BE OPND.
   LO2 ET ULLAGE PRESS RSYS TRANSFFERED. (RED)

121-113 LPS

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C3 TO BKUP BEGINNING.

RSYS TRANSFER OF SSME RCL FD’S TO BKUP BEGINNING.

RSYS TRANSFER OF SSME RCL FD’S TO BKUP COMPLETE.

RSYS/SAFING FOR CONSOLE C3 TO BKUP COMPLETE

121-114	**LPS**	**NTD**	**232**
	NTD	**CLOX**	
		CMPL	
		CSME	

C3 RSYS transfer to Backup Console complete.

121-115	**CLOX**	**NTD**	**232**

IF transfer of LO_2 measurements was not successful,

THEN perform Hardwire Safing per OMI S1003 Emergency Instruction E7.

Not Performed:_____

***** End of C3 RSYS Transfer to Backup Console *****

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-116 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE OPEN CONCURRENCY AND ONE CRT POSITION (A1).

2. SAE02 - TYPE
   PERF PGM KEY - **PRESS**

   VERIFY PROGRAM ACTIVE

121-117 NTD CMPL 232
CPRP

Two USA MPS Engineers and one NASA MPS Engineer move to Backup Console (Position A1) and report on OIS CH 156.
Verify PGM SAE02 is active.

All other personnel remain at C3/C4 to monitor system configuration until Hot Spare is initialized.

Hot Spare Initialization

121-118 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP___(2 OR 3)
2. C PP C3 _ _

121-119 **LPS** **C4SE** **127**

AT HSP___(2 OR 3) H/W _____

1. **PERFORM** $BMAP C3
2. **HALT** HSP___

121-120 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-121 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-122 **LPS** **C4MC** **127**

Transmit Limits.

121-123 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-124 **LPS**

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C3 TO C3 BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO C3 BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO C3 COMPLETE.

RSYS/SAFING FOR CONSOLE C3 TO C3 COMPLETE.

121-125 **LPS**

CRT (SLP50 PG-A)

VERIFY LOX SAFING PGM (SAL06) EXECUTING OR COMPLETE.

VERIFY FOLLOWING MESSAGES:

SAL06 - LOX CONSOLE SUPPORTING
SAL06 - LOX RSYS RETURNED TO LOX CONSOLE

121-126 **LPS** **NTD** **232**
NTD **CLOX**
CMPL
CSME

C3 Console Hot Spare initialization complete. C3 Console is located in Console_____.

121-127 **NTD** **CLOX** **232**
CMPL
CSME

C3 Engineers supporting at failed C3 Console and Backup Console relocate to Hot Spare Console. **Initiate** and **configure** C3 software set.

121-128 **CLOX** **NTD** **232**

C3 Console software configuration complete at Hot Spare Console.

***** End of Hot Spare Initialization *****

121-129 **CLOX** **NTD** **232**

Safing per OMI S1003 E1 - Console C3 Loss During LO_2 Load or Drain complete.

Personnel are relocated to Hot Spare Console and are ready to support.

CLO3 and CPRP will remain at failed C3 Console to man Hardwire Safing panels.

121-130 **CTPE**

TERMINATE PROGRAMS

CONSOLE KYBD (SAE02 PG-B)
PFK-15 - **PRESS TWICE**

VERIFY SAE02 INACTIVE

121-131 **CTPE** **NTD** **232**

Backup Console reconfiguration steps are complete.

121-132 **NTD** **CLOX** **232**

Perform OMI S1003 Operation 155 - Return to Drain After Stop Drain.

***** End of Option C - ET LO_2 Drain *****

Option D - After T-4 Minutes 55 Seconds

NOTE

Perform this option if C3 Console fails after T-4 Minutes 55 Seconds and no Launch occurs.

Option D Not Performed:_____

NOTE

Primary Hot Spare Console for this recovery procedure is Console XX43. Secondary Hot Spare Console is Console XX34.

121-133 **CLOX** **NTD** **212**
NTD **LPS**
CTPE

Perform S0007.500 Op 121, C3 Console Failure Recovery Procedure, Option D - After T-4 Minutes 55 Seconds.

121-134 **NTD** **LPS** **212**

Support CLOX on OIS CH 156.

121-135 **NTD** **LPS** **232**

Reconfigure C3 software to Hot Spare Console.
Report completion. (4 minutes)

121-136 **LPS** **C4SE** **127**

Halt failed C3 Console (H/W XX16).
Report completion.

C3 RSYS Transfer to Backup Console

121-137 CLOX LPS 156

CRT (SLP50 PG-A)

1. **VERIFY** LOX SAFING PGM (SAL06) EXECUTING OR COMPLETE.

2. **VERIFY** FOLLOWING MESSAGES:

   SAL06 - LOX CONSOLE IS NOT SUPPORTING (YELLOW)
   SAL06 - LOX LOADING/DRAIN IN PROGRESS, SAFING COMMANDS ISSUED (RED)
   OR
   SAL06 - LOX SUCTION VLVS OPN, SAFING COMMANDS ISSUED (RED)
   LOX ET ULLAGE PRESS RSYS TRANSFERRED. (RED)

121-138 LPS

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C3 TO BKUP BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO BKUP BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO BKUP COMPLETE.

RSYS/SAFING FOR CONSOLE C3 TO BKUP COMPLETE

121-139	**LPS**	**NTD**	**212**
	NTD	**CLOX**	
		CMPL	
		CSME	

C3 RSYS transfer to Backup Console complete.

121-140	**CLOX**	**NTD**	**232**

IF transfer of LO_2 measurements was not successful,

THEN perform Hardwire Safing per OMI S1003 Emergency Instruction E3.

Not Performed:_____

***** End of C3 RSYS Transfer to Backup Console *****

Hardwire Safing and Hardwire Drain

NOTE
If unable to verify LOX Bleed Path and Helium Bubbling active then CLOX must perform this option immediately per S1003 Emergency Instruction E3.

Hardwire Safing and Hardwire Drain Not Performed:_____

121-141 **CLOX NTD 212**

Unable to verify LO_2 System Post Abort or Cutoff Safing complete. Hardwire Safing has been initiated. Proceeding to Hardwire Drain.

121-142 **CLOX NTD 212**

LOX Hardwire Drain flow has been initiated.

121-143 **CLOX TBC 136**
TBC NTD 232

LOX Hardwire Drain is complete. Ready to relocate to Hot Spare Console.

***** End of Hardwire Safing and Hardwire Drain *****

CMPL Relocation to Backup Console

NOTE

If Hardwire Safing and Hardwire Drain is required then CMPL will not relocate to Backup Console.

CMPL Relocation to Backup Console Not Performed:_____

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-144 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE OPEN CONCURRENCY AND ONE CRT POSITION (A1).

2. SAE02 - TYPE
   PERF PGM KEY - **PRESS**

   VERIFY PROGRAM ACTIVE

121-145 **NTD** **CMPL** **232**
CPRP

Two USA MPS Engineers and one NASA MPS Engineer move to Backup Console (Position A1) and report on OIS CH 156.
Verify PGM SAE02 is active.

All other personnel remain at C3/C4 to monitor system configuration until Hot Spare is initialized.

***** End of CMPL Relocation to Backup Console *****

Hot Spare Initialization

121-146 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP___(2 OR 3)
2. C PP C3 _ _

121-147 **LPS** **C4SE** **127**

AT HSP___(2 OR 3) H/W _____

1. **PERFORM** $BMAP C3
2. **HALT** HSP___

121-148 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-149 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-150 **LPS** **C4MC** **127**

Transmit Limits.

121-151 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-152 **LPS**

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C3 TO C3 BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO C3 BEGINNING.

RSYS TRANSFER OF SSME RCL FD'S TO C3 COMPLETE.

RSYS/SAFING FOR CONSOLE C3 TO C3 COMPLETE.

121-153 **LPS**

CRT (SLP50 PG-A)

VERIFY LOX SAFING PGM (SAL06) EXECUTING OR COMPLETE.

VERIFY FOLLOWING MESSAGES:

SAL06 - LOX CONSOLE SUPPORTING
SAL06 - LOX RSYS RETURNED TO LOX CONSOLE

121-154

LPS	**NTD**	**212**
NTD	**CLOX**	
	CMPL	
	CSME	

C3 Console Hot Spare initialization complete. C3 Console is located in Console_____.

121-155 **NTD** **CLOX** **212**
CMPL
CSME

C3 Engineers supporting at failed C3 Console and Backup Console relocate to Hot Spare Console. **Initiate** and **configure** C3 software set.

***** End of Hot Spare Initialization *****

121-156 **CLOX** **NTD** **212**

IF Hardwire Safing and Hardwire Drain were not required,

THEN C3 Console software configuration complete at Hot Spare Console.

Not Performed:_____

121-157 **CLOX** **NTD** **212**

Safing per OMI S1003 E3 - Console C3 Loss after T-4M55S complete.

Personnel are relocated to Hot Spare Console.

CLO3 and CPRP will remain at failed C3 Console to man Hardwire Safing panels.

121-158 **NTD** **CLOX** **212**

IF Hardwire Safing and Hardwire Drain was not required,

THEN perform Drain from Revert per S1003 Operation 145.

Not Performed:_____

121-159 **NTD TBC 232**
TBC CLOX 136

IF Hardwire Safing and Hardwire Drain was required,

THEN perform Return from Hardwire Safing per S1003 Operation 505.

Not Performed:_____

121-160 **CTPE**

```
IF C3 PERSONNEL RELOCATED TO BACKUP CONSOLE,

THEN
TERMINATE PROGRAMS

CONSOLE KYBD (SAE02 PG-B)
PFK-15 - PRESS TWICE

VERIFY SAE02 INACTIVE
```

Not Performed:_____

121-161 **CTPE NTD 232**

IF C3 personnel relocated to Backup Console,

THEN Backup Console reconfiguration steps are complete.

Not Performed:_____

***** End of Option D - After T-4 Minutes 55 Seconds *****

Option E - ET LO_2 Pre-loading or Post Launch

NOTE
Perform this option prior to Suction Line Chilldown or Post Launch.

Option E Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX43.
Secondary Hot Spare Console is Console XX34.

121-162 CLOX NTD 212

IF Launch has occurred,

THEN perform S0007.500 Op 121, C3 Console Failure Recovery Procedure, Option E - Post Launch.

Not Performed:_____

121-163 NTD LPS 232

Reconfigure C3 software to Hot Spare Console.
Report completion. (4 minutes)

121-164 LPS C4SE 127

Halt failed C3 Console (H/W XX16).
Report completion.

Hot Spare Initialization

121-165 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP___(2 OR 3)
2. C PP C3 _ _

121-166 **LPS** **C4SE** **127**

AT HSP___(2 OR 3) H/W _____

1. **PERFORM** $BMAP C3
2. **HALT** HSP___

121-167 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-168 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-169 **LPS** **C4MC** **127**

Transmit Limits.

121-170 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-171	**LPS**	**NTD**	**212**
	NTD	**CLOX**	**232**
		CMPL	
		CSME	

C3 Console Hot Spare initialization complete. C3 Console is located in Console_____.

121-172	**NTD**	**CLOX**	**212**
		CMPL	**232**
		CSME	

C3 Engineers supporting at failed C3 Console and Backup Console relocate to Hot Spare Console. **Initiate** and **configure** C3 software set.

***** End of Hot Spare Initialization *****

121-173	**CLOX**	**NTD**	**212**
			232
	NTD	**TBC**	**136**

C3 Console software configuration complete at Hot Spare Console.

121-174	**CLOX**	**NTD**	**212**
			232
	NTD	**TBC**	**136**

IF Launch has occurred,

THEN
Safing per OMI S1003 E3 - Console C3 Loss after T-4M55S complete.

Personnel are relocated to Hot Spare Console.

Proceeding with LOX System Safing after Launch per OMI G3153

Not Performed:_____

121-175	**CLOX**	**NTD**	**232**
	NTD	**TBC**	**136**

IF prior to Suction Line Chilldown,

THEN
Personnel are relocated to Hot Spare Console and are ready to support.

CLO3 and CPRP will remain at failed C3 Console to man Hardwire Safing panels.

Not Performed:_____

***** End of Option E - ET LO_2 Pre-loading or Post Launch *****

***** End of C3 Console Failure Recovery Procedure *****

Section 4

C4 Console Failure Recovery Procedure

NOTE

C4 Console Failure Recovery Procedure is a contingency procedure. Perform as directed by NTD/SPE from LH_2 System Power up through Post Launch Securing/completion of LH_2 Drain. (Ref LPS-07).

C4 Console Failure Recovery Procedure Not Performed:_____

NOTE

The following Application Programs may be performed at the Backup Console in support of console recovery operations. They have been verified compatible with the GLS software active during Terminal Count. No other programs are allowed after GLS initialization.

SAE12, SEP03 and Subs

NOTE

This section contains the following options:

Option A - ET LH_2 Loading or Drain
Option B - ET LH_2 Backup Replenish
Option C - After T-1 Minute 57 Seconds
Option D - ET LH_2 Pre-loading or Post Launch
Option E - ET LH_2 Boiloff

CLHY will determine which option(s) to perform based on ET LH_2 System configuration.

Option A - ET LH_2 Loading or Drain

NOTE
Perform this option if ET LH_2 Loading or Drain is in progress.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX43.
Secondary Hot Spare Console is Console XX34.

121-176 **CLHY** **NTD** **232**
NTD **LPS**

1. **Perform** Safing per OMI S1004 E17: Console C4 Loss During LH+ Load or Drain.

2. **Perform** S0007.500 Op 121, C4 Console Failure Recovery Procedure, Option A - ET LH_2 Loading or Drain.

121-177 **NTD** **LPS** **232**

Support CLHY on OIS Ch 166.

121-178 **NTD** **LPS** **232**

Reconfigure C4 software to Hot Spare Console.
Report completion. (4 minutes)

121-179 **LPS** **C4SE** **127**

Halt failed C4 Console (H/W XX15).
Report completion.

C4 RSYS Transfer to Backup Console

NOTE

SAH06 program messages will be recorded on SA001 active concurrency page, or on SLP50 concurrency when SA001 concurrency is inactive.

121-180 **LPS**

CRT (SA001 or SLP50, PG-A)

VERIFY

SAH06 - LH2 CONSOLE IS NOT SUPPORTING
SAH06 - LH2 SAFING IN PROGRESS, LH2 RSYS
TRANSFERRED AND STOP FLOW COMMANDS ISSUED

121-181 **LPS**

CRT (SLP50 PG-A)

VERIFY

RSYS/SAFING FOR CONSOLE C4 TO BKUP BEGINNING

RSYS TRANSFER OF MPS RCL FD'S TO BKUP BEGINNING

RSYS TRANSFER OF MPS RCL FD'S TO BKUP COMPLETE

RSYS/SAFING FOR CONSOLE C4 TO BKUP COMPLETE

121-182 **LPS** **NTD** **232**
CLHY

C4 RSYS Transfer to Backup Console complete.

121-183 CLHY

IF console transfer not successful
AND ET Vent Valve Cycling Active or in Drain Prepress,

THEN:

1. **CLHY CLH2 166**
   CMPS

   Relocate to C4 Console

2. **CLHY NTD 232**
   LPS
   CTPE

   Continue with C4 Console Hot Spare Initialization.

   Proceeding to Hardwire Safing per OMI S1004 E15: Hardwire System Safing.

Not Performed:_____

***** End of C4 RSYS Transfer to Backup Console *****

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-184 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE OPEN CONCURRENCY AND ONE CRT POSITION (A1).

2. SAE12
   PERF PGM KEY - **PRESS**

   CRT

   VERIFY SAE12 PROGRAM ACTIVE

121-185 NTD CLHY 232
CMPS

One USA MPS Engineer and one NASA MPS Engineer move to Backup Console position A1.

C4 LH_2/MPS Safing Panels will remain manned by CLHF and CPRP Engineers.

All other personnel remain at C3/C4 to monitor system configuration until Hot Spare is initialized.

Hot Spare Initialization

121-186 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP___(2 OR 3)
2. C PP C4 _ _

121-187 **LPS** **C4SE** **127**

AT HSP___ (2 OR 3) H/W_____

1. **PERFORM** $BMAP C4.
2. **HALT** HSP___.

121-188 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-189 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-190 **LPS** **C4MC** **127**

Transmit Limits.

121-191 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

NOTE

SAH06 program messages will be recorded on SA001 active concurrency page, or on SLP50 concurrency when SA001 concurrency is inactive.

121-192 **LPS**

CRT (SA001 or SLP50, PG-A)

VERIFY

SAH06 - LH2 CONSOLE IS NOW SUPPORTING
SAH06 - LH2 RSYS RETURNED TO LH2 CONSOLE

121-193 **LPS**

CRT (SLP50 PG-A)

VERIFY

RSYS/SAFING FOR CONSOLE C4 TO C4 BEGINNING

RSYS TRANSFER OF MPS RCL FD'S TO C4 BEGINNING

RSYS TRANSFER OF MPS RCL FD'S TO C4 COMPLETE

RSYS/SAFING FOR CONSOLE C4 TO C4 COMPLETE

121-194 **LPS NTD 232**
NTD CLHY

C4 Console Hot Spare initialization complete. C4 Console located in Console _____.

121-195 **NTD** **CLHY** **232**
CLHY **CMPS** **166**
CLH2
CLHL

Relocate to C4 Hot Spare Console.
Initiate and **configure** software set.

121-196 **CLHY** **NTD** **232**

C4 Console software configuration complete at Hot Spare Console.
All personnel are relocated to Hot Spare Console and are ready to support.
Safing panels will remain manned by CLHF and CPRP.
Proceeding with Recovery from Console C4 Loss in S1004.

***** End of Hot Spare Initialization *****

121-197 **CTPE**

TERMINATE MPS SOFTWARE AT BACKUP

CONSOLE KYBD (SAE12, PG-B)

PFK-15 - **PRESS TWICE**

VERIFY SAE12 INACTIVE

121-198 **CTPE** **NTD** **232**

Backup Console reconfiguration steps are complete.

***** End of Option A - ET LH_2 Loading and Drain *****

Option B - ET LH_2 Backup Replenish

NOTE
Perform this option if LH_2 is in Backup Replenish.

Option B Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX43.
Secondary Hot Spare Console is Console XX34.

121-199 **CLHY** **NTD** **232**
NTD **LPS**

1. **Perform** Safing per OMI S1004 E18: Console C4 Loss During LH_2 Replenish.

2. **Perform** S0007.500 Op 121, C4 Console Failure Recovery Procedure, Option B - ET LH_2 Backup Replenish.

121-200 **NTD** **LPS** **212**

Support CLHY on OIS CH 166.

121-201 **CLHY** **LPS** **166**

LH_2 Backup Replenish control is being performed by program SA001 at Master Console.
Monitor for any exception and notify CLHY immediately.

121-202 **NTD** **LPS** **232**

Reconfigure C4 software to Hot Spare Console.
Report completion. (4 minutes)

121-203 **LPS** **C4SE** **127**

Halt failed C4 Console (H/W XX15).
Report completion.

C4 RSYS Transfer to Backup Console

121-204 **LPS**

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C4 TO BKUP BEGINNING.

RSYS TRANSFER OF MPS RCL FD'S TO BKUP BEGINNING.

RSYS TRANSFER OF MPS RCL FD'S TO BKUP COMPLETE.

SAH06 NOT PERFORMED - HANDLED BY SA001

RSYS/SAFING FOR CONSOLE C4 TO BKUP COMPLETE

121-205 **LPS** **NTD** **232**
CLHY

C4 RSYS Transfer to Backup Console complete.

121-206 CLHY

IF UNABLE TO MAINTAIN LH2 IN STABLE REPLENISH
OR C4 CONSOLE RSYS TRANSFER NOT SUCCESSFUL,

THEN

1. **CLHY CLO2 156**

   CURSOR CNTL (GAL51 LO2 SYSTEM DISPLAY)

   LH2 SAFE - **ON**

2. **CLHY LPS 166**

   CRT (SA001 PG-A, MASTER CONSOLE)

   VERIFY

   SAH06 - LH2 CONSOLE IS NOT SUPPORTING
   SAH06 - LH2 SAFING IN PROGRESS, LH2 RSYS TRANSFERRED AND STOP FLOW COMMANDS ISSUED

3. **CLHY NTD 232**

   LH2 UNABLE TO MAINTAIN STABLE REPLENISH.
   LH2 SAFING HAS BEEN PERFORMED.

   Perform Safing per OMI S1004 E17: Console C4 Loss During LH_2 Load or Drain.

4. Proceed to S0007.500 Op 121, Console Failure Recovery Procedure, Option A - ET LH_2 Loading or Drain.

Not Performed:_____

***** End of C4 RSYS Transfer to Backup Console *****

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-207 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE OPEN CONCURRENCY AND ONE CRT POSITION (A1).

2. **CONSOLE KYBD**

   SAE12
   PERF PGM KEY - **PRESS**

   CRT

   VERIFY SAE12 PROGRAM ACTIVE

121-208 NTD CLHY 232
CMPS

One USA MPS Engineer and one NASA MPS Engineer move to Backup Console Position A1

C4 LH_2/MPS Safing Panels will remain manned by CLHF and CPRP Engineers.

All other personnel remain at C3/C4 to monitor system configuration until Hot Spare is initialized.

Hot Spare Initialization

121-209 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP__(2 OR 3)
2. C PP C4 _ _

121-210 **LPS** **C4SE** **127**

AT HSP___(2 OR 3) H/W_____

1. **PERFORM** $BMAP C4
2. **HALT** HSP___

121-211 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-212 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-213 **LPS** **C4MC** **127**

Transmit Limits.

121-214 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION

121-215 **LPS**

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C4 TO C4 BEGINNING.

RSYS TRANSFER OF MPS RCL FD'S TO C4 BEGINNING.

RSYS TRANSFER OF MPS RCL FD'S TO C4 COMPLETE.

SAL06 NOT PERFORMED - HANDLED BY SA001

RSYS/SAFING FOR CONSOLE C4 TO C4 COMPLETE.

121-216 **LPS** **NTD** **232**
CLHY

C4 Console Hot Spare initialization complete.
C4 Console is located in Console_____.

121-217 **NTD** **CLHY** **232**
CLHY **CMPS** **166**
CLH2
CLHL

Relocate to C4 Hot Spare Console.
Initiate and **configure** software set.

121-218 **LPS**

CRT (SA001, PG-A)

VERIFY

SA001 - RECEIVED N003LH2 REMCOM FROM C4

121-219 CLHY NTD 232

C4 Console software configuration complete at Hot Spare Console.
All personnel are relocated to Hot Spare Console and are ready to support.
Safing panels will remain manned by CLHF and CPRP.

121-220 CLHY NTD 232

LH_2 Replenish Control has been transferred back to C4 Hot Spare Console.
LH_2 System is in Stable Replenish.

121-221 CTPE

TERMINATE MPS SOFTWARE AT BACKUP

CONSOLE KYBD (SAE12, PG-B)

PFK-15 - **PRESS TWICE**

VERIFY SAE12 INACTIVE

121-222 CTPE NTD 232

Backup Console reconfiguration steps are complete.

***** End of Hot Spare Initialization *****

***** End of Option B - ET LH_2 Backup Replenish *****

Option C - After T-1 Minute 57 Seconds

NOTE

Perform this option if C4 Console fails during:

LH_2 Terminal Count (T-1min57sec through T-10sec)
LH_2 Terminal Count (After T-10sec and Abort declared)
LH_2 Post SSME Ignition Safing.
LH_2 Terminal Count Safing.

Option C Not Performed:_____

NOTE

Primary Hot Spare Console for this recovery procedure is Console XX43.
Secondary Hot Spare Console is Console XX34.

121-223 CLHY NTD LPS 232

1. **Perform** Safing per OMI S1004 E19: Console C4 Loss During LH_2 Terminal Count.

2. **Perform** S0007.500 Op 121, C4 Console Failure Recovery Procedure, Option C - After T-1 Minute 57 Seconds.

121-224 NTD LPS 232

Support CLHY on OIS CH 166.

121-225 NTD LPS 232

Reconfigure C4 Software to Hot Spare Console.
Report completion (4 minutes).

121-226 LPS C4SE 127

Halt failed C4 Console (H/W XX15).
Report completion.

CAUTION
ET Vent valve has to be vented within 10 seconds of SSME Shutdown verification (reference S00E00.130). CLHY will initiate Hardwire Safing if SAH06 Safing program is not performed upon GLS Safing.

121-227 CLHY

IF ET Vent valve not open,

THEN:

1. **CLHY NTD 232**
   CSME

   Verify all 3 SSME's are shut down.

2. **CLHY NTD 232**
   LPS

   Continue with C4 Console Hot Spare initialization.

   Proceed to Hardwire Safing per OMI S1004 E15: Hardwire System Safing.

Not Performed:_____

C4 RSYS Transfer to Backup Console

121-228 **LPS**

CRT (SLP50, PG-A)

VERIFY

SAH06 - LH2 CONSOLE IS NOT SUPPORTING
SAH06 - LH2 SAFING IN PROGRESS, LH2 RSYS TRANSFERRED AND STOP FLOW AND TERMINAL COUNT SAFING COMMANDS ISSUED

121-229 **LPS**

CRT (SLP50 PG-A)

VERIFY

RSYS/SAFING FOR CONSOLE C4 TO BKUP BEGINNING

RSYS TRANSFER OF MPS RCL FD'S TO BKUP BEGINNING

RSYS TRANSFER OF MPS RCL FD'S TO BKUP COMPLETE

RSYS/SAFING FOR CONSOLE C4 TO BKUP COMPLETE

121-230 **LPS** **NTD** **232**
CLHY

C4 RSYS Transfer to Backup Console complete.

***** End of C4 RSYS Transfer to Backup Console *****

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-231 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO OPEN CONCURRENCIES OR ONE OPEN CONCURRENCY AND SEP03 ACTIVE AND TWO CRT POSITIONS (A1 AND A2).

2. CONSOLE KYBD

   SAE12
   PERF PGM KEY - **PRESS**

   CRT
   VERIFY PROGRAM ACTIVE

3. **PERFORM** PROGRAM GEH51 VIA "LH2" SELECTION ON PROGRAM SEP03.

   CRT
   VERIFY PROGRAM ACTIVE.

121-232 NTD CLHY 232
CMPS

One USA LH_2 Engineer and one NASA LH_2 Engineer move to Backup Console (Position A1).

One USA MPS Engineer and one NASA MPS Engineer move to Backup Console (Position A2)

C4 LH_2/MPS Safing Panels will remain manned by CLHF and CPRP Engineers.

All other personnel remain at C3/C4 to monitor system configuration until Hot Spare is initialized.

Hot Spare Initialization

121-233 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP___(2 OR 3)
2. C PP C4 _ _

121-234 **LPS** **C4SE** **127**

AT HSP___(2 OR 3) H/W _____

1. **PERFORM** $BMAP C4
2. **HALT** HSP___

121-235 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-236 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-237 **LPS** **C4MC** **127**

Transmit Limits.

121-238 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-239 **LPS**

CRT (SLP50, PG-A)

VERIFY

SAH06 - LH2 CONSOLE IS NOW SUPPORTING.
SAH06 - LH2 RSYS RETURNED TO LH2 CONSOLE.

121-240 **LPS**

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C4 TO C4 BEGINNING.

RSYS TRANSFER OF MPS RCL FD'S TO C4 BEGINNING.

RSYS TRANSFER OF MPS RCL FD'S TO C4 COMPLETE.

RSYS/SAFING FOR CONSOLE C4 TO C4 COMPLETE.

121-241

LPS	**NTD**	**232**
NTD	**CLHY**	

C4 Console Hot Spare initialization complete.
C4 Console is located in Console_____.

121-242

NTD	**CLHY**	**232**
CLHY	**CMPS**	**166**
	CLH2	
	CLHL	

Relocate to C4 Hot Spare Console.
Initiate and **configure** software set.

121-243 CLHY NTD 232

C4 Console software configuration complete at Hot Spare Console.
All personnel are relocated to Hot Spare Console.
Safing panels will remain manned by CLHF and CPRP.

***** End of Hot Spare Initialization *****

121-244 CLHY NTD 232

Proceed with Terminal Count Safing (Post or Pre SSME Ignition) Operations per OMI S1004 .

121-245 CTPE

TERMINATE MPS SOFTWARE AT BACKUP

1. **CONSOLE KYBD (SAE12, PG-B)**
   PFK-15 - **PRESS TWICE**

   VERIFY SAE12 INACTIVE

2. **CONSOLE KYBD (GEH51 BACKUP)**
   PFK-15 - **PRESS**

   VERIFY GEH51 INACTIVE

121-246 CTPE NTD 232

Backup Console reconfiguration steps are complete.

***** End of Option C - After T-1 Minute 57 Seconds *****

Option D - ET LH_2 Pre-loading or Post Launch

NOTE
Perform this option if LH_2 Loading has not begun or Launch has occurred.

Option D Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX43.
Secondary Hot Spare Console is Console XX34.

121-247 NTD CLOX 212

1. C4 Console is down. No RSYS Transfer is required. Standing by for Hot Spare initialization.

2. **Perform** S0007.500 Op 121, C4 Console Failure Recovery Procedure, Option D - ET LH_2 Pre-loading or Post Launch.

121-248 NTD LPS 232

Reconfigure C4 software to Hot Spare Console.
Report completion. (4 minutes)

121-249 LPS C4SE 127

Halt failed C4 Console (H/W XX15).
Report completion.

Hot Spare Initialization

121-250 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP___(2 OR 3)
2. C PP C4 _ _

121-251 **LPS** **C4SE** **127**

AT HSP___(2 OR 3) H/W _____

1. **PERFORM** $BMAP C4
2. **HALT** HSP___

121-252 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-253 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-254 **LPS** **C4MC** **127**

Transmit Limits.

121-255 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-256 **LPS** **NTD** **232**
CLHY

C4 Console Hot Spare initialization complete.
C4 Console is located in Console_____.

121-257 **NTD** **CLHY** **232**
CLHY **CMPS** **166**
CLH2

Relocate to C4 Hot Spare Console.
Initiate and **configure** C4 software set.

121-258 **CLHY** **NTD** **232**

C4 Console software configuration complete at Hot Spare Console.
All personnel are relocated to Hot Spare Console and ready to support.
Safing Panels will remain manned by CLHF and CPRP.

***** End of Hot Spare Initialization *****

***** End of Option D - ET LH_2 Pre-loading or Post Launch *****

Option E - ET LH_2 Boiloff

NOTE
Perform this option if C4 Console fails during ET LH_2 Boiloff.

Option E Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX43.
Secondary Hot Spare Console is Console XX34.

121-259 **CLHY** **TBC** **136**
TBC **NTD** **232**

1. **Perform** OMI S1018 E13: Console Loss During ET LH_2 Boiloff.

2. **Perform** S0007.500 Op 121, C4 Console Failure Recovery Procedure, Option E - ET LH_2 Boiloff.

121-260 **NTD** **LPS** **232**

Reconfigure C4 Software to Hot Spare Console.
Report completion (4 minutes).

121-261 **LPS** **C4SE** **127**

Halt failed C4 Console (H/W XX15).
Report completion.

C4 RSYS Transfer to Backup Console

121-262 **LPS**

CRT (SLP50, PG-A)

VERIFY

SAH06 - LH2 CONSOLE IS NOT SUPPORTING
SAH06 - LH2 SAFING IN PROGRESS, LH2 RSYS TRANSFERRED, ET PRESSURE SAFING COMMANDS ISSUED

121-263 **LPS**

CRT (SLP50 PG-A)

VERIFY

RSYS/SAFING FOR CONSOLE C4 TO BKUP BEGINNING

RSYS TRANSFER OF MPS RCL FD'S TO BKUP BEGINNING

RSYS TRANSFER OF MPS RCL FD'S TO BKUP COMPLETE

RSYS/SAFING FOR CONSOLE C4 TO BKUP COMPLETE

121-264 **LPS** **NTD** **232**
CLHY

C4 RSYS Transfer to Backup Console complete.

***** End of C4 RSYS Transfer to Backup Console *****

CAUTION

CTPE immediate action is required if C4 Console Transfer is not successful and ET Boiloff Venting is in progress. Failure to maintain ET structural integrity will result in damage to flight hardware. Reference S00E00.240-1.

ET Boiloff Venting Securing

NOTE

The following three steps are contingency steps only and will not be performed if ET structural integrity is maintained.

ET Boiloff Venting Securing Not Performed:_____

121-265 CLHY CTPE 166

IF console transfer not successful
AND immediate ET Boiloff Venting Securing is required,

THEN perform ET Boiloff Venting Securing

Not Performed:_____

121-266 CLHY CTPE 166

```
CONSOLE KYBD
SET LISTED COMMANDS OFF USING FOLLOWING FORMAT:

SET_(COMMAND)_(STATE)
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

COMMAND   STATE
GLHK4321E OFF (A100680 TSM DRAIN VLV PRI OPEN)
GLHK3521E OFF (A78284 ET V/V PRI OPEN)
GLHK3520E ON  (A78384 ET V/V PRI DISABLE)
```

121-267 **CLHY** **NTD** **232**
LPS
CTPE

IF console transfer not successful
AND attempt to secure venting using LPS fails,

THEN continue with C4 Console Hot Spare Initialization.

Proceed to Hardwire Safing per OMI S1018 E2: Loss of LPS.

Not Performed:_____

***** End of ET Boiloff Venting Securing *****

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-268 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **PROVIDE** TWO OPEN CONCURRENCIES OR ONE OPEN CONCURRENCY AND SEP03 ACTIVE AND TWO CRT POSITIONS (A1 AND A2).

2. CONSOLE KYBD

   SAE12
   PERF PGM KEY - **PRESS**

   CRT
   VERIFY PROGRAM ACTIVE

3. **PERFORM** PROGRAM GEH51 VIA "LH2" SELECTION ON PROGRAM SEP03.

   CRT
   VERIFY PROGRAM ACTIVE.

121-269 NTD CLHY 232
CMPS

One USA LH_2 Engineer and one NASA LH_2 Engineer move to Backup Console (Position A1).

One USA MPS Engineer and one NASA MPS Engineer move to Backup Console (Position A2)

C4 LH_2 Safing Panels will remain manned by CLHY Engineer.

All other personnel remain at C3/C4 to monitor system configuration until Hot Spare is initialized.

Hot Spare Initialization

121-270 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP___(2 OR 3)
2. C PP C4 _ _

121-271 **LPS** **C4SE** **127**

AT HSP___(2 OR 3) H/W _____

1. **PERFORM** $BMAP C4
2. **HALT** HSP___

121-272 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-273 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-274 **LPS** **C4MC** **127**

Transmit Limits.

121-275 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-276 **LPS**

CRT (SLP50, PG-A)

VERIFY

SAH06 - LH2 CONSOLE IS NOW SUPPORTING.
SAH06 - LH2 RSYS RETURNED TO LH2 CONSOLE.

121-277 **LPS**

CRT (SLP50 PG-A)

VERIFY MESSAGES:

RSYS/SAFING FOR CONSOLE C4 TO C4 BEGINNING.

RSYS TRANSFER OF MPS RCL FD'S TO C4 BEGINNING.

RSYS TRANSFER OF MPS RCL FD'S TO C4 COMPLETE.

RSYS/SAFING FOR CONSOLE C4 TO C4 COMPLETE.

121-278 **LPS NTD 232**
NTD CLHY

C4 Console Hot Spare initialization complete.
C4 Console is located in Console_____.

121-279 **NTD CLHY 232**
CLHY CMPS 166
CLH2

Relocate to C4 Hot Spare Console.
Initiate and **configure** software set.

121-280 CLHY NTD 232

C4 Console software configuration complete at Hot Spare Console.
All personnel are relocated to Hot Spare Console and are ready to support.
Safing panels will remain manned by CLHF.

***** End of Hot Spare Initialization *****

121-281 CTPE

TERMINATE MPS SOFTWARE AT BACKUP

1. **CONSOLE KYBD (SAE12, PG-B)**
   PFK-15 - **PRESS TWICE**

   VERIFY SAE12 INACTIVE

2. **CONSOLE KYBD (GEH51 BACKUP)**
   PFK-15 - **PRESS**

   VERIFY GEH51 INACTIVE

121-282 CTPE NTD 232

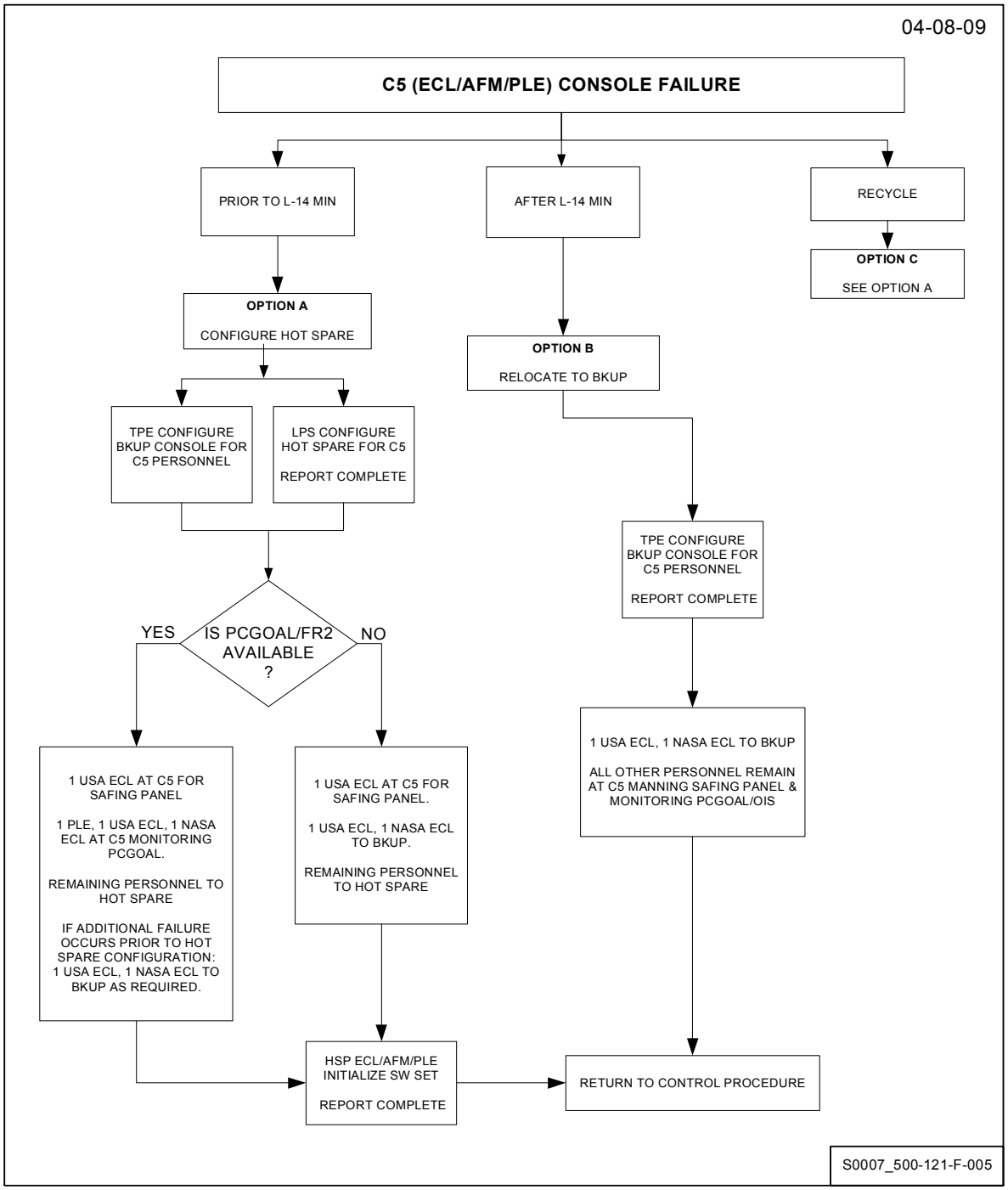
Backup Console reconfiguration steps are complete.

***** End of Option E - ET LH_2 Boiloff *****

***** End of C4 Console Failure Recovery Procedure *****

Section 5

C5 (ECL/AFM/PLE) Console Failure Recovery



C5 Console Failure Recovery Procedure

NOTE

C5 Console Failure Recovery Procedure is a contingency procedure that may be performed from T-6 hrs to T-31 sec when a C5 Console failure occurs, as directed by NTD/SPE.

C5 Console Failure Recovery Procedure Not Performed:_____

NOTE

The following Application Programs are required at the Backup Console in support of console recovery operations. They have been verified compatible with the GLS software active during Terminal Count. No other programs are allowed after GLS initialization.

SEP03 and Subs, VAG63

NOTE

This section contains the following options:

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)
Option B - Console Recovery After L-14 (Relocate to Backup Console)
Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

The decision as to which option(s) to perform in event of a C5 Console failure can be determined by referencing the C5 Console Failure Recovery Flow Chart.

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare)

NOTE
Option A is the primary option prior to L-14 min.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-283 NTD LPS 212

Reconfigure C5 software to Hot Spare Console.
Report completion (4 minutes).

121-284 LPS C4SE 127

Halt failed C5 Console (H/W XX24).
Report completion.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-285 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO AVAILABLE CONCURRENCIES OR ONE AVAILABLE CONCURRENCY AND PROGRAM SEP03 ACTIVE, AND ONE CRT POSITION (A1).

2. **PERFORM** PROGRAM VEG29 VIA "ECLSS" SELECTION ON PROGRAM SEP03.

3. CONSOLE KYBD
   VAG63
   PERF PGM KEY - PRESS

121-286 **NTD** **CECL**
CAFM
CPLE

If PCGOAL/FR2 is not available, or for additional failures, then one USA, one NASA ECL move to Backup console until software has been configured at Hot Spare.

One NASA and one USA MEQ Engineer monitor system via PCGOAL (if available) until Hot Spare is ready.

One Payload Electrical Engineer monitor system via PCGOAL (if available) until Hot Spare is ready.

One USA ECL Engineer remain to man ECLSS Safing panel.

All other C5 personnel move to Hot Spare Console.
Prepare for initialization.

121-287 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1

2. C PP C5 _ _

121-288 **LPS** **C4SE** **127**

AT HSP1 H/W_____

1. **PERFORM** $BMAP C5.

2. **HALT** HSP1.

121-289 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-290 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-291 **LPS** **C4MC** **127**

Transmit Limits.

121-292 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-293 **LPS** **NTD** **212**
NTD **CECL**
CPLE
CAFM

C5 Console Hot Spare initialization complete. C5 Console is located in Console _____.

121-294 **NTD** **CECL**
CAFM
CPLE

At Hot Spare Console, **Initiate** and **configure** C5 software set.

121-295 **CECL**

```
CONSOLE KYBD
HOME CMD KEY - PRESS
ENTER VAG50
PERF PGM KEY - PRESS

VERIFY PGM VAG42/VAG50 IS EXECUTING
```

121-296 **CECL**

```
CRT (VAG50/VAG42, PG-B)
TERMINATE BOX - XMIT CURSOR
TERMINATE BOX - XMIT CURSOR
```

121-297 **CECL**

```
CONSOLE KYBD (VAG50)
PFPK3 (VAG59 START) - PRESS

VERIFY VAG59 IS EXECUTING
```

NOTE
The next two steps initialize program VAG29 per LCC requirements.

121-298 **CECL**

```
INITIALIZE (VAG29)

CONSOLE KYBD
HOME CMD KEY - PRESS
VAG29
PERF PGM KEY - PRESS
SELECT APP PG-B
PFK1-PG - PRESS
PER INSTRUCTIONS ON PAGE-B, INPUT MOST RECENT AV
BAY DP BASELINE VALUES THAT WERE RECORDED
PREVIOUSLY IN S0007.400 OR NOTED IN ENGINEERING
TIE-IN (FOR SIGNIFICANT CHANGES CAUSED BY AV-BAY
REAR BREATHER PAYLOADS).
```

121-299 **CECL**

PFP (VAG59)
WHILE VIEWING PG-A

PFPK2 EMON SELECTION - PRESS ONCE
PFK13 - PRESS ONCE
PFK12 - PRESS ONCE

CRT
VERIFY SMOKE DETECTION/FIRE BOTTLE INFO DISPLAYED ON PG-A

121-300 **CECL**

CONSOLE KYBD
HOME CMD KEY - PRESS
ENTER VAG28
PERF PGM KEY - PRESS

VERIFY PGM VAG28 IS EXECUTING

121-301 **CECL** **NTD**
CAFM
CPLE

C5 Console software configuration complete at Hot Spare Console. CPLE EMONs are active. Backup personnel can report to Hot Spare, if applicable.

121-302 **NTD** **CECL**
CPLE

If Engineers at Backup Console **relocate** to Hot Spare Console. CPLE at Hot Spare can return to C5.

121-303 **CTPE**

TERMINATE CECL PROGRAMS AT BACKUP CONSOLE:

1. CONSOLE KYBD (VEG29 PG-B)
PFK15 - PRESS TWICE

VERIFY SEP03 ESA MENU DISPLAYED AND VEG29 INACTIVE.

2. CONSOLE KYBD (VAG63 PG-B)
PFPK (VAG63) - PRESS
PFPK1 - PRESS

VERIFY VAG63 INACTIVE

121-304 **CTPE** **NTD** **232**

Backup Console reconfiguration steps are complete.

121-305 **CECL NTD**
CAFM

Console configuration complete. All personnel relocated to Hot Spare Console and are ready to support. ECLSS Safing Panel will remain manned by USA ECL Engineering. PLE EMONS are monitored by AFM at Hot Spare. CPLE will continue to monitor system using PCGOAL at C5.

***** End of Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console) *****

Option B - Console Recovery After L-14 (Relocate to Backup Console)

NOTE
Option B is the primary option after L-14 minutes.

Option B Not Performed:_____

CAUTION
CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-306 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY** TWO AVAILABLE CONCURRENCIES OR ONE AVAILABLE CONCURRENCY AND PROGRAM SEP03 ACTIVE, AND ONE CRT POSITION (A1).

2. **PERFORM** PROGRAM VEG29 VIA "ECLSS" SELECTION ON PROGRAM SEP03.

3. CONSOLE KYBD
   VAG63
   PERF PGM KEY - PRESS

121-307 **NTD** **CECL** **232**
CAFM
CPLE
CTPE

One USA ECL Engineer and one NASA ECL Engineer move to Backup Console (position A1).

At ESA Console, NASA & USA MEQ monitor and report to NTD any anomalies not visible at C5 via PCGOAL during the remainder of Launch Countdown.

All Payload Electrical Engineers remain at C5 to monitor PCGOAL.

C5 ECLSS Safing Panel will remain manned by minimum one USA Engineer (SE).

All other C5 personnel remain at C5 to monitor PCGOAL and OIS.

121-308 **NTD** **LPS** **232**

Halt failed C5 Console.

121-309 **LPS** **C4SE** **127**

Halt failed C5 Console (H/W XX24).
Report completion.

121-310 **CECL** **NTD**
CAFM
CPLE

Console configuration complete. Personnel are relocated to Backup Console and are ready to support. CPLE and CAFM will continue to monitor system using PCGOAL at C5. ECLSS Safing Panel will remain manned by USA Engineering.

***** End of Option B - Console Recovery After L-14 (Relocate to Backup Console) *****

Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

NOTE
Option C is the primary option during any Recycle.

Option C Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-311 **NTD** **LPS** **212**

Reconfigure C5 software to Hot Spare Console.
Report completion (4 minutes).

121-312 **LPS** **C4SE** **127**

Halt failed C5 Console (H/W XX24).
Report completion.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-313 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO AVAILABLE CONCURRENCIES OR ONE AVAILABLE CONCURRENCY AND PROGRAM SEP03 ACTIVE, AND ONE CRT POSITION (A1).

2. **PERFORM** PROGRAM VEG29 VIA "ECLSS" SELECTION ON PROGRAM SEP03.

3. CONSOLE KYBD
   VAG63
   PERF PGM KEY - PRESS

121-314 **NTD** **CECL**
CAFM
CPLE

If PCGOAL/FR2 is not available, or for additional failures, then one USA, one NASA ECL move to Backup Console until software has been configured at Hot Spare.

One USA Mechanisms Engineer monitor system via PCGOAL (if available) until Hot Spare is ready.

One NASA and one USA MEQ monitor system via PCGOAL (if available) until Hot Spare is ready.

One Payload Electrical Engineer monitor system via PCGOAL (if available) until Hot Spare is ready.

One USA ECL Engineer remain to man ECLSS Safing panel.

All other C5 personnel move to Hot Spare Console.
Prepare for initialization.

121-315 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1

2. C PP C5 _ _

121-316 **LPS** **C4SE** **127**

AT HSP1 H/W_____

1. **PERFORM** $BMAP C5.

2. **HALT** HSP1.

121-317 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-318 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-319 **LPS** **C4MC** **127**

Transmit Limits.

121-320 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-321 **LPS** **NTD** **212**
NTD **CECL**
CPLE
CAFM

C5 Console Hot Spare initialization complete. C5 Console is located in Console _____.

121-322 **NTD** **CECL**
CAFM
CPLE

At Hot Spare Console, **Initiate** and **configure** C5 software set.

121-323 **CECL**

```
CONSOLE KYBD
HOME CMD KEY - PRESS
ENTER VAG50
PERF PGM KEY - PRESS

VERIFY PGM VAG42/VAG50 IS EXECUTING
```

121-324 **CECL**

```
CRT (VAG50/VAG42, PG-B)
TERMINATE BOX - XMIT CURSOR
TERMINATE BOX - XMIT CURSOR
```

121-325 **CECL**

```
CONSOLE KYBD (VAG50)
PFPK3 (VAG59 START) - PRESS

VERIFY VAG59 IS EXECUTING
```

NOTE
The next two steps initialize program VAG29 per LCC requirements.

121-326 **CECL**

```
INITIALIZE (VAG29)

CONSOLE KYBD
HOME CMD KEY - PRESS
VAG29
PERF PGM KEY - PRESS
SELECT APP PG-B
PFK1-PG - PRESS
PER INSTRUCTIONS ON PAGE-B, INPUT MOST RECENT AV
BAY DP BASELINE VALUES THAT WERE RECORDED
PREVIOUSLY IN S0007.400 OR NOTED IN ENGINEERING
TIE-IN (FOR SIGNIFICANT CHANGES CAUSED BY AV-BAY
REAR BREATHER PAYLOADS).
```

121-327 **CECL**

PFP (VAG59)
WHILE VIEWING PG-A

PFPK2 EMON SELECTION - PRESS ONCE
PFK13 - PRESS ONCE
PFK12 - PRESS ONCE

CRT
VERIFY SMOKE DETECTION/FIRE BOTTLE INFO DISPLAYED ON PG-A

121-328 **CECL**

CONSOLE KYBD
HOME CMD KEY - PRESS
ENTER VAG28
PERF PGM KEY - PRESS

VERIFY PGM VAG28 IS EXECUTING

121-329 **CECL NTD**
CAFM
CPLE

C5 Console software configuration complete at Hot Spare Console. CPLE EMONs are active.

121-330 **NTD CECL**
CPLE

Engineers at Backup Console **relocate** to Hot Spare Console. CPLE at Hot Spare can return to C5.

121-331 **CTPE**

TERMINATE PROGRAMS AT BACKUP CONSOLE:

1. CONSOLE KYBD (VEG29 PG-B)
   PFK15 - PRESS TWICE

   VERIFY SEP03 ESA MENU DISPLAYED AND VEG29 INACTIVE.

2. CONSOLE KYBD (VAG63 PG-B)
   PFPK (VAG63) - PRESS
   PFPK1 - PRESS

   VERIFY VAG63 INACTIVE

121-332 **CTPE NTD 232**

Backup Console reconfiguration steps are complete.

121-333 **CECL NTD**
CAFM

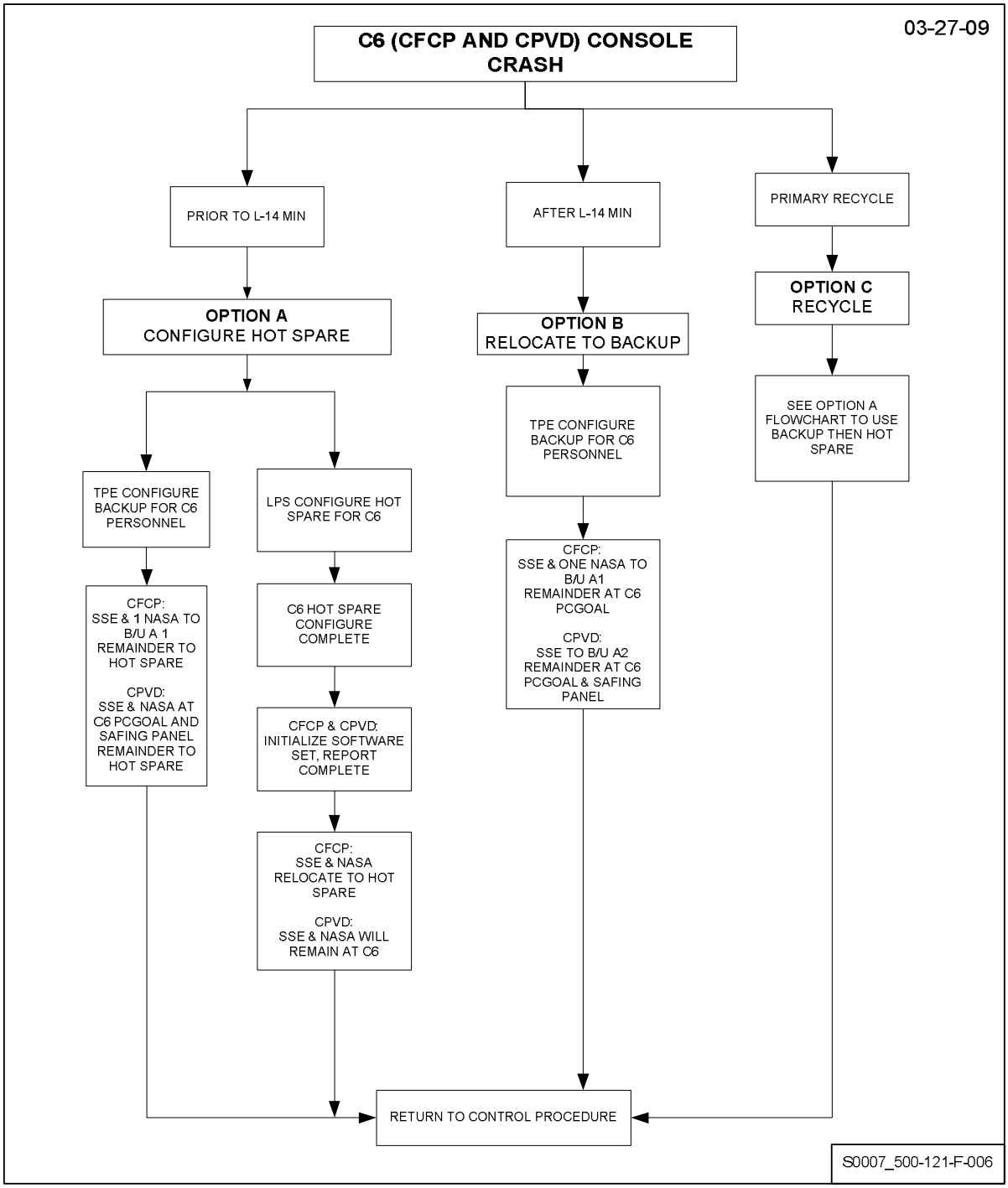
Console configuration complete. All personnel relocated to Hot Spare Console and are ready to support. ECLSS Safing Panel will remain manned by USA ECL Engineering. PLE EMONS are monitored by AFM at Hot Spare. CPLE will continue to monitor system using PCGOAL at C5.

***** End of Option C- Console Recovery During Recycle (Relocate to Hot Spare Console) *****

***** End of C5 Console Failure Recovery Procedure *****

Section 6

C6 (CFCP and CPVD) Console Failure Recovery



C6 Console Failure Recovery Procedure

NOTE

C6 Console Recovery Procedure is a contingency procedure that may be performed from T-6 hrs down to T-31 seconds when a C6 Console failure occurs, as directed by NTD/SPE. RCL RSYS transfers will automatically occur for C6 down to T-0.

C6 Console Failure Recovery Procedure Not Performed:_____

NOTE

The following Application Programs are required at the Backup Console in support of console recovery operations. They have been verified compatible with the GLS software active during Terminal Count. No other programs are allowed after GLS initialization.

SEP03 and Subs

NOTE

This section contains the following options:

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)

Option B - Console Recovery After L-14 (Relocate to Backup Console)(if required)

Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

The decision as to which option(s) to perform in event of a C6 Console failure can be determined by referencing the C6 Console Failure Recovery Flow Chart.

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)

NOTE
Option A is the primary option prior to L-14 min.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-334 NTD LPS 212

Reconfigure C6 software to Hot Spare Console.
Report completion (4 minutes).

121-335 LPS C4SE 127

Halt failed C6 Console (H/W XX23).
Report completion.

121-336 LPS

```
SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C6 TO BKUP COMPLETE.
```

121-337 LPS NTD 212
CTPE

C6 RCL RSYS transfer to Backup Console complete.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-338 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE AVAILABLE CONCURRENCY OR PROGRAM SEP03 ACTIVE, AND ONE CRT POSITION (A1).

2. **PERFORM** PROGRAM VER96 VIA "PRSD/FC" SELECTION ON PROGRAM SEP03.

3. **SELECT** "LCC" BLOCK ON VER96.
   VERIFY LCC DISPLAYED INVERT GREEN.

121-339 NTD CFCP 232
CPVD

One USA PRSD/FC Engineer and one NASA PRSD/FC Engineer move to Backup Console position A1.

One USA PVD Engineer and one NASA PVD Engineer remain at C6 to monitor PCGOAL and ECS Safing Panel.

Other C6 personnel move to Hot Spare Console.
Prepare for initialization.

121-340 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1

2. C PP C6 _ _

121-341 **LPS** **C4SE** **127**

AT HSP1 H/W_____

1. **PERFORM** $BMAP C6.

2. **HALT** HSP1.

121-342 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-343 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-344 **LPS** **C4MC** **127**

Transmit Limits.

121-345 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-346 **LPS**

SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C6 TO C6 COMPLETE.

121-347 **LPS** **NTD** **212**
NTD **CFCP**
CPVD

C6 Console Hot Spare initialization complete. C6 RCL RSYS is now at Hot Spare Console. C6 Console is located in Console _____.

121-348 **NTD** **CFCP**
CPVD

At Hot Spare Console, **Initiate** and **configure** C6 software set.

121-349 **CFCP** **NTD**
CPVD

C6 Console software configuration complete at Hot Spare Console.

121-350 **NTD** **CFCP**
CPVD

Engineers at Backup Console **relocate** to Hot Spare Console.

121-351 **CPVD**

```
HOT SPARE CONSOLE KYBD (CMD LINE)
ENTER VAM01A
PERFORM PGM KEY - PRESS
```

VERIFY VAM01A AND VAM31 ARE ACTIVE AND CONSOLE CRASH PROGRAM IS INITIATED AND SUCCESSFULLY COMPLETED.

121-352 **CFCP**

PERFORM THE FOLLOWING:

1. **PERFORM** SYSTEM/OPS MANAGER PROGRAMS
   VAR10/VAR11, VAR17

2. **PERFORM** FOLLOWING DISPLAY DRIVERS
   VWR05
   VWR70

3. **SELECT** "LCC" BLOCK (YWR05)
   VERIFY LCC DISPLAYED INVERT GREEN.

121-353 **CPVD**
CFCP

Verify no change in system configuration/operation during console recovery operations.

121-354 **CTPE**

TERMINATE PROGRAMS AT BACKUP CONSOLE:

CONSOLE KYBD (VER96 PG-B)
PFK15 - PRESS TWICE

VERIFY SEP03 ESA MENU DISPLAYED

121-355 CTPE NTD 232

Backup Console reconfiguration steps are complete.

121-356 CFCP NTD
CPVD

Console configuration complete. All personnel relocated to Hot Spare Console and are ready to support. ECS Safing Panel will remain manned by USA PVD Engineering.

***** End of Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console) *****

Option B - Console Recovery After L-14 (Relocate to Backup Console)

NOTE
Option B is the primary option after L-14 min.

Option B Not Performed:_____

CAUTION
CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-357 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO AVAILABLE CONCURRENCIES OR PROGRAM SEP03 IS ACTIVE IN TWO CONCURRENCIES, AND TWO CRT POSITIONS (A1 AND A2).

2. **PERFORM** PROGRAM VAM09A VIA "ECS/PVD" SELECTION ON PROGRAM SEP03 AT POSITION A1.

3. **PERFORM** PROGRAM VER96 VIA "PRSD/FC" SELECTION ON PROGRAM SEP03 AT POSITION A2.

4. **SELECT** "LCC" BLOCK ON VER96.
   VERIFY LCC DISPLAYED INVERT GREEN.

121-358 **NTD** **CFCP**
CPVD

One USA PRSD/FC Engineer and one NASA PRSD/FC Engineer move to Backup Console position A1.

One USA PVD Engineer move to Backup Console position A2.

Remainder of C6 personnel remain at C6 and monitor PCGOAL and man ECS Safing Panel.

121-359 **LPS**

SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C6 TO BKUP COMPLETE.

121-360 **NTD** **LPS** **212**

Halt failed C6 Console.

121-361 **LPS** **C4SE**

Halt failed C6 Console. **Report** completion.

121-362 **CPVD**

IF CONTROL NEEDED WHILE SUPPORTING AT BACKUP CONSOLE,

THEN USE COMMAND PROCESSOR AS FOLLOWS AND RECORD CHANGES.

```
FOR ANALOG COMMANDS:
APPLY <FD> <VALUE> - XMIT CMD, EXEC CMD
IE APPLY GECK5P34A 170 (PLB FLOW SP)

FOR DISCRETE COMMANDS:
SET <FD> <STATE> - XMIT CMD, EXEC CMD
```

_____

_____

_____

Not Performed:_____

121-363 **CFCP NTD**
CPVD

Console configuration complete. Personnel are relocated to Backup Console and are ready to support. ECS Safing Panel will remain manned by USA Engineering.

***** End of Option B - Console Recovery After L-14 (Relocate to Backup Console) *****

Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

NOTE
Option C is the primary option during any Recycle.

Option C Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-364 **NTD** **LPS** **212**

Reconfigure C6 software to Hot Spare Console.
Report completion (4 minutes).

121-365 **LPS** **C4SE** **127**

Halt failed C6 Console (H/W XX23).
Report completion.

121-366 **LPS**

```
SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C6 TO BKUP COMPLETE.
```

121-367 **LPS** **NTD** **212**
CTPE

C6 RCL RSYS transfer to Backup Console complete.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-368 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE AVAILABLE CONCURRENCY OR PROGRAM SEP03 ACTIVE, AND ONE CRT POSITION (A1).

2. **PERFORM** PROGRAM VER96 VIA "PRSD/FC" SELECTION ON PROGRAM SEP03.

3. **SELECT** "LCC" BLOCK ON VER96.
   VERIFY LCC DISPLAYED INVERT GREEN.

121-369 NTD CFCP
CPVD

One USA PRSD/FC Engineer and one NASA PRSD/FC Engineer move to Backup Console position A1.

One USA PVD Engineer and one NASA PVD Engineer remain at C6 to monitor PCGOAL and ECS Safing Panel.

Other C6 personnel move to Hot Spare Console.
Prepare for initialization.

121-370 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1

2. C PP C6 _ _

121-371 **LPS** **C4SE** **127**

AT HSP1 H/W_____

1. **PERFORM** $BMAP C6.

2. **HALT** HSP1.

121-372 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-373 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-374 **LPS** **C4MC** **127**

Transmit Limits.

121-375 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-376 **LPS**

SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C6 TO C6 COMPLETE.

121-377 **LPS** **NTD** **212**
NTD **CFCP**
CPVD

C6 Console Hot Spare initialization complete. C6 RCL RSYS is now at Hot Spare Console. C6 Console is located in Console _____.

121-378 **NTD** **CFCP**
CPVD

At Hot Spare Console, **Initiate** and **configure** C6 software set.

121-379 **CFCP** **NTD**
CPVD

C6 Console software configuration complete at Hot Spare Console.

121-380 **NTD** **CFCP**
CPVD

Engineers at Backup Console **relocate** to Hot Spare Console.

121-381 **CPVD**

```
HOT SPARE CONSOLE KYBD (CMD LINE)
ENTER VAM01A
PERFORM PGM KEY - PRESS
```

VERIFY VAM01A AND VAM31 ARE ACTIVE AND CONSOLE CRASH PROGRAM IS INITIATED AND SUCCESSFULLY COMPLETED.

121-382 **CFCP**

PERFORM THE FOLLOWING:

1. **PERFORM** SYSTEM/OPS MANAGER PROGRAMS
   VAR10/VAR11, VAR17

2. **PERFORM** FOLLOWING DISPLAY DRIVERS
   VWR05
   VWR70

3. **SELECT** "LCC" BLOCK (YWR05)
   VERIFY LCC DISPLAYED INVERT GREEN.

121-383 **CPVD**
CFCP

Verify no change in system configuration/operation during console recovery operations.

121-384 **CTPE**

TERMINATE PROGRAMS AT BACKUP CONSOLE:

CONSOLE KYBD (VER96 PG-B)
PFK15 - PRESS TWICE

VERIFY SEP03 ESA MENU DISPLAYED.

121-385 CTPE NTD

Backup Console reconfiguration steps are complete.

121-386 CFCP NTD
CPVD

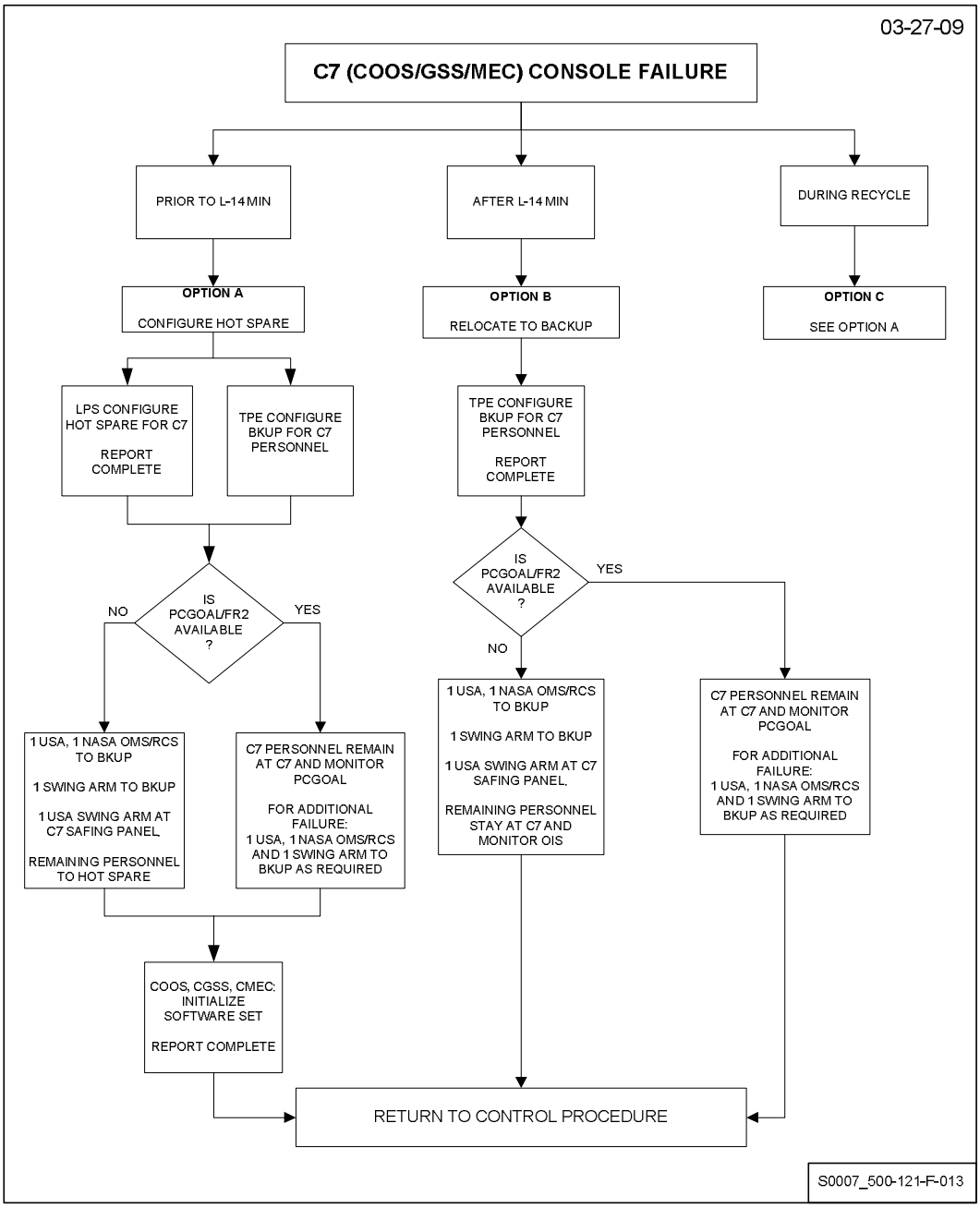
Console configuration complete. All personnel relocated to Hot Spare Console and are ready to support. ECS Safing Panels will remain manned by USA PVD Engineering.

***** End of Option C - Console Recovery During Recycle (Relocate to Hot Spare Console) *****

***** End of C6 Console Failure Recovery Procedure *****

Section 7

C7 (COOS/GSS/MEC) Console Failure Recovery



C7 Console Failure Recovery Procedure

NOTE

C7 Console Failure Recovery Procedure is a contingency procedure that may be performed from T-6 hrs down to T-31 seconds when a C7 Console failure occurs, as directed by NTD/SPE.

C7 Console Failure Recovery Procedure Not Performed:_____

NOTE

The following Application Programs are required at the Backup Console in support of console recovery operations. They have been verified compatible with the GLS software active during Terminal Count. No other programs are allowed after GLS initialization.

SEP03 and Subs

NOTE

This section contains the following options:

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)

Option B - Console Recovery After L-14 (Relocate to Backup Console, if required)

Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

The decision as to which option(s) to perform in event of a C7 Console failure can be determined by referencing the C7 Console Failure Recovery Flow Chart.

Option A - Console Recovery Prior to T-14 (Relocate to Hot Spare Console)

NOTE
Option A is the primary option prior to L-14 min.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-387 **NTD** **LPS** **212**

Reconfigure C7 software to Hot Spare Console.
Report completion (4 minutes).

121-388 **LPS** **C4SE** **127**

Halt failed C7 Console (H/W XX32).
Report completion.

121-389 **LPS**

```
SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C7 TO BKUP COMPLETE.
```

121-390 **LPS** **NTD** **212**
COOS
CGSS
CMEC

C7 RCL RSYS transfer to Backup Console complete.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-391 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO AVAILABLE CONCURRENCIES OR PROGRAM SEP03 ACTIVE IN TWO CONCURRENCIES, AND EITHER ONE OR TWO CRT POSITIONS (A1 AND A2), BASED ON PCGOAL AVAILABILITY.

2. **PERFORM** PROGRAM VYD20 VIA "OMS/RCS" SELECTION ON PROGRAM SEP03.

3. **IF** PCGOAL IS NOT OPERATIONAL,

   THEN PERFORM PROGRAM VEJ14 VIA "GOX/ARM" OR "OAA" SELECTION ON PROGRAM SEP03 .

Not Performed:_____
SS3

121-392 **NTD** **COOS**
CGSS
CMEC

If PCGOAL/FR2 is not available, or for additional failures, then one Swing Arms and one OMS/RCS Engineer move to Backup Console until software has been configured at Hot Spare.

One Swing Arms Engineer remain at C7 to man Swing Arms Safing Panels.

Remaining C7 personnel move to Hot Spare Console.
Prepare for initialization.

121-393 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1
2. C PP C7 _ _

121-394 **LPS** **C4SE** **127**

AT HSP1 H/W_____

1. **PERFORM** $BMAP C7.
2. **HALT** HSP1.

121-395 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-396 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-397 **LPS** **C4MC** **127**

Transmit Limits.

121-398 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-399 **LPS**

SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C7 TO C7 COMPLETE.

121-400 **LPS** **NTD** **212**
NTD **COOS**
CGSS
CMEC

C7 Console Hot Spare initialization complete. C7 RCL RSYS is now at Hot Spare Console. C7 Console is located in Console _____.

121-401 **NTD** **COOS**
CGSS
CMEC

At Hot Spare Console, **Initiate** and **configure** C7 software set.

121-402 **COOS** **NTD**
CGSS
CMEC

C7 Console software configuration complete at Hot Spare Console.

121-403 **NTD** **COOS**
CGSS
CMEC

IF Engineers at Backup Console,

THEN relocate to Hot Spare Console.

Not Performed:_____

121-404 **CTPE**

TERMINATE PROGRAMS:

1. CONSOLE KYBD (VYD20, PG-B)
   PFK15 - PRESS
   XMIT CURSOR - TERM SET

2. **IF** ACTIVE,

   THEN
   CONSOLE KYBD (VEJ14,PG-A)
   PFK15 - PRESS TWICE

Not Performed:_____
SS2

121-405 **CTPE** **NTD**

Backup Console reconfiguration steps are complete.

121-406 **COOS** **NTD**
CGSS
CMEC

Console configuration complete. All personnel relocated to Hot Spare Console and are ready to support. Swing Arms Safing panels will remain manned by USA Swing Arms Engineering.

***** End of Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console) *****

Option B - Console Recovery After L-14 (Relocate to Backup Console)

NOTE
Option B is the primary option after L-14 min.

Option B Not Performed:_____

CAUTION
CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-407 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO AVAILABLE CONCURRENCIES OR PROGRAM SEP03 IS ACTIVE IN TWO CONCURRENCIES, AND EITHER ONE OR TWO CRT POSITIONS (A1 AND A2) BASED ON PCGOAL AVAILABILITY.

2. **PERFORM** PROGRAM VYD20 VIA "OMS/RCS" SELECTION ON PROGRAM SEP03.

3. **IF** PCGOAL IS NOT OPERATIONAL,

   THEN PERFORM PROGRAM VEJ14 VIA "GOX/ARM" OR "OAA" SELECTION ON PROGRAM SEP03.

Not Performed:_____
SS3

121-408 **NTD** **LPS** **212**

Halt failed C7 Console.

121-409 **LPS** **C4SE** **127**

Halt failed C7 Console (H/W XX32).
Report completion.

121-410 **NTD** **COOS**
CGSS
CMEC

If PCGOAL/FR2 is not available, or for additional failures, then one USA Swing Arms and one OMS/RCS Engineer move to Backup Console.

Remaining personnel remain at Console C7 to man Swing Arm Safing Panels and monitor PCGOAL/OIS.

121-411 **LPS**

SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C7 TO BKUP COMPLETE.

***** End of Option B - Console Recovery After L-14**
(Relocate to Backup Console) ***

Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

NOTE
Option C is the primary option during any Recycle.

Option C Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-412 **NTD** **LPS** **212**

Reconfigure C7 software to Hot Spare Console.
Report completion (4 minutes).

121-413 **LPS** **C4SE** **127**

Halt failed C7 Console (H/W XX32).
Report completion.

121-414 **LPS**

```
SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C7 TO BKUP COMPLETE.
```

121-415 **LPS** **NTD** **212**
COOS
CGSS
CMEC

C7 RCL RSYS transfer to Backup Console complete.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-416 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO AVAILABLE CONCURRENCIES OR PROGRAM SEP03 ACTIVE IN TWO CONCURRENCIES.

2. **PERFORM** PROGRAM VYD20 VIA "OMS/RCS" SELECTION ON PROGRAM SEP03.

3. **IF** PCGOAL IS NOT OPERATIONAL,

   THEN PERFORM PROGRAM VEJ14 VIA "GOX/ARM" OR "OAA" SELECTION ON PROGRAM SEP03.

Not Performed:_____
SS3

121-417 **NTD** **COOS**
CGSS
CMEC

If PCGOAL/FR2 is not available, or for additional failures, then one Swing Arms and one OMS/RCS Engineer move to Backup Console until software has been configured at Hot Spare.

One Swing Arms Engineer remain at C7 to man Swing Arms Safing Panels.

Remaining C7 personnel move to Hot Spare Console.
Prepare for initialization.

121-418 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1
2. C PP C7 _ _

121-419 **LPS** **C4SE** **127**

AT HSP1 H/W_____

1. **PERFORM** $BMAP C7.
2. **HALT** HSP1.

121-420 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-421 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-422 **LPS** **C4MC** **127**

Transmit Limits.

121-423 **LPS** **C4SE** **127**

BOOT H/W _____ #0203
VERIFY SUCCESSFUL INITIALIZATION.

121-424 **LPS**

```
SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C7 TO C7 COMPLETE.
```

121-425 **LPS** **NTD** **212**
NTD **COOS**
CGSS
CMEC

C7 Console Hot Spare initialization complete. C7 RCL RSYS is now at Hot Spare Console. C7 Console is located in Console _____.

121-426 **NTD** **COOS**
CGSS
CMEC

At Hot Spare Console, **Initiate** and **configure** C7 software set.

121-427 **COOS** **NTD**
CGSS
CMEC

C7 Console software configuration complete at Hot Spare Console.

121-428 **NTD** **COOS**
CGSS
CMEC

IF Engineers at Backup Console

THEN relocate to Hot Spare Console.

Not Performed:_____

121-429 **CTPE**

TERMINATE PROGRAMS:

1. CONSOLE KYBD (VYD20, PAGE-B)
   PFK15 - PRESS
   XMIT CURSOR - TERM SET

2. **IF** ACTIVE,

   THEN
   CONSOLE KYBD (VEJ14,PAGE-A)
   PFK15 - PRESS TWICE

Not Performed:_____
SS2

121-430 **CTPE** **NTD**

Backup Console reconfiguration steps are complete.

121-431 **COOS** **NTD**
CGSS
CMEC

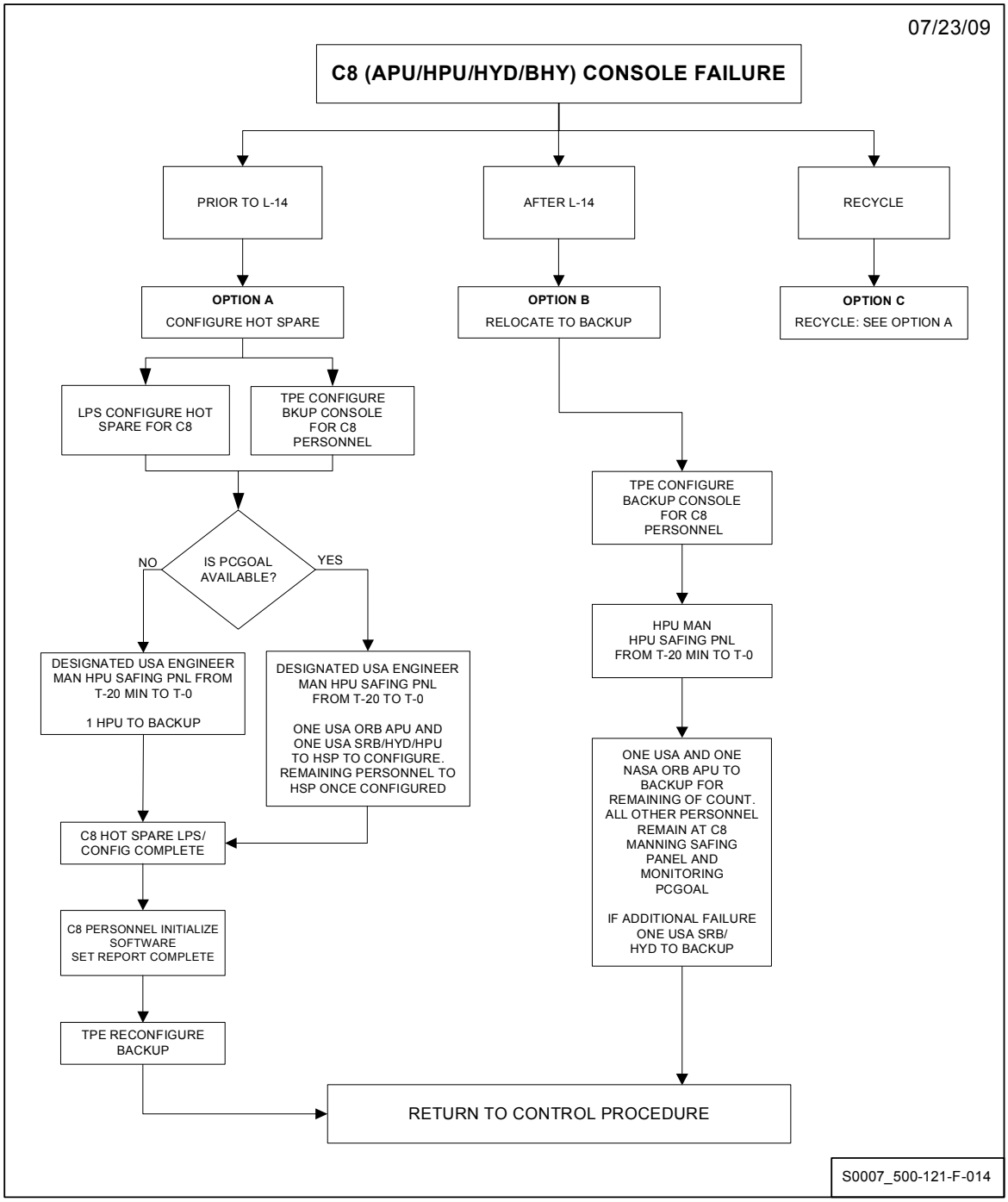
Console configuration complete. All personnel relocated to Hot Spare Console and are ready to support. Swing Arms Safing panels will remain manned by USA Swing Arms Engineering.

***** End of Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)*****

***** End of C7 Console Failure Recovery Procedure *****

Section 8

C8 (APU/HYD/SRB) Console Failure Recovery



C8 Console Failure Recovery Procedure

NOTE

C8 Console Failure Recovery Procedure is a contingency procedure that may be performed from T-6 hrs down to T-31 seconds when a C8 Console failure occurs, as directed by NTD/SPE. RSYS transfers will occur automatically until T-0.

C8 Console Failure Recovery Procedure Not Performed:_____

NOTE

The following Application Programs are required at the Backup Console in support of console recovery operations. They have been verified compatible with the GLS software active during Terminal Count. No other programs are allowed after GLS initialization.

SEP03 and Subs BAI00 BAT90

NOTE

This section contains the following options:

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)
Option B - Console Recovery After L-14 (Relocate to Backup Console)
Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

The decision as to which option(s) to perform in event of a C8 Console failure can be determined by referencing the C8 Console Failure Recovery Flow Chart.

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)

NOTE
Option A is the primary option prior to L-14 min.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-432 **NTD** **LPS** **212**

Reconfigure C8 software to Hot Spare Console.
Report completion (4 minutes).

121-433 **LPS** **C4SE** **127**

Halt failed C8 Console (H/W XX31).
Report completion.

121-434 **LPS**

SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C8 TO BKUP COMPLETE.

121-435 **LPS** **NTD** **212**
CAPU
CHYD
CBHY
CTPE

C8 RCL RSYS transfer to Backup Console complete.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-436 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE OPEN CONCURRENCY OR PROGRAM BAI00 ACTIVE, AND ONE CRT POSITION (A1).

2. **PERFORM** PROGRAM BAT90 VIA PROGRAM BAI00.

121-437 NTD CAPU
CHYD
CBHY
CHPU

If PCGOAL/FR2 is not available, then one USA HPU Engineer move to Backup Console position A1 until software has been configured at Hot Spare.

One USA ORB APU and one USA SRB/HYD/HPU Engineer move to Hot Spare and prepare for initialization.

SRB Hydraulics HPU Safing Panel at C8 to be manned from T-20 minutes to T-0 by designated USA Engineer.

All other C8 personnel monitor PCGOAL if available until Hot Spare is ready.

121-438 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1

2. C PP C8 _ _

121-439 **LPS** **C4SE** **127**

AT HSP1 H/W_____

1. **PERFORM** $BMAP C8.

2. **HALT** HSP1.

121-440 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-441 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-442 **LPS** **C4MC** **127**

Transmit Limits.

121-443 **LPS** **C4SE** **127**

BOOT H/W _____ #0203.
VERIFY SUCCESSFUL INITIALIZATION.

121-444 **LPS**

SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C8 TO C8 COMPLETE.

121-445 **LPS** **NTD** **212**
NTD **CAPU**
CHYD
CBHY

C8 Console Hot Spare initialization complete. C8 RCL RSYS is now at Hot Spare Console. C8 Console is located in Console _____.

121-446 **NTD** **CAPU**
CHYD
CBHY

At Hot Spare Console, **Initiate** and **configure** C8 software set.

121-447 **CAPU** **NTD**
CHYD
CBHY

C8 Console software configuration complete at Hot Spare Console.

121-448 **NTD** **CHPU**

If Engineer is at Backup Console **relocate** to Hot Spare Console.

121-449 **CTPE**

TERMINATE CHPU PROGRAMS AT BACKUP CONSOLE:

CONSOLE KYBD (BAT90)
PFK15 - PRESS
VERIFY BAI00 MENU DISPLAYED

121-450 **CTPE** **NTD**

Backup Console reconfiguration steps complete.

121-451 **CAPU** **NTD**
CHYD
CHPU
CBHY

Console configuration complete. All personnel are relocated to Hot Spare Console and are ready to support. SRB Hydraulics HPU Safing Panel will be manned by designated USA Engineer from T-20 minutes to T-0.

***** End of Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console) *****

Option B - Console Recovery After L-14 (Relocate to Backup Console)

NOTE
Option B is the primary option after L-14 min.

Option B Not Performed:_____

CAUTION
CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-452 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO OPEN CONCURRENCIES OR PROGRAMS BAI00 AND SEP03 ACTIVE AND TWO CRT POSITIONS (A1 AND A2).

2. **PERFORM** PROGRAM VEF38 VIA "APU/HYD" SELECTION ON PROGRAM SEP03.

3. **PERFORM** PROGRAM BAT90 VIA PROGRAM BAI00.

121-453 **NTD** **CAPU**
CHYD
CHPU
CBHY

One USA Engineer and one NASA ORB APU Engineer move to Backup Console A2 position. One USA SRB/HYD Engineer move to Backup Console A1 position for additional failure as required.

All other C8 personnel remain at C8 to monitor PCGOAL.

HPU to man SRB Hydraulics HPU Safing Panel.

FR2 and BLOC personnel to monitor for APU and HPU LCC compliance.

121-454 **NTD** **LPS** **212**

Halt failed C8 Console.

121-455 **LPS** **C4SE** **127**

Halt failed C8 Console (H/W XX31).
Report completion.

121-456 **LPS**

SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C8 TO BKUP COMPLETE.

121-457 **CAPU** **NTD**
CHYD
CHPU
CBHY

Console configuration complete. All personnel are relocated to Backup Console as required or remain at C-8 and are ready to support. APU/Hydraulics Safing Panels will be manned by USA APU/HYD Engineering to T-0.

***** End of Option B - Console Recovery After L-14**
(Relocate to Backup Console) ***

Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

NOTE
Option C is the primary option during any Recycle.

Option C Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-458 **NTD** **LPS** **212**

Reconfigure C8 software to Hot Spare Console.
Report completion (4 minutes).

121-459 **LPS** **C4SE** **127**

Halt failed C8 Console (H/W XX31).
Report completion.

121-460 **LPS**

```
SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C8 TO BKUP COMPLETE.
```

121-461 **LPS** **NTD** **212**
CAPU
CHYD
CBHY
CTPE

C8 RCL RSYS transfer to Backup Console complete.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other Software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO or SLPA1.

121-462 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE OPEN CONCURRENCY OR PROGRAM BAI00 ACTIVE, AND ONE CRT POSITION (A1).

2. **PERFORM** PROGRAM BAT90 VIA PROGRAM BAI00.

121-463 NTD CAPU
CHYD
CBHY
CHPU

If PCGOAL/FR2 is not available, then one USA HPU Engineer move to Backup Console position A1 until software has been configured at Hot Spare.

One USA ORB APU and one USA SRB/HYD/HPU Engineer move to Hot Spare and prepare for initialization.

SRB Hydraulics HPU Safing Panel at C8 to be manned from T-20 minutes to T-0 by designated USA Engineer.

All other C8 personnel monitor PCGOAL if available until Hot Spare is ready.

121-464 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1

2. C PP C8 _ _

121-465 **LPS** **C4SE** **127**

AT HSP1 H/W_____

1. **PERFORM** $BMAP C8.

2. **HALT** HSP1.

121-466 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-467 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-468 **LPS** **C4MC** **127**

Transmit Limits.

121-469 **LPS** **C4SE** **127**

BOOT H/W _____ #0203.
VERIFY SUCCESSFUL INITIALIZATION.

121-470 **LPS**

SLP50 PG-A

VERIFY FOLLOWING GREEN MESSAGE:

RCL RSYS CHANGE FOR CONSOLE C8 TO C8 COMPLETE.

121-471 **LPS** **NTD** **212**
NTD **CAPU**
CHYD
CBHY

C8 Console Hot Spare initialization complete. C8 RCL RSYS is now at Hot Spare Console. C8 Console is located in Console _____.

121-472 **NTD** **CAPU**
CHYD
CBHY

At Hot Spare Console, **Initiate** and **configure** C8 software set.

121-473 **CAPU** **NTD**
CHYD
CBHY

C8 Console software configuration complete at Hot Spare Console.

121-474 **NTD** **CHPU**

If Engineer at Backup Console, **relocate** to Hot Spare Console.

121-475 **CTPE**

TERMINATE CHPU PROGRAMS AT BACKUP CONSOLE:

CONSOLE KYBD (BAT90)
PFK15 - PRESS
VERIFY BAI00 MENU DISPLAYED

121-476 **CTPE** **NTD**

Backup Console reconfiguration steps are complete.

121-477 **CAPU** **NTD**
CHYD
CHPU
CBHY

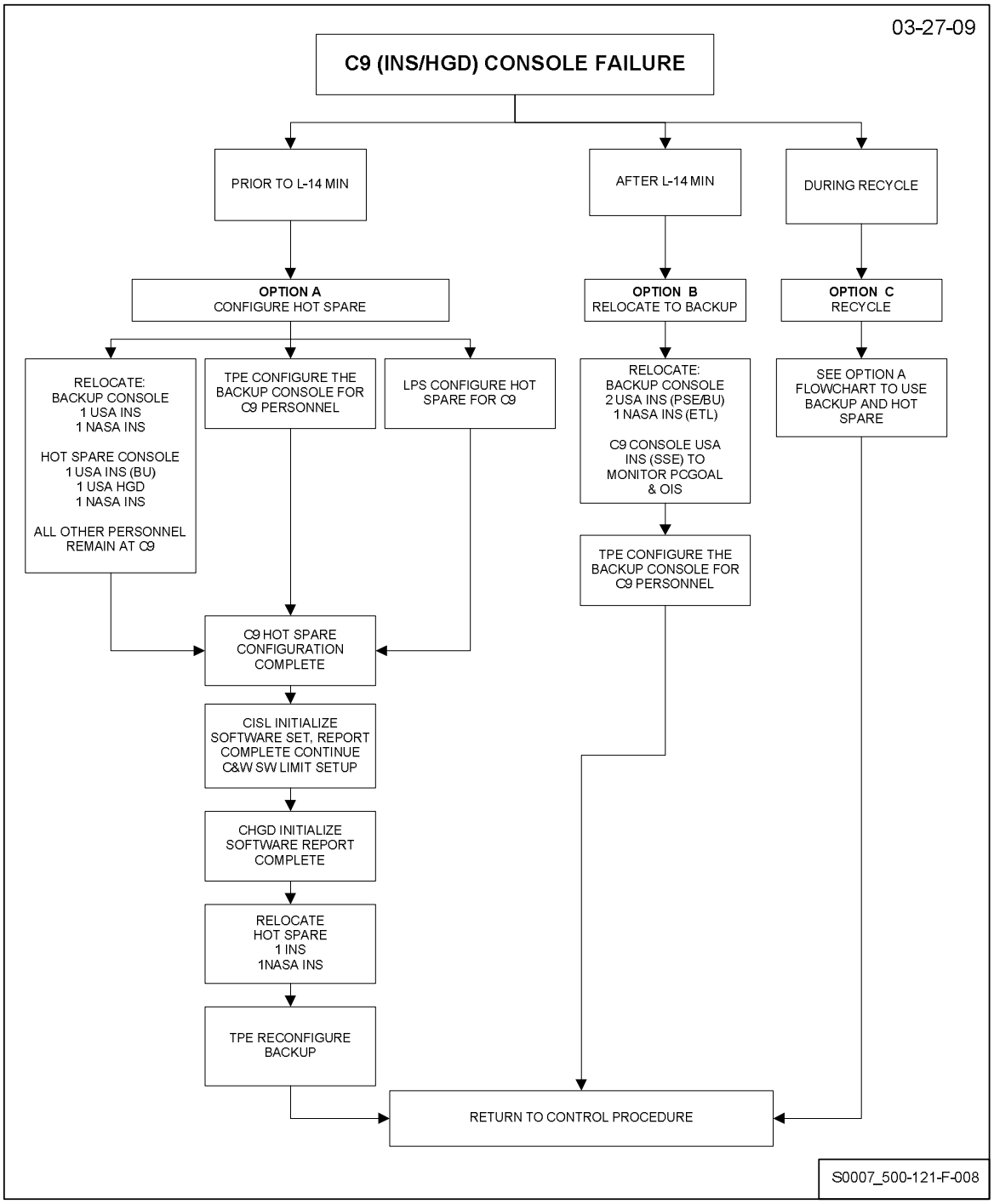
Console configuration complete. All personnel are relocated to Hot Spare Console and are ready to support. SRB Hydraulics HPU Safing Panel will be manned by designated USA Engineer as required.

***** End of Option C - Console Recovery During Recycle (Relocate to Hot Spare Console) *****

***** End of C8 Console Failure Recovery Procedure *****

Section 9

C9 (INS/HGD) Console Failure Recovery



C9 Console Failure Recovery Procedure

NOTE

C9 Console Failure Recovery Procedure is a contingency procedure that may be performed from T-6 hrs down to T-31 seconds when a C9 Console failure occurs, as directed by NTD/SPE.

C9 Console Failure Recovery Procedure Not Performed:_____

NOTE

The following Application Programs are required at the Backup Console in support of console recovery operations. They have been verified compatible with the GLS software active during Terminal Count. No other programs are allowed after GLS initialization.

SAP10 SWQ01A VWQ11 VWQ13 VWQ14 VWQ30 VAQ29

NOTE

This section contains the following options:

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)
Option B - Console Recovery After L-14 (Relocate to Backup Console)
Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

The decision as to which option(s) to perform in event of a C9 Console failure can be determined by referencing the C9 Console Failure Recovery Flow Chart.

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)

NOTE
Option A is the primary option prior to L-14 min.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-478 NTD LPS 212

Reconfigure C9 software to Hot Spare Console.
Report completion (4 minutes).

121-479 LPS C4SE 127

Halt failed C9 Console (H/W XX04).
Report completion.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO, or SLPA1.

121-480 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO OPEN CONCURRENCIES AND ONE CRT POSITION (A1).

2. CONSOLE KYBD
   SAP10
   PERF PGM KEY - PRESS

3. CURSOR CNTL (SAP10-INTG SYS MGR)
   MONITOR ONLY
   XMIT CURSOR KEY - PRESS

4. CURSOR CNTL (SWP05/SDP16)
   SCHEDULED REQUESTS
   SYSTEMS SOFTWARE SELECT
   XMIT CURSOR KEY - PRESS

5. CURSOR CNTL (SWP07/SDP18)
   INST
   XMIT CURSOR KEY - PRESS

6. CURSOR CNTL (SWP07/SDP28)
   SWQ01 - INST OVERVIEW DISPLAY
   XMIT CURSOR KEY - PRESS

   VERIFY CRT SWQ01A INST OVERVIEW DIPLAY SDQ01A

121-481 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

CURSOR CNTL (SAP10-INTG SYS MGR)
SYS TERMINATION (SAP10)
XMIT CURSOR KEY - PRESS

121-482 NTD CISL 212
CHGD

One USA INS Engineer and one NASA INS Engineer move to Backup Console position A1.

One USA INS Engineer, and one USA HGD Engineer, and one NASA INS Engineer move to Hot Spare Console

Other C9 personnel will remain to monitor PCGOAL, HAZ GAS 2000 and HUMS.

121-483 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1
2. C PP C9 _ _

121-484 LPS C4SE 127

AT HSP1 H/W_____

1. **PERFORM** $BMAP C9.
2. **HALT** HSP1.

121-485 LPS C4MC 127

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-486 C4MC LPS 127

LL_____, UL_____ in B/S _____/_____

121-487 **LPS** **C4MC** **127**

Transmit Limits.

121-488 **LPS** **C4SE** **127**

```
BOOT H/W ______ #0203.
VERIFY SUCCESSFUL INITIALIZATION.
```

121-489 **LPS** **NTD** **212**

C9 Console Hot Spare initialization complete. C9 Console is located in Console _____.

121-490 **NTD** **CHGD**
CISL

At Hot Spare Console, **Initiate** and **configure** C9 software set.

121-491 **CHGD** **NTD**
CISL

C9 Console software configuration complete at Hot Spare Console.

121-492 **NTD** **CHGD**
CISL

Engineers at Backup Console **relocate** to Hot Spare Console.

121-493 **CTPE**

Terminate INS programs at Backup Console.

121-494 CTPE NTD 212

Backup Console reconfiguration steps are complete.

121-495 CISL NTD 212

INS software set initialization complete. Caution and Warning software limit setup continues.

121-496 CHGD 212

Perform the following at the C9 Hot Spare Console:

1. **Initialize** HGD software set (SAW01)

2. **Initialize** HGD software program (HWW10) and verify EMON EEFDS/FC is highlighted "Invert Green"

121-497 CISL NTD 212
CHGD

Console configuration complete. All required personnel are relocated to Hot Spare Console and are ready to support.

***** End of Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console) *****

Option B - Console Recovery After L-14 (Relocate to Backup Console)

NOTE
Option B is the primary option after L-14 min.

Option B Not Performed:_____

CAUTION
CTPE is to ensure that the software is configured as directed below. Any other software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO, or SLPA1.

121-498 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO OPEN CONCURRENCIES AND ONE CRT POSITION (A1).

2. CONSOLE KYBD
   SAP10
   PERF PGM KEY - PRESS

3. CURSOR CNTL (SAP10-INTG SYS MGR)
   MONITOR ONLY
   XMIT CURSOR KEY - PRESS

4. CURSOR CNTL (SWP05/SDP16)
   SCHEDULED REQUESTS

   SYSTEMS SOFTWARE SELECT
   XMIT CURSOR KEY - PRESS

5. CURSOR CNTL (SWP07/SDP18)
INST
XMIT CURSOR KEY - PRESS

6. CURSOR CNTL (SWP07/SDP28)
SWQ01A - INST OVERVIEW DISPLAY
XMIT CURSOR KEY - PRESS

VERIFY CRT SWQ01A INST OVERVIEW DISPLAY SDQ01A

121-499 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

CURSOR CNTL (SAP10 - INTG SYS MGR)
SYS TERMINATION (SAP10)
XMIT CURSOR KEY - PRESS

121-500 NTD LPS 212

Halt failed C9 Console.

121-501 LPS C4SE 127

Halt failed C9 Console (H/W XX04).
Report completion.

121-502 NTD CISL 212
CHGD

Two USA INS Engineers and one NASA INS Engineer move to Backup Console position A1.

Other C9 personnel will remain to monitor PCGOAL, HAZ GAS 2000 and HUMS.

121-503 CISL NTD 212
CHGD

Console configuration compete. All personnel relocated to Backup Console and are ready to support. HGDS Safing panels will remain manned by USA HGD Engineering.

***** End of Option B - Console Recovery After L-14**
(Relocate to Backup Console) ***

Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

NOTE
Option C is the primary option during any Recycle.

Option C Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-504 NTD LPS 212

Reconfigure C9 software to Hot Spare Console.
Report completion (4 minutes).

121-505 LPS C4SE 127

Halt failed C9 Console (H/W XX04).
Report completion.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO, or SLPA1.

121-506 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO OPEN CONCURRENCIES AND ONE CRT POSITION (A1).

2. CONSOLE KYBD
   SAP10
   PERF PGM KEY - PRESS

3. CURSOR CNTL (SAP10-INTG SYS MGR)
   MONITOR ONLY
   XMIT CURSOR KEY - PRESS

4. CURSOR CNTL (SWP05/SDP16)
   SCHEDULED REQUESTS

   SYSTEMS SOFTWARE SELECT
   XMIT CURSOR KEY - PRESS

5. CURSOR CNTL (SWP07/SDP18)
   INST
   XMIT CURSOR KEY - PRESS

6. CURSOR CNTL (SWP07/SDP28)
   SWQ01 - INST OVERVIEW DISPLAY
   XMIT CURSOR KEY - PRESS

   VERIFY CRT SWQ01A INST OVERVIEW DIPLAY SDQ01A

121-507 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

CURSOR CNTL (SAP10-INTG SYS MGR)
SYS TERMINATION (SAP10)
XMIT CURSOR KEY - PRESS

121-508 NTD CISL 212
CHGD

One USA INS Engineer and one NASA INS Engineer move to Backup Console position A1.

One USA INS Engineer, one USA HGD Engineer and one NASA INS Engineer move to Hot Spare Console

Other C9 personnel will remain to monitor PCGOAL, HAZ GAS 2000 and HUMS.

121-509 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1
2. C PP C9 _ _

121-510 LPS C4SE 127

AT HSP1 H/W_____

1. **PERFORM** $BMAP C9.
2. **HALT** HSP1.

121-511 LPS C4MC 127

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-512 C4MC LPS 127

LL_____, UL_____ in B/S _____/_____

121-513 **LPS** **C4MC** **127**

Transmit Limits.

121-514 **LPS** **C4SE** **127**

```
BOOT H/W _______ #0203.
VERIFY SUCCESSFUL INITIALIZATION.
```

121-515 **LPS** **NTD** **212**

C9 Console Hot Spare initialization complete. C9 Console is located in Console _____.

121-516 **NTD** **CHGD**
CISL

At Hot Spare Console, **Initiate** and **configure** C9 software set.

121-517 **CHGD** **NTD**
CISL

C9 Console software configuration complete at Hot Spare Console.

121-518 **NTD** **CHGD**
CISL

Engineers at Backup Console **relocate** to Hot Spare Console.

121-519 **CTPE**

Terminate INS programs at Backup Console.

121-520 CTPE NTD 212

Backup Console reconfiguration steps are complete.

121-521 CISL NTD 212

INS software set initialization complete. Caution and Warning software limit setup continues.

121-522 CHGD 212

Perform the following at the C9 Hot Spare Console:

1. **Initialize** HGD software set (SAW01)

2. **Initialize** HGD software program (HWW10) and verify EMON EEFDS/FC is highlighted "Invert Green"

121-523 CISL NTD 212
CHGD

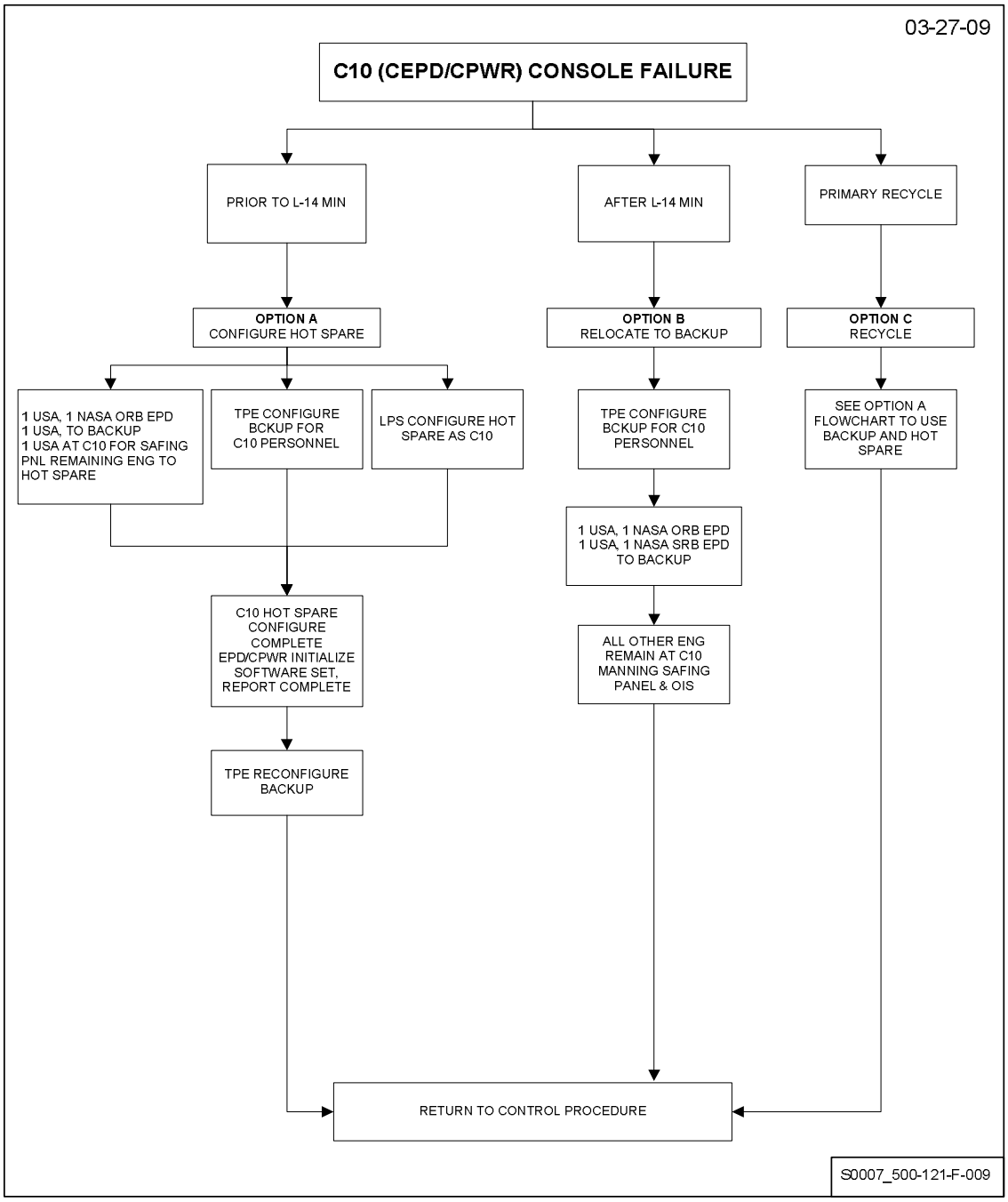
Console configuration complete. All personnel relocated to Hot Spare Console and are ready to support.

***** End of Option C - Console Recovery During Recycle (Relocate to Hot Spare Console) *****

***** End of C9 Console Failure Recovery Procedure *****

Section 10

C10 (CEPD/CPWR) Console Failure Recovery



C10 Console Failure Recovery Procedure

NOTE

C10 Console Failure Recovery Procedure is a contingency procedure that may be performed from T-6 hrs down to T-31 seconds when a C10 Console failure occurs, as directed by NTD/SPE.

C10 Console Failure Recovery Procedure Not Performed:_____

NOTE

The following Application Programs are required at the Backup Console in support of console recovery operations. They have been verified compatible with the GLS software active during Terminal Count. No other programs are allowed after GLS initialization.

SAP10	SEP03 and Subs	
SWC02	VWC16	VWC17
VWC20	VWC01	VWC23
VWC10	VWC18	VWC19
VWC03	VWC15	

NOTE

This section contains the following options:

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)
Option B - Console Recovery After L-14 (Relocate to Backup Console)
Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

The decision as to which option(s) to perform in event of a C10 Console failure can be determined by referencing the C10 Console Failure Recovery Flow Chart.

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)

NOTE
Option A is the primary option prior to L-14 min.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-524 NTD LPS 212

Reconfigure C10 software to Hot Spare Console.
Report completion (4 minutes).

121-525 LPS C4SE 127

Halt failed C10 Console (H/W XX39).
Report completion.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO, or SLPA1.

121-526 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO OPEN CONCURRENCIES AND TWO CRT POSITIONS (A1 AND A2).

2. CONSOLE KYBD
   SAP10
   PERF PGM KEY - PRESS

3. CURSOR CNTL (SAP10)
   MONITOR ONLY
   XMIT CURSOR KEY - PRESS

4. CURSOR CNTL (SAP10/SWP05)
   SCHEDULED REQUESTS

   SYSTEMS SOFTWARE SELECT
   XMIT CURSOR KEY - PRESS

5. CURSOR CNTL (SAP29/SWP07)
   EPDC
   XMIT CURSOR KEY - PRESS

6. CURSOR CNTL (SAP29/SWP07)
   SWC02 - EPDC SHUTTLE OVERVIEW
   XMIT CURSOR KEY - PRESS

   CRT
   VERIFY
   SHUTTLE POWER SYS OVERVIEW DISPLAYED

7. CURSOR CNTL (SAP10-INTG SYS MGR)
   SYS TERMINATION (SAP10)
   XMIT CURSOR KEY - PRESS

8. CONSOLE KYBD
SEP03
PERF PGM KEY - PRESS

9. CURSOR CNTL (SEP03/SEP05)
SRB
EPDC
XMIT CURSOR KEY - PRESS

10. CURSOR CNTL (SEP03/SEP43)
SRB
BEE11 SRB JOINT HEATERS
XMIT CURSOR KEY - PRESS

CRT
VERIFY
SRB JOINT HEATER ESA OVERVIEW DISPLAYED

121-527 **NTD** **CEPD**
CPWR
CTPE

One USA Orbiter EPD Engineer and one NASA Orbiter EPD Engineer move to Backup Console position A1.

One USA SRB EPD Engineer move to Backup Console position A2.

EPD Safing panels will remain manned by USA Engineer (CEPD or CPWR).

NASA SRB EPD Engineer remain at C10 to monitor PCGOAL.

All other C10 personnel move to Hot Spare Console.
Prepare for initialization.

121-528 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1
2. C PP C10 _ _

121-529 **LPS** **C4SE** **127**

AT HSP1 H/W_____

1. **PERFORM** $BMAP C10.
2. **HALT** HSP1.

121-530 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-531 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-532 **LPS** **C4MC** **127**

Transmit Limits.

121-533 **LPS** **C4SE** **127**

BOOT H/W_____ #0203.
VERIFY SUCCESSFUL INITIALIZATION.

121-534 **LPS** **NTD** **212**

C10 Console Hot Spare initialization complete. C10 Console is located in Console _____.

121-535 **NTD** **CEPD**
CPWR

At Hot Spare Console, **Initiate** and **configure** C10 software set.

121-536 **CEPD** **NTD**
CPWR

C10 Console software configuration complete at Hot Spare Console.

121-537 **NTD** **CEPD**
CPWR

Engineers at Backup Console **relocate** to Hot Spare Console.
NASA SRB EPD at failed C10 **relocate** to Hot Spare Console.

121-538 **CTPE**

Terminate EPDC programs at Backup Console.

121-539 **CTPE** **NTD**

Backup Console reconfiguration steps are complete.

121-540 **CEPD/ NTD**
CPWR

Console configuration complete. All personnel relocated to Hot Spare Console and are ready to support. EPD Safing panels will remain manned by USA EPD Engineering.

***** End of Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console) *****

Option B - Console Recovery After L-14 (Relocate to Backup Console)

NOTE
Option B is the primary option after L-14 min.

Option B Not Performed:_____

CAUTION
CTPE is to ensure that the software is configured as directed below. Any other SW configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO, or SLPA1.

121-541 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO OPEN CONCURRENCIES AND TWO CRT POSITIONS (A1 AND A2).

2. CONSOLE KYBD
   SAP10
   PERF PGM KEY - PRESS

3. CURSOR CNTL (SAP10)
   MONITOR ONLY
   XMIT CURSOR KEY - PRESS

4. CURSOR CNTL (SAP10/SWP05)
   SCHEDULED REQUESTS

   SYSTEMS SOFTWARE SELECT
   XMIT CURSOR KEY - PRESS

5. CURSOR CNTL (SAP29/SWP07)
EPDC
XMIT CURSOR KEY - PRESS

6. CURSOR CNTL (SAP29/SWP07)
SWC02 - EPDC SHUTTLE OVERVIEW
XMIT CURSOR KEY - PRESS

CRT
VERIFY
SHUTTLE POWER SYS OVERVIEW DISPLAYED

7. CURSOR CNTL (SAP10-INTG SYS MGR)
SYS TERMINATION (SAP10)
XMIT CURSOR KEY - PRESS

8. CONSOLE KYBD
SEP03
PERF PGM KEY - PRESS

9. CURSOR CNTL (SEP03/SEP05)
SRB
EPDC
XMIT CURSOR KEY - PRESS

10. CURSOR CNTL (SEP03/SVP43)
SRB
BEE11 SRB JOINT HEATERS
XMIT CURSOR KEY - PRESS

CRT
VERIFY
SRB JOINT HEATER ESA OVERVIEW DISPLAYED

121-542 NTD LPS 212

Halt failed C10 Console.

121-543 LPS C4SE 127

Halt failed C10 Console (H/W XX39).
Report completion.

121-544 **NTD** **CEPD**
CPWR
CTPE

One USA Orbiter EPD Engineer and one NASA Orbiter EPD Engineer move to Backup Console position A1.

One USA SRB EPD Engineer and one NASA SRB EPD Engineer move to Backup Console position A2.

Other C10 personnel remain to monitor PCGOAL, OIS and man EPD Safing Panels.

121-545 **CEPD** **NTD**
CPWR

Console configuration complete. All personnel relocated to backup Console and are ready to support. EPD Safing panels will remain manned by USA EPD Engineering.

***** End of Option B - Console Recovery After L-14**
(Relocate To Backup Console) ***

Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

NOTE
Option C is the primary option during any Recycle.

Option C Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-546 NTD LPS 212

Reconfigure C10 software to Hot Spare Console.
Report completion (4 minutes).

121-547 LPS C4SE 127

Halt failed C10 Console (H/W XX39).
Report completion.

CAUTION

CTPE is to ensure that the software is configured as directed below. Any other software configuration could corrupt the GLS resulting in an inadvertent cutoff. Do not terminate SLPBO, SLPCO, SLPAO, or SLPA1.

121-548 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** TWO OPEN CONCURRENCIES AND TWO CRT POSITIONS (A1 AND A2).

2. CONSOLE KYBD
   SAP10
   PERF PGM KEY - PRESS

3. CURSOR CNTL (SAP10)
   MONITOR ONLY
   XMIT CURSOR KEY - PRESS

4. CURSOR CNTL (SAP10/SWP05)
   SCHEDULED REQUESTS

   SYSTEMS SOFTWARE SELECT
   XMIT CURSOR KEY - PRESS

5. CURSOR CNTL (SAP29/SWP07)
   EPDC
   XMIT CURSOR KEY - PRESS

6. CURSOR CNTL (SAP29/SWP07)
   SWC02 - EPDC SHUTTLE OVERVIEW
   XMIT CURSOR KEY - PRESS

   CRT
   VERIFY
   SHUTTLE POWER SYS OVERVIEW DISPLAYED

7. CURSOR CNTL (SAP10-INTG SYS MGR)
   SYS TERMINATION (SAP10)
   XMIT CURSOR KEY - PRESS

8. CONSOLE KYBD
SEP03
PERF PGM KEY - PRESS

9. CURSOR CNTL (SEP03/SEP05)
SRB
EPDC
XMIT CURSOR KEY - PRESS

10. CURSOR CNTL (SEP03/SEP43)
SRB
BEE11 SRB JOINT HEATERS
XMIT CURSOR KEY - PRESS

CRT
VERIFY
SRB JOINT HEATER ESA OVERVIEW DISPLAYED

121-549 NTD CEPD
CPWR

One USA Orbiter EPD Engineer and one NASA Orbiter EPD Engineer move to Backup Console position A1.

One USA SRB EPD Engineer and one NASA SRB EPD Engineer move to Backup Console position A2.

EPD Safing panels will remain manned by minimum one USA Engineer (CEPD or CPWR).

All Other C10 personnel move to Hot Spare Console.
Prepare for initialization.

121-550 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1

2. C PP C10 _ _

121-551 **LPS** **C4SE** **127**

AT HSP1 H/W_____

1. **PERFORM** $BMAP C10.

2. **HALT** HSP1.

121-552 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-553 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-554 **LPS** **C4MC** **127**

Transmit Limits.

121-555 **LPS** **C4SE** **127**

BOOT H/W _____ #0203.
VERIFY SUCCESSFUL INITIALIZATION.

121-556 **LPS** **NTD** **212**
NTD **CEPD**

C10 Console Hot Spare initialization complete. C10 Console is located in Console _____.

121-557 **NTD** **CEPD**
CPWR

At Hot Spare Console, **Initiate** and **configure** C10 software set.

121-558 **CEPD** **NTD** **232**
CPWR

C10 Console software configuration complete at Hot Spare Console. .

121-559 **NTD** **CEPD** **232**
CPWR

Engineers at Backup Console **relocate** to Hot Spare Console.

121-560 **CTPE**

Terminate EPDC programs at Backup Console.

121-561 **CTPE** **NTD** **232**

Backup Console reconfiguration steps are complete.

121-562 **CEPD/** **NTD** **232**
CPWR

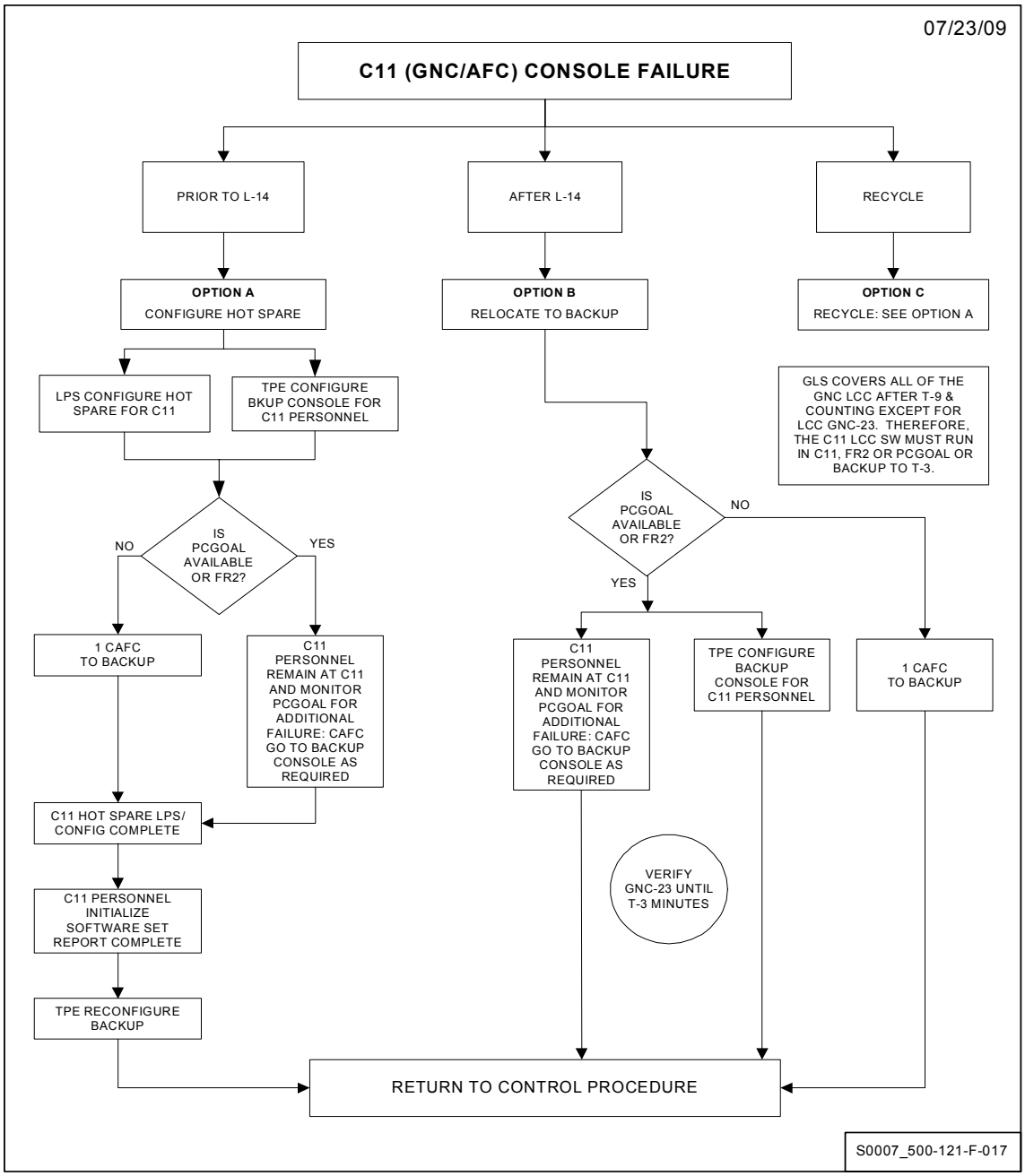
Console configuration complete. All personnel relocated to backup Console and are ready to support. EPD Safing panels will remain manned by USA EPD Engineering.

***** End of Option C - Console Recovery During Recycle (Relocate to Hot Spare Console) *****

***** End of C10 Console failure Recovery Procedure *****

Section 11

C11 Console Failure Recovery Procedure



C11 Console Failure Recovery Procedure

NOTE

C11 Console Failure Recovery Procedure is a contingency procedure that may be performed from T-6 hrs down to T-31 sec when a C11 Console failure occurs, as directed by NTD/SPE.

C11 Console Failure Recovery Procedure Not Performed:_____

NOTE

This section contains the following options:

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)

Option B - Console Recovery After L-14 (Relocate to Backup Console if no PCGOAL or FR2)

Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

The decision as to which option(s) to perform in event of a C11 Console failure can be determined by referencing the C11 Console Failure Recovery Flow Chart.

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)

NOTE
Option A is the primary option prior to L-14 min.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-563 NTD LPS 212

Reconfigure C11 software to Hot Spare Console.
Report completion (4 minutes).

121-564 LPS C4SE 127

Halt failed C11 Console (H/W XX48).
Report completion.

121-565 CTPE

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE AVAILABLE CONCURRENCY OR PROGRAM SEP03 IS ACTIVE, AND ONE CRT POSITION (A1).

2. **PERFORM** PROGRAM VEB03 VIA "AVIONICS" SELECTION ON SEP03.

121-566 NTD COFC

If PCGOAL/FR2 is not available, or for additional failures, then one USA OFC Engineer move to Backup console until software has been configured at Hot Spare.

Other C11 personnel move to Hot Spare Console and prepare for initialization.

121-567 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1
2. C PP C11 _ _

121-568 LPS C4SE 127

AT HSP1 H/W_____

1. **PERFORM** $BMAP C11.
2. **HALT** HSP1.

121-569 LPS C4MC 127

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-570 C4MC LPS 127

LL_____, UL_____ in B/S _____/_____

121-571 LPS C4MC 127

Transmit Limits.

121-572 LPS C4SE 127

BOOT H/W _____ #0203.
VERIFY SUCCESSFUL INITIALIZATION.

121-573 LPS NTD 212

C11 Console Hot Spare initialization complete. C11 Console is located in Console _____.

121-574 NTD COFC

At Hot Spare Console, **Initiate** and **configure** C11 software set.

C11 Software Initialization

NOTE

Next two steps may cause Class 3 errors on concurrency 2 (SAB20) if after T-2 hrs (GLS initialization).

121-575 **COFC**

```
CONSOLE KYBD
SAB19
PERFORM PGM KEY - PRESS
```

GNC LCC Monitor Activation

NOTE

Allow 1 to 2 minutes for following step to complete.

121-576 **COFC**

```
CURSOR CNTL (SAB20/VSB79 PG-B)
ACTIVATE LCC MONITOR
XMIT CURSOR KEY - PRESS
```

Activate GN&C LCC EMONs

121-577 **COFC**

```
APPL PG A (SAB20/SWB02)
PFK13 KEY - PRESS (ACT EMON ACT PG)
```

NOTE
Activate following items as applicable for respective events that are complete.

121-578 COFC

CURSOR CNTL (SAB20/SWB02 PG-A)

1. **IF** IMUs POWERED UP,

   THEN
   A-IMU PWR UP
   XMIT CURSOR KEY - PRESS

   Not Performed:_____
   SS1

2. **IF** OMS GIMBAL PROFILE COMPLETE,

   THEN
   A-OMS TVC
   XMIT CURSOR KEY - PRESS

   Not Performed:_____
   SS2

3. **IF** SRB TVCs POWERED UP,

   THEN
   A-SRB TVC
   XMIT CURSOR KEY - PRESS

   Not Performed:_____
   SS3

4. **IF** SRB RGAs POWERED UP,

   THEN
   A-SRB RGA
   XMIT CURSOR KEY - PRESS

   Not Performed:_____
   SS4

121-579 COFC

APPL PAGE A (SAB20/SWB02)
PFK13 KEY - PRESS (DE-ACT EMON PG)

***** End of Activate GN&C LCC EMONs *****

GNC Profile Eval Monitor Setup

NOTE

Perform next two steps for S0007 only.

GNC profile evaluation monitor has no significant function in OMI S0017 and is not required to be reactivated.

GNC Profile Eval Monitor Setup Not Performed:_____

121-580 **COFC**

```
CURSOR CNTL (SAB19/SWB01 PG-B)
COUNTDOWN - DETAIL
EXEC CMD KEY - PRESS
(RUN UNDER SAB21)
```

121-581 **COFC**

```
APPL PG (SAB21/VWB05 PG-B)
PFK8 KEY - PRESS (CLEAR ALL BYPASSES)
PFK1 KEY - PRESS (START PGM)
```

***** End of GNC Profile Eval Monitor Setup *****

Reset SRB TVC IVD Status

NOTE

Next step resets the SRB TVC IVD status to On which is set at SRB TVC power up at T-7 hrs 45 min. This is a C11 only indication and is not mandatory for continuing Launch Countdown.

121-582 **COFC**

```
CONSOLE KYBD
ISSU N79IV048D #000F
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

IMU Disk File Data Reset

NOTE

Perform next step to update the disk file data to the listed default values unless the current data is valid (IE, the respective data validity = 9999).

Follow PGM info/prompts to update data.

121-583 **CGNC**

```
CURSOR CNTL (SAB19/SWB01 PG-B)
IMU - OPS MAN
XMIT CURSOR KEY - PRESS
```

121-584 **CGNC**

```
APPL PG (VWB19 PG-A)
PFK2 KEY - PRESS (DF 5 SECT 2)
      DEFAULT VALUES:

      IMU S/N VALIDITY = 9999
      IMU 1 S/N        = 201
      IMU 2 S/N        = 202
      IMU 3 S/N        = 203

PFK10 KEY - PRESS TO WRITE TO IMU DISK FILE

PFK3 KEY - PRESS (DF 5 SECT 3)
      DEFAULT VALUES:

      IMU PWR ON TIME VALIDITY = 9999
      IMU 1 PWR ON TIME = CURRENT JTOY -24H
      IMU 2 PWR ON TIME = SAME AS IMU 1
      IMU 3 PWR ON TIME = SAME AS IMU 1

      IMU OPERATE TIME VALIDITY = 9999
      IMU 1 OPERATE TIME = CURRENT JTOY -6H
      IMU 2 OPERATE TIME = SAME AS IMU 1
      IMU 3 OPERATE TIME = SAME AS IMU 1
```

IMU Software Initialization

121-585 **CGNC**

IF IMU PRE-FLIGHT CAL IS IN PROGRESS,

THEN

CURSOR CNTL (VABM1/VWB19 PG-B)
PRE-FLIGHT CAL (ITEM 23)
XMIT CURSOR KEY - PRESS

START
XMIT CURSOR KEY - PRESS

Not Performed:_____

121-586 **CGNC**

IF IMU PRE-FLIGHT ALIGNMENT IS IN PROGRESS,

THEN

CURSOR CNTL (VABM1/VWB19 PG-B)
PRE-FLIGHT ALIGN (ITEM 24)
XMIT CURSOR KEY - PRESS

START
XMIT CURSOR KEY - PRESS

Not Performed:_____

121-587 **CTPE**

Terminate GNC programs at Backup Console.

121-588 **CTPE** **NTD** **212**

Report Backup Console reconfiguration steps are complete.

***** End of IMU Software Initialization *****

121-589 **NTD** **COFC**

IF GNC Engineer was required at Backup Console,

THEN GNC Engineer at Backup move to Hot Spare Console.

Not Performed:_____

121-590 **COFC** **NTD**

Console configuration complete. All personnel are relocated to Hot Spare Console and are ready to support. Safing panels will remain manned by USA GNC Engineering.

***** End of Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console) *****

Option B - Console Recovery After L-14 (Relocate to Backup Console if no PCGOAL or FR2)

NOTE

Perform Option B as primary option after L-14 minutes.

Do not perform after T-3 minutes. GLS adequately covers all of the GNC LCC after T-9 minutes & counting except for GNC-23. Therefore, the GNC LCC software must run in C11, FR2 or verified by PCGOAL.

Option B Not Performed:_____

NOTE

Primary Hot Spare Console for this recovery procedure is Console XX35.

121-591 **CTPE**

IF OFC ENGINEER CANNOT MONITOR PCGOAL OR FR2 ETL IS NOT SUPPORTING,

THEN PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY** ONE AVAILABLE CONCURRENCY OR PROGRAM SEP03 IS ACTIVE, AND ONE CRT POSITION (A1).

2. **PERFORM** PROGRAM VEB03 FROM AVIONICS MENU VIA SEP03.

Not Performed:_____

121-592 NTD COFC

If PCGOAL/FR2 is not available, or for additional failures, then one USA OFC Engineer move to Backup Console.

Other C11 personnel will remain at the failed C11 Console and monitor by PCGOAL (with special attention to GNC-23 until T-3 minutes), if available.

121-593 NTD LPS 212

Halt failed C11 Console.

121-594 LPS C4SE 127

Halt failed C11 Console (H/W XX48).
Report completion.

121-595 COFC NTD 212

Console configuration complete. All required personnel relocated to Backup Console and are ready to support.

***** End of Option B - Console Recovery After L-14 (Relocate to Backup Console) *****

Option C - Console Recovery During Recycle (Relocate to Hot Spare Console)

NOTE
Option C is the primary option during any Recycle.

Option C Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX35.

121-596 **NTD** **LPS** **212**

Reconfigure C11 software to Hot Spare Console.
Report completion (4 minutes).

121-597 **LPS** **C4SE** **127**

Halt failed C11 Console (H/W XX48).
Report completion.

121-598 **CTPE**

PERFORM FOLLOWING AT BACKUP CONSOLE:

1. **VERIFY/PROVIDE** ONE AVAILABLE CONCURRENCY OR PROGRAM SEP03 IS ACTIVE.

2. **PERFORM** PROGRAM VEB03 VIA "AVIONICS" SELECTION ON SEP03.

121-599 NTD COFC

If PCGOAL/FR2 is not available, or for additional failures, then one USA OFC Engineer move to Backup Console until software has been configured at Hot Spare.

C11 personnel move to Hot Spare Console and prepare for initialization.

121-600 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP1
2. C PP C11 _ _

121-601 LPS C4SE 127

AT HSP1 H/W_____

1. **PERFORM** $BMAP C11.
2. **HALT** HSP1.

121-602 LPS C4MC 127

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-603 C4MC LPS 127

LL_____, UL_____ in B/S _____/_____

121-604 LPS C4MC 127

Transmit Limits.

121-605 LPS C4SE 127

```
BOOT H/W _____ #0203.
VERIFY SUCCESSFUL INITIALIZATION.
```

121-606 LPS NTD 212

C11 Console Hot Spare initialization complete. C11 Console is located in Console _____.

121-607 NTD COFC

At Hot Spare Console, **Initiate** and **configure** C11 software set.

C11 Software Initialization

NOTE

Next two steps may cause Class 3 errors on concurrency 2 (SAB20) if after T-2 hrs (GLS initialization).

121-608 **COFC**

```
CONSOLE KYBD
SAB19
PERFORM PGM KEY - PRESS
```

GNC LCC Monitor Activation

NOTE

Allow 1 to 2 minutes for following step to complete.

121-609 **COFC**

```
CURSOR CNTL (SAB20/VSB79 PG-B)
ACTIVATE LCC MONITOR
XMIT CURSOR KEY - PRESS
```

Activate GN&C LCC EMONs

121-610 **COFC**

```
APPL PG A (SAB20/SWB02)
PFK13 KEY - PRESS (ACT EMON ACT PG)
```

NOTE
Activate following items as applicable for respective events that are complete.

121-611 COFC

CURSOR CNTL (SAB20/SWB02 PG-A)

1. **IF** IMUs POWERED UP,

   THEN
   A-IMU PWR UP
   XMIT CURSOR KEY - PRESS

   Not Performed:_____
   SS1

2. **IF** OMS GIMBAL PROFILE COMPLETE,

   THEN
   A-OMS TVC
   XMIT CURSOR KEY - PRESS

   Not Performed:_____
   SS2

3. **IF** SRB TVCs POWERED UP,

   THEN
   A-SRB TVC
   XMIT CURSOR KEY - PRESS

   Not Performed:_____
   SS3

4. **IF** SRB RGAs POWERED UP,

   THEN
   A-SRB RGA
   XMIT CURSOR KEY - PRESS

   Not Performed:_____
   SS4

121-612 COFC

APPL PAGE A (SAB20/SWB02)
PFK13 KEY - PRESS (DE-ACT EMON PG)

***** End of Activate GN&C LCC EMONs *****

GNC Profile Eval Monitor Setup

NOTE

Perform next two steps for S0007 only.

GNC profile evaluation monitor has no significant function in OMI S0017 and is not required to be reactivated.

GNC Profile Eval Monitor Setup Not Performed:_____

121-613 **COFC**

```
CURSOR CNTL (SAB19/SWB01 PG-B)
COUNTDOWN - DETAIL
EXEC CMD KEY - PRESS
(RUN UNDER SAB21)
```

121-614 **COFC**

```
APPL PG (SAB21/VWB05 PG-B)
PFK8 KEY - PRESS (CLEAR ALL BYPASSES)
PFK1 KEY - PRESS (START PGM)
```

***** End of GNC Profile Eval Monitor Setup *****

Reset SRB TVC IVD Status

NOTE

Next step resets the SRB TVC IVD status to On which is set at SRB TVC power up at T-7 hrs 45 min. This is a C11 only indication and is not mandatory for continuing Launch Countdown.

121-615 **COFC**

```
CONSOLE KYBD
ISSU N79IV048D #000F
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

IMU Disk File Data Reset

NOTE

Perform next step to update the disk file data to the listed default values unless the current data is valid (IE, the respective data validity = 9999).

Follow PGM info/prompts to update data.

121-616 **CGNC**

```
CURSOR CNTL (SAB19/SWB01 PG-B)
IMU - OPS MAN
XMIT CURSOR KEY - PRESS
```

121-617 **CGNC**

```
APPL PG (VWB19 PG-A)
PFK2 KEY - PRESS (DF 5 SECT 2)
      DEFAULT VALUES:

      IMU S/N VALIDITY = 9999
      IMU 1 S/N        = 201
      IMU 2 S/N        = 202
      IMU 3 S/N        = 203

PFK10 KEY - PRESS TO WRITE TO IMU DISK FILE

PFK3 KEY - PRESS (DF 5 SECT 3)
      DEFAULT VALUES:

      IMU PWR ON TIME VALIDITY = 9999
      IMU 1 PWR ON TIME = CURRENT JTOY -24H
      IMU 2 PWR ON TIME = SAME AS IMU 1
      IMU 3 PWR ON TIME = SAME AS IMU 1

      IMU OPERATE TIME VALIDITY = 9999
      IMU 1 OPERATE TIME = CURRENT JTOY -6H
      IMU 2 OPERATE TIME = SAME AS IMU 1
      IMU 3 OPERATE TIME = SAME AS IMU 1
```

IMU Software Initialization

121-618 **CGNC**

IF IMU PRE-FLIGHT CAL IS IN PROGRESS,

THEN

CURSOR CNTL (VABM1/VWB19 PG-B)
PRE-FLIGHT CAL (ITEM 23)
XMIT CURSOR KEY - PRESS

START
XMIT CURSOR KEY - PRESS

Not Performed:_____

121-619 **CGNC**

IF IMU PRE-FLIGHT ALIGNMENT IS IN PROGRESS,

THEN

CURSOR CNTL (VABM1/VWB19 PG-B)
PRE-FLIGHT ALIGN (ITEM 24)
XMIT CURSOR KEY - PRESS

START
XMIT CURSOR KEY - PRESS

Not Performed:_____

121-620 **CTPE**

Terminate GNC programs at Backup Console.

121-621 **CTPE** **NTD** **212**

Report Backup Console reconfiguration steps are complete.

***** End of IMU Software Initialization *****

121-622 **NTD** **COFC**

IF GNC Engineer was required at Backup Console,

THEN GNC Engineer at Backup move to Hot Spare Console.

Not Performed:_____

121-623 **COFC** **NTD**

Console configuration complete. All personnel are relocated to Hot Spare Console and are ready to support. Safing panels will remain manned by USA GNC Engineering.

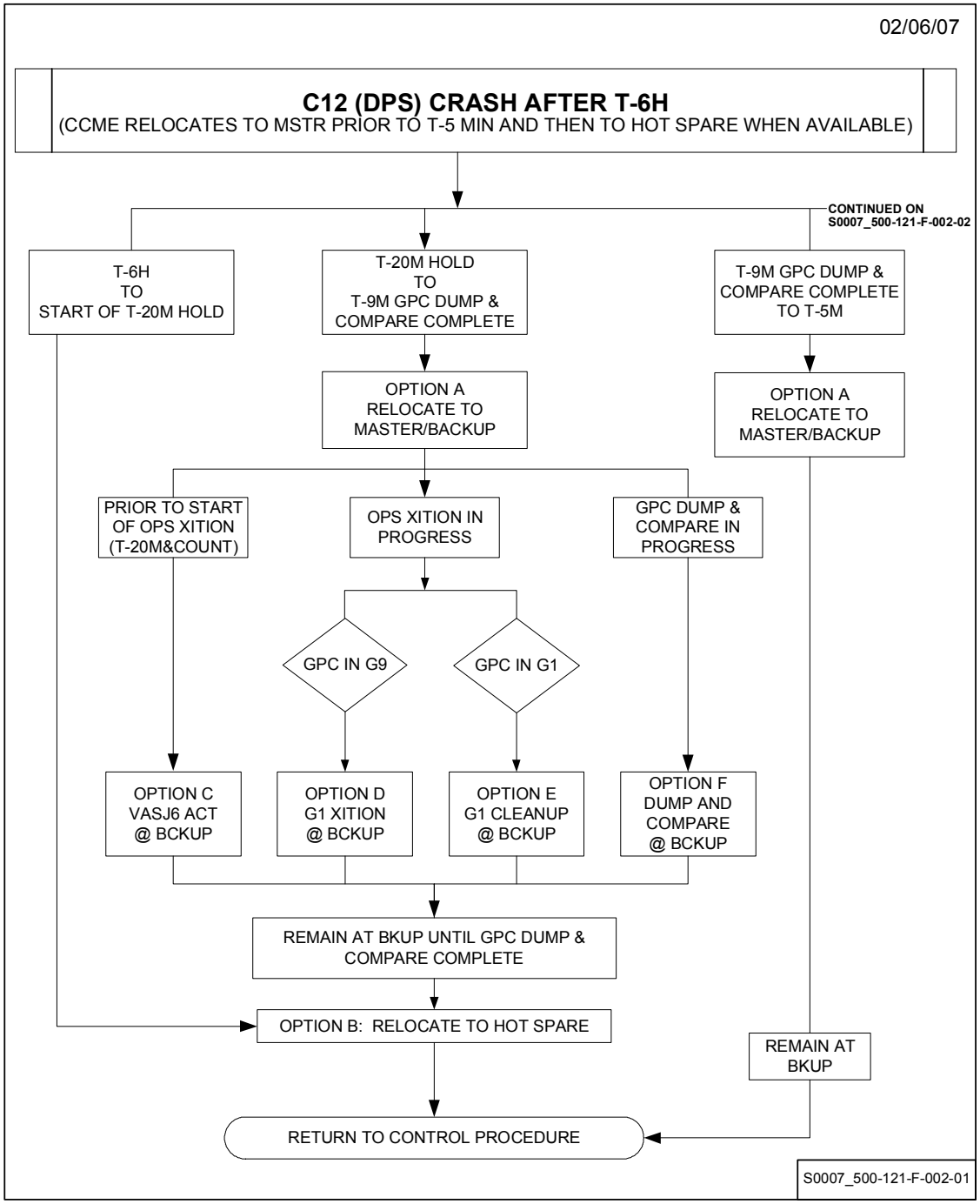
***** End of Option C - Console Recovery During Recycle (Relocate to Hot Spare Console) *****

***** End of C11 Console Failure Recovery Procedure *****

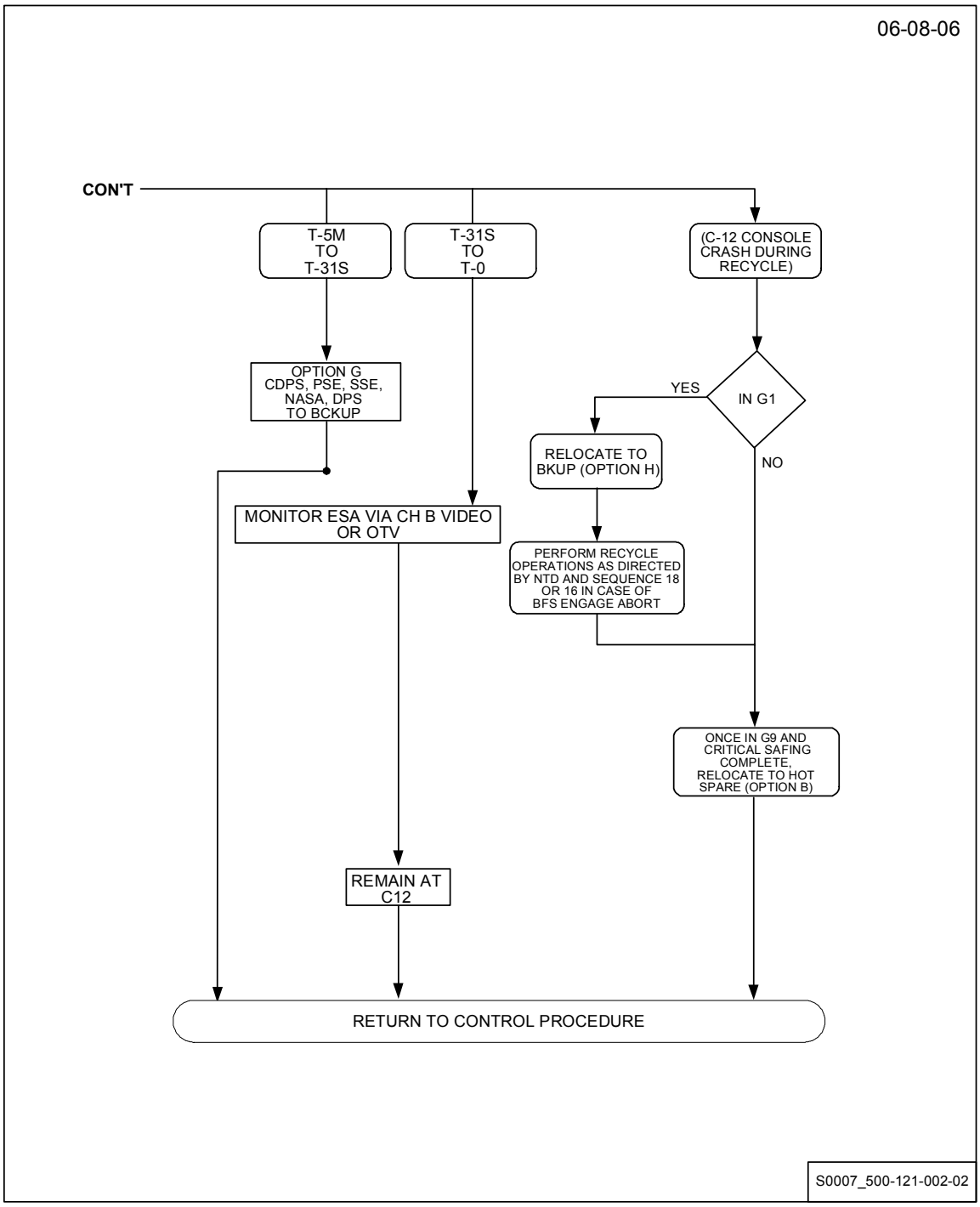
Section 12

C12 (DPS) Failure After T-6 hrs

(Page 1 of 2)



C12 (DPS) Failure After T-6 hrs (Page 2 of 2)



C12 Console Failure Recovery Procedure

NOTE

Perform C12 Console Failure Recovery Procedure if C12 fails after T-6 hrs 00 minutes.

C12 Console Failure Recovery Procedure Not Performed:_____

NOTE

The following top level programs are required at Master/Backup to support Countdown operations and contingencies and are acceptable to run at Backup with GLS.

	BACKUP		MASTER
SWS19	VASJ6	BSM06	VWE01A
VAS60	VASP9	VASC7	
VAS94	VSSD4		

NOTE

This section contains the following options.

Option A - C12 Relocate to Master/Backup
Option B - C12 Relocate to Hot Spare
Option C - VASJ6 Activation at Backup
Option D - G1 Transition at Backup
Option E - G1 Transition Cleanup at Backup
Option F - G1 Dump and Compare at Backup
Option G - Recovery of DPS LCC Monitor at Backup
Option H - C12 Relocate to Master/Backup During Recycle

The decision as to which option(s) to perform in event of a C12 Console failure can be determined by referencing the C12 Console Failure Recovery Flow Chart.

121-624 CDPS

Proceed to C12 Console Failure Recovery Flow Chart to determine proper option(s) to be used.

Option A - C12 Relocate to Master/Backup

NOTE
Perform Option A between start of T-20 min hold and T-5 minutes.

Option A Not Performed:_____

121-625 **NTD** **LPS** **212**
CDPS
CCME

Perform C12 relocate to Master/Backup Console Failure Recovery procedure.

121-626 **LPS** **C4SE** **127**

Halt failed C12 Console (H/W XX47).
Report completion.

121-627 **LPS**

```
CRT (SLP50 PG-A)

VERIFY FOLLOWING MESSAGES:

C12 - RSYS CHANGE FOR DPS TO BKUP COMPLETE.
C12 - RSYS CHANGE FOR CCME TO MSTR COMPLETE.
```

121-628 **LPS** **NTD**
NTD **CDPS**
CCME

C12 RSYS transfer to Backup/Master complete.

121-629 **CTPE**

Provide two open concurrencies and one CRT position (A1) at Backup Console for DPS monitor.

121-630 **LPS**

Provide one open concurrency and one CRT position (A1) at Master Console for CCME monitor.

121-631 **NTD** **CDPS**
CVFS
CODS
CCME

Two USA DPS Engineers, one NASA DPS Engineer and one CVFS Engineer (if required to monitor dump and compare) relocate to Backup Console, A1 position.

One USA CCME Engineer and one NASA CCME Engineer relocate to Master Console, A1 position.

All others remain on station at failed C12 and monitor ESA via Channel B video or OTV.

121-632 **CCME**

```
AT MASTER CONSOLE

CONSOLE KYBD
VWE01A
PERF PGM KEY - PRESS
```

NOTE

Perform next step after LPS reports C12 RSYS transfer to Backup Console complete.

121-633 **CDPS**

```
AT BACKUP CONSOLE

CONSOLE KYBD
VASP9
PERF PGM KEY - PRESS

CONSOLE KYBD
SWS19
PERF PROG KEY - PRESS

CRT
VERIFY
VASP9 - LCC MONITOR PROGRAM ACTIVE
SWS19 - C12 CONSOLE T-20 OVERVIEW ACTIVE
```

121-634 **CDPS**
CCME

Return to C12 Console Failure Recovery Flow Chart.

***** End of Option A - C12 Relocate to Master/Backup *****

Option B - C12 Relocate to Hot Spare

NOTE
Perform Option B if directed by C12 Console Failure Recovery Flow Chart.

Option B Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX34.
Secondary Hot Spare Console is Console XX43.

121-635 CDPS NTD 212

Ready to reconfigure Hot Spare to C12.

121-636 NTD LPS 212

Reconfigure C12 software to Hot Spare Console.
Report completion. (4 minutes).

121-637 LPS C4SE 127

IF C12 not previously halted,

THEN halt failed C12 Console (H/W XX47).
Report completion.

Not Performed:_____

121-638 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD.

1. A KU HSP___(2 OR 3)
2. C PP C12 _ _

121-639 **LPS** **C4SE** **127**

AT HSP___(2 OR 3) H/W_____

1. **PERFORM** $BMAP C12.
2. HALT HSP___.

121-640 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S _____,_____; LL _____ UL _____.

121-641 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-642 **LPS** **C4MC** **127**

Transmit Limits.

121-643 **LPS** **C4SE** **127**

BOOT H/W_____ #0203.
VERIFY SUCCESSFUL INITIALIZATION.

121-644 **LPS**

CRT (SLP50 PG-A)

VERIFY FOLLOWING MESSAGE:

C12-RSYS CHANGE FOR DPS/CCME TO C12 COMPLETE.

121-645 **LPS** **NTD** **212**
NTD **CDPS**
CCME

C12 Console Hot Spare initialization complete. C12 RSYS is now at Hot Spare Console. C12 Console is located in Console _____.

121-646 **CCME**

AT MASTER CONSOLE

TERMINATE VWE01A.

Relocating from Backup to Hot Spare

NOTE
Perform this option if relocating from Backup to Hot Spare.

Relocating from Backup to Hot Spare Not Performed:_____

121-647 **CDPS**

```
AT BACKUP CONSOLE,

IF VASJ6 IS ACTIVE,

THEN

PFP (VASJ6)
TERMINATE KEY - PRESS
```

Not Performed:_____

121-648 **CDPS**

```
AT BACKUP CONSOLE,

IF SWS19 IS ACTIVE,

THEN

CONSOLE KYBD (SWS19 PG-B)
PFK-15 KEY - PRESS
```

Not Performed:_____

121-649 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD (VASP9 PG-B)
PFK-15 KEY - PRESS
PFK-15 KEY - PRESS
```

***** End of Relocating from Backup to Hot Spare *****

121-650 **CDPS**
CCME
CODS
CVFS

Relocate to C12 Hot Spare.

NOTE
Perform next step after LPS/DPS report DPS RSYS transfer to C12 complete.

121-651 **CDPS**

```
CONSOLE KYBD (C12HS)
SAS01
PERF PGM KEY - PRESS
```

ACTIVATE REQUIRED DISPLAY DRIVERS.

121-652 **CDPS**

```
CURSOR CNTL (C12HS, SAS01 PG-B)
DPS INIT DISPLAY
XMIT CURSOR KEY - PRESS

CURSOR CNTL (C12HS, SAS01 PG-B)
TERMINATE OPS MGR 1 (SAS07)
XMIT CURSOR KEY - PRESS
```

121-653 **CDPS**

```
CONSOLE KYBD (C12HS)
VASP9
PERF PGM KEY - PRESS
```

121-654 **CDPS**

```
CURSOR CNTL (VASP9, PG-B)
ERROR NOTIF TO: 4A, 4B
XMIT CURSOR KEY - PRESS

CRT (VASP9)
PAGE 4A, 4B INHIBITED
```

121-655 **CDPS**

```
CONSOLE KYBD (VASP9, PG-B)
PFK-1 KEY - PRESS
```

121-656 **CCME**

Activate program VWE01A.

VASJ6 Activation

NOTE

Perform this option if VASJ6 is to be activated (Prior to T-20 min and counting).

VASJ6 Activation Not Performed:_____

121-657 CDPS

```
CURSOR CNTL (C12HS, SAS01 PG-B)
TERMINATE OPS MGR 5 (SAS25)
XMIT CURSOR KEY - PRESS
```

121-658 CDPS

```
CONSOLE KYBD (C12HS)
VASJ6
PERF PGM KEY - PRESS

PFK-1 KEY - PRESS (BSR CONTINUE)
PFK-1 KEY - PRESS (NBAT CONTINUE)
```

***** End of VASJ6 Activation *****

121-659 **CDPS**

APPL PAGE (C12HS, SAS01 PG-B)
PFK-2 KEY - PRESS

121-660 **CDPS**

IF C12 WAS DOWN DURING BFS ONE-SHOT DATA TRANSFER (T-22 MIN),

THEN

PFP (VASJ6)
ONE-SHOT SELECT KEY - PRESS

CRT (VASJ6, PG-B)
ONE-SHOT COMPLETE - INVERT GREEN

Not Performed:_____

121-661 **CDPS**
CCME

Return to C12 Console Failure Recovery Flow Chart.

***** End of Option B - C12 Relocate to Hot Spare *****

Option C - VASJ6 Activation at Backup

NOTE

Perform Option C if C12 crash occurred after start of T-20 min Hold and prior to start of OPS 1 Transition. (T-20 min & Counting)

Option C Not Performed:_____

121-662 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD (SWS19 PG-B)
PFK-15 KEY - PRESS
```

121-663 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD
VASJ6
PERF PGM KEY - PRESS
```

121-664 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD (VASJ6 PG-B)
PFK-1 KEY - PRESS (BSR CONTINUE)
PFK-1 KEY - PRESS (NBAT CONTINUE)
```

121-665 **CDPS OTC 212**
OTC CGLS

IF Countdown has proceeded below T-20 minutes,

THEN request CGLS transmit "START OPS 1 TRANSITION" REMCOM to Backup Console.

Not Performed:_____

121-666 **CDPS**

Return to C12 Console Failure Recovery Flow Chart.

***** End of Option C - VASJ6 Activation at Backup *****

Option D - G1 Transition at Backup

NOTE
Perform Option D if after T-20 min and counting and DPS is still in G9 after relocation to Backup.

Option D Not Performed:_____

121-667 **CDPS** **OTC**
OTC **NTD**

DPS is still in G9. **Request** concurrence to reattempt transition to G1.

121-668 **NTD** **OTC**
TBC
PTC
CSPE
OTC **CGNC**
CGLS
CMPL
TBC **CLOX**
CLHY

DPS will be transitioning to G1. **Verify** ready to proceed.

121-669 **NTD** **ALL**

Console Operators discontinue all LDB commands and reads during PASS OPS transition.

121-670 **NTD** **OTC**
OTC **CDPS**

Perform transition to G1.

121-671 **CDPS**

AT BACKUP CONSOLE,

CONSOLE KYBD (SWS19 PG-B)
PFK-15 KEY - PRESS

121-672 **CDPS**

AT BACKUP CONSOLE,

CONSOLE KYBD
VASJ6
PERF PGM KEY - PRESS

121-673 **CDPS**

AT BACKUP CONSOLE,

CONSOLE KYBD (VASJ6 PG-B)
PFK-1 KEY - PRESS (BSR CONTINUE)
PFK-1 KEY - PRESS (NBAT CONTINUE)

121-674 **CDPS**

AT BACKUP CONSOLE,

PFP (VASJ6)
OPS 101 SELECT - PRESS

CRT (VASJ6 PG-B)
VERIFY "TRANSITION CPLT"
MILESTONE - INVERT GREEN

121-675 **CDPS** **OTC**
OTC **NTD**
NTD **ALL**

PASS OPS 1 transition complete. DPS ready for BFS transition to OPS 101.

121-676 **CDPS**

Return to C12 Console Failure Recovery Flow Chart.

***** End of Option D - G1 Transition at Backup *****

Option E - G1 Transition Cleanup at Backup

NOTE
Perform Option E if DPS is in OPS 1 and Dump and Compare has not started.

Option E Not Performed:_____

NOTE
In next step, G3 archive status will indicate MMU area from where transitioned.

121-677 **CDPS**

```
AT BACKUP CONSOLE,

CRT (SWS19 PG-B)
VERIFY

DL FMT 21 ACTIVE
NO MMU 1 OR 2 FAULT SUM MSGS
G3 ARC STATUS:  1111
CRT 1 AND 2 DISP ID = 1011
BUS ASSIGNMENTS NOMINAL
NO UNEXPECTED I/O OR GPC ERRORS
```

121-678 **CDPS**

```
AT BACKUP CONSOLE,

CURSOR CNTL (SWS19 PG-B)
VASC7
XMIT CURSOR KEY - PRESS
```

121-679 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD
ENTER DEUE KEY - PRESS

VERIFY DEST = DEU1, GNC, LDBA
```

121-680 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD
DEUE SPEC 0 PRO
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

CRT (SWS19 PG-B)
CRT1 DISP ID = 1
```

121-681 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD
DEUE ITEM 48 EXEC
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

DEUE RESUME
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

DEUE FAULT SUM
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

CRT (SWS19 PG-B) - VERIFY
CRT1 DISP ID = 990
```

121-682 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD
SET N72IV167E OFF
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

SET N03IS017E OFF
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

121-683 **CDPS** **OTC**
OTC **CGLS**

PASS OPS 1 transition complete. DPS ready for BFS transition to OPS 101.

121-684 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD (SWS19 PG-B)
PFK-15 KEY - PRESS
```

121-685 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD
VASJ6
PERF PGM KEY - PRESS
```

121-686 **CDPS**

```
AT BACKUP CONSOLE,

PFP (VASJ6)
T-20 MIN D&C SELECT - PRESS

CRT (VASJ6 PG-B) - VERIFY
T-20 MIN DUMP IN PROGRESS
```

121-687 **CDPS**

Return to C12 Console Failure Recovery Flow Chart.

***** End of Option E - G1 Transition Cleanup at Backup *****

Option F - G1 Dump & Compare at Backup

NOTE

Perform Option F if Dump and Compare was in progress prior to console Failure.

Option F Not Performed:_____

121-688 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD (SWS19 PG-B)
PFK-15 KEY - PRESS
```

121-689 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD
VASJ6
PERF PGM KEY - PRESS
```

121-690 **CDPS**

```
AT BACKUP CONSOLE,

PFP (VASJ6)
T-20 MIN D&C SELECT - PRESS

CRT (VASJ6 PG-B)
VERIFY
T-20 MIN DUMP IN PROGRESS
```

121-691 **CDPS**

Return to C12 Console Failure Recovery Flow Chart.

***** End of Option F - G1 Dump & Compare at Backup *****

Option G - Recovery of DPS LCC Monitor at Backup

NOTE
Perform Option G if C12 fails between T-5 min and T-31 sec.

Option G Not Performed:_____

121-692 **NTD** **CDPS** **212**
LPS

Perform recovery of DPS LCC monitor at Backup Console.

121-693 **LPS** **C4SE** **127**

Halt failed C12 Console (H/W XX47).
Report completion.

121-694 **LPS**

CRT (SLP50 PG A)

VERIFY FOLLOWING MESSAGE:

"C12 - RSYS CHANGE FOR DPS TO BKUP COMPLETE"

121-695 **NTD** **CDPS**
CODS
CCME

Two USA DPS Engineers and one NASA DPS Engineer relocate to Backup Console, A1 position.

All others remain on station at failed C12 Console and monitor via PCGOAL or ESA via CH B video/OTV.

121-696 **LPS** **NTD** **212**
CDPS

C12 RSYS transfer to Backup Console complete.

121-697 **CTPE**

Provide two open concurrencies and one CRT position at Backup Console for DPS monitor.

NOTE
Perform next step after LPS reports C12 RSYS transfer to Backup complete.

121-698 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD
VASP9
PERF PGM KEY - PRESS
PFK-1 KEY - PRESS

CONSOLE KYBD
SWS19
PERF PGM KEY - PRESS

CRT
VASP9 - LCC MONITOR PROGRAM ACTIVE
SWS19 - C12 CONSOLE T-20M OVERVIEW ACTIVE
```

121-699 **CDPS** **NTD**

DPS LCC monitor recovery complete.

***** End of Option G - Recovery of DPS LCC Monitor at Backup *****

Option H - C12 Relocate to Master/Backup During Recycle

NOTE
Option H is the primary option during any Recycle.

Option H Not Performed:_____

121-700 **NTD** **LPS** **212**
CDPS
CCME

Perform C12 relocate to Master/Backup Console Failure Recovery procedure.

121-701 **LPS** **C4SE** **127**

Halt failed C12 Console (H/W XX47).
Report completion.

121-702 **LPS**

IF CONSOLE FAILED PRIOR TO T-31 SECONDS,

THEN
CRT (SLP50 PG-A)

VERIFY FOLLOWING MESSAGES:

C12 - RSYS CHANGE FOR DPS TO BKUP COMPLETE.
C12 - RSYS CHANGE FOR CCME TO MSTR COMPLETE.

Not Performed:_____

121-703 **LPS** **NTD** **212**
NTD **CDPS**
CCME

IF Console failed prior to T-31 seconds,

THEN C12 RSYS transfer to Backup/Master complete.

Not Performed:_____

121-704 **CTPE**

Provide two open concurrencies and one CRT position at Backup Console for DPS monitor.

121-705 **LPS**

Provide one open concurrency and one CRT position at Master Console for CCME monitor.

121-706 **NTD** **CDPS**
CODS

Two USA DPS Engineers and one NASA DPS Engineer relocate to Backup Console, A1 position.

All others remain on station at failed C12 and monitor ESA via CH B video/OTV.

121-707 **CCME**

```
AT MASTER CONSOLE

CONSOLE KYBD
VWE01A
PERF PGM KEY - PRESS
```

NOTE

Perform next step after LPS reports C12 RSYS transfer to Backup Console complete.

121-708 **CDPS**

```
AT BACKUP CONSOLE,

CONSOLE KYBD
SWS19
PERF PROG KEY - PRESS

CRT
SWS19 - C12 CONSOLE T-20 OVERVIEW ACTIVE
```

121-709 **CDPS**
CCME

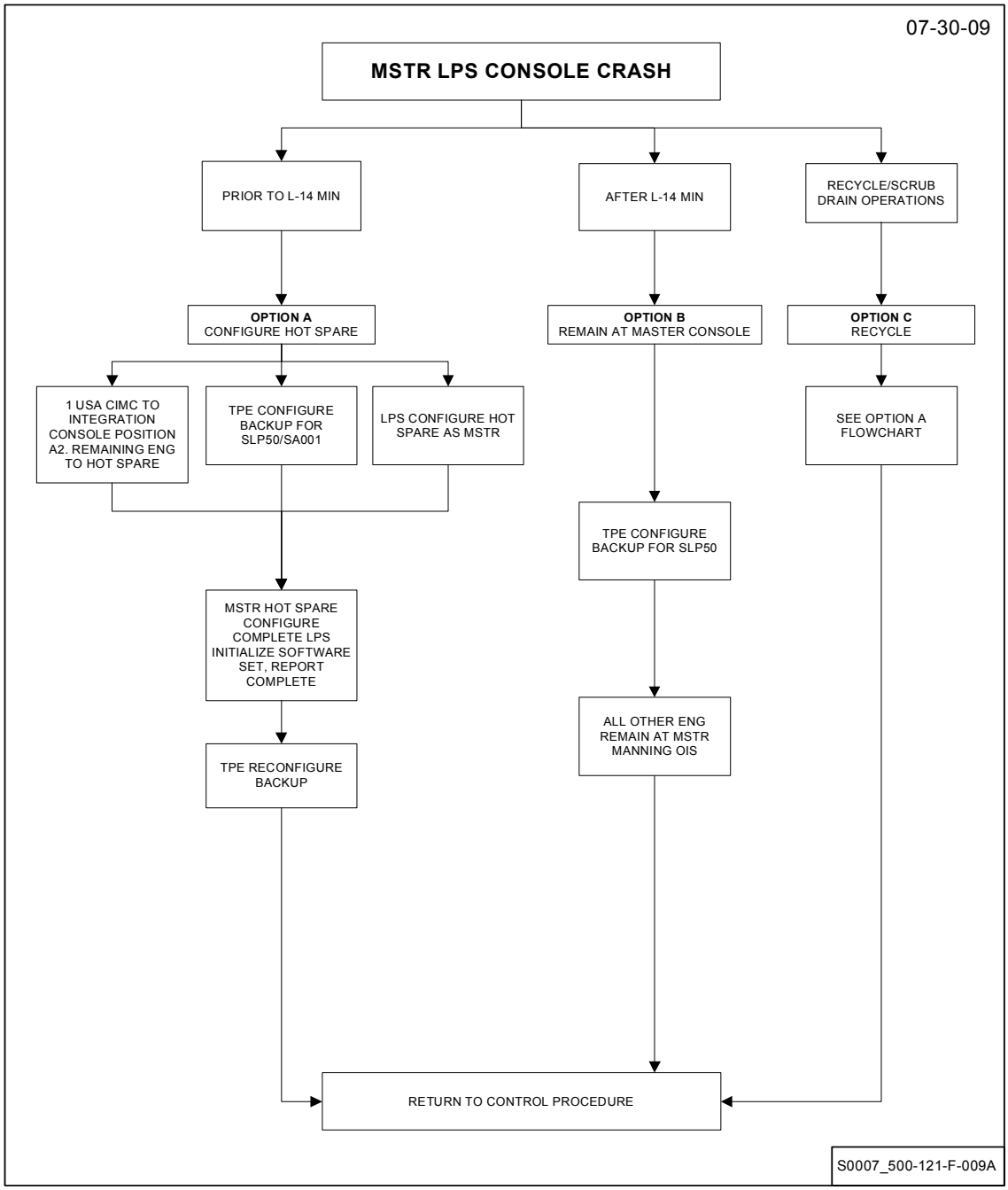
Return to C12 Console Failure Recovery Flow Chart.

***** End of Option H - C12 Relocate to Master/Backup During Recycle *****

***** End of Section 12 - C12 Console Failure Recovery Procedure *****

Section 13

Master Console Failure Recovery Procedure



Master Console Failure Recovery Procedure

NOTE

Master Console Failure Recovery procedure is a contingency procedure with three options, one of which will be performed from T-6 hrs if Master Console fails. Choice of options will be made by NTD/SPE.

Master Console Failure Recovery Procedure Not Performed:_____

NOTE

The following Application programs are required at Backup/Integration Console in support of console failure operations. They have been verified compatible with the GLS software active during Terminal Count. No other programs are allowed after GLS initialization.

SLP50 SA001

NOTE

This section contains the following options:

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)

Option B - Console Recovery After L-14 (Remain at Master Console)

Option C - Console Recovery During Recycle/Scrub Drain Operations (Relocate to Hot Spare Console)

The decision as to which option(s) to perform in event of a Master Console failure can be determined by referencing the Master Console Failure Recovery Flow Chart.

Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console)

NOTE
Option A is the primary option prior to L-14 min.

Option A Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX34.
Secondary Hot Spare Console is Console XX35.

121-710 NTD LPS 212

Reconfigure Master software to Hot Spare Console.
Report completion (4 minutes).

121-711 LPS C4SE 127

Halt failed Master Console (H/W XX33).
Report completion.

121-712 NTD CTPE 212

IF AFTER T-6 HRS 30 MIN (SLP50 ACTIVATION)

THEN AT BACKUP CONSOLE, **ACTIVATE** SLP50 AND MONITOR CHANNEL 127 FOR ADDITIONAL STEPS:

1. **VERIFY/PROVIDE** TWO AVAILABLE CONCURRENCIES (NOTE: SLP50 WILL AUTOMATICALLY PERFORM SA001 CONCURRENTLY).

2. SLP50
   PERFORM PGM KEY - PRESS

   VERIFY PAGE A MESSAGE:

   1 - FOR TERMINAL COUNT
   2 - CRYO DRAIN SUPPORT

3. 1
   XMIT RESPONSE KEY - PRESS

4. **VERIFY** SLP50 PAGE A MSG:

   1 - ACTIVATE SA001 REGARDLESS OF PSEUDO VALUE
   2 - DO NOT ACTIVATE SA001 NOW

5. 1
   XMIT RESPONSE KEY - PRESS
   (ACTIVATE SA001)

6. **VERIFY** SA001 ACTIVE

Not Performed:_____

121-713 NTD LPS 212

C4MC move to Integration Console position A2.

CPDR, CCMS, C4SM, and LPS (PSE) to remain in the prime Firing Room to monitor CCMS health status via PCGOAL and SPA System messages.

All other Master personnel move to Hot Spare Console.
Prepare for Initialization.

121-714 LPS C4MC 127

At Integration Console position A2,
Verify Integration Console has system integrity.

121-715 LPS C4SE 127

PERFORM FOLLOWING AT HOT SPARE CONSOLE:

1. **HALT** HSP _____ (1 OR 3) AT H/W_____.

2. **BOOT** CONSOLE #4103/8000.

3. $BMAP MSTR

4. **BOOT** CONSOLE #4103/8000.
   VERIFY $BMAP SUCCESSFUL.

121-716 LPS C4MC 127

PERFORM FOLLOWING AT INTEGRATION CONSOLE KEYBOARD (A2 POSITION):

C PP MSTR _ _

REPORT COMPLETION.

121-717 LPS CPDR 127

PERFORM FOLLOWING AT CDBFR H/W _____:

1. **SELECT** B/S __/__.

2. **ENTER** LIMITS: LL ____ UL ____.

121-718 C4MC LPS 127

LL_____, UL_____ in B/S _____/_____

121-719 LPS CPDR 127

Transmit Limits.

121-720 LPS C4SE 127

BOOT HOT SPARE CONSOLE #4103/0100.
VERIFY SYSTEM INTEGRITY TRANSFER SUCCESSFUL.
VERIFY SUCCESSFUL INITIALIZATION.

121-721 LPS NTD 212

Master Console Hot Spare Initialization complete. Master Console is located in Console _____.

121-722 NTD LPS 212

C4MC at Integration Console relocate to Hot Spare Console.

121-723 LPS

PERFORM PROGRAMS $HWMON (TCB1), AA008 (TCB2), $T (TCB3), AWP01 (TCB4).

SLP50 Recovery

NOTE
Perform this option (SLP50 Recovery) if after T-6 hours 30 minutes (SLP50 Activation). Prior to T-6 house 30 minutes the TPE RSYS Transfer software performs the console crash monitoring function.

SLP50 Recovery Not Performed:_____

121-724 LPS

```
REACTIVATE SLP50 AND SA001 IN CONC 5 AND 6:

SLP50
PERFORM PGM KEY - PRESS

VERIFY PAGE A MESSAGE:

1 - FOR TERMINAL COUNT
2 - CRYO DRAIN SUPPORT

1
XMIT RESPONSE KEY - PRESS

VERIFY SLP50 PAGE A MSG:

1 - ACTIVATE SA001 REGARDLESS OF PSEUDO VALUE
2 - DO NOT ACTIVATE SA001 NOW

1
XMIT RESPONSE KEY - PRESS
(ACTIVATE SA001)

VERIFY SA001 ACTIVE
```

121-725 LPS CTPE 127

Terminate SLP50 and SA001 at Backup Console using the next two steps.

NOTE

The termination of SA001 must be performed using the console terminate program key rather than the PFPKs to avoid corruption of the pseudos being used by the copy of SA001 running at the new Master console.

121-726 CTPE

```
SA001
TERM PGM - PRESS
```

121-727 CTPE

```
PFPK  - SLP50     - PRESS
PFPK1 - TERMINATE - PRESS
PFPK6 - EXEC TERM - PRESS
```

121-728 CTPE LPS 127

SA001 and SLP50 are inactive.

121-729 CTPE NTD 212

Backup Console reconfiguration steps in support of Master console crash are complete.

***** End of SLP50 Recovery *****

121-730 LPS NTD 212
CTPE

Master Console configuration complete.

***** End of Option A - Console Recovery Prior to L-14 (Relocate to Hot Spare Console) *****

Option B - Console Recovery After L-14 (Remain at Master Console)

NOTE
Option B is the primary option after L-14 min.

Option B Not Performed:_____

NOTE
After Liftoff is complete, C4MC will relocate to Integration Console, A2 position and perform program AWP01 (1 concurrency).

121-731 **NTD** **LPS** **212**
CTPE

Perform Master Console recovery procedure, Option B.
Report completion (8 minutes).

121-732 **CGLS**

Verify Integration console has system integrity.
(Invert white OS on system message page)

121-733 **CGLS** **NTD** **212**

System Integrity verified at the Integration console.

121-734 **LPS** **C4SE** **127**

Halt failed Master Console (H/W XX33).
Report completion.

121-735 NTD CTPE 212

IF PRIOR TO TERM LOX REPLENISH (-4/55),

THEN AT BACKUP CONSOLE, **REACTIVATE** SLP50:

1. **VERIFY/PROVIDE** TWO AVAILABLE CONCURRENCIES. (NOTE: SLP50 WILL AUTOMATICALLY PERFORM SA001 CONCURRENTLY).

2. SLP50
   PERFORM PGM KEY - PRESS

   VERIFY PAGE A MESSAGE:

   1 - FOR TERMINAL COUNT
   2 - CRYO DRAIN SUPPORT

3. 1
   XMIT RESPONSE KEY - PRESS

4. **VERIFY** SLP50 PAGE A MSG:

   1 - ACTIVATE SA001 REGARDLESS OF PSEUDO VALUE
   2 - DO NOT ACTIVATE SA001 NOW

5. 1
   XMIT RESPONSE KEY - PRESS
   (ACTIVATE SA001)

6. **VERIFY** SA001 ACTIVE

Not Performed:_____

121-736 NTD CTPE 212

IF AFTER TERM LOX REPLENISH (-4/55),

THEN AT BACKUP CONSOLE, **REACTIVATE** SLP50:

1. **VERIFY/PROVIDE** ONE AVAILABLE CONCURRENCY.

2. SLP50
   PERFORM PGM KEY - PRESS

   VERIFY PAGE A MESSAGE:

   1 - FOR TERMINAL COUNT
   2 - CRYO DRAIN SUPPORT

3. 1
   XMIT RESPONSE KEY - PRESS

4. **VERIFY** SLP50 PAGE B MSG:

   LH2/LO2 SAFING SUPPORTED

5. **VERIFY** SLP50 ACTIVE
   VERIFY SA001 IS NOT ACTIVE

Not Performed:_____

121-737 NTD LPS 212

CPDR, CCMS, C4SM, and LPS (PSE) to remain on station to monitor CCMS health status via PCGOAL and SPA System messages.

All other Master personnel move to Hot Spare Console.
Prepare for Initialization following Liftoff/Scrub declaration.

121-738 LPS NTD 212

Master Console configuration complete.

***** End of Option B - Console Recovery After L-14 (Remain at Master Console) *****

Option C - Console Recovery During Recycle/Scrub Drain Operations (Relocate to Hot Spare Console)

NOTE
Option C is the primary option for any Recycle/Scrub Drain Operations.

Option C Not Performed:_____

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX34.
Secondary Hot Spare Console is Console XX35.

121-739 NTD LPS 212

Reconfigure Master software to Hot Spare Console.
Report completion (4 minutes).

121-740 LPS C4SE 127

Halt failed Master Console (H/W XX33).
Report completion.

121-741 NTD CTPE 212

IF IN SCRUB/RECYCLE AND SUPPORTING LH2 DRAIN/ET BOILOFF,

THEN AT THE BACKUP CONSOLE, **REACTIVATE** SLP50 WITH CRYO DRAIN OPTION AND MONITOR CHANNEL 127 FOR ADDITIONAL STEPS:

1. **VERIFY/PROVIDE** ONE AVAILABLE CONCURRENCY.

2. SLP50
   PERFORM PGM KEY - PRESS

   VERIFY PAGE A MESSAGE:

   1 - FOR TERMINAL COUNT
   2 - CRYO DRAIN SUPPORT

3. 2
   XMIT RESPONSE KEY - PRESS

4. CRT (PG-A)

   VERIFY SELECTED CRYO DRAIN SUPPORT.

Not Performed:_____

121-742 NTD LPS 212

C4MC move to Integration Console position A2.

CPDR, CCMS, C4SM, and LPS (PSE) to remain in the prime Firing Room to monitor CCMS health status via PCGOAL and SPA System messages.

All other Master personnel move to Hot Spare Console.
Prepare for Initialization.

121-743 LPS C4MC 127

Verify Integration Console has system integrity.

121-744 LPS C4SE 127

PERFORM FOLLOWING AT HOT SPARE CONSOLE:

1. **HALT** HSP _____ (1 OR 3) AT H/W_____.
2. **BOOT** CONSOLE #4103/8000.
3. $BMAP MSTR
4. **BOOT** CONSOLE #4103/8000.
   VERIFY $BMAP SUCCESSFUL.

121-745 LPS C4MC 127

PERFORM FOLLOWING AT INTEGRATION CONSOLE KEYBOARD:

C PP MSTR _ _

REPORT COMPLETION.

121-746 LPS CPDR 127

PERFORM FOLLOWING AT CDBFR H/W _____:

1. **SELECT** B/S __/__.
2. **ENTER** LIMITS: LL ____ UL ____.

121-747 CPDR LPS 127

LL_____, UL_____ in B/S _____/_____

121-748 LPS CPDR 127

Transmit Limits.

121-749 LPS C4SE 127

```
BOOT HOT SPARE CONSOLE #4103/0100.
VERIFY SYSTEM INTEGRITY TRANSFER SUCCESSFUL.
VERIFY SUCCESSFUL INITIALIZATION.
```

121-750 LPS NTD 212

Master Console Hot Spare Initialization complete. Master Console is located in Console _____.

121-751 NTD LPS 212

C4MC at Integration Console relocate to Hot Spare Console.

121-752 LPS

```
PERFORM PROGRAMS $HWMON (TCB1), AA008 (TCB2),
$T (TCB3), AWP01 (TCB4).
```

SLP50 Recovery

NOTE
Perform this option (SLP50 Recovery) if in Scrub/Recycle and supporting LH2 Drain/ET Boiloff.

SLP50 Recovery Not Performed:_____

121-753 NTD LPS 212

REACTIVATE SLP50 IN CONC 5:

```
SLP50
PERFORM PGM KEY - PRESS
```

VERIFY PAGE A MESSAGE:

```
1 - FOR TERMINAL COUNT
2 - CRYO DRAIN SUPPORT

2
XMIT RESPONSE KEY - PRESS

CRT (PAGE A)
```

VERIFY SELECTED CRYO DRAIN SUPPORT.

121-754 LPS CTPE 212

TERMINATE SLP50:

```
PFPK  - SLP50     - PRESS
PFPK1 - TERMINATE - PRESS
PFPK6 - EXEC TERM - PRESS
```

121-755 CTPE LPS 212

SLP50 is inactive.

121-756 CTPE NTD 212

Backup Console reconfiguration steps in support of Master console crash are complete.

***** End of SLP50 Recovery *****

121-757 LPS NTD 212
CTPE

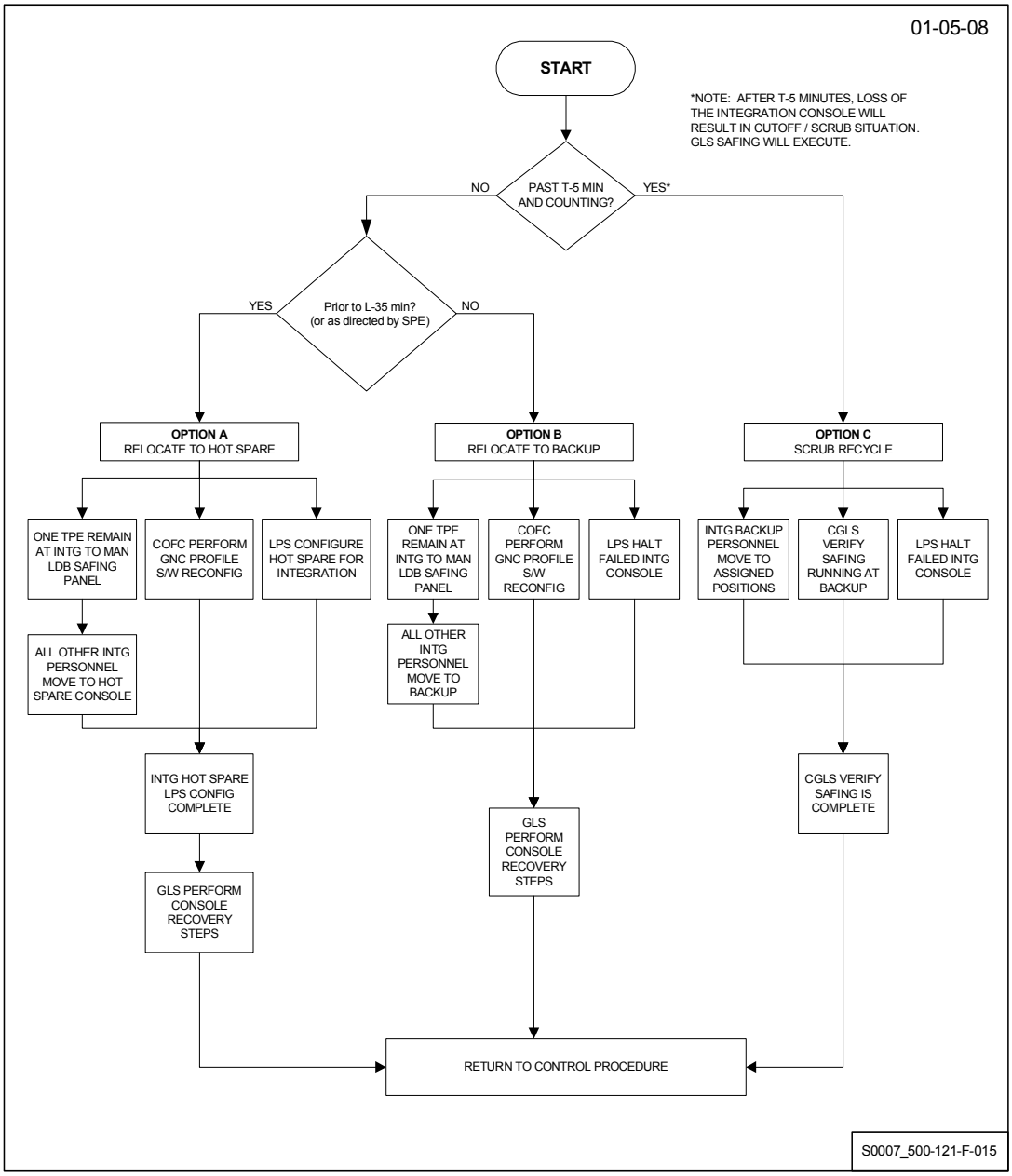
Master Console configuration complete.

***** End of Option C - Console Recovery During Recycle/Scrub Drain Operations (Relocate to Hot Spare Console) *****

***** End of Section 13 - Master Console Failure Recovery Procedure *****

Section 14

Integration Console Failure Recovery Procedure



Integration Console Failure Recovery Procedure

NOTE

Integration Console Failure Recovery Procedure is a contingency procedure that may be performed from T-6 hrs down to T-0 when an Integration Console failure occurs, as directed by SPE. Window availability may limit recovery options and destination recovery consoles. (Ref LCC LPS-02)

After T-5 minutes, Scrub is the only option.

Integration Console Failure Recovery Procedure Not Performed:_____

NOTE

This section contains the following options:

Option A - Configure Hot Spare Console as Integration Console
Option B - GLS Mainline Runs at Backup
Option C - GLS Safing at Backup (Scrub/Recycle Option)

The decision as to which option(s) to perform in event of an Integration Console failure can be determined by referencing the Integration Console Failure Recovery Flow Chart.

NOTE

For Firing Room 4 Console Recovery the Console displays are available on following OTV Channels:

Console	OTV Channel No.
Hot Spare 2 (443A9)	217
Backup (456A9)	220

Option A - Configure Hot Spare Console as Integration Console

NOTE

Option A is the primary option prior to L-35 minutes. Final decision will be per SPE direction. Total recovery time will be ~20 min.

Option A Not Performed:_____

121-758 **CSPE** **NTD** **212**

Performing Option A of the Integration Console Failure Recovery Procedure.

NOTE

Hot Spare Console for this recovery procedure is Console XX43.

121-759 **NTD** **LPS** **212**

Configure Hot Spare Console with Integration Console Load.
Report completion (5 minutes).

121-760 **LPS** **NTD** **212**
NTD **CGLS**
CTPE
CSPE

Integration Console will be located at Console XX43.

121-761 NTD CTPE 212
CGLS
CSPE

GLS Primary Operator and GLS System Specialist relocate to Hot Spare Console, A3 position.

Backup SPE to Hot Spare, A2 position.

GLS Support Personnel / TPE relocate to Backup Console, A3 position.

GLS Lookup Operator move over to failed Integration Console, A3 position to man LDB Safing Panel.

Lead SPE and GLS TPE to Hot Spare, A1 position.

NASA GLS to Hot Spare behind primary GLS Operator.

LCC TPE to Hot Spare behind Lead SPE.

121-762 NTD COFC 212

Perform GNC Profile Evaluation Software Reconfiguration.

121-763 LPS C4SE 127

Halt failed Integration Console (H/W XX55).
Report completion.

121-764 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP___(2 OR 3)

2. C PP INTG _ _

121-765 **LPS** **C4SE** **127**

AT HSP___ (2 OR 3) H/W_____

1. **PERFORM** $BMAP INTG.

2. **HALT** HSP_____

121-766 **LPS** **C4MC** **127**

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-767 **C4MC** **LPS** **127**

LL_____, UL_____ in B/S _____/_____

121-768 **LPS** **C4MC** **127**

Transmit Limits.

121-769 **LPS** **C4SE** **127**

BOOT H/W _____ #4103/0000.
VERIFY SUCCESSFUL INITIALIZATION.

121-770 **LPS** **NTD** **212**
NTD **CGLS**
CTPE
CSPE

Hot Spare Initialization with Integration Console load complete.

NOTE

GLS will perform recovery procedures per the Integration Console Failure Recovery Flow Charts (15 min). All work performed will be documented on an IPR.

121-771 **NTD** **CGLS** **212**

At Hot Spare Console, **Initiate** and **configure** GLS Software.

121-772 **CSPE** **NTD** **212**
CGLS
CTPE

Console configuration complete. All personnel relocated to Hot Spare Console and are ready to support. NTD hold switch is no longer available. All NTD holds must be verbal via OIS call to CGLS.

***** End of Option A - Configure Hot Spare Console as Integration Console *****

Option B - GLS Mainline Runs at Backup

NOTE
Option B is the primary option after L-35 minutes and prior to T-5 minutes and counting. After T-5 minutes and counting, Scrub is the only option. Final decision will be per SPE direction. Total recovery time will be ~15 min.

Option B Not Performed:_____

121-773 CSPE NTD 212

Performing Option B of the Integration Console Failure Recovery Procedure.

Verify GLS Safing

NOTE
Perform this option (Verify GLS Safing) after T-9 minutes and counting.

Verify GLS Safing Not Performed:_____

NOTE
GLS Safing will automatically run in response to the Integration Console loss. Recycle will be T-9 minutes. This is not a Sequence 18 event.

121-774 CGLS

Verify Safing runs at Backup.

121-775 CGLS NTD 212

GLS Safing is in progress to support recycle to a T-9/00 configuration.

121-776 CGLS NTD 212

PCMMU _____ to GSE control performed. ISL reconfiguration of PCMMU will be required to support another Launch attempt.

121-777 CGLS NTD 212

GLS Safing complete.

***** End of Verify GLS Safing *****

121-778 NTD LPS 212

Halt failed Integration Console.

121-779 LPS C4SE 127

Halt failed Integration Console (H/W XX55).
Report completion.

121-780 NTD COFC 212

Perform GNC Profile Evaluation Software Reconfiguration.

121-781 LPS

Terminate programs in concurrencies 1 through 4 (SLP50 and SA001 should remain active).

121-782 **NTD** **CGLS** **212**
CTPE
CSPE

GLS Primary Operator and GLS System Specialist relocate to Backup Console, A3 position.

Backup SPE to Backup Console, A2 position.

GLS Support Personnel / TPE relocate to Master Console, A1 position.

GLS Lookup Operator move to failed Integration Console A3 position to man LDB Safing Panel.

Lead SPE and GLS TPE move to Backup Console A1 position.

NASA GLS to Backup behind primary GLS.

LCC TPE move to Backup behind SPE.

All Backup Console personnel move to Integration Console for OIS use.

NOTE

GLS will perform recovery procedures per the Integration Console Failure Recovery Flow Charts (15 min). All work performed will be documented on an IPR.

121-783 **NTD** **CGLS** **212**

At Backup Console, **Initiate** and **configure** GLS Software.

121-784 **CSPE** **NTD** **212**
CGLS
CTPE

Console configuration complete. All personnel relocated to Backup Console and are ready to support. NTD hold switch is still available for use.

***** End of Option B - GLS Mainline Runs at Backup *****

Option C - GLS Safing Runs at Backup (Scrub/Recycle Option)

NOTE

Option C is the only option available after T-5 minutes and counting. This option will result in a cutoff / Scrub condition. GLS Safing will execute with no recovery available. Safing steps will be performed per Operation 18.

Option C Not Performed:_____

121-785 **NTD** **CGLS** **212**
CTPE

GLS Primary Operator and GLS System Specialist relocate to Backup Console, A1 position.

GLS Lookup Operator remains at Integration to man Integration Safing panel.

Backup Console position A1 personnel move to Integration Console for OIS use.

NOTE

Verify GLS Safing is in progress due to system integrity marking the INTG Console NOGO. If GLS Safing is not in progress, perform the next two steps.

121-786 **CGLS** **NTD** **212**
NTD **LPS**

Halt failed Integration Console.

Not Performed:_____

121-787 LPS C4SE 127

Halt failed Integration Console (H/W XX55).
Report completion.

Not Performed:_____

NOTE
Proceed to S0007.200 Operation 18.

***** End of Option C - GLS Safing Runs at Backup (Scrub/Recycle)*****

GNC Profile Evaluation Software Reconfigure

NOTE

The GNC profile evaluation software (VWB05) depends on the GLS Pseudo N03IS162D-GLS event complete (GEC). During the GLS re-initialization, GEC will be set to zero prior to being reset for continuing LCD. This event causes VWB05 to continue execution and display false evaluations if not terminated prior to the GLS re-initialization.

GNC Profile Evaluation Software Reconfiguration Not Performed:_____

NOTE

The next five steps may be performed anytime after Integration Console failure.

121-788 **COFC**

```
APPL PG (VWB05 PG-B)
PFK 15 KEY - PRESS (TERM VWB05)
```

121-789 **COFC**

```
CURSOR CNTL (SAB19/SWB01 PG-B)
COUNTDOWN - DETAIL
EXEC CMD KEY - PRESS
```

121-790 **COFC**

```
APPL PG (VWB05 PG-B)
PFK 8 KEY - PRESS (CLEAR ALL BYPASSES)
```

NOTE

Perform next two steps after GLS re-initialization is complete or when GEC returns to 540. GEC can be statused from the Shared Application page.

121-791 COFC

```
APPL PG (VWB05 PG-B)
PFK1 KEY - PRESS (START PGM)
```

121-792 COFC NTD 212

GNC Profile Evaluation Software Reconfigure complete.

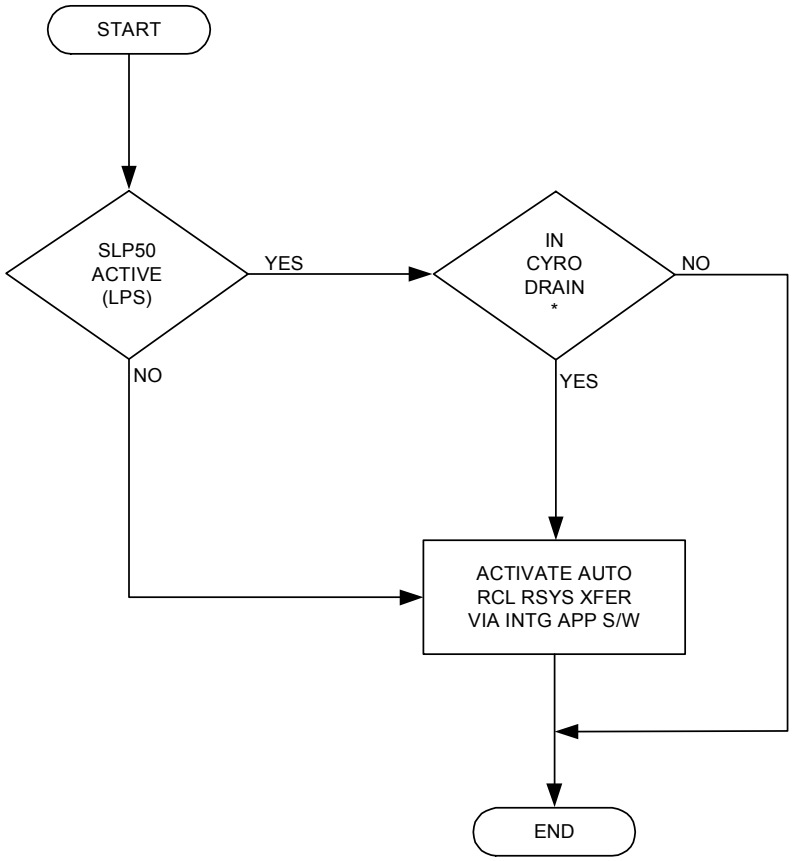
***** End of GNC Profile Evaluation Software Reconfigure *****

NOTE

This operation represents a preplanned illustrated procedure for use in event of an apparent LPS-02 LCC violation. All work performed will be documented on an IPR.

Integration Failure Recovery (T-4300/00 thru T-600/00)

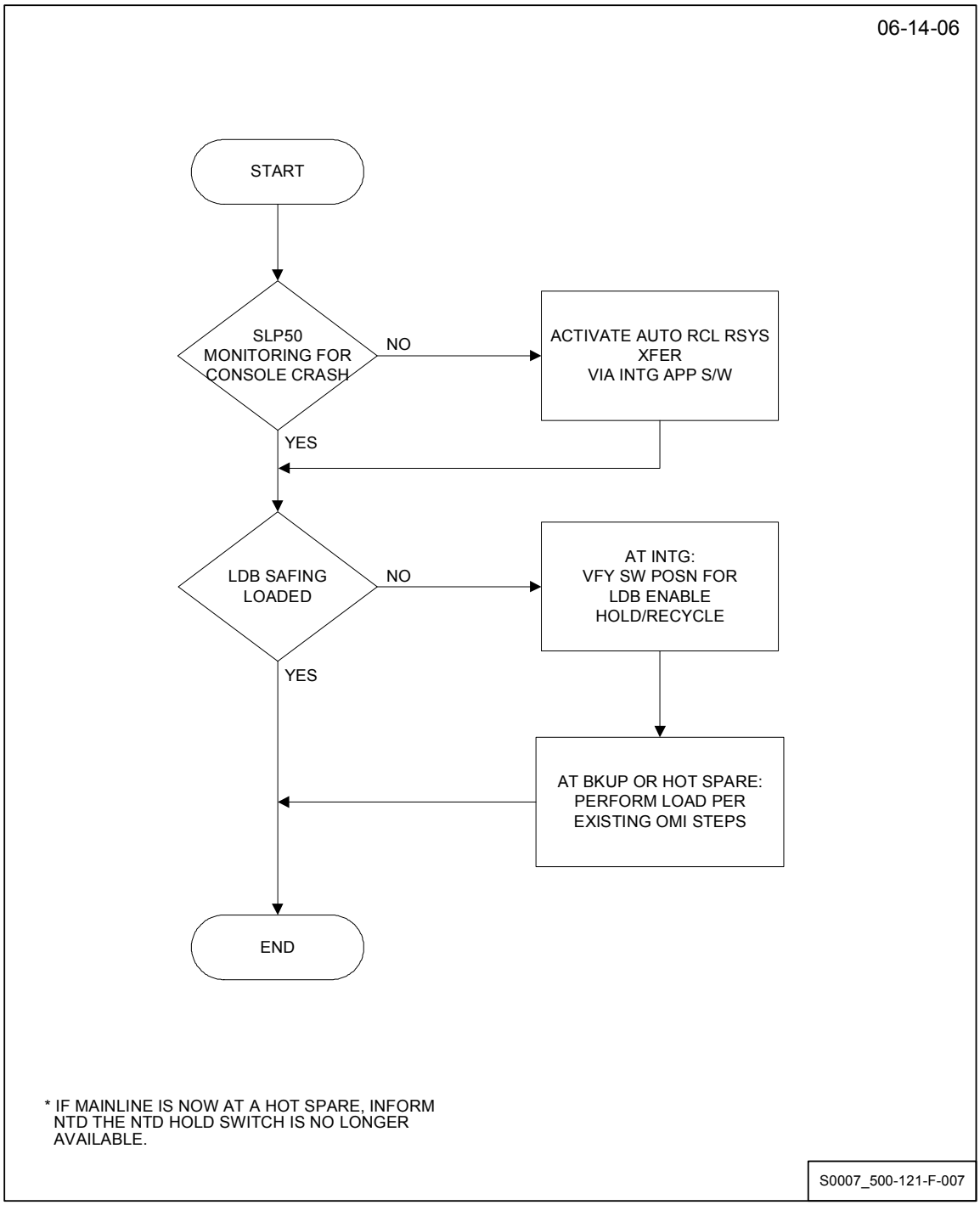
03-31-05



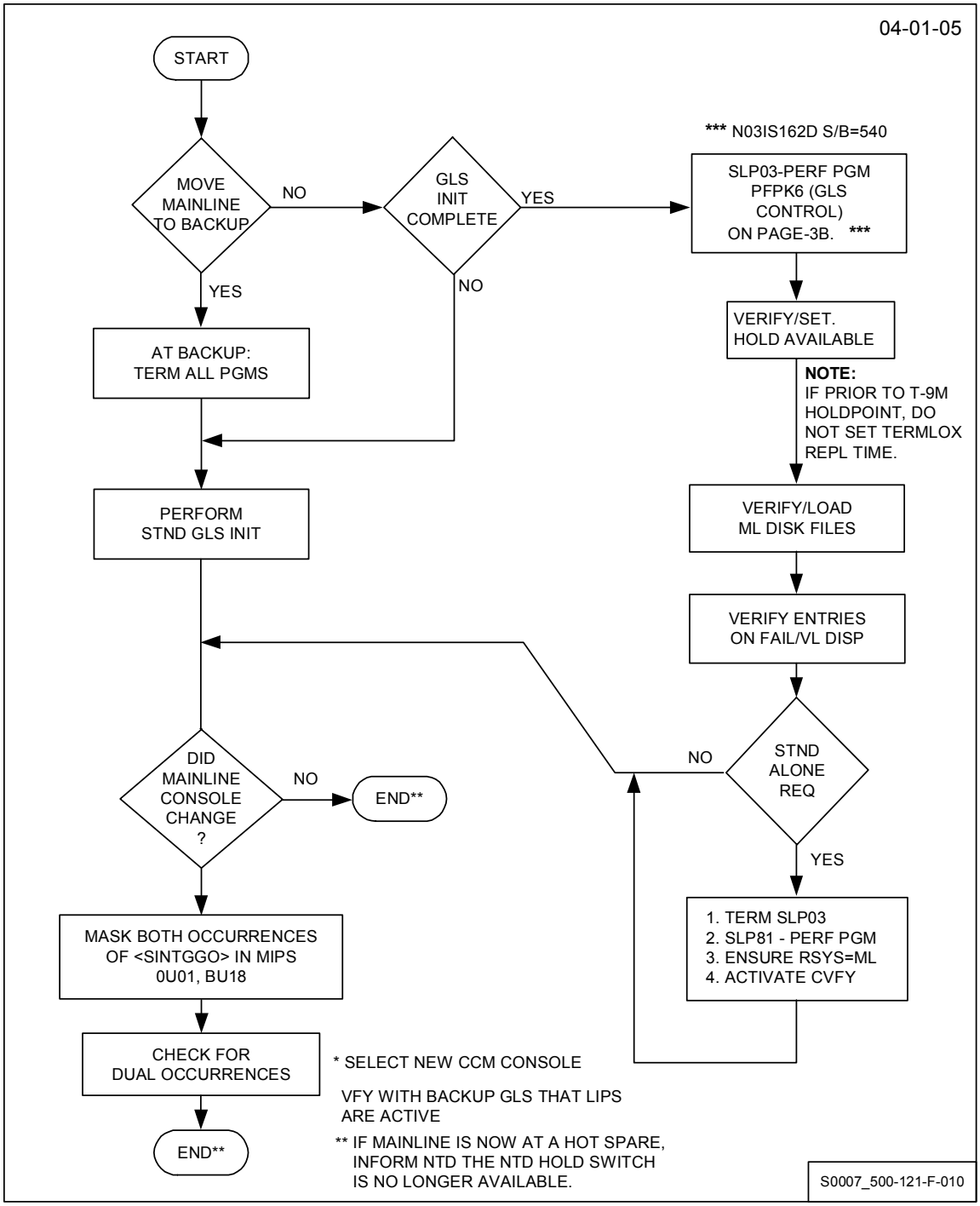
* SEE SLP50 PAGE-B FOR MESSAGE
AUTO/MANUAL RSYS TRANSFER CAPABILITY INHIBITED
LH2/LO2 SAFING SUPPORTED

S0007_500-121-F-002A

Integration Failure Recovery (T-0600/00 Thru T-0200/00)

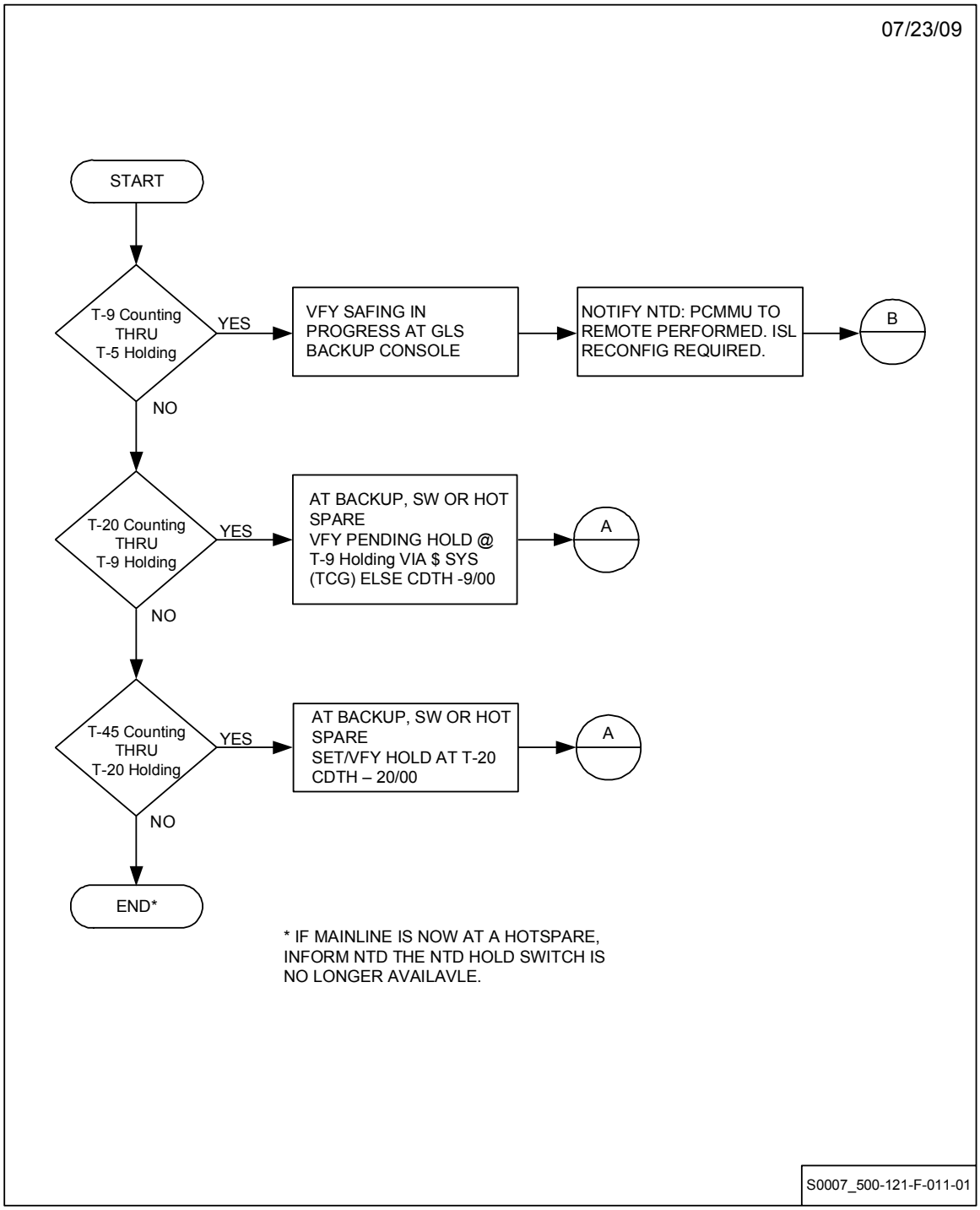


Integration Failure Recovery (T-0200/00 Thru T-0045/00)

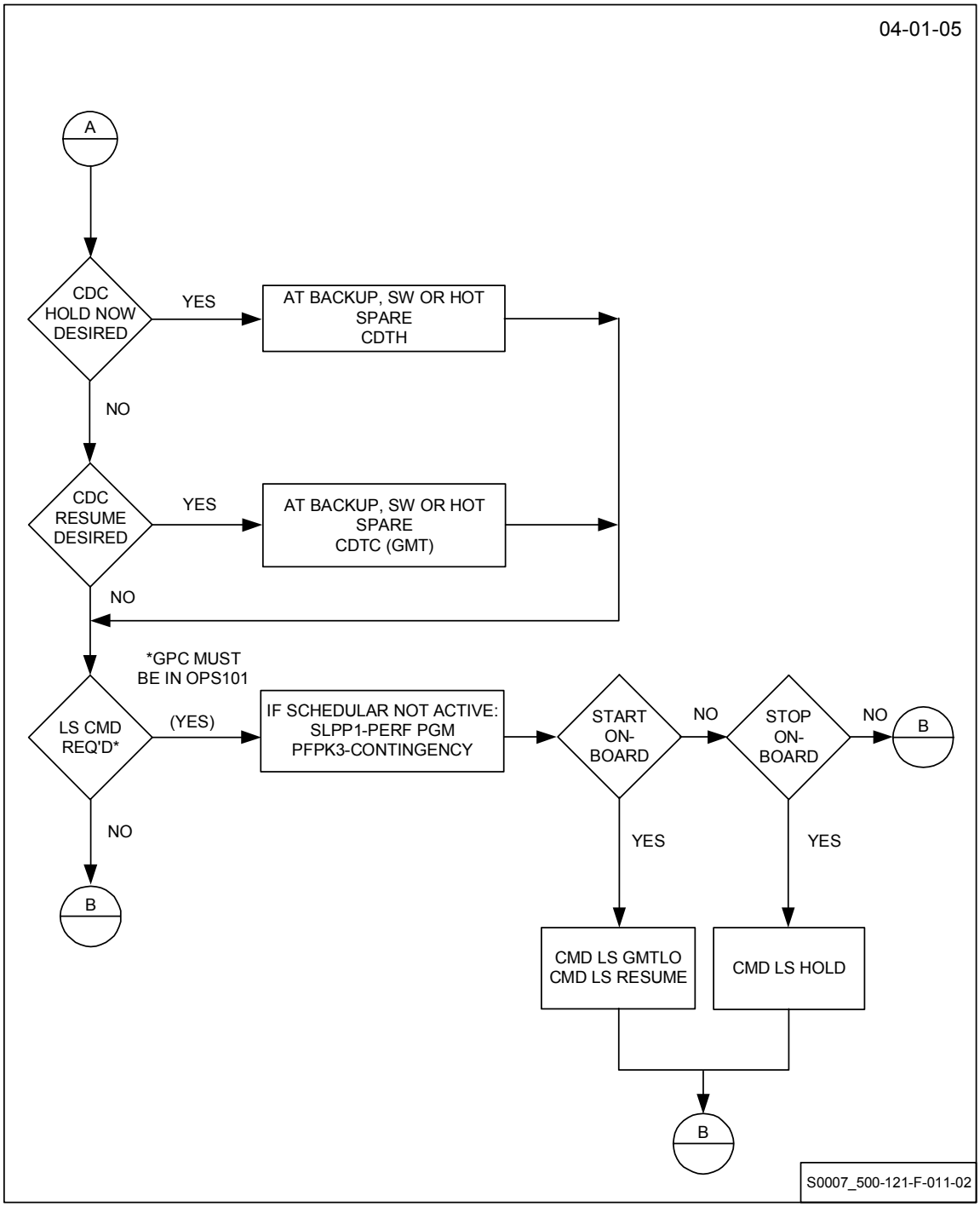


Integration Failure Recovery (T-0045/00 Thru T-0005/00)

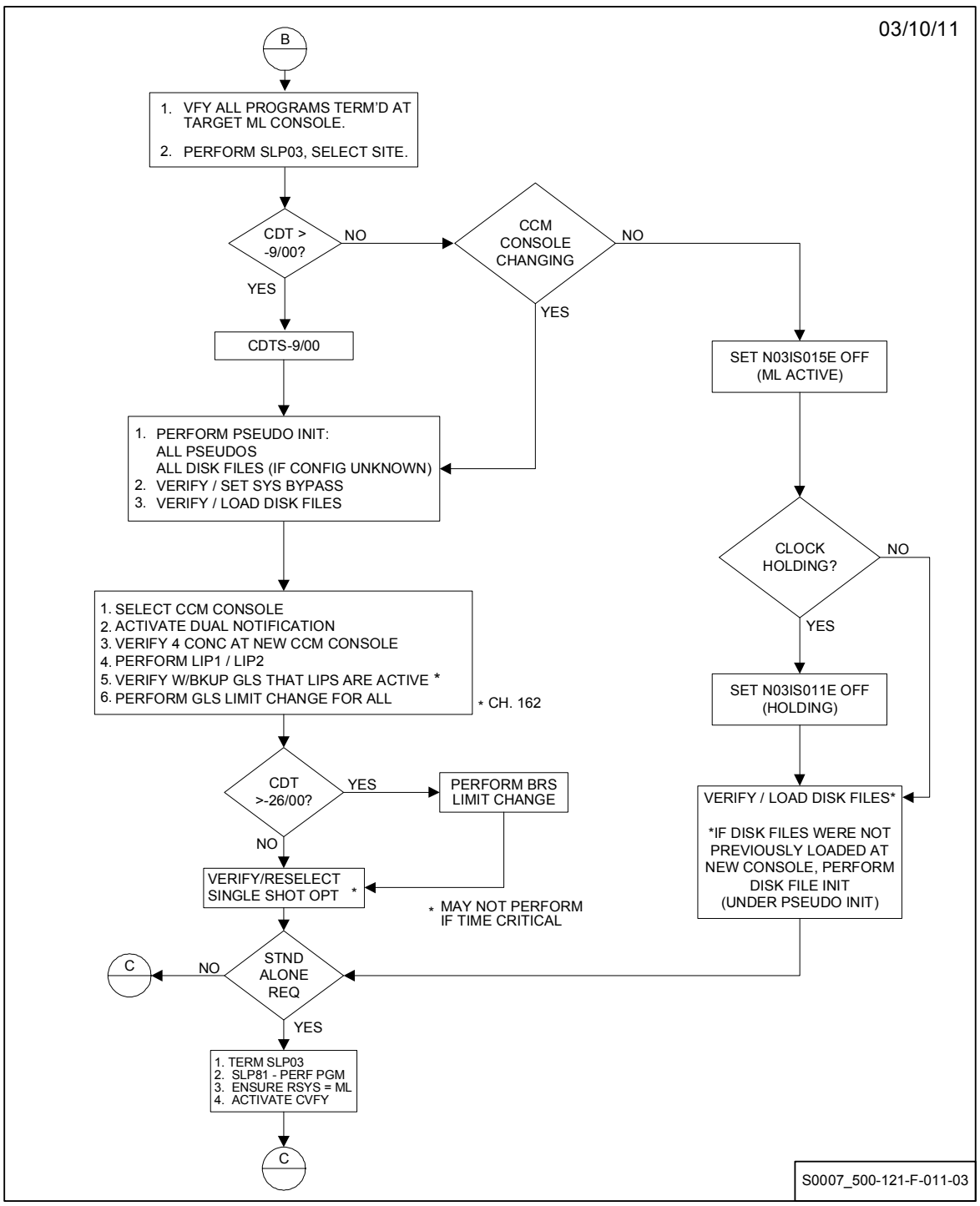
(Page 1 of 4)



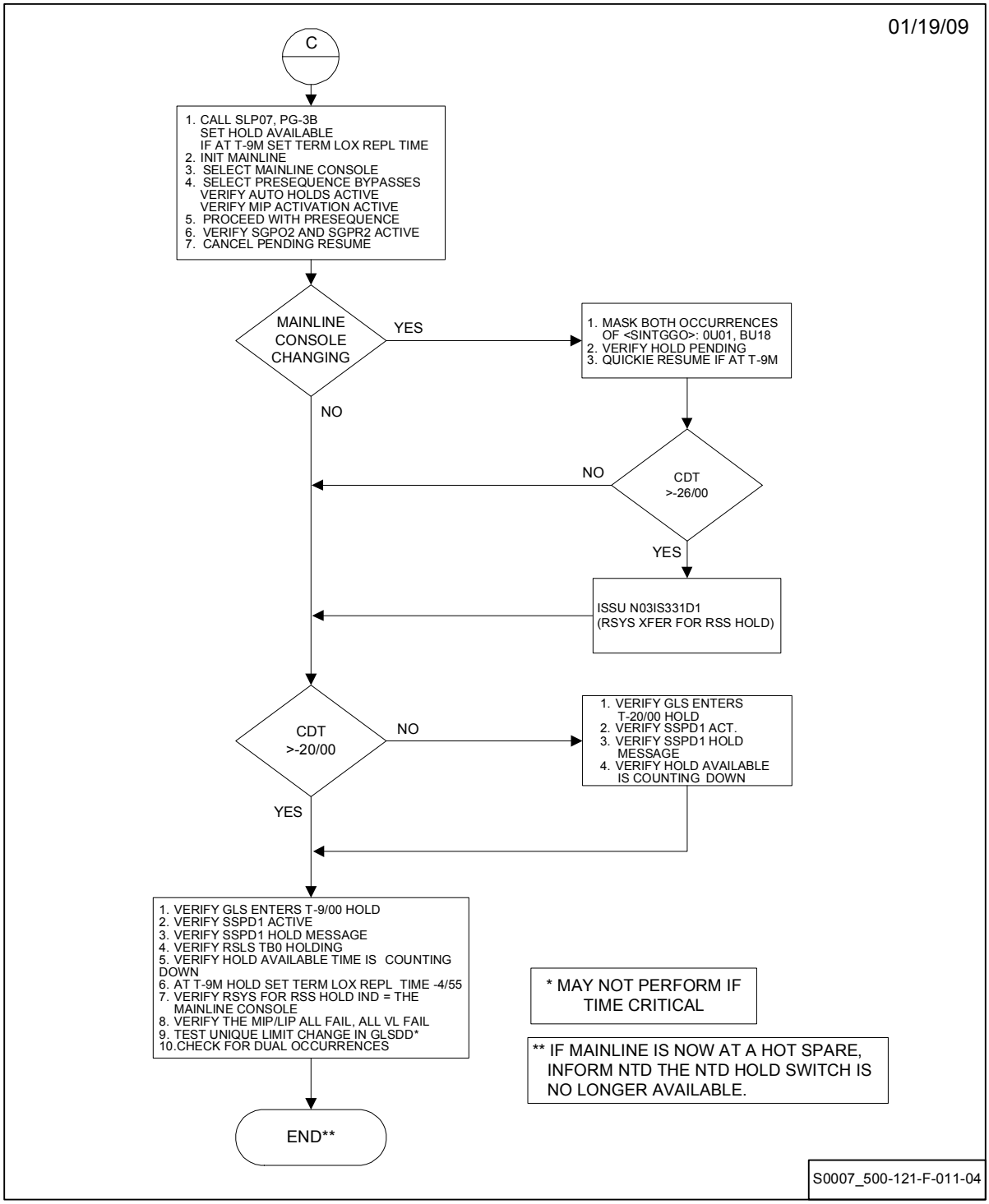
Integration Failure Recovery (T-0045/00 Thru T-0005/00) (Page 2 of 4)



Integration Failure Recovery (T-0045/00 Thru T-0005/00) (Page 3 of 4)



Integration Failure Recovery (T-0045/00 Thru T-0005/00) (Page 4 of 4)



Integration Failure Recovery (T-0230/00 Thru T-0009/00)

Manual Presequence Operations

NOTE
Per GLS/TPE direction, perform any steps listed for times missed while the Integration Console was down.

Manual Presequence Operations Not Performed:_____

NOTE
PASS/BFS one-shot data transfer.

121-793 **CTPE** **CDPS** **212**
T-22M00S

Manually initiate PASS/BFS one-shot data transfer and report completion.

Not Performed:_____

121-794 **CDPS**

```
PFP PANEL
PFPK (VASJ6) - PRESS
PFPK (ONE-SHOT SELECT) - PRESS
```

Not Performed:_____

NOTE
PASS OPS 101 transition.

121-795 **CTPE** **CDPS** **212**
T-19M59S

Manually initiate PASS OPS 101 transition. **Report** completion.

Not Performed:_____

121-796 **CDPS**

```
PFP PANEL
PFPK (VASJ6) - PRESS
PFPK (OPS 101 SELECT) - PRESS
```

Not Performed:_____

NOTE
GPC Dump and Compare.

121-797 **CTPE** **CDPS** **212**
T-19M00S

Manually initiate GPC Dump and Compare.
Report completion.

Not Performed:_____

121-798 **CDPS**

```
PFP PANEL
PFPK (VASJ6) - PRESS
PFPK (T-20 MIN D&C SELECT) - PRESS
```

Not Performed:_____

***** End of Manual Presequence Operations *****

Interrupt Processor Recovery
(T-0200/00 Thru T-0005/00)

NOTE

Following checklist should be verified if GLS is reconfiguring Master or Hot Spare as GLS Backup Console.

One GLS personnel will relocate to new console. That person shall have a copy of GLSDD and current Mask/Bypass list available.

121-799 **CGLS**

Verify four concurrencies available.

NOTE

SLP50/SA001 monitors Firing Room, including GLS for console failures and performs RSYS transfers/safing procedures.

121-800 **CGLS**

Verify SLP50/SA001 are active at Master Console.

121-801 **CGLS**

Clear Shared-Applications page.

NOTE

Perform following step when LIP1 and LIP2 appear.

121-802 **CGLS** **162**

SLPBO and SLPCO are active.

NOTE
Perform following step when MIP1 and MIP2 appear.

121-803 **CGLS** **162**

SLPAO and SLPA1 are active.

121-804 **CGLS**

Confirm expected exceptions are listed on the SA-page.

121-805 **CGLS**

Check reported failures for dual occurrences and report table/row assignments to GLS System Specialist.

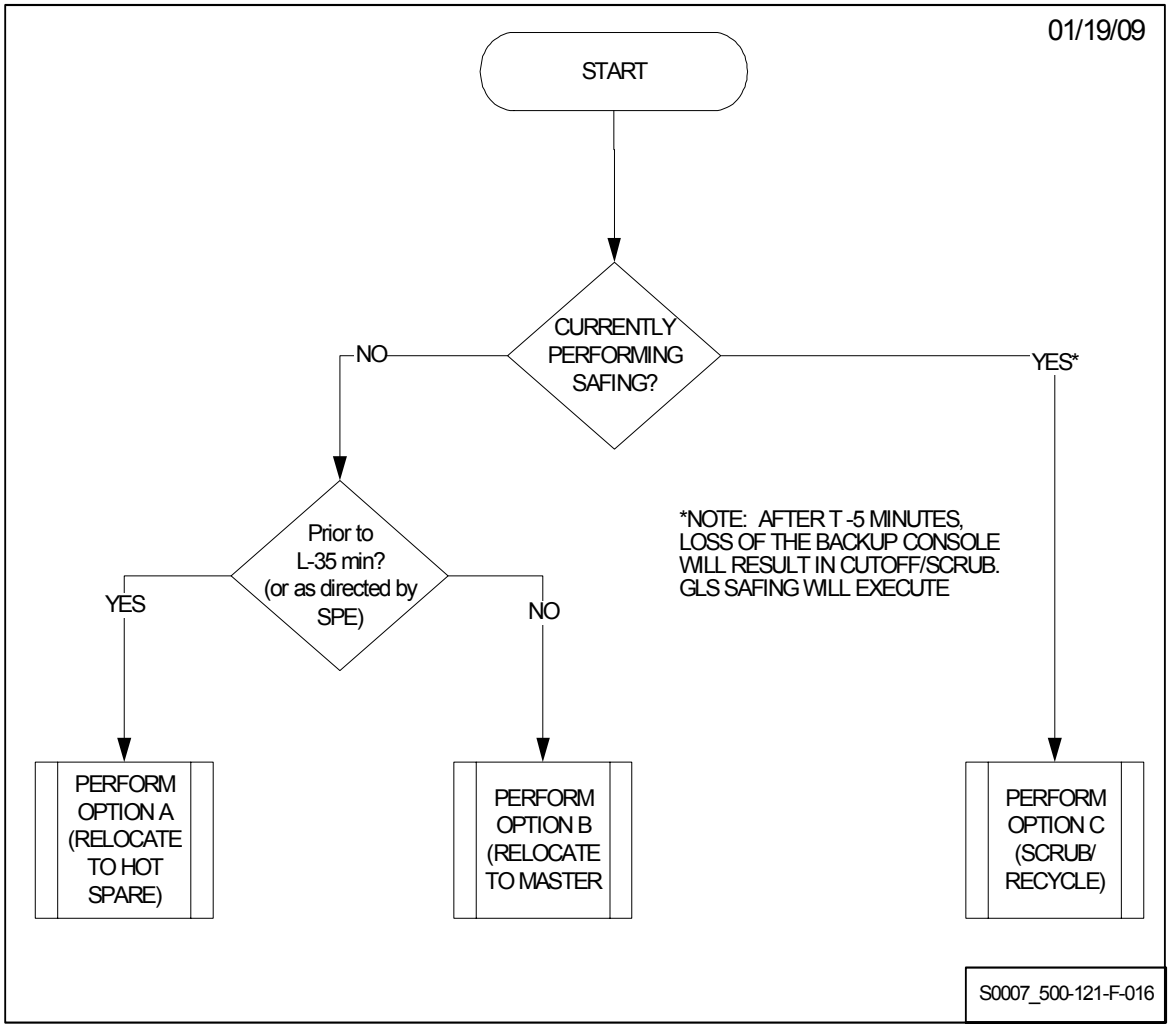
NOTE
Any off-nominal exceptions or activities thru T-0 should be reported to GLS on channel 162.

***** End of Interrupt Processor Recovery *****

***** End of Section 14 - Integration Console Failure Recovery Procedure *****

Section 15

Backup Console Failure Recovery Procedure



Backup Console Failure Recovery Procedure

NOTE

Backup Console Failure Recovery Procedure is a contingency procedure that may be performed from T-6 hrs down to T-0 when a Backup Console failure occurs, as directed by SPE. (Ref LCC LPS-03)

After T-5 minutes, Scrub is the only option.

Backup Console Recovery Procedure Not Performed:_____

NOTE

This section contains the following options:

Option A - Console Hot Spare as Backup Console
Option B - GLS Interrupt Processors run at Master
Option C - Scrub/Recycle

The decision as to which option(s) to perform in event of a Backup Console failure can be determined by referencing the Backup Console Failure Recovery Flow Chart.

NOTE

For Firing Room 4 Console Recovery the Console displays are available on following OTV Channels:

Console	OTV Channel No.
Hot Spare 1 (435A9)	216
Hot Spare 2 (443A9)	217
Backup (456A9)	220

Option A - Configure Hot Spare as Backup Console

NOTE
Option A is the primary option prior to L-35 minutes. Final decision will be per SPE direction. Total recovery time will be ~15 min.

Option A Not Performed:_____

121-806 CSPE NTD 212

Performing Option A of the Backup Console Failure Recovery Procedure.

NOTE
Primary Hot Spare Console for this recovery procedure is Console XX43. Secondary Hot Spare Console is Console XX34.

121-807 NTD LPS 212

Reconfigure Backup to Hot Spare Console.
Report completion (4 minutes).

121-808 LPS NTD 212
NTD CGLS
CTPE

Backup Console will be located at Console _____.

121-809 NTD CTPE 212
CGLS
COPE

GLS Support personnel / TPE relocate to Hot Spare Console, A3 position.

All other personnel remain at Backup Console to monitor PCGOAL and OIS.

121-810 LPS C4SE 127

Halt failed Backup Console (H/W XX56).
Report completion.

121-811 LPS C4MC 127

PERFORM FOLLOWING AT MASTER CONSOLE KEYBOARD:

1. A KU HSP___(2 OR 3)

2. C PP BKUP _ _

121-812 LPS C4SE 127

AT HSP___ (2 OR 3) H/W_____

1. **PERFORM** $BMAP BKUP.

2. **HALT** HSP___.

121-813 LPS C4MC 127

AT BUFFER H/W _____,

ENTER
PWA LIMITS IN B/S ___,___; LL _____ UL _____.

121-814 C4MC LPS 127

LL_____, UL_____ in B/S _____/_____

121-815 LPS C4MC 127

Transmit Limits.

121-816 **LPS** **C4SE** **127**

```
BOOT H/W ______ #0203.
VERIFY SUCCESSFUL INITIALIZATION.
```

121-817 **LPS** **NTD** **212**
NTD **CTPE**
CGLS

Backup Console Hot Spare initialization at Console _____ complete.

NOTE
GLS will perform recovery procedures per the Backup Console Failure Recovery Flow Charts (10 minutes). All work performed will be documented in an IPR.

121-818 **CGLS** **NTD** **212**

Console configuration complete. All personnel relocated to Hot Spare Console and are ready to support.

***** End of Option A - Configure Hot Spare as Backup Console *****

Option B - GLS Interrupt Processors run at Master

NOTE

Option B is the primary option after L-35 minutes and prior to T-5 minutes and counting. Final decision will be per SPE direction. Total recovery time will be ~10 min.

Option B Not Performed:_____

121-819 **CSPE** **NTD** **212**

Performing Option B of the Backup Console Failure Recovery Procedure.

121-820 **NTD** **LPS** **212**

Halt failed Backup Console.

121-821 **LPS** **C4SE** **127**

Halt failed Backup Console (H/W XX56).
Report completion.

121-822 **LPS**

Make four concurrencies available.
Verify SLP50/SA001 remain active.

121-823 **NTD** **CGLS** **212**
CTPE
COPE

GLS Lookup Operator relocate to Master Console, A1 position.

All other personnel remain at Backup Console to monitor PCGOAL and OIS.

NOTE

GLS will perform recovery procedures per the Backup Console Failure Recovery Flow Charts (10 minutes). All work performed will be documented in an IPR.

121-824 CGLS NTD 212

Console configuration complete. All personnel relocated to Master Console and are ready to support.

***** End of Option B - GLS Interrupt Processors run at Master *****

Option C - Scrub/Recycle

NOTE
Option C is the primary option for a Scrub/Recycle.

Option C Not Performed:_____

LH_2 Inlet Pressure Monitor

NOTE
Perform this section if Abort Safing is in progress.

Not Performed:_____

121-825 CGLS CMPS 212

Due to Backup Console failure, LH_2 Inlet Pressures are no longer being monitored by GLS.

***** End of LH_2 Inlet Pressure Monitor *****

SRB HPU Shutdown

NOTE
Perform this section if Cutoff occurred after T-0/29, Safing is in progress and SRB HPU Shutdown has not already occurred.

Not Performed:_____

121-826 CGLS CHPU 212

Due to Backup Console failure, Closure of A-2 and B-2 start commands will no longer be sent by GLS.

CAUTION

The following step must be performed after the SRB APU turbine speeds have decreased below 40000 RPMs but prior to the turbine speed reaching 0 RPMs to avoid hardware damage.

121-827 **CHPU**

```
SRB HYDRAULIC SAFING PANEL
APU'S OFF SW - (UP)
HOLD (3 SEC), THEN (DOWN)
```

***** End of SRB HPU Shutdown *****

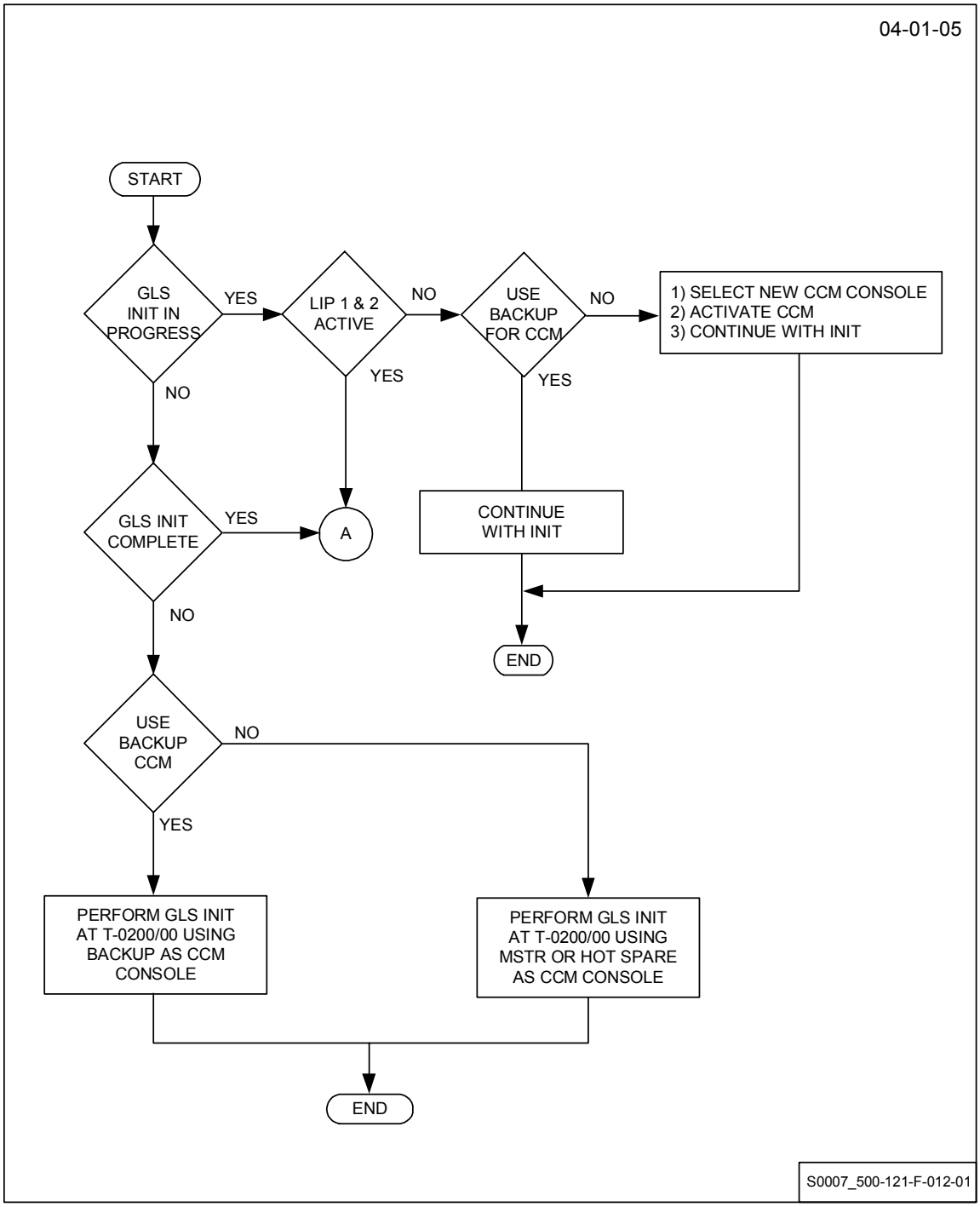
***** End of Option C - Scrub/Recycle *****

NOTE

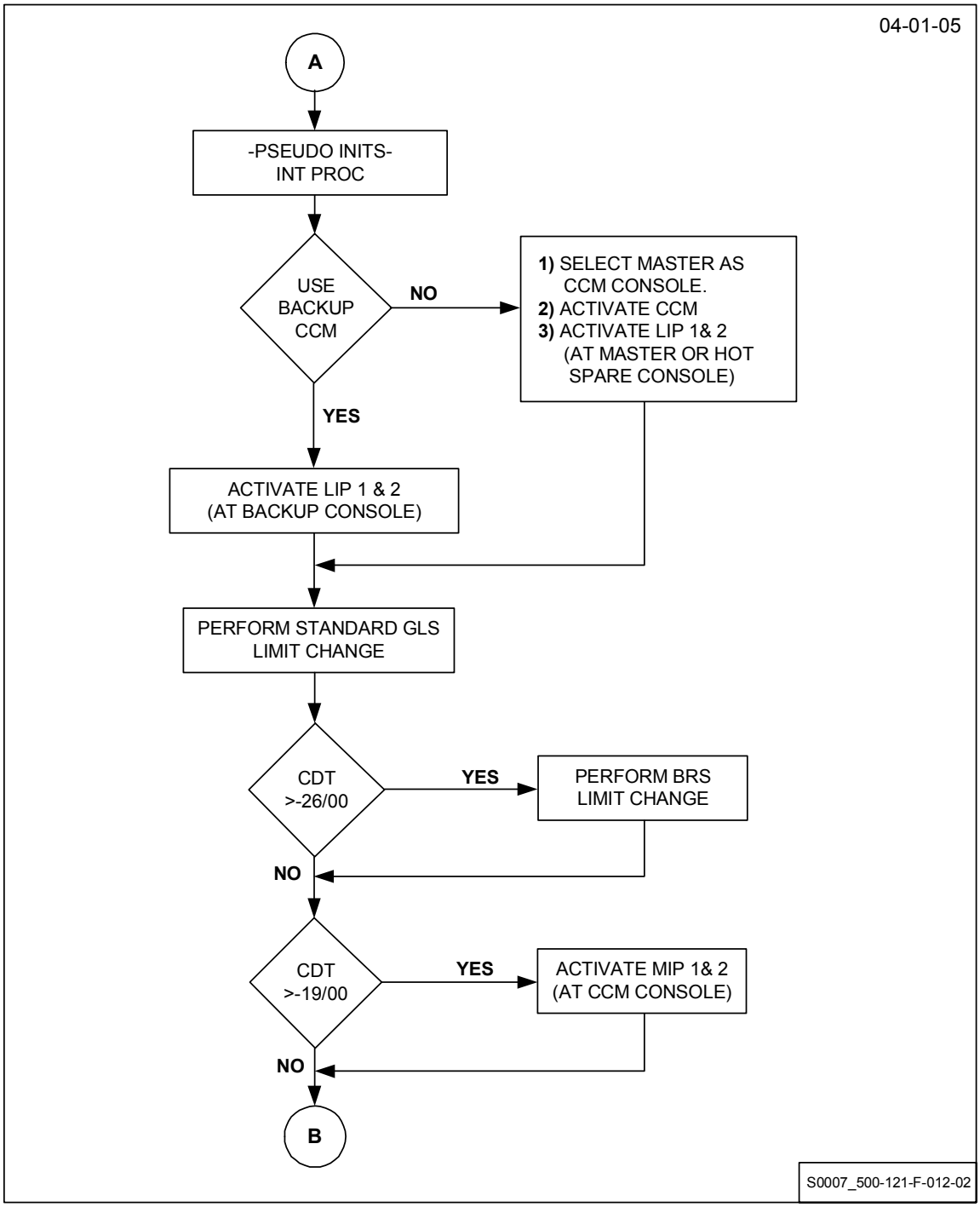
This operation represents a preplanned illustrated procedure for use in event of an apparent LPS-03 LCC violation. All work performed will be documented on an IPR.

Backup Failure Recovery (T-0200/00 Thru T-5/00)

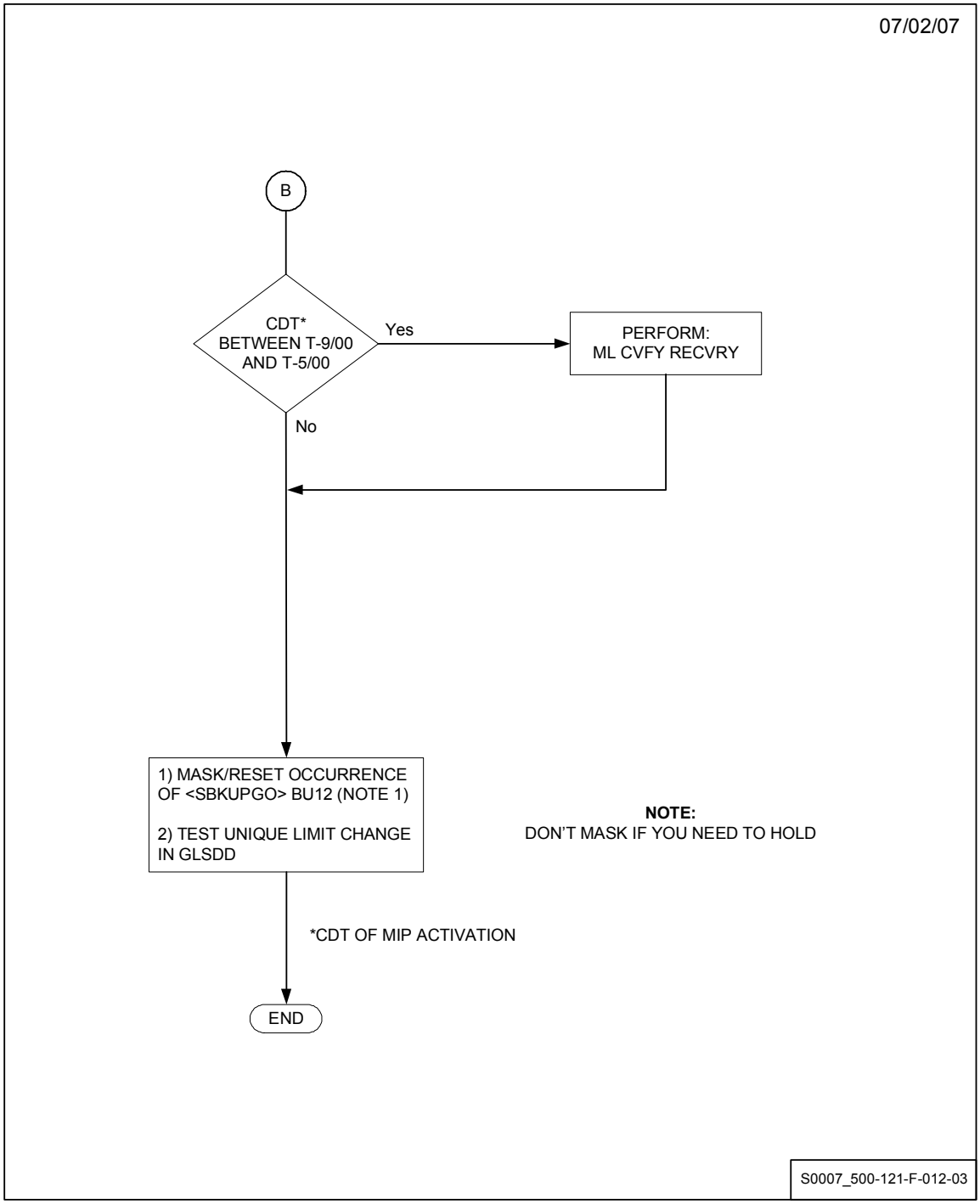
(Page 1 of 3)



Backup Failure Recovery (T-0200/00 Thru T-5/00) (Page 2 of 3)



Backup Failure Recovery (T-0200/00 Thru T-5/00) (Page 3 of 3)



Interrupt Processor Recovery
(T-0200/00 Thru T-5/00)

NOTE

Following checklist should be verified if GLS is reconfiguring Master or Hot Spare as GLS Backup Console.

One GLS personnel will relocate to new console. That person shall have a copy of GLSDD and current Mask/Bypass list available.

121-828 **CGLS**

Verify four concurrencies available.

NOTE

SLP50/SA001 monitors Firing Room, including GLS for console failures and performs RSYS transfers/safing procedures.

121-829 **CGLS**

Verify SLP50/SA001 are active at Master Console.

121-830 **CGLS**

Clear Shared-Applications page.

NOTE

Perform following step when LIP1 and LIP2 appear.

121-831 **CGLS** **162**

SLPBO and SLPCO are active.

NOTE
Perform following step when MIP1 and MIP2 appear.

121-832 **CGLS** **162**

SLPAO and SLPA1 are active.

121-833 **CGLS**

Confirm expected exceptions are listed on the SA-page.

121-834 **CGLS**

Check reported failures for dual occurrences and report table/row assignments to GLS System Specialist.

NOTE
Any off-nominal exceptions or activities thru T-0 should be reported to GLS on channel 162.

***** End of Interrupt Processor Recovery *****

***** End of Section 15 - Backup Console Failure Recovery Procedure *****

*** End of Operation **121** ***

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OPERATION 122 FEP/LDB and Data Loss Troubleshooting

Shop: **LPS**
Cntrl Rm Console: **ALL**
OPR: **LPS**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.3**

NOTE

This operation contains contingency procedures to recover from CCMS hardware failures. These procedures may be performed at NTD/SPE direction in accordance with Launch Countdown time based matrix listed below. Failures prior to time listed in matrix will be recovered in accordance with CCMS Firing Room recovery procedure C4500.

CCMS FEP's	Time
LDBA	T-6 hrs thru T-10 sec
LDBS	T-6 hrs thru L-14 min
GPCA	T-6 hrs thru T-0
GPCS	T-6 hrs thru L-14 min
OIA	T-6 hrs thru T-10 sec
OIS	T-6 hrs thru L-14 min
GS1A,2A,3A	T-6 hrs thru T-0
GS1S,2S,3S	T-6 hrs thru L-14 min
PLDA	T-6 hrs thru T-31 sec
PLDS	T-6 hrs thru L-14 min

Data Loss	Time
RF & RF Glitch	COMM Activation thru L-14 min
Hardline	COMM Activation thru T-5 min
Hardline Glitch	COMM Activation thru L-14 min

Section 1

GPCA FEP Recovery Procedure

NOTE

GPCA FEP Recovery Procedure is a contingency procedure. Perform if a GPCA FEP failure occurs prior to T-0. A redundant FEP is not available and a Launch Commit Criteria is violated.

GPCA FEP Recovery Procedure Not Performed:_____

122-1 NTD LPS 212

Reconfigure GPCA software to a spare PCM FEP.
Report completion (5 minutes).

122-2 LPS C4SE 127

HALT FAILED FEP H/W_____.
REPORT COMPLETION.

122-3 LPS C4MC 127

PERFORM FOLLOWING AT CDBFR H/W_____:

1. **ENABLE** B/S _____/_____.

2. **ENTER** PWA LIMITS IN B/S _____/_____;
   LL ____, UL ____.

122-4 C4MC LPS 127

LL _____, UL _____ IN B/S _____/_____.

122-5 **LPS** **C4MC** **127**

TRANSMIT LIMITS.

122-6 **LPS** **C4SE** **127**

BOOT SPARE FEP H/W_____ #0012.
REPORT COMPLETION.

122-7 **LPS**

Verify correct patching for spare FEP.

NOTE
Following five steps are performed at Master Console keyboard.

122-8 **LPS** **C4MC** **127**

C PP GPCA __ __

122-9 **LPS** **C4MC** **127**

$FLAI GPCA LOAD CKPT

122-10 **LPS** **C4MC** **127**

IF FAILURE OCCURRED AFTER COMM ACTIVATION,

THEN PERFORM THE FOLLOWING:

AWP01 PG-B
SELECT:
GPCA, S2, 192KB, L3, PEND
EXEC

Not Performed:_____

122-11 LPS C4MC 127

A DA GPCA

122-12 LPS NTD 212

GPCA FEP Recovery complete.

***** End of GPCA FEP Recovery Procedure *****

Section 2

GPCS FEP Recovery Due to Redundant Switch Procedure

NOTE

GPCS FEP Recovery Due to Redundant Switch Procedure is a contingency procedure. Perform if a GPCA FEP failure occurs prior to L-14 min for a short window or prior to T-5 min for a long window mission that results in an active/standby redundant switch.

GPCS FEP Recovery Due to Redundant Switch Procedure Not Performed:_____

122-13 NTD LPS 212

Reconfigure GPCS software to a spare PCM FEP.
Report completion (5 minutes).

122-14 LPS C4SE 127

HALT FAILED FEP H/W_____.
REPORT COMPLETION.

122-15 LPS C4MC 127

PERFORM FOLLOWING AT CDBFR H/W_____:

1. **ENABLE** B/S __/__.

2. **ENTER** PWA LIMITS IN B/S _____/_____;
   LL _____, UL _____.

122-16 C4MC LPS 127

LL _____, UL _____ IN B/S _____/_____.

122-17 LPS C4MC 127

TRANSMIT LIMITS.

122-18 **LPS** **C4SE** **127**

BOOT SPARE FEP H/W_____ #0012.
REPORT COMPLETION.

122-19 **LPS**

Verify correct patching for spare FEP.

NOTE
Following five steps are performed at Master Console keyboard.

122-20 **LPS** **C4MC** **127**

C PP GPCS __ __

122-21 **LPS** **C4MC** **127**

$FLAI GPCS LOAD CKPT

122-22 **LPS** **C4MC** **127**

IF FAILURE OCCURRED AFTER COMM ACTIVATION,

THEN PERFORM THE FOLLOWING:

AWP01 PG-B
SELECT:
GPCS, S2, 192KB, L3, PEND
EXEC

Not Performed:_____

122-23 **LPS** **C4MC** **127**

A DA GPCS

122-24 LPS C4MC 127

A RS GPCA

122-25 LPS NTD 212

GPCS FEP Recovery complete.

***** End of GPCS FEP Recovery Due to Redundant Switch Procedure *****

Section 3

GPCS FEP Recovery Due to GPCS FEP Failure Procedure

NOTE
GPCS FEP Recovery Due to GPCS FEP Procedure is a contingency procedure. Perform if a GPCS FEP failure occurs prior to L-14 min for a short window or prior to T-5 min for a long window mission.

GPCS FEP Recovery Due to GPCS FEP Failure Procedure Not Performed:_____

122-26 NTD LPS 212

Reconfigure GPCS software to a spare PCM FEP.
Report completion (5 minutes).

122-27 LPS C4SE 127

HALT FAILED FEP H/W_____.
REPORT COMPLETION.

122-28 LPS C4MC 127

PERFORM FOLLOWING AT CDBFR H/W_____:

1. **ENABLE** B/S __/__.

2. **ENTER** PWA LIMITS IN B/S _____/_____;
LL _____, UL _____.

122-29 C4MC LPS 127

LL _____, UL _____ IN B/S _____/_____.

122-30 LPS C4MC 127

TRANSMIT LIMITS.

122-31 **LPS** **C4SE** **127**

BOOT SPARE FEP H/W_____ #0012.
REPORT COMPLETION.

122-32 **LPS**

Verify correct patching for spare FEP.

NOTE
Following five steps are performed at Master Console keyboard.

122-33 **LPS** **C4MC** **127**

C PP GPCS __ __

122-34 **LPS** **C4MC** **127**

$FLAI GPCS LOAD CKPT

122-35 **LPS** **C4MC** **127**

IF FAILURE OCCURRED AFTER COMM ACTIVATION,

THEN PERFORM FOLLOWING:

AWP01 PG-B
SELECT:
GPCS, S2, 192KB, L3, PEND
EXEC

Not Performed:_____

122-36 **LPS** **C4MC** **127**

A DA GPCS

122-37 LPS C4MC 127

A RS GPCA

122-38 LPS NTD 212

GPCS FEP Recovery complete.

***** End of GPCS FEP Recovery Due to GPCS FEP Failure Procedure *****

Section 4

OIA FEP Recovery Procedure

NOTE

OIA FEP Recovery Procedure is a contingency procedure. Perform if an OIA FEP failure occurs prior to T-10S. A redundant FEP is not available and a Launch Commit Criteria is violated.

OIA FEP Recovery Procedure Not Performed:_____

122-39 NTD LPS 212

Reconfigure OIA software to a spare PCM FEP.
Report completion (5 minutes).

122-40 LPS C4SE 127

HALT FAILED FEP H/W_____.
REPORT COMPLETION.

122-41 LPS C4MC 127

PERFORM FOLLOWING AT CDBFR H/W_____:

1. **ENABLE** B/S _____/_____.

2. **ENTER** PWA LIMITS IN B/S _____/_____;
LL _____, UL _____.

122-42 C4MC LPS 127

LL _____, UL _____ IN B/S _____/_____.

122-43 **LPS** **C4MC** **127**

TRANSMIT LIMITS.

122-44 **LPS** **C4SE** **127**

BOOT SPARE FEP H/W_____ #0012.
REPORT COMPLETION.

122-45 **LPS**

Verify correct patching for spare FEP.

NOTE
Following five steps are performed at Master Console keyboard.

122-46 **LPS** **C4MC** **127**

C PP OIA __ __

122-47 **LPS** **C4MC** **127**

$FLAI OIA LOAD CKPT

122-48 **LPS** **C4MC** **127**

IF FAILURE OCCURRED AFTER COMM ACTIVATION,

THEN PERFORM FOLLOWING:

AWP01 PG-B
SELECT:
OIA, S2, 192KB, L3, PEND
EXEC

Not Performed:_____

122-49 LPS C4MC 127

A DA OIA

122-50 LPS NTD 212

OIA FEP Recovery complete.

***** End of OIA FEP Recovery Procedure *****

Section 5

OIS FEP Recovery Due to Redundant Switch Procedure

NOTE

OIS FEP Recovery Due to Redundant Switch Procedure is a contingency procedure. Perform if an OIA FEP failure occurs prior to L-14 min for short window or prior to T-5 min for a long window mission that results in active/standby redundant switch.

OIS FEP Recovery Due to Redundant Switch Procedure Not Performed:_____

122-51 NTD LPS 212

Reconfigure OIS software to a spare PCM FEP.
Report completion (5 minutes).

122-52 LPS C4SE 127

HALT FAILED OIS FEP H/W _____.
REPORT COMPLETION.

122-53 LPS C4MC 127

PERFORM FOLLOWING AT CDBFR H/W_____:

1. **ENABLE** B/S ____/____.

2. **ENTER** PWA LIMITS IN B/S ____/____;
   LL _____, UL _____.

122-54 C4MC LPS 127

LL _____, UL _____ IN B/S _____/_____.

122-55 LPS C4MC 127

TRANSMIT LIMITS.

122-56 **LPS** **C4SE** **127**

BOOT SPARE FEP H/W_____ #0012.
REPORT COMPLETION.

122-57 **LPS**

Verify correct patching for spare FEP.

NOTE
Following five steps are performed at Master Console keyboard.

122-58 **LPS** **C4MC** **127**

C PP OIS _ __

122-59 **LPS** **C4MC** **127**

$FLAI OIS LOAD CKPT

122-60 **LPS** **C4MC** **127**

IF FAILURE OCCURRED AFTER COMM ACTIVATION,

THEN PERFORM FOLLOWING:

AWP01 PG-B
SELECT:
OIS, S2, 192KB, L3, PEND
EXEC

Not Performed:_____

122-61 **LPS** **C4MC** **127**

A DA OIS

122-62 LPS C4MC 127

A RS OIA

122-63 LPS NTD 212

OIS FEP Recovery complete.

***** End of OIS FEP Recovery Due to Redundant Switch Procedure *****

Section 6

OIS FEP Recovery Due to OIS FEP Failure Procedure

NOTE

OIS FEP Recovery Due to OIS FEP Failure Procedure is a contingency procedure. Perform if an OIS FEP failure occurs prior to L-14 min for short window or prior to T-5 min for a long window mission.

OIS FEP Recovery Due to OIS FEP Failure Procedure Not Performed:_____

122-64 NTD LPS 212

Reconfigure OIS software to a spare PCM FEP.
Report completion (5 minutes).

122-65 LPS C4SE 127

HALT FAILED OIS FEP H/W _____.
REPORT COMPLETION.

122-66 LPS C4MC 127

PERFORM FOLLOWING AT CDBFR H/W_____:

1. **ENABLE** B/S ____/____.

2. **ENTER** PWA LIMITS IN B/S _____/____;
LL _____, UL _____.

122-67 C4MC LPS 127

LL _____, UL _____ IN B/S _____/_____.

122-68 **LPS** **C4MC** **127**

TRANSMIT LIMITS.

122-69 **LPS** **C4SE** **127**

BOOT SPARE FEP H/W_____ #0012.
REPORT COMPLETION.

122-70 **LPS**

Verify correct patching for spare FEP.

NOTE
Following five steps are performed at Master Console keyboard.

122-71 **LPS** **C4MC** **127**

C PP OIS __ __

122-72 **LPS** **C4MC** **127**

$FLAI OIS LOAD CKPT

122-73 **LPS** **C4MC** **127**

IF FAILURE OCCURRED AFTER COMM ACTIVATION,

THEN PERFORM FOLLOWING:

AWP01 PG-B
SELECT:
OIS, S2, 192KB, L3, PEND
EXEC

Not Performed:_____

122-74 **LPS** **C4MC** **127**

A DA OIS

122-75 **LPS** **C4MC** **127**

A RS OIA

122-76 **LPS** **NTD** **212**

OIS FEP Recovery complete.

***** End of OIS FEP Recovery Due to OIS FEP Failure Procedure *****

Section 6A

PLDA FEP Recovery Procedure

NOTE

PLDA FEP Recovery Procedure is a contingency procedure.

Perform if a PLDA FEP failure occurs prior to L-14 min for short window or prior to T-5 min for a long window mission that results in an active/standby redundant switch.

PLDA FEP Recovery Procedure Not Performed:_____

122-77 NTD LPS 212

Reconfigure PLDS software to a spare PCM FEP.
Report completion (5 minutes).

122-78 LPS C4SE 127

HALT FAILED FEP H/W _____.
REPORT COMPLETION.

122-79 LPS C4MC 127

IF FAILURE OCCURRED AFTER COMM ACTIVATION,

THEN PERFORM FOLLOWING:

AWP01 PG-B
SELECT:
PLDA, S1, 128KB, L3
EXEC

Not Performed:_____

122-80 **LPS** **C4MC** **127**

IF FAILURE OCCURRED AFTER COMM ACTIVATION,

THEN PERFORM FOLLOWING:

AWP01 PG-B
SELECT:
PLDA, S2, 192KB, L3, PEND
EXEC

Not Performed:_____

122-81 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT CDBFR H/W_____:

1. **ENABLE** B/S ____/____.

2. **ENTER** PWA LIMITS IN B/S ____/____;
   LL _____, UL _____.

122-82 **C4MC** **LPS** **127**

LL _____, UL _____ IN B/S _____/_____.

122-83 **LPS** **C4MC** **127**

TRANSMIT LIMITS.

122-84 **LPS** **C4SE** **127**

BOOT SPARE FEP H/W_____ #0012.
REPORT COMPLETION.

122-85 **LPS**

Verify correct patching for spare FEP.

NOTE
Following five steps are performed at Master Console keyboard.

122-86 **LPS** **C4MC** **127**

C PP PLDS _ __

122-87 **LPS** **C4MC** **127**

$FLAI PLDS LOAD CKPT

122-88 **LPS** **C4MC** **127**

IF FAILURE OCCURRED AFTER COMM ACTIVATION,

THEN PERFORM FOLLOWING:

SELECT:
PLDS, S2, 192KB, L3,
EXEC

Not Performed:_____

122-89 **LPS** **C4MC** **127**

A DA PLDS

122-90 **LPS** **C4MC** **127**

A RS PLDA

122-91 **LPS** **NTD** **212**

PLDA FEP Recovery complete.

***** End of PLDA FEP Recovery Procedure *****

Section 6B

PLDS FEP Recovery Procedure

NOTE
PLDS FEP Recovery Procedure is a contingency procedure.
Perform if a PLDS FEP failure occurs prior to L-14 min for short window or prior to T-5 min for a long window mission.

PLDS FEP Recovery Procedure Not Performed:_____

122-92 NTD LPS 212

Reconfigure PLDS software to a spare PCM FEP.
Report completion (5 minutes).

122-93 LPS C4SE 127

HALT FAILED PLDS FEP H/W _____.
REPORT COMPLETION.

122-94 LPS C4MC 127

PERFORM FOLLOWING AT CDBFR H/W_____:

1. **ENABLE** B/S ____/____.

2. **ENTER** PWA LIMITS IN B/S _____/____;
   LL _____, UL _____.

122-95 C4MC LPS 127

LL _____, UL _____ IN B/S _____/_____.

122-96 **LPS** **C4MC** **127**

TRANSMIT LIMITS.

122-97 **LPS** **C4SE** **127**

BOOT SPARE FEP H/W_____ #0012.
REPORT COMPLETION.

122-98 **LPS**

Verify correct patching for spare FEP.

NOTE
Following five steps are performed at Master Console keyboard.

122-99 **LPS** **C4MC** **127**

C PP PLDS __ __

122-100 **LPS** **C4MC** **127**

$FLAI PLDS LOAD CKPT

122-101 **LPS** **C4MC** **127**

IF FAILURE OCCURRED AFTER COMM ACTIVATION,

THEN PERFORM FOLLOWING:

AWP01 PG-B
SELECT:
PLDS, S2, 192KB, L3,
EXEC

Not Performed:_____

122-102 LPS C4MC 127

A DA PLDS

122-103 LPS C4MC 127

A RS PLDA

122-104 LPS NTD 212

PLDS FEP Recovery complete.

***** End of PLDS FEP Recovery Procedure *****

Section 7

LDB FEP Recovery Procedure

NOTE
LDB FEP Recovery Procedure is a contingency procedure. Perform if on LDB FEP failure occurs prior to L-14 min for short window or prior to T-5 min for a long window mission.

LDB FEP Recovery Procedure Not Performed:_____

122-105 LPS CGLS 127

IF LDB FEP failure that results in an active/standby redundant switch occurs after LDB safing sequences (T-6 hrs 15 min) are loaded,

THEN place LDB Safing Switch to Position_____.

Not Performed:_____

122-106 NTD LPS 212

Reconfigure LDBS software to a spare LDB FEP.
Report completion (5 minutes).

122-107 LPS C4SE 127

HALT FAILED LDB FEP H/W_____.
REPORT COMPLETION.

122-108 **LPS** **C4MT** **127**

IF replacement FEP will be used for remainder of Countdown
AND after T-6 hrs (S0007),

THEN
At Rack XX83,

Disconnect safing cable of failed FEP ____ from J_____ and connect safing cable of spare FEP _____ to J_____.

Not Performed:_____

122-109 **LPS** **C4MC** **127**

PERFORM FOLLOWING AT CDBFR H/W_____:

1. **ENABLE** B/S ____/____.

2. **ENTER** PWA LIMITS IN B/S _____/_____;
LL _____, UL _____.

122-110 **C4MC** **LPS** **127**

LL _____, UL _____ IN B/S _____/_____.

122-111 **LPS** **C4MC** **127**

TRANSMIT LIMITS.

122-112 **LPS** **C4SE** **127**

BOOT SPARE FEP H/W_____ #0012.
REPORT COMPLETION.

122-113 **LPS**

Verify correct patching for spare FEP.

NOTE
Following four steps are performed at Master Console keyboard.

122-114 **LPS** **C4MC** **127**

```
C PP LDBS __
```

122-115 **LPS** **C4MC** **127**

```
$FLAI LDBS LOAD CKPT
```

122-116 **LPS** **C4MC** **127**

```
A DA LDBS
```

122-117 **LPS** **C4MC** **127**

```
A RS LDBA
```

122-118 **LPS** **NTD** **212**

LDB FEP Recovery complete.

***** End of LDB FEP Recovery Procedure *****

Section 8

LDB Transmission System Recovery Procedure

NOTE

LDB Transmission System Recovery Procedure is a contingency procedure. Perform if a LDB transmission system failure occurs causing GPC to switch to alternate Bus prior to T-31 sec (Ref LCC LPS-17).

LDB Transmission System Recovery Procedure Not Performed:_____

122-119 **LPS** **NTD** **212**

Launch data Bus has switched to alternate Bus. This is a possible LCC violation: (LPS-17).
Request hold at next available milestone.

122-120 **LPS** **NTD** **212**
OTC
CDPS

Request permission to switch back to LDB-1

122-121 **OTC** **CDPS** **212**
LPS

Proceed with LDB switch.

122-122 **CDPS**

```
HOME CMD KEY - PRESS
CONSOLE KYBD
GPCC LDBC
XMIT CMD KEY - PRESS
```

122-123 **CDPS**

```
CURSOR CNTL (OC PAGE)
POLL GSE ON LDB NO. 1
XMIT CURSOR KEY - PRESS

CRT (LC PAGE)
BOX TURNS GREEN
```

122-124 **CDPS**

```
PFK 1 KEY - PRESS
```

122-125 **CDPS** **NTD** **212**
OTC
LPS

```
CRT (VAS59)
VERIFY POLLING ON LDB - 1
```

122-126 **LPS** **NTD** **212**
OTC
CDPS

IF LDB - 1 polling restored,

THEN LDB - 1 polling restored, ready to proceed with count.

Not Performed:_____

122-127 **LPS** **NTD** **212**
OTC
CDPS

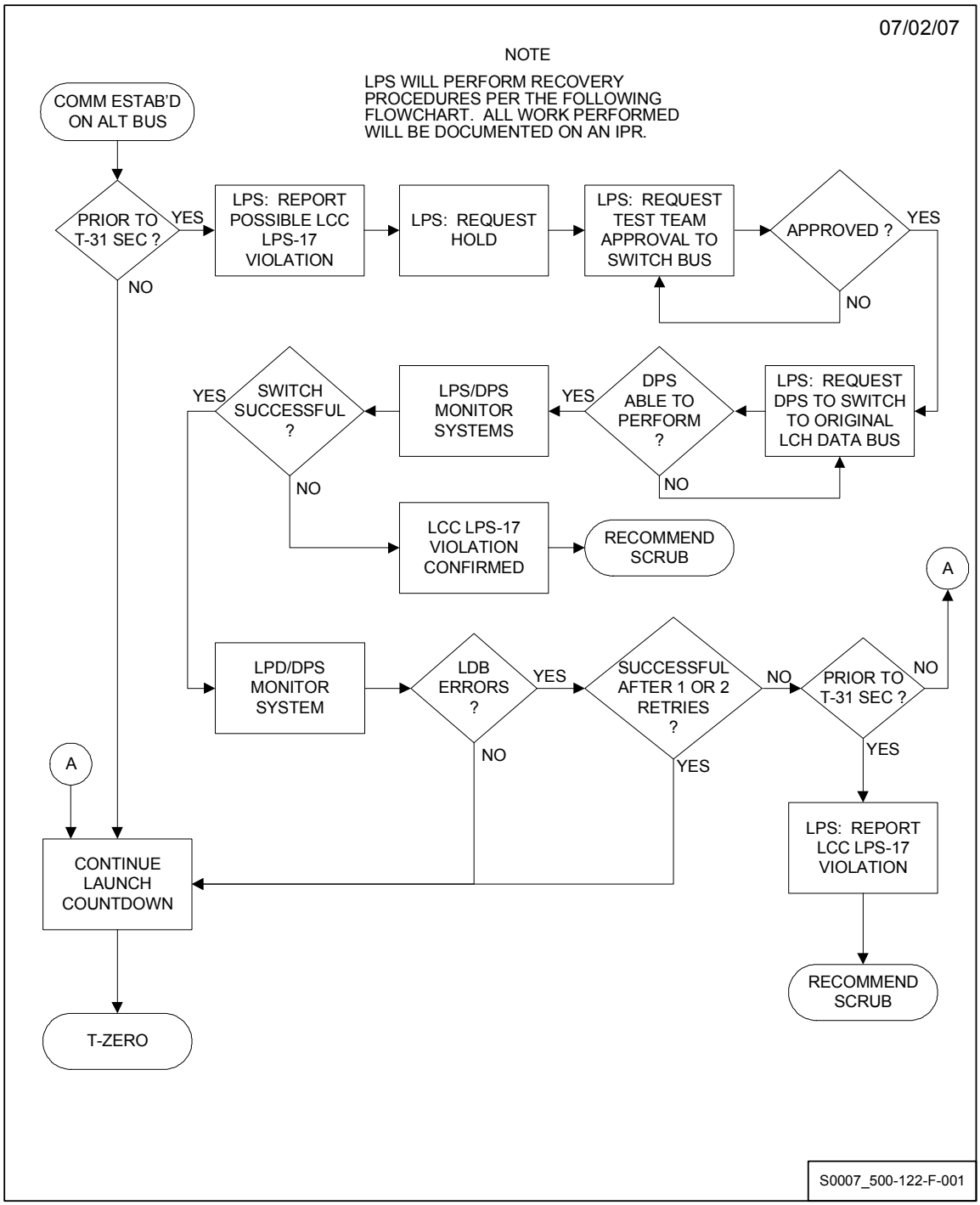
IF LDB - 1 polling not restored,

THEN LDB - 1 polling not restored. This is an LCC violation LPS-17. Recommend hold and evaluate.

Not Performed:_____

***** End of LDB Transmission System Recovery Procedure *****

LDB Transmission System Recovery Procedure (LCC LPS-17)



Section 9

GS____ FEP Recovery Procedure

NOTE
GS___ FEP Recovery Procedure is a contingency procedure. Perform if a GS___ FEP failure occurs prior to L-14 min for short window or prior to T-5 min for a long window mission.

GS____ FEP Recovery Procedure Not Performed:_____

122-128 NTD LPS 212

Reconfigure GS____ software to a spare GSE FEP.
Report completion (5 minutes).

122-129 LPS C4SE 127

HALT FAILED GS____ FEP H/W_____.
REPORT COMPLETION.

122-130 LPS C4MC 127

PERFORM FOLLOWING AT CDBFR:

1. **ENABLE** B/S _____/_____.

2. **ENTER** PWA LIMITS IN B/S_____/_____;
   LL _____, UL _____.

122-131 C4MC LPS 127

LL _____, UL _____ IN B/S _____/_____.

122-132 LPS C4MC 127

TRANSMIT LIMITS.

122-133 **LPS** **C4MC** **127**

Make patch connections in local patch panel.

122-134 **LPS** **C4SE** **127**

```
BOOT SPARE FEP H/W_____ #0012.
REPORT COMPLETION.
```

NOTE
Perform following four steps at Master Console keyboard.

122-135 **LPS** **C4MC** **127**

```
C PP GS___ ___ ___.
```

122-136 **LPS** **C4MC** **127**

```
$FLAI GS___ LOAD CKPT
```

122-137 **LPS** **C4MC** **127**

```
A DA GS___
```

122-138 **LPS** **C4MC** **127**

```
A RS GS___
```

122-139 **LPS** **NTD** **212**

GS___ FEP Recovery complete.

***** End of GS___ FEP Recovery Procedure *****

Section 10

GOAL/System Software Recovery for Total FEP Loss

NOTE
Perform this section following the recovery of both active and standby GPC, OI, PL, or GS1, 2, or 3 FEP's or in the case of loss of a CDL or ME FEP.

GOAL/System Software Recovery for Total FEP Loss Not Performed:_____

122-140 **LPS** **NTD**
CSPE

The _____FEP(s) have been reactivated and are ready to support recovery.

122-141 **LPS** **NTD**
NTD **OTC**
TBC
PTC

The _____FEP(s) were reactivated from (baseline/checkpointed) _____tables.

Record time of checkpoint (or N/A for baseline).

_____CDT

122-142 **NTD** **OTC**
TBC
PTC

Perform reconfiguration from loss of the _____FEP.

FEP Reconfiguration from Checkpointed Tables

122-143 **OTC** **ALL**
TBC
PTC

IF lost FEP(s) was reactivated from checkpointed tables,

THEN the _____FEP(s) have been reconfigured with checkpointed tables. The status of all EMON, CL, and GOAL exception monitoring was returned to the configuration reflected at _____CDT. This includes changes in EMON, CL, or GOAL notification status and any limits that may have been changed since that time. If your configuration has been modified manually or by software since then, reperform the steps necessary to re-establish your proper configuration.

Not Performed:_____

FEP Reconfiguration from Baseline Tables

122-144 **OTC** **ALL**
TBC
PTC

IF lost FEP(s) was reactivated from baseline tables,

THEN the _____FEP(s) have been reconfigured to their baseline tables. All EMONs, CL, and GOAL exception monitoring have been returned to default values and limits have been opened to the default range of each measurement in the FEP(s). All systems must perform steps necessary to re-establish the proper configuration for this time in the Countdown.

Not Performed:_____

RSYS Group Relocation

NOTE

Within a given RSYS group, there may be FDs which belong to both GSE, GPC, and OI FEPs. The console location Pseudos may not be correct for groups that contain FDs from multiple FEPs, one of which has been reset to either baseline or checkpointed tables.

122-145 OTC CTPE

IF any RSYS group must be reconfigured to the console where it resided prior to the FEP configuration (this could be the home console or a secondary console to support standard operations or console crashes),

THEN relocate any RSYS groups required by the _____FEP reconfiguration.

Not Performed:_____

122-146 OTC ALL

All systems verify (1) reconfiguration from FEP loss complete or not required and (2) ready to continue the Countdown.

CCSE	CHYD
CNSE	CISL
CPLE	CHGD
CSME	CEPD
CMPS	COFC
CECL	CAFC
CAFM	CGNC
CPVD	CDPS
CFCP	CVFS
CGSS	CCME
COOS	CGLS
CAPU	CTPE

122-147 TBC ALL

All systems verify
(1) reconfiguration from FEP loss complete or not required
(2) ready to continue the Countdown.

CPWR CBHY
CLHY CLOX
CBRS

122-148 PTC ALL

All payload systems verify
(1) reconfiguration from FEP loss complete or not required
(2) ready to continue the Countdown.

122-149 OTC NTD
TBC
PTC

Firing Room/system reconfiguration from FEP loss complete.

122-150 CSPE NTD

Firing Room/system reconfiguration complete, ready to continue the Countdown.

***** End of GOAL/System Software Recovery for Total FEP Loss *****

Section 11

PDR Recovery Procedure

NOTE

PDR Recovery Procedure is a contingency procedure.

Perform after T-43 hrs in event of a PDR failure prior to L-30 min for a short window, or prior to T-5 min for a long window.

PDR Recovery Procedure Not Performed:_____

122-151	**NTD**	**LPS**	**212**
	LPS	**C4MC**	**127**
	C4SE	**CPDR**	

Reconfigure PDR/SPA support to Hot Spare PDR/SPA hardware per MWO. (15 minutes).

122-152	**CPDR**	**LPS**	**127**
	LPS	**NTD**	**212**

Reconfiguration to Hot Spare PDR/SPA complete.

***** End of PDR Recovery Procedure *****

Section 12

RF Data Loss Recovery Procedure

NOTE

RF Data Loss Recovery Procedure is a contingency procedure.

Perform after COMM Activation in event of an RF data loss prior to L-14 min for a short window or prior to T-5 min for a long window.

RF Data Loss Recovery Procedure Not Performed:_____

122-153 NTD LPS 212

Configure PLDS FEP to Source 1, 128Kb Hardline data.
Report completion.

122-154 LPS C4MC 127

Perform the following:

```
AWP01 PG-B
SELECT:
PLDS, S1, 128KB, L3
EXEC
```

122-155 LPS NTD 212

Reconfiguration of PLDS FEP to Hardline Data complete.

***** End of RF Data Loss Recovery Procedure *****

Section 13

Hardline Data Loss Recovery Procedure

NOTE

Hardline Data Loss Recovery Procedure is a contingency procedure. Perform in event of a hardline data loss from COMM activation to T-12 min.

Hardline Data Loss Recovery Procedure Not Performed:_____

122-156 NTD LPS 212

Verify GPC, PLD and OI FEPs to source 2, 192 kb RF data and in Go Mode.
Report completion.

122-157 LPS C4SE 127

IF prior to T-1 hr,

THEN configure VSB FEP to S2, 192KB RF data.
Verify FR LED is On.

Not Performed:_____

122-158 LPS C4MC 127

A RS GPCA
A RS OIA
A RS PLDA

122-159 LPS NTD 212

Reconfiguration of GPC, PLD and OI FEPs to RF data complete.

***** End of Hardline Data Loss Recovery Procedure *****

Section 14

RF Data Interruption Recovery Procedure

NOTE

RF Data Interruption Recovery Procedure is a contingency procedure.

Perform after COMM Activation multiple times in event of an RF data interruption prior to L-14 min for a short window and prior to T-5 min for a long window.

RF Data Interruption Recovery Procedure Not Performed:_____

122-160 NTD LPS 232

Inhibit data processing on PLDS FEP.
Load with checkpointed tables. **Report** completion.

122-161 LPS C4MC 127

I RS PLDA

122-162 LPS C4MC 127

I DA PLDS

122-163 LPS C4MC 127

```
$FLAI PLDS,,CKPT
```

122-164 LPS C4MC 127

Perform the following:

```
AWP01 PG-B
SELECT:
PLDS, S2, 192KB, L3
EXEC
```

122-165 LPS C4MC 127

A DA PLDS

122-166 LPS C4MC 127

A RS PLDA

122-167 LPS NTD

Data processing has resumed. PLDS FEP reloaded with check pointed tables and returned to RF source.

***** End of RF Data Interruption Recovery Procedure *****

Section 15

HL Data Interruption Recovery Procedure

NOTE

HL Data Interruption Recovery Procedure is a contingency procedure. Perform after COMM Activation in event of an HL data interruption prior to L-14 min for a short window or prior to T-5 min for a long window or a Launch Countdown scrub.

HL Data Interruption Recovery Procedure Not Performed:_____

122-168 NTD LPS 212

Configure OIA/S, GPCA/S and PLDA/S to normal data sources and orginal FEP configuration.

NOTE

Delay performance of section 15 if LH_2 is in Drain. If LH_2 Drain is in progress, Orbiter COMM and MILA must remain active on RF 192 Kb data until the LH_2 Drain is complete.

122-169 LPS NTD 212
NTD CLHY

Verify LH_2 is not in Drain.

122-170 LPS C4MC 127

Perform the following:

```
AWP01 PG-B
SELECT:
GPCA, OIA, GPCS, OIS, PLDA, PLDS, S1, 128KB, L3
EXEC
```

122-171 **LPS** **C4MC** **127**

Verify OIA, OIS, GPCA, GPCS, PLDA and PLDS FEPs processing 128KB data on Source 1 (hardline).

122-172 **LPS** **C4MC** **127**

```
IF COUNTDOWN IS TO CONTINUE,

THEN
AWP01, PG-B
SELECT
OIA, OIS, GPCA, GPCS, PLDA, S2, 192KB, L3, PEND
EXEC
AND
AWP01, PG-B
SELECT
PLDS, S2, 192KB, L3
EXEC
```

Not Performed:_____

122-173 **LPS** **C4MC** **127**

A RS OIA
A RS GPCA
A RS PLDA

122-174 **LPS** **NTD**
NTD **CLOX**

IF LO_2 is in drain,

THEN configure LO_2 to drain using low range transducers.
Report completion.

Not Performed:_____

NOTE

During LPS FEP recovery, momentary data loss may occur. NTD concurrence is required before performing the next step.

122-175 **LPS** **NTD** **232**
NTD **OTC** **212**
TBC
PTC
CSPE

IF SCRUB HAS BEEN INITIATED,

THEN
```
$TERM OIA, GPCA, AND PLDA
PERF PGM
$FLAI OIS,,CKPT
$FLAI GPCS,,CKPT
$FLAI PLDS,,CKPT
A DA OIS
A DA GPCS
A DA PLDS
A RS OIA
A RS GPCA
A RS PLDA
```

Not Performed:_____

122-176 **LPS** **NTD** **212**

Recovery of PCM FEPs Configuration complete. GLS may perform limit changes and LO_2 may reconfigure to high range pressure control if necessary.

***** End of HL Data Interruption Recovery Procedure *****

Section 16

Active PLD FEP Inhibit Redundant Switch Procedure

NOTE
Inhibit redundant switch on PLDA FEP is a contingency procedure. Perform this section if a PLDS RF consecutive sync error occurs after L-14 min.

Active PLD FEP Inhibit Redundant Switch Procedure Not Performed:_____

122-177 NTD LPS 212

Inhibit redundant switch on PLDA FEP.

122-178 LPS C4MC 127

`I RS PLDA`

***** End of Active PLD FEP Inhibit Redundant Switch Procedure *****

Section 17

Main Engine 60 Kb Data Recovery Procedure

NOTE

For loss of Main Engine 60 Kb data via T-0 connectors 50J71 (EIU #1) and/or 50J64 (EIU's #2 and #3), the following section may be run to restore 60 Kb data through the FMSP hardline.

Main Engine 60 Kb Data Recovery Procedure Not Performed:_____

FM Signal Processor Hardline Activation prior to Comm Activation

NOTE

If Main Engine 60 Kb hardline data is required for SSME final preps, and Comm system activation for flight has not occurred, then perform the following to configure the FMSP hardline for ME 60 Kb data

FM Signal Processor Hardline Activation prior to Comm Activation Not Performed:_____

122-179 OTC CCSE

Perform FM Signal Processor hardline activation.

122-180 CCSE JRPS

Perform RPS hardline patching for FM line 6TVM1202 (Pad A) or 6TVM3038 (Pad B) set up for 60 Kb main engine data (EIU 1, 2 or 3) per JI-LPSO-RPSO-592. **Report** completion.

122-181 **CCSE**

```
CONSOLE KYBD (C2)
VWA40
PERF PGM KEY - PRESS
```

VERIFY "INTEGRATED COMM/NAVAIDS SYSTEM" SKELETON

122-182 **CCSE**

```
CONSOLE KYBD (VWA40)
SET V74K6652NL ON          (FM XMTR 1 DISABLE)
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

VERIFY COMMAND SUCCESSFUL

122-183 **CCSE**

```
CONSOLE KYBD (VWA40)
CBTU BT4 V74K6652NL 1
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

VERIFY CBTU SUCCESSFUL
XXXX XXX1 XXXX XXXX

122-184 **CCSE** **MS1**

```
PANEL A1R
   S-BAND FM
      CONTROL SW - PANEL
      POWER SW - 1
      DATA SOURCE SW - ME
```

122-185 **CCSE**

CRT (VDA40)
VERIFY
FM SYSTEM
CONTROL - PNL
XMTR - OFF
SP SRCE - ME

122-186 **CCSE**

```
CONSOLE KYBD (VWA40)
SET V74K6081NL ON              (FM SP1 T-0 ON)
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

VERIFY COMMAND SUCCESSFUL
```

122-187 **CCSE**

```
CONSOLE KYBD (VWA40)
CBTU BT4 V74K6081NL 1
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

VERIFY CBTU SUCCESSFUL
XXXX XXX1 XXXX XXXX
```

122-188 **CCME** **JRPS**

Verify the FM Composite signal is patched to a PSK demodulator.

122-189 **CCME** **JRPS**

Verify reception of ME Subcarriers (576 KHz, 768 KHz, or 1.024 MHz) on 6TVM1202 (Pad A) or 6TVM3038 (Pad B).
Verify the following for the affected engine:

1. Recording of ME _____ data
2. Decom lock on ME _____ data.
3. Data configured to KMTS System.
4. Data configured to Firing Room _____ on RPS playback line _____.

122-190 **CCME** **LPS**

Configure ME _____ (1, 2 or 3) from RPS P/B line _____ to provide FMSP hardline data to Source 1 of FEP.
Verify ME _____ FEP processing data without errors.

122-191 **CCME**

Verify data valid on ME _____ FMSP hardline.

122-192 **CCME** **OTC**
OTC **NTD**

Report that ME _____ 60 Kb data has been restored to the Firing Room via the FMSP hardline.

Marshall/HOSC Data Verification

122-193 **CCME** **JRPS**

Verify that MSFC/HOSC is receiving FMSP hardline data through KMTS:

POC: Marshall Data (8-256-544-2183)

***** End of Marshall/HOSC Data Verification *****

122-194 **CCSE**

```
IF FM SYSTEM IS TO REMAIN POWERED UP AND ENGINEER
TO BE OFF STATION,

THEN
CONSOLE KYBD (VWA40)
PFK15 - PRESS
(TERMINATES VWA40)
```

Not Performed:_____

122-195 **CCSE** **OTC**

FM Signal Processor Hardline Activation complete.

NOTE
Perform the following steps concurrently with Comm Activation to enable the FM Transmitter. FM Transmitter enable should be performed prior to S-Band FM Verification, which is within V1117, Operations 70 and 80. Hardline data will still be available after Transmitter is enabled.

122-196 **CCSE**

Verify RF Hazard Control Area established for S-Band Upper Hemi Antenna (193 ft level).

122-197 **CCSE**

```
CONSOLE KYBD - (VWA40)
SET V74K6652NL OFF            (FM XMTR 1 ENABLE)
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

VERIFY COMMAND SUCCESSFUL
```

122-198 **CCSE**

```
CONSOLE KYBD (VWA40)
CBTU BT4 V74K6652NL 1
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

VERIFY CBTU SUCCESSFUL
XXXX XXX0 XXXX XXXX
```

122-199 **CCSE**

```
CRT (VDA40)
VERIFY
FM SYSTEM
CONTROL - CMD
XMTR - 1 ON
________ WATTS
SP SRCE - ME
```

NOTE

Upon completion of Comm Activation per V1117, the FM System will be powered down. If FM hardline data is still required, the following section is to be performed after completion of Comm Activation.

***** End of FM Signal Processor Hardline Activation prior to Comm Activation *****

FM Signal Processor Hardline Activation after Comm Activation

NOTE

Perform this section if FM hardline data is required after Comm Activation has been performed.

FM Signal Processor Hardline Activation after Comm Activation
Not Performed:_____

122-200 OTC CCSE

Perform FM Signal Processor hardline activation

122-201 CCSE JRPS

Verify RPS hardline patching for FM line 6TVM1202 (Pad A) or 6TVM3038 (Pad B) set up for 60 Kb main engine data (EIU 1, 2 or 3).

122-202 CCSE

```
CONSOLE KYBD (C2)
VWA40
PERF PGM KEY - PRESS

VERIFY "INTEGRATED COMM/NAVAIDS SYSTEM" SKELETON
```

122-203 CCSE

```
CRT (VDA40)
VERIFY
FM SYSTEM
CONTROL - CMD

CURSOR CNTL (VDA40)
FM SYSTEM
XMIT CURSOR KEY - PRESS

VERIFY VAA11 SKELETON DISPLAYED
```

122-204 **CCSE**

CURSOR CNTL (VAA11)
COMMAND PROCESSING
XMIT CURSOR KEY - PRESS

VERIFY VAA24 SKELETON DISPLAYED

122-205 **CCSE**

CURSOR CNTL (VAA24)
LDB A
XMIT CURSOR KEY - PRESS

VERIFY LDB A IND ON

TERMINATE AND RETURN
XMIT CURSOR KEY - PRESS

VERIFY VAA11 SKELETON DISPLAYED

122-206 **CCSE**

CURSOR CNTL (VAA11)
SIG PRSR 1 UMB ON
XMIT CURSOR KEY - PRESS

122-207 **CCSE**

CONSOLE KYBD (VAA19)
CBTU BT4 V74K6081NL 1
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

VERIFY CBTU SUCCESSFUL
XXXX XXX1 XXXX XXXX

122-208 **CCSE**

```
CURSOR CNTL (VAA11)
FM XMTR 1 DISABLE
XMIT CURSOR KEY - PRESS
```

122-209 **CCSE**

```
CONSOLE KYBD (VAA19)
CBTU BT4 V74K6652NL 1
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

VERIFY CBTU SUCCESSFUL
XXXX XXX1 XXXX XXXX
```

122-210 **CCSE**

```
CURSOR CNTL (VAA11)
FM 1 ON
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS

VERIFY
FM XMTR 1 IND OFF
FM XMTR 2 IND OFF
DATA SRCE ME IND ON
```

122-211 **CCME** **JRPS**

Verify the FM Composite signal is patched to a PSK demodulator.

122-212 **CCME** **JRPS**

Verify reception of ME Subcarriers (576 KHZ, 768 KHz, or 1.024 MHz) on 6TVM1202 (Pad A) or 6TVM3038 (Pad B).
Configure/Verify the following for the affected engine:

1. Recording of ME _____ data.
2. Decom lock on ME _____ data.
3. Data configured to KMTS System.
4. Data configured to Firing Room _____ on RPS playback line _____.

122-213 **CCME** **LPS** **127**

Configure ME _____ (1, 2 or 3) from RPS P/B line _____ to provide FMSP H/L data to Source 1 of FEP.
Verify ME _____ processing data without errors.

122-214 **CCME**

Verify data valid on ME _____ FMSP hardline.

122-215 **CCME** **OTC**
OTC **NTD**

Report that ME _____ 60 Kb data has been restored to the Firing Room via the FMSP hardline.

Marshall/HOSC Data Verification

122-216 CCME JRPS

Verify that MSFC/HOSC is receiving FMSP hardline data through KMTS:

POC: Marshall Data (8-256-544-2183)

***** End of Marshall/HOSC Data Verification *****

122-217 CCSE

```
IF FM SYSTEM IS TO REMAIN POWERED UP AND ENGINEER
TO BE OFF STATION,

THEN
CONSOLE KYBD (VWA40/VAA11)
PFK15 - PRESS
(TERMINATES VWA40)
```

Not Performed:_____

122-218 CCSE OTC

FM Signal Processor Hardline Activation complete.

***** End of FM Signal Processor Hardline Activation after Comm Activation *****

FM Signal Processor Hardline Deactivation

NOTE

FM Signal Processor Hardline Deactivation may be performed if FM Signal Processor hardline data is no longer required to support S0007 operations.

FM Signal Processor Hardline Deactivation Not Performed:_____

NOTE

FM Signal Processor Hardline Deactivation will be performed prior to COMM system to high power. During this period there will be a loss of Main Engine 60 Kb data to the Firing Room.

During FM Signal Processor Hardline Deactivation, LPS may receive Main Engine FEP errors.

Do not report single dropouts on the ME FEP while 60 Kb data is being provided via the FMSP RF link.

122-219 OTC CCSE

Perform FM Signal Processor Hardline Deactivation.

122-220 CCSE

```
CONSOLE KYBD (C2)
VWA40
PERF PGM KEY - PRESS
```

VERIFY "INTEGRATED COMM/NAVAIDS SYSTEMS" SKELETON

122-221 **CCSE**

CRT (VDA40)
VERIFY
FM SYSTEM
CONTROL - CMD
SP SRCE - ME DATA

122-222 **CCSE**

CURSOR CNTL (VDA40)
FM SYSTEM
XMIT CURSOR KEY - PRESS

VERIFY VAA11 SKELETON DISPLAYED

122-223 **CCSE**

CURSOR CNTL (VAA11)
COMMAND PROCESSING
XMIT CURSOR KEY - PRESS

VERIFY VAA24 SEKELTON DISPLAYED

122-224 **CCSE**

CURSOR CNTL (VAA24)
LDB A
XMIT CURSOR KEY - PRESS

VERIFY LDB A IND ON

TERMINATE AND RETURN
XMIT CURSOR KEY - PRESS

VERIFY VAA11 SKELETON DISPLAYED

122-225 **CCSE**

CURSOR CNTL (VAA11)
FM PRSR 1 UMB OFF
XMIT CURSOR KEY - PRESS

122-226 **CCSE**

CONSOLE KYBD (C2)
CBTU BT4 V74K6081NL 1
XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS

VERIFY CBTU SUCCESSFUL
XXXX XXX0 XXXX XXXX

122-227 **CCSE**

CURSOR CNTL (VAA11)
FM 1/2 OFF
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS

VERIFY
DATA SRCE ME IND OFF

122-228 **CCSE**

CURSOR CNTL (VAA11)
FM XMTR 1 ENABLE
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS

122-229 **CCSE**

```
CONSOLE KYBD (C2)
CBTU BT4 V74K6652NL 1
XMIT CMD KEY - PRESS
EXEX CMD KEY - PRESS

VERIFY CBTU SUCCESSFUL
XXXX XXX0 XXXX XXXX
```

122-230 **CCSE** **JRPS**

Configure the appropriate KMTS Bit Sync to Source 2 for the affected engine.

ME-1 0505A1 A7

Not Performed:_____

ME-2 0505A1 A8

Not Performed:_____

ME-3 0505A1 A9

Not Performed:_____

Verify no longer receiving FM SP hardline data.

122-231 **LPS**

IF ME FEP errors were reported during FM Signal Processor Hardline Deactivation,

THEN annotate errors that were received:

Errors:_____

Not Performed:_____

122-232 **CCSE** **OTC**

FM Signal Processor Hardline Deactivation complete.

***** End of FM Signal Processor Hardline Deactivation *****

***** End of Main Engine 60 Kb Data Recovery Procedure *****

Section 18

FEP RF Source Verification Contingency

NOTE
The FEP RF Source Verification Contingency Procedure is only to be performed if one or more EIU hardlines are bypassed.

FEP RF Source Verification Contingency Not Performed:_____

NOTE
The affected engine will remain in Source 2 for the remainder of Launch Countdown.

NOTE
During the FEP RF Source Verification, LPS may receive ME FEP errors.

122-233 LPS C4SE 128

Verify ME 1/2/3 Bit Syncs in Program Mode.

122-234 LPS C4MC 128

Verify AWP01 active and T-55 min window not inverted.

NOTE
The following program requires 2 OC and 1 application TCB for execution.

122-235 LPS C4MC 128

```
CURSOR CNTL (AWP01 PG-B)
SOURCE 2 TARGET
XMIT CURSOR KEY - PRESS
```

122-236 LPS C4SE 128

Verify ME 1/2/3 Bit Syncs indicate Source 2 data processing.

122-237 LPS C4MC 128

Verify Source 2, GO MODE, no error conditions exists for ME 1/2/3.

122-238 LPS CCME 128

Verify data valid on ME 1/2/3 RF data.

122-239 LPS C4MC 128

```
CURSOR CNTL (AWP01 PG-B)
UNDER OVERRIDE COMMANDS
SELECT ME 1, OR ME 2 OR ME 3
S1, L3 AND EXEC
XMIT CURSOR KEY - PRESS
```

122-240 LPS C4SE 128

Verify ME 1, or ME 2, or ME 3 Bit Syncs indicate Source 1 data processing.

122-241 LPS C4MC 128

Verify Source 1, GO MODE, no error conditions exist for ME 1, or ME 2, or ME 3.

122-242 LPS C4MC 128

Verify data valid on ME 1, or ME 2, or ME 3 hardline data.

122-243 LPS CCME 128

Released to command channel.

122-244 LPS C4SE 128

Switch VSB to Source 2, high rate.
Verify FR LED is On.

122-245 LPS CBSE 163

BIOMED data now on RF Source.

Verify data valid.

122-246 LPS

IF ME FEP errors were reported during the FEP RF Source verification,

THEN annotate errors that were received:

Errors_____

_____

Not Performed:_____

Marshall/HOSC Data Verification

122-247 CCME JRPS

Verify that MSFC/HOSC is receiving FMSP RF data through KMTS:

POC: Marshall Data (8-256-544-2183)

***** End of Marshall/HOSC Data Verification *****

122-248 LPS NTD 232

Report completion of RF Source Verification Contingency

***** End of FEP RF Source Verification Contingency *****

*** End of Operation **122** ***

OPERATION 123 SRSS Contingency Options

Shop: **CBRS**
Cntrl Rm Console: **C2**
OPR: **CBRS**
Zone: **NA**
Hazard (Y/N): **Y**
Duration (Hrs): **1.0**

NOTE

This operation contains the following contingency options:

Option A: SRSS Multipath Test (SSID BRSS-15) Contingency
Option B: SRSS Arm Inhibit (SSID BRSS-05) Contingency
Option C: Eastern Range System Failure Contingency
Option D: Terminal Count Close Loop Test GSE Failure Contingency
Option E: Terminal Count Close Loop Test Indication Failure Contingency

Option A - SRSS Multi-Path Test (SSID BRSS-15) Contingency

NOTE
Perform this option if fluctuations of vehicle AGC levels are observed after Range Safety Carrier has been brought online by Eastern Test Range. This test may be performed as late as T-31 seconds.

Option A Not Performed:_____

C2 RSS Multipath Test

NOTE
Perform this option if C2 Console is available.

C2 RSS Multipath Test Not Performed:_____

123-1 **NTD** **CBRS** **232**

Perform the SRSS Multipath Test.

123-2 **CBRS**

```
CURSOR CNTL (SWRB2)
MULTIPATH
XMIT CURSOR KEY - PRESS
```

123-3 **CBRS** **NTD** **232**

C2 RSS Multipath Test complete.

123-4 CBRS NTD 232

1. **IF** test confirms multipathing caused AGC level fluctuation,

   THEN
   Recommend continue.

   Not Performed:_____
   SS1

2. **IF** test does not confirm multipathing caused AGC level fluctuation,

   THEN
   Recommend hold and evaluate with Eastern Range.

   Not Performed:_____
   SS2

***** End of C2 RSS Multipath Test *****

GLS RSS Multipath Test

NOTE
Perform this option if C2 Console is unavailable to support SRSS Multi-Path Test.

GLS RSS Multipath Test Not Performed:_____

123-5 NTD CGLS 232
CBRS

Perform GLS RSS Multipath Test on channel 175. CBRS monitor PCGOAL during test and report on test results.

123-6 CBRS CGLS 175

CBRS is ready to support Multipath Test. Execute Range Safety System Multipath Test and report completion.

123-7 CGLS CBRS 175

RSS Multipath Test will commence momentarily.

123-8 CGLS

```
CRT
CURSOR CNTL (SLP07)
RSS MULTI-PATH TEST - XMIT CURSOR - PRESS
```

123-9 CGLS

```
CRT
(SAP93) PG-B
VERIFY RSS MULTI-PATH CONTINGENCY COMPLETED.
```

123-10 CGLS CBRS 175

RSS Multipath Test complete.

123-11 CBRS NTD 232

GLS RSS Multipath Test complete.

***** End of GLS RSS Multipath Test *****

123-12 CBRS NTD 232

1. **IF** test confirms multipathing caused AGC level fluctuation,

THEN
Recommend continue.

Not Performed:_____
SS1

2. **IF** test does not confirm multipathing caused AGC level fluctuation,

THEN
Recommend hold and evaluate with Eastern Range.

Not Performed:_____
SS2

***** End of Option A - SRSS Multi-Path Test (SSID BRSS-15) Contingency *****

Option B - SRSS Arm Inhibit (SSID BRSS-05) Contingency

NOTE
Perform this section if an inhibit indication is Off.

Option B Not Performed:_____

123-13 **CBRS**

RANGE SAFETY SAFING PANEL
RSS INHIBIT S1 - ON

CRT (SWRB2)

ALL SYSTEMS INHIBIT - ON

123-14 **CBRS**

CURSOR CNTL (BWR10)
LH A UNH - UNH
LH B UNH - UNH
RH A UNH - UNH
RH B UNH - UNH

123-15 **CBRS**

PERFORM AT T-10 SECONDS,
RANGE SAFETY SAFING PANEL
RSS INHIBIT S1 - OFF

123-16 **CBRS**

IF RECYCLE OCCURS,

THEN IMMEDIATELY

RANGE SAFETY SAFING PANEL
RSS INHIBIT S1 - ON

CRT (SWRB1)
ALL SYSTEMS INHIBIT IND - ON

Not Performed:_____

***** End of Option B - SRSS Arm Inhibit (SSID BRSS-05) Contingency *****

Option C - ER Command System Failure Contingency

NOTE
Perform this option if required.

Option C Not Performed:_____

NOTE
This contingency is applicable after SRSS T-45 min power up and until T-5 minutes.

NOTE
The following steps will cause flight CRD's to lock on to high level GSE closed loop signal. Verify C&T station on line, status hardwire inhibit indications.

NOTE
ER will not perform any open loop test until GSE is activated.

123-17 **NTD** **CBRS** **212**

Configure SRSS system for ER troubleshooting.

123-18 **CBRS**

```
CURSOR CNTL (BWR10) (ACTIVE RF SYSTEM)
LSRB RF ON - ON
RSRB RF ON - ON
```

123-19 **CBRS**

```
CURSOR CNTL (BWR11) (ACTIVE RF SYSTEM)
1 - XMIT CURSOR
3 - XMIT CURSOR
DBM - XMIT CURSOR
```

123-20 **CBRS**

CRT (SWRB1)
VERIFY

ALL SYSTEMS AGC GREATER THAN 4.5 VOLTS
ALL SYSTEMS INHIBITS ON

123-21 **CBRS** **RSRT** **175**

Inform CBRS of any changes of open loop signals and modulation.
Verify rack 8234 audio levels for SYS A&B are audible.

123-22 **CBRS** **FCA** **175**

ER transmitter carrier and modulation changes may occur during range troubleshooting.

CAUTION
Loss of inhibits can result in damage to S&As if Eastern Range inadvertently transmits flight commands requiring S&A replacement.

123-23 **CBRS** **SRO** **175**

IF SRSS inhibit status changes,

THEN CBRS will contact SRO on OIS Ch 175 or Hot Dial phone and range testing will be terminated immediately.

Not Performed:_____

NOTE

SRSS systems configured for ER command system retest. SRO will inform CBRS of the following items.

1. ER range carrier changes.
2. ER transmission of test Arm and Fire commands sent open loop.

123-24 **CBRS** **NTD** **212**
NTD **SRO** **212**

SRSS configured for ER troubleshooting. Range carrier can be removed.

123-25 **SRO** **NTD** **212**
CBRS

ER testing complete and range command system in Launch configuration.

123-26 **NTD** **CBRS** **212**

Configure SRSS GSE system to Launch configuration.

123-27 **CBRS**

```
CURSOR CNTL (BWR11) (ACTIVE RF SYSTEM)
(-) - XMIT CURSOR
1   - XMIT CURSOR
0   - XMIT CURSOR
DBM - XMIT CURSOR
```

123-28 **CBRS**

```
CURSOR CNTL (BWR10) (ACTIVE RF SYSTEM)
LSRB RF OFF - OFF
RSRB RF OFF - OFF
```

123-29 CBRS RSRT 175
FCA

ER command system testing is complete. Perform normal Launch Countdown monitoring.

123-30 CBRS NTD 212

ER command system contingency complete. Range Safety System is in Launch configuration.

***** End of Option C - ER Command System Failure Contingency *****

Option D - Terminal Count Close Loop Test GSE System Failure Contingency

NOTE

Perform this option if switch to GSE System A or B is required during Terminal Count Close Loop Test..

Option D Not Performed:_____

123-31 **CBRS**

```
CRT (SARB5)
SEQUENCER
TERMINATE - XMIT CURSOR

VERIFY SSRB4 TERMINATE
```

123-32 **CBRS**

```
CURSOR CNTL (SWRB2)
LH A POWER OFF - XMIT CURSOR
LH B POWER OFF - XMIT CURSOR
RH A POWER OFF - XMIT CURSOR
RH B POWER OFF - XMIT CURSOR

VERIFY

POWER INDICATIONS
LH A OFF
LH B OFF
RH A OFF
RH B OFF
```

123-33 CBRS

```
CURSOR CNTL (BWR10)
RF SYSTEM SELECT - XMIT CURSOR

VERIFY GSE SYSTEM _____ ACTIVE (RECORD A OR B)
```

123-34 CBRS

```
CURSOR CNTL (SWRB3)
SSRB4 - XMIT CURSOR
SPA ON - XMIT CURSOR
```

123-35 CBRS CBP1

Verify reception of Arm commands (four pulses).

123-36 CBRS CBP1

Verify reception of Fire commands (four pulses).

***** End of Option D - Terminal Count Close Loop Test GSE System Failure Contingency *****

Option E - Terminal Count Close Loop Test Indication Failure Contingency

NOTE

Perform this section if an instrumentation failure prevents the Terminal Count Close Loop Sequencer from continuing.

Option E Not Performed:_____

123-37 **CBRS**

```
CRT (SARB5)
SEQUENCER
TERMINATE - XMIT CURSOR

VERIFY SSRB4 TERMINATE
```

123-38 **CBRS**

CRT (SWRB2)
RECORD

LH A
POWER IND - _____

BATTERY CURRENT - _____

BARTERY VOLTAGE - _____

LH B
POWER IND - _____

BATTERY CURRENT - _____

BARTERY VOLTAGE - _____

RH A
POWER IND - _____

BATTERY CURRENT - _____

BARTERY VOLTAGE - _____

RH B
POWER IND - _____

BATTERY CURRENT - _____

BARTERY VOLTAGE - _____

123-39 **CBRS**

CURSOR CNTL (SWRB2)

TURN ON ANY RSS SYSTEMS INDICATING OFF, SHOWING OPEN CIRCUIT VOLTAGE AND LOWER LIMITS ON CURRENT.

123-40 **CBRS**

VERIFY FOLLOWING MEASUREMENTS:

LH A
BATTERY CURRENT 0.1 TO 0.2 AMPS
BATTERY VOLTAGE 27.15 TO 28.8 VDC

LH B
BATTERY CURRENT 0.1 TO 0.2 AMPS
BATTERY VOLTAGE 26.1 TO 31.9 VDC

RH A
BATTERY CURRENT 0.1 TO 0.2 AMPS
BATTERY VOLTAGE 27.15 TO 28.8 VDC

RH B
BATTERY CURRENT 0.1 TO 0.2 AMPS
BATTERY VOLTAGE 26.1 TO 31.9 VDC

123-41 **CBRS**

CURSOR CNTL (SWRB2)
PRINTER/PLOTTER CONTROL
  DCDR IND - A
  XMIT CURSOR KEY - PRESS

123-42 **CBRS**

CURSOR CNTL (BWR12)
"SYS A" OR "SYS B"
TEST SELECT - (TEST SELECT)
017 ENTER - (4 ARM CMDS)

123-43 CBRS CBP1 175

Verify 4 ARM pulses on Printer/Plotter.

123-44 CBRS

```
CURSOR CNTL (BWR12)
"SYS A"
018 ENTER - (4 FIRE CMDS)
```

123-45 CBRS CBP1 175

Verify 4 FIRE pulses on Printer/Plotter.

123-46 CBRS

Verify Range Carrier is supporting.

123-47 CBRS

```
CURSOR CNTL (BWR10)
LSRB RF ON - OFF
RSRB RF ON - OFF
```

***** End of Option E - Terminal Count Close Loop Test Indication Failure Contingency *****

*** End of Operation **123** ***

OPERATION 124 GLS Real Time Contingency Functions

Shop: **INTG**
Cntrl Rm Console: **INTG**
OPR: **OTC**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.5**

RSLS Hold Flag Reset

NOTE

Perform this section to clear the RSLS hold flag if the following 2 conditions are true:

1. CDT is between T-9/00 and T-0/31 and is holding at a GLS milestone.
2. The RSLS hold flag is "On", (V90X8667X1) inhibiting the milestone and a CDC resume is desired (i.e., the onboard hold condition must be resumable).

RSLS Hold Flag Reset Not Performed:_____

124-1 **CGLS**

```
(SLP07)
PFP
PFPK1 RESUME - PRESS
PFPK6 EXECUTE - PRESS
```

124-2 **CGLS**

VERIFY RSLS ON-BOARD CLOCK IS HOLDING.

124-3 **CGLS**

VERIFY CDT IS HOLDING.

124-4 **CGLS**

VERIFY

ML LOOKUP (SLP02)
RSLS HOLD FLAG OFF

124-5 **CGLS**

RESET V90X8667X1

***** End of RSLS Hold Flag Reset *****

GLS Real Time Mask/Reset and Contingency Launch Sequence Commands

NOTE

Perform this section in event realtime masks or resets are required. This operation supports masks/ resets per 10 or 25 lookup displays.

Steps within this operation may be Not Performed as required depending on GLS Configuration.

GLS Real Time Mask/Reset and Contingency Launch Sequence Commands

Not Performed:_____

NOTE

OPE/SPE concurrence must be obtained before any of the following steps may be worked.

NOTE

A list of FD's worked by steps in this operation will be provided by CGLS to QC post-test.

LIP Mask/Reset

NOTE

Perform this section for LIP selection.

LIP Mask/Reset Not Performed:_____

124-6 **CGLS**

```
VERIFY INTG MENU
PFPK5 (VIEW INTERRUPT) - PRESS
PFPK5 (LCC SELECTIONS) - PRESS
```

124-7 **CGLS**

```
CURSOR CNTL
(ALL LCC FAILURES)
XMIT CURSOR - PRESS
```

Not Performed:_____

124-8 **CGLS**

```
CURSOR CNTL
(ALL LCC VL FAILURES)
XMIT CURSOR - PRESS
```

Not Performed:_____

124-9 **CGLS**

```
CURSOR CNTL
(ALL LCC MASK)
XMIT CURSOR - PRESS
```

Not Performed:_____

124-10 **CGLS**

```
CURSOR CNTL
_____ TABLE UPPER/LOWER
XMIT CURSOR - PRESS
```

Not Performed:_____

***** End of LIP Mask/Reset *****

MIP Mask/Reset

NOTE
Perform this section for MIP selection.

MIP Mask/Reset Not Performed:_____

124-11 **CGLS**

```
VERIFY INTG MENU
PFPK5 (VIEW INTERRUPT) - PRESS
```

124-12 **CGLS**

```
CURSOR CNTL
(ALL FAILURES)
XMIT CURSOR - PRESS
```

Not Performed:_____

124-13 **CGLS**

```
CURSOR CNTL
(ALL VL FAILURES)
XMIT CURSOR - PRESS
```

Not Performed:_____

124-14 **CGLS**

```
CURSOR CNTL
(ALL MASK)
XMIT CURSOR - PRESS
```

Not Performed:_____

124-15 **CGLS**

```
CURSOR CNTL
_____ TABLE UPPER/LOWER
XMIT CURSOR - PRESS
```

Not Performed:_____

***** End of MIP Mask/Reset *****

Verify Mask

NOTE
Perform this section for VFY selection.

Verify Mask Not Performed:_____

124-16 **CGLS**

```
VERIFY INTG MENU
PFPK5 (VIEW INTERRUPT) - PRESS
```

124-17 **CGLS**

```
CURSOR CNTL
(ALL ML VFY FAILURES)
XMIT CURSOR - PRESS
```

Not Performed:_____

124-18 **CGLS**

CURSOR CNTL
(ALL ML VFY MASK)
XMIT CURSOR - PRESS

Not Performed:_____

***** End Verify Mask *****

124-19 **CGLS**

IF REQUIRED TO MASK A SINGLE FD,

THEN
POSITION CURSOR TO BLOCK M FOR DESIRED FD.
XMIT CURSOR KEY - PRESS

REPEAT AS NECESSARY

Not Performed:_____

124-20 **CGLS**

IF REQUIRED TO MASK ALL FD'S SHOWN,

THEN
POSITION CURSOR TO BLOCK M FOR ALL
XMIT CURSOR KEY - PRESS

REPEAT AS NECESSARY

Not Performed:_____

124-21 **CGLS**

IF REQUIRED TO RESET A SINGLE FD,

THEN
POSITION CURSOR TO BLOCK R FOR DESIRED FD.
XMIT CURSOR KEY - PRESS

REPEAT AS NECESSARY

Not Performed:_____

124-22 **CGLS**

IF REQUIRED TO RESET ALL FD'S SHOWN,

THEN
POSITION CURSOR TO BLOCK R FOR ALL.
XMIT CURSOR KEY - PRESS

REPEAT AS NECESSARY

Not Performed:_____

NOTE
Perform one of next three steps after page has refreshed.

124-23 **CGLS**

CURSOR CNTL
(TERMINATE)
XMIT CURSOR KEY - PRESS

Not Performed:_____

124-24 **CGLS**

CURSOR CNTL
PFPK1 (INTG MENU) - PRESS
VERIFY INTG MENU

Not Performed:_____

124-25 **CGLS**

CURSOR CNTL
PFPK6 (RESELECT) - PRESS

Not Performed:_____

Contingency Launch Sequence Commands

NOTE

This section to be used in the event that an unplanned Launch sequence command is required. This function is available from all GLS schedulers.

Contingency Launch Sequence Commands Not Performed:_____

124-26 **CGLS**

```
VERIFY INTEGRATED SCHEDULER

PFPK3 (CONTINGENCY) - PRESS
VERIFY CONTINGENCY SELECT MENU SAP90
```

NOTE

For each of the following Launch sequence commands, a cursor selection causes the function to be armed. The EXEC CMD causes LS commands to be sent to the Orbiter. DISARM CMD causes the function to be disarmed. Data area "\\\\" is used to enter values to be sent as a part of the LS command. Left display commands are valid and selectable in OPS Mode G9 only, and commands on the right, selectable in OPS Mode 101 only.

NOTE

A prerequisite condition of "GNC GRND CKOUT ENABLE FLAG" must be On for the next step to be successful. This flag is set to "On" by DPS at Launch Countdown activation (T-45 min).

124-27 CGLS

```
CMD LINE:
S FD V93X5538XX
XMIT CMD KEY - PRESS

VERIFY (GRND CKOUT FLAG) ON

CRT (SAP90 PG-B)
(BYPASS OF SSME SOP)
XMIT CURSOR KEY - PRESS

VERIFY YELLOW

EXEC CMD KEY - PRESS

VERIFY GREEN

CMD LINE:
S FD V90X0114X1
XMIT CMD KEY - PRESS

VERIFY (SSME SOP BYPASS INDICATOR) ON
```

Not Performed:_____

124-28 **CGLS**

CURSOR CNTL
(ESTIMATE ORBITER MASS WITH ET)
XMIT CURSOR KEY - PRESS

CRT
VERIFY MESSAGE: ENTER QUANTITY
DATA VALUE - SLUGS

CONSOLE KYBD

_____.__

XMIT RESP KEY - PRESS
EXEC CMD KEY - PRESS

Not Performed:_____

124-29 **CGLS**

CURSOR CNTL
(SRM CHAMBER PRESS CAL WORD)
XMIT CURSOR KEY - PRESS

CRT
VERIFY MESSAGE: ENTER 12
QUANTITY VALUES - PSIA/VOLTS

CONSOLE KYBD

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS

_____.__
XMIT RESP KEY - PRESS
EXEC CMD KEY - PRESS

Not Performed:_____

Orbiter Vent Door Override

NOTE

Left order bit = bit 0 bit assignments.
Left vent to right vent.
Vent group 1 (PORT 1 & 2) = bits 0-3 word 1
Vent group 2 (PORT 3) = bits 4-7 word 1
Vent group 3 (PORT 5) = bits 8-11 word 1
Vent group 5 (PORT 6) = bits 0-3 word 2
Vent group 6 (PORT 8 & 9) = bits 4-7 word 2

Orbiter Vent Door Override Not Performed:_____

124-30 CGLS

```
CURSOR CNTL
(ORBITER VENT DOORS OVERRIDE MENU)
XMIT CURSOR KEY - PRESS

RECORD DISPLAYED VALUE OF CURRENT OVERRIDE
WORD = __________

VERIFY BIT'S PREVIOUSLY SET ARE INVERT GREEN WITH
A YELLOW 'B'
```

NOTE

Select vent doors to be bypassed.

```
___ L FWD VENT 1&2 IND 1
___ L FWD VENT 1&2 IND 2
___ R FWD VENT 1&2 IND 1
___ R FWD VENT 1&2 IND 2

___ L PLB VENT 3 IND 1
___ L PLB VENT 3 IND 2
___ R PLB VENT 3 IND 1
___ R PLB VENT 3 IND 2
```

___ L PLB VENT 5 IND 1
___ L PLB VENT 5 IND 2
___ R PLB VENT 5 IND 1
___ R PLB VENT 5 IND 2

___ L PLB VENT 6 IND 1
___ L PLB VENT 6 IND 2
___ R PLB VENT 6 IND 1
___ R PLB VENT 6 IND 2

___ L AFT VENT 8&9 IND 1
___ L AFT VENT 8&9 IND 2
___ R AFT VENT 8&9 IND 1
___ R AFT VENT 8&9 IND 2

POSITION CURSOR FOR SELECT/DESELECT - XMIT CURSOR

VERIFY INVERT GREEN

> **NOTE**
> When all selections have been made perform next command.

CURSOR CNTL
(EXECUTE COMMAND)
XMIT CURSOR - PRESS

VERIFY VALUE SENT TO VEHICLE INCLUDES ONLY THOSE BITS WHOSE INDICATORS WERE INVERT GREEN.

RECORD DISPLAYED VALUE OF CURRENT OVERRIDE WORD = _____

CURSOR CNTL
(RETURN TO MAIN MENU)
XMIT CURSOR KEY - PRESS

***** End of Orbiter Vent Door Override *****

MPS ET Low Level Sensor Disable

NOTE
Perform this option if required to bypass a Low Level Sensor due to a failure.

MPS ET Low Level Sensor Disable Not Performed:_____

124-31 CGLS

```
CONSOLE KYBD
(MPS/ET LOW LVL SNCR DSBL MENU)
XMIT CURSOR KEY - PRESS

RECORD DISPLAYED VALUE OF CURRENT OVERRIDE
WORD = __________

VERIFY BIT'S PREVIOUSLY SET ARE INVERT
GREEN WITH A YELLOW 'B'
```

NOTE
Select sensors to be disabled.

```
____ET LH2 LOW LVL LIQ SNSR 1 - T41X1730X1
____ET LH2 LOW LVL LIQ SNSR 2 - T41X1731X1
____ET LH2 LOW LVL LIQ SNSR 3 - T41X1732X1
____ET LH2 LOW LVL LIQ SNSR 4 - T41X1733X1

____ET LO2 LEFT ECO SNSR 1 - V41X1555X1
____ET LO2 LEFT ECO SNSR 2 - V41X1556X1
____ET LO2 RIGHT ECO SNSR 2 - V41X1557X1
____ET LO2 RIGHT ECO SNSR 1 - V41X1558X1

POSITION CURSOR FOR SELECT/DESELECT -
XMIT CURSOR

VERIFY INVERT GREEN
```

NOTE
When all selections have been made, perform next command.

```
CURSOR CNTL
(EXECUTE COMMAND)
XMIT CURSOR - PRESS

VERIFY VALUE SENT TO VEHICLE INCLUDES ONLY THOSE
BITS WHOSE INDICATORS WERE INVERT GREEN.

RECORD DISPLAYED VALUE OF CURRENT OVERRIDE
WORD = __________

CURSOR CNTL
(RETURN TO MAIN MENU)
XMIT CURSOR KEY - PRESS
```

Not Performed:_____

***** End of MPS ET Low Level Sensor Disable *****

OMS B Crossfeed Bypass

NOTE

Repeat any or all of the next five steps to issue the OMS B Crossfeed Bypass Launch sequence commands. The value of the downlisted override flags are displayed beside each command.

124-32 **CGLS**

```
CURSOR CNTL
(OMS-L OX)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
VERIFY DOWNLISTED INDICATOR IS ON
```

Not Performed:_____

124-33 **CGLS**

```
CURSOR CNTL
(OMS-L FU)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
VERIFY DOWNLISTED INDICATOR IS ON
```

Not Performed:_____

124-34 **CGLS**

```
CURSOR CNTL
(OMS-R OX)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
VERIFY DOWNLISTED INDICATOR IS ON
```

Not Performed:_____

124-35 **CGLS**

CURSOR CNTL
(OMS-R FU)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
VERIFY DOWNLISTED INDICATOR IS ON

Not Performed:_____

124-36 **CGLS**

CURSOR CNTL
(RESET)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
VERIFY DOWNLISTED INDICATORS ARE OFF

Not Performed:_____

***** End of OMS B Crossfeed Bypass *****

124-37 **CGLS**

CURSOR CNTL
(JTOY OF LIFTOFF)
XMIT CURSOR KEY - PRESS

CRT
VERIFY MESSAGE: ENTER GMT OF LIFTOFF
IN FORMAT DDD:HHMM/SS

CONSOLE KYBD

_____:_____/___

XMIT RESP KEY - PRESS
EXEC CMD KEY - PRESS

Not Performed:_____

124-38 **CGLS**

```
CURSOR CNTL
(RS AUTO SEQUENCE START)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

124-39 **CGLS**

```
CURSOR CNTL
(HOLD)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

124-40 **CGLS**

```
CURSOR CNTL
(RECYCLE)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

124-41 **CGLS**

```
CURSOR CNTL
(RESUME)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

124-42 **CGLS**

```
CURSOR CNTL
(BYP LO2 ACCUM RECIRC VLV OPEN)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

NOTE

Aerosurface slew check must be completed by Redundant Set Auto-Sequence Start milestone. This slew check currently takes 20.8 seconds to complete.

124-43 **CGLS**

```
CURSOR CNTL
(AEROSURFACE DRIVE CHECK)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

NOTE

MPS slew check must be completed by the Redundant Set Auto-Sequence Start milestone. This slew check currently takes 23 seconds to complete.

124-44 **CGLS**

```
CURSOR CNTL
(MPS GIMBAL CHECK)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

NOTE

SRB gimbal must be completed by SRB ignition. This slew check currently takes 4.3 seconds to complete.

124-45 **CGLS**

```
CURSOR CNTL
(SRB FCS HYD VERIFICATION FLG)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

124-46 CGLS

```
CURSOR CNTL
(LPS GO FOR ENGINE START)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

124-47 CGLS

```
CURSOR CNTL
(BYP LO2 OVBD BLEED VLV CL A)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

124-48 CGLS

```
CURSOR CNTL
(BYP LO2 OVBD BLEED VLV CL B)
XMIT CURSOR KEY - PRESS
EXEC CMD KEY - PRESS
```

Not Performed:_____

***** End of Contingency Launch Sequence Commands *****

***** End of GLS Real Time Mask/Reset and Contingency Launch Sequence Commands *****

GLS LDB Hardwire Safing Switch

NOTE

Perform this section if an immediate Hold/Recycle of the onboard countdown clock is required.

GLS LDB Hardwire Safing Switch Not Performed:_____

124-49 **CGLS**

On Integration Safing Panel,
Position LPS Hold Switch to HOLD (Up Position).

***** End of GLS LDB Hardwire Safing Switch *****

GLS Limit Change Contingency for RF Glitch (T-0200/00 Thru T-0005/00)

NOTE
Between T-9 min and T-5 min, perform these steps only in a hold.

GLS Limit Change Contingency for RF Glitch Not Performed:_____

124-50 **CGLS**

CANCEL PENDING REQUESTS.

Not Performed:_____

124-51 **CGLS**

SELECT APP PG 2B

VERIFY INTEGRATED MENU

124-52 **CGLS**

PFP (SLP02)
PFPK2 - PRESS

124-53 **CGLS**

PFP(LCC CONTROL)
PFPK4 - PRESS

CRT
LCC C&D (SDP08)

124-54 **CGLS**

CURSOR CNTL
(TERM LIP 1)
XMIT CURSOR - PRESS

124-55 **CGLS**

CURSOR CNTL
(TERM LIP 2)
XMIT CURSOR - PRESS

124-56 **CGLS**

IF MIPS ARE ACTIVE,

THEN
CURSOR CNTL
(TERM MIP 1)
XMIT CURSOR - PRESS

Not Performed:_____

124-57 **CGLS**

IF MIPS ARE ACTIVE,

THEN
CURSOR CNTL
(TERM MIP 2)
XMIT CURSOR - PRESS

Not Performed:_____

124-58 **CGLS**

SELECT APP PG 1B

VERIFY INTEGRATED MENU

124-59 **CGLS**

```
CURSOR CNTL
(PSEUDO INIT)
XMIT CURSOR - PRESS
```

NOTE
Next step resets interrupt processor activity indicators and lockout bits.

124-60 **CGLS**

```
CURSOR CNTL
(INIT PROC)
XMIT CURSOR - PRESS
```

124-61 **CGLS**

```
CURSOR CNTL
(TERMINATE)
XMIT CURSOR - PRESS
```

124-62 **CGLS**

```
SELECT APP PG 2B
```

124-63 **CGLS**

```
PFP (LIMIT CHANGE)
PFPK2 - PRESS
```

124-64 **CGLS**

```
CURSOR CNTL
(CONSOLE BACKUP)
XMIT CURSOR - PRESS

CRT
VERIFY BACKUP SOLID BLOCK
```

124-65 **CGLS**

CURSOR CNTL
(ACTIVATE DUAL NOTIFICATION)
XMIT CURSOR - PRESS

CRT
VERIFY ACTIVE SOLID BLOCK

124-66 **CGLS**

VERIFY TWO CONCURRENCIES AT BACKUP.

124-67 **CGLS**

PFP (TERM LIMIT CHANGE)
PFPK2 - PRESS

CRT
VERIFY LCC C&D (SDP08)

124-68 **CGLS**

CURSOR CNTL
(ACT LIP 1)
XMIT CURSOR - PRESS

124-69 **CGLS**

CURSOR CNTL
(ACT LIP 2)
XMIT CURSOR - PRESS

124-70 **CGLS**

VERIFY SLPBO AND SLPCO ACTIVE AT BACKUP.

124-71 **CGLS**

PFP (LIMIT CHANGE)
PFPK2 - PRESS

124-72 **CGLS**

CURSOR CNTL
(XFER TO GLS FOR ALL)
XMIT CURSOR - PRESS

124-73 **CGLS**

VERIFY LIMITS TRANSFERRED TO GLS EXCEPT BRS.

Countdown Time > -26/00

NOTE
Perform this option if Countdown Time is > -26/00.

Countdown Time > -26/00 Not Performed:_____

124-74 **CGLS**

CURSOR CNTL
(LIMITS TO GLS FOR BRS)
XMIT CURSOR - PRESS

***** End of Countdown Time > -26/00 *****

124-75 **CGLS**

VERIFY TWO CONCURRENCIES AT BACKUP.

Countdown Time > -19/00

NOTE
Perform this option if Countdown Time is > -19/00.

Countdown Time > -19/00 Not Performed:_____

124-76 **CGLS**

```
PFP (TERM LIMIT CHANGE)
PFPK2 - PRESS
```

124-77 **CGLS**

```
CURSOR CNTL
(ACT MIP 1)
XMIT CURSOR - PRESS
```

124-78 **CGLS**

```
CURSOR CNTL
(ACT MIP 2)
XMIT CURSOR - PRESS
```

***** End of Countdown Time > -19/00 *****

NOTE
LIP and MIP masks remain set. No need to set bits again.

124-79 **CGLS**

```
PFP (INTG MENU)
PFPK1 - PRESS
PFPK7 - PRESS
```

Countdown Time > -9/00

NOTE
Perform this section if Countdown Time is > -9/00.

Countdown Time > -9/00 Not Performed:_____

124-80 **CGLS**

PFP (SLP02)
PFPK2 - PRESS

124-81 **CGLS**

PFP (LCC CONTROL)
PFPK4 - PRESS

CRT
VERIFY LCC C AND D (SDP08)

124-82 **CGLS**

CURSOR CNTL
(ML CVFY RECVRY)
XMIT CURSOR KEY - PRESS

CRT
VERIFY ML CVFY RECOVERY PROGRAM COMPLETE - SLP80

124-83 **CGLS**

PFP (INTG MENU)
PFPK1 - PRESS

CRT
VERIFY INTEGRATED MENU

***** End of Countdown Time > -9/00 *****

***** End of GLS Limit Change Contingency for RF Glitch (T-0200/00 thru T-0005/00) *****

Manually Initiate OAA Accumulator Recharge and System Reconfiguration

NOTE

Perform this option only if GOAL Program, SLPG1 (OAA Accumulator Recharge and System Reconfiguration) fails to execute at the GLS Mainline Console by T-5 minutes.

Manually Initiate OAA Accumulator Recharge and System Reconfiguration
Not Performed:_____

124-84 **CGLS** **NTD** **212**
CSPE

OAA Accumulator Recharge and System Reconfiguration Software failed to execute.
Request concurrence to manually initiate software.

124-85 **NTD** **CGSS** **212**
CSPE

GLS requests concurrence to manually initiate OAA Accumulator Recharge and System Reconfiguration.

124-86 **CGSS** **NTD** **212**

CGSS concurs with manual OAA Accumulator Recharge and System Reconfiguration.

124-87 **NTD** **CGLS** **212**

Initiate OAA Accumulator Recharge and System Reconfiguration.

124-88 **CGLS**

```
CRT
SLPG1  PERF PGM
```

124-89 **CGLS**

Verify SLPG1 is executing.

124-90 **CGLS** **NTD** **212**
CGSS
CSPE

Software initiation successful.

***** End of Manually Initiate OAA Accumulator Recharge and System Reconfiguration *****

Manually Mark Measurement as Failed

NOTE

In the event that a measurement has failed good, perform this section, repeating as required, to establish the correct voting logic associated with the effected measurement. OPE/SPE concurrence must be obtained before any of the following steps may be worked.

Manually Mark Measurement as Failed Not Performed:_____

NOTE

Perform one of the following two options for each FD that must be manually marked as failed. Option used will be based on whether the graphical interface for marking a measurement failed has been implemented for the given FD.

NOTE

A list of FD's worked by steps in this option and the associated fill-ins will be provided by CGLS to QC post-test.

Mark Failed via 25 Lookup Display

NOTE

This option (Mark Failed via 25 Lookup Display) should be used for those measurements that have the Fail Bit graphical user interface available.

Mark Failed via 25 Lookup Display Not Performed:_____

124-91 **CGLS**

```
VERIFY INTG MENU
PFPK5 (VIEW INTERRUPT) - PRESS
```

124-92 **CGLS**

IF MEASUREMENT TO BE FAILED IS IN THE LIPS,

THEN
PFPK5 (LCC SELECTIONS) - PRESS

Not Performed:_____

124-93 **CGLS**

CURSOR CNTL
_____ TABLE UPPER/LOWER
XMIT CURSOR - PRESS

124-94 **CGLS**

POSITION CURSOR TO BLOCK F FOR DESIRED FD.
XMIT CURSOR KEY - PRESS

VERIFY FD IS MARKED AS FAILED

HARD COPY KEY - PRESS

REPEAT AS NECESSARY

124-95 **CGLS**

CURSOR CNTL
PFPK1 (INTG MENU) - PRESS

VERIFY INTG MENU

***** End of Mark Failed via 25 Lookup Display *****

Mark Failed via Manual Fail Bit Issuance

NOTE
This option (Mark Failed via Manual Fail Bit Issuance) should be used for those measurements that do not have the Fail Bit graphical user interface available.

Mark Failed via Manual Fail Bit Issuance Not Performed:_____

124-96 **CGLS**

Verify console printer online.

Not Performed:_____

NOTE
Logically "OR" the value obtained in the PVO below with the value required for the affected measurement to obtain the correct value to be issued.

124-97 **CGLS**

```
CONSOLE KYBD
PVO __________
      PSEUDO

XMIT CMD KEY - PRESS
```

124-98 **CGLS**

```
CONSOLE KYBD
ISSU __________   __________
      PSEUDO        VALUE

XMIT CMD KEY - PRESS
EXEC CMD KEY - PRESS
```

124-99 **CGLS**

Verify console printer offline.

Not Performed:_____

***** End of Mark Failed via Manual Fail Bit Issuance *****

***** End of Manually Mark Measurement as Failed *****

LOX Flight Mass Override

NOTE
Perform this option if the LOX Flight Mass check at T-5 minutes is to be bypassed.

LOX Flight Mass Override Not Performed:_____

124-100 **CGLS**

```
CURSOR CNTL
(LOX FLIGHT MASS OVERRIDE)
XMIT CURSOR KEY - PRESS

VERIFY LOX FLIGHT MASS OVERRIDE INDICATES ON
```

***** End of LOX Flight Mass Override *****

Load Command File

NOTE

Perform this option to load a command file from SDC to a CCMS console. This operation may be repeated more than once to support loading multiple command files or loading files at multiple consoles.

Load Command File Not Performed:_____

124-101 CGLS LPS 127

Request LPS activate keyboard utilities at target console and report completion.

124-102 CGLS

```
VERIFY 2 CONSECUTIVE APPLICATION CONCURRENCIES
AVAILABLE

CONSOLE KYBD
HOME CMD KEY - PRESS

$LIBRARY V0 CF
PERF PGM KEY - PRESS
```

NOTE

If command file library does not exist, perform the next step.

124-103 CGLS

```
CONSOLE KYBD
HOME CMD KEY - PRESS

$BLDLIB V0 CF #900 8 4 0
PERF PGM KEY - PRESS

VERIFY NO UNEXPECTED MESSAGES
```

Not Performed:_____

124-104 CGLS

```
CONSOLE KYBD (POSITION 2)
HOME CMD KEY - PRESS

$T
PERF PGM KEY - PRESS
```

124-105 CGLS

```
CONSOLE KYBD (POSITION 3)
SDC ENABLE KEY - PRESS

SDC
SIGN ON KEY - PRESS

CD /APPS/DAPFILE/FRAS_GLS/CMDFILES
SDC XMIT KEY - PRESS
```

NOTE

Repeat the following three steps for each source file that makes up the complete command file.

124-106 CGLS

```
CONSOLE KYBD (POSITION 3, SDC)
MENU->EDIT->CLEAR

SDC XMIT KEY - PRESS
SDC XMIT KEY - PRESS
SDC XMIT KEY - PRESS

CAT [FILENAME]
SDC XMIT KEY - PRESS

ERASE "RSHELL>" FROM LAST LINE
HOME KEY - PRESS

HARD COPY KEY - PRESS
MENU->SAVE
```

124-107 **CGLS**

```
CONSOLE KYBD (POSITION 3, CCMS)
MENU->RESTORE
```

124-108 **CGLS**

```
CONSOLE KYBD (POSITION 2, $T)
HOME CMD KEY - PRESS

CRT 3
XMIT RESP KEY - PRESS

HOME CMD KEY - PRESS

PAG
XMIT RESP KEY - PRESS
```

124-109 **CGLS**

```
CONSOLE KYBD (POSITION 2, $T)
HOME CMD KEY - PRESS

SAV V0 CF [FILENAME]
XMIT RESP KEY - PRESS
```

124-110 **CGLS**

```
CONSOLE KYBD (POSITION 2, $T)
HOMD CMD KEY - PRESS

EXI
XMIT RESP KEY - PRESS
```

124-111 **CGLS**

```
CONSOLE KYBD
HOME CMD KEY - PRESS

$LIBRARY V0 CF
PERF PGM KEY - PRESS

VERIFY [FILENAME] EXISTS
```

124-112 **CGLS**

```
CONSOLE KYBD
HOME CMD KEY - PRESS

$PRINT V0 CF [FILENAME]
PERF PGM KEY - PRESS

VERIFY FILE LISTING IS CORRECT
```

NOTE

If the contents of the command file are not correct, perform the following step and then reload the invalid command file.

124-113 **CGLS**

```
CONSOLE KYBD
HOME CMD KEY - PRESS

$DELENT V0 CF [FILENAME]
PERF PGM KEY - PRESS
```

Not Performed:_____

124-114 CGLS LPS 127

Request LPS deactivate keyboard utilities at target console and report completion.

***** End of Load Command File *****

MPS LH_2 Low Level Sensor Voltage Monitoring Enable

NOTE

This option is only available prior to T-9 and counting. Perform this section to activate Monitoring of the MPS LH_2 Low Level Sensor Voltages.

MPS LH_2 Low Level Sensor Voltage Monitoring Enable Not Performed:_____

124-115 **CGLS**

```
PFP (VIEW INTERRUPT)
PFPK5 - PRESS
```

124-116 **CGLS**

```
CURSOR CONTROL
(MPS-53 ACTIVATION - DISABLED)
XMIT CURSOR - PRESS
```

124-117 **CGLS**

VERIFY MESSAGE:
SELECT FAILED SENSOR [OR NONE] TO ENABLE
ACTIVATION,
CANCEL TO EXIT

NOTE

Select one of the following six options to activate or cancel out of MPS-53 Monitoring.

124-118 **CGLS**

```
CURSOR CONTROL
(T41V1930A1)
XMIT CURSOR
VERIFY MESSAGE:
MPS-53 ACTIVATION ENABLED - T41V1930A1 MARKED AS
FAILED [SENSOR 1]
```

Not Performed:_____

124-119 **CGLS**

```
CURSOR CONTROL
(T41V1931A1)
XMIT CURSOR
VERIFY MESSAGE:
MPS-53 ACTIVATION ENABLED - T41V1931A1 MARKED AS
FAILED [SENSOR 2]
```

Not Performed:_____

124-120 **CGLS**

```
CURSOR CONTROL
(T41V1932A1)
XMIT CURSOR
VERIFY MESSAGE:
MPS-53 ACTIVATION ENABLED - T41V1932A1 MARKED AS
FAILED [SENSOR 3]
```

Not Performed:_____

124-121 **CGLS**

CURSOR CONTROL
(T41V1933A1)
XMIT CURSOR
VERIFY MESSAGE:
MPS-53 ACTIVATION ENABLED - T41V1933A1 MARKED AS FAILED [SENSOR 4]

Not Performed:_____

124-122 **CGLS**

CURSOR CONTROL
(CANCEL)
XMIT CURSOR
VERIFY MESSAGE:
MPS-53 ACTIVATION ENABLE CANCELED

Not Performed:_____

124-123 **CGLS**

CURSOR CONTROL
(NONE)
XMIT CURSOR
VERIFY MESSAGE:
MPS-53 ACTIVATION ENABLED - NO SENSOR VOLTAGE FD MARKED AS FAILED

Not Performed:_____

124-124 **CGLS**

IF CANCEL was selected,	**Verify**
THEN verify MPS-53 ACTIVATION DISABLED message.	☐
ELSE verify MPS53 ACTIVATION ENABLED message.	☐

***** End of MPS LH2 Low Level Sensor Voltage Monitoring Enable *****

MPS LH_2 Low Level Sensor Voltage Monitoring Disable

NOTE
This option is only available prior to T-9 and counting. Perform this section to disable Monitoring of the MPS LH_2 Low Level Sensor Voltages.

MPS LH_2 Low Level Sensor Voltage Monitoring Disable Not Performed:_____

124-125 **CGLS**

```
PFP
(VIEW INTERRUPT)
PFPK5 - PRESS
```

124-126 **CGLS**

```
CURSOR CONTROL
(MPS-53 ACTIVATION - ENABLED)
XMIT CURSOR - PRESS
```

124-127 **CGLS**

```
VERIFY MPS-53 ACTIVATION - DISABLED
```

124-128 **CGLS**

```
VERIFY MESSAGE:
MPS-53 ACTIVATION DISABLED AND FAIL BITS FOR
SENSOR VOLTAGES CLEARED
```

***** End of MPS LH_2 Low Level Sensor Voltage Monitoring Disable *****

MPS-01 Preplan Limit Change

NOTE

Perform this option upon request of Test Team to change limits monitored by GLS for MPS-01 measurements.

This option is only available after T-2/50 and prior to T-0/31 resume.

MPS-01 Preplan Limit Change Not Performed:_____

124-129 **CGLS**

```
PFP
PFPK4 (LCC CONTROL) - PRESS
```

124-130 **CGLS**

```
CURSOR CONTROL
(MPS-01 PREPLAN)
XMIT CURSOR KEY - PRESS
```

124-131 **CGLS**

VERIFY MESSAGE:
MPS-01 PREPLAN LIMIT CHANGE EXECUTED

124-132 **CGLS**

```
CURSOR CONTROL
(TERMINATE)
XMIT CURSOR KEY - PRESS
```

***** End of MPS-01 Preplan Limit Change *****

*** End of Operation **124** ***

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OPERATION 125 LCC Workaround for FIREX Loop and Tank T-3 Pressure Anomaly - LCC EGR-03, GSE-15

Shop: **JBWC, JBFX**
Cntrl Rm Console: **C1**
OPR: **JBWC, JBFX**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **1.0**

NOTE
This is a contingency operation. Perform for an LCC violation - EGR-03 only.

Operation Not Performed:_____

125-1

JBFX	**STM**	**111**
STM	**NTD**	**232**
NTD	**OTC**	
OTC	**CMPL**	**132**

We have an LCC violation - EGR-03, FIREX loop and tank T-3 pressure anomaly.
Request CMPS contact JBFX on CH 123 for verifications.

Support: WSSA

125-2

CMPL	**JBFX**	**123**

Use CPRO or S FD

Firing Room FIREX pressure measurements are as follows:

1. GWDPPT91A (FX TNK FARM T3 PRESS STAT): _____PSI
2. GWDPPT90A (FX STRUCTURES WATER PRESS): _____PSI

125-3

JBFX	**STM**	**111**
STM	**NTD**	**132**

	Verify
IF at least one of the Firing Room FIREX pressure measurements indicates a pressure greater than 182 psig,	
THEN LCC violation cleared, continue Countdown.	☐
ELSE additional CCC measurement verifications will be required.	☐

Support: WSSA

125-4 **JBFX**

On console, Launch Pad HMI (screen WD2),

Verify that the following non-launch Pad measurement indicates a pressure greater than 182 psig:

PUMP STATION FIREX PRESSURE
(WP0036_FXMNPRESS_DSCHG)

Support: WSSA

125-5 **JBFX STM 111**
STM NTD 232

CCC Non-Launch Pad FIREX pressure measurements are as follows:

PUMP STATION FIREX PRESSURE _____PSI

125-6 **JBFX STM 111**
STM NTD 132

IF the CCC Non-Launch Pad FIREX pressure measurement indicates a pressure greater than 182 psig,	**Verify**
THEN FIREX pressure measurements indicate acceptable pressure. Before LCC can be cleared, Elevated Tank Top-off is required to demonstrate a clear flow path and intact FIREX piping. **Request** a "Go" for Elevated Tank Top-off.	☐
ELSE additional CCC measurement verifications will be required.	☐

Support: WSSA

125-7 **NTD STM 111**
STM JBFX 132

IF NTD gives a "Go" for Elevated Tank Top-off,

THEN perform Elevated Tank Top-off per Doc: JOB PLAN M3189.210 (LI) SS Elevated Tank Top-off without Field Support (Pad A/Pad B).

Not Performed:_____

125-8 **JBFX STM 111**
STM NTD 132

IF Elevated Tank Top-off was successful, **Verify**

THEN LCC violation cleared, continue Countdown. ☐

ELSE additional CCC measurement verifications will be required. ☐

125-9 **JBFX STM 111**
STM NTD 132

IF FIREX LCC violation has not been cleared by previous steps in this operation,

THEN report status of following Pad Pump Station engine run indicators (Screen WD2):

WP0036_PUMP1_RUNDIND (ON/OFF) _____
WP0036_PUMP2_RUNDIND (ON/OFF) _____
WP0036_PUMP3_RUNDIND (ON/OFF) _____
WP0036_PUMP4_RUNDIND (ON/OFF) _____

Support: WSSA

Not Performed:_____

125-10 **JBFX STM 111**
STM NTD 132

IF all of the Pad Pump Station engine run indicators indicate "OFF", **Verify**

THEN run indicators indicate FIREX pressure is acceptable at Pump Station. Before LCC can be cleared, Elevated Tank Top-off is required to demonstrate a clear flow path and intact FIREX piping. ☐
Request a "Go" for Elevated Tank Top-off.

ELSE FIREX pressure cannot be verified. Recommend that Countdown should not continue past T-31 seconds unless FIREX pressure can be verified. ☐

125-11 **NTD STM 232**
STM JBFX 111

IF NTD gives a "Go" for Elevated Tank Top-off,

THEN perform Elevated Tank Top-off per Doc: JOB PLAN M3189.210 (LI) SS Elevated Tank LCD Topoff without Field Support .

Not Performed:_____

125-12	**JBFX**	**STM**	**111**
	STM	**NTD**	**132**

IF Elevated Tank Top-off was successful,	**Verify**
THEN LCC violation cleared, continue Countdown.	☐
ELSE FIREX pressure cannot be verified. Recommend that Countdown should not continue past T-31 seconds unless FIREX pressure can be verified.	☐

Workaround for Sound Suppression Elevated Tank Level Measurements Less Than 258.5 feet (SSID GSE-15)

NOTE

This section shall be performed for sound suppression elevated tank level measurements less than 258.5 feet. This is a GSE-15 Launch Commit Criteria violation from OPS-1 Transition (T-20 min) until Go for RSLS Start (T-31 sec).

Workaround Not Performed:_____

125-13 **CGSS OTC 132**
OTC NTD 232
NTD STM 232
STM JBWC 111

We have sound suppression elevated tank level measurements less than 258.5 feet. This is a GSE-15 Launch Commit Criteria violation. **Request** JBWC contact CGSS on Ch 123 for verifications.

125-14 **CGSS JBWC 123**

Ready for sound suppression elevated tank level measurement checks.

125-15 **JBWC CGSS 123**

The Complex Control Center values are as follows:

1. Screen SSA (Pad A): PRI:_____Feet

2. Screen SSA (Pad A): RED:_____Feet

125-16 **CGSS JBWC 123**

The Firing Room values are as follows:

1. GWDQPT83A: _____Feet

2. GWDQPT84A: _____Feet

125-17	**CGSS**	**OTC**	**132**
	OTC	**NTD**	**232**
	NTD	**STM**	**232**

Both the Complex Control Center and Firing Room elevated tank level measurements are verified as less than 258.5 feet.
Request an elevated tank topoff be performed to provide a visual indication of the tank level. All following topoffs must be performed by the clock. The calculated sound suppression leak rate for this mission will be referenced to assure the tank water level remains above the redlined 258.5 foot level.

125-18	**STM**	**JBWC**	**111**

Perform topoff of sound suppression elevated tank per Doc: JOB PLAN M3189.210 (LI) SS Elevated Tank LCD Topoff without Field Support . All following topoffs must be performed by the clock. The calculated sound suppression leak rate for this mission will be referenced to assure the tank water level remains above the 258.5 foot redline.

***** End of Workaround for Sound Suppression Elevated Tank Level Measurements Less Than 258.5 feet (SSID GSE-15) *****

*** End of Operation **125** ***

OPERATION 126 Loss of Pad Operating Air Compressor

Shop: **JBPN**
Cntrl Rm Console: **NA**
OPR: **JBPN**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **2.0**

NOTE
This is a contingency operation. Do not perform unless a failure of facility air compressor occurs.

Operation Not Performed:_____

126-1 **JBPN** **STM**

Air compressor shutdown in fail mode. Monitoring system for automatic start of redundant compressor.

Support: CPNS

126-2 **JBPN**

IF back-up air compressor fails to start before air pressure decays to 125 psi,

THEN On skel C1A for Pad A/C1B for Pad B,
Open the control point window for "COMPRESSOR A/B RESET/STOP" and then **depress** the reset button.

Support: CPNS

Not Performed:_____

126-3 **JBPN**

IF back-up air compressor fails to start,

THEN while the control point window is still open,
Depress the override button for the back-up compressor.

Support: CPNS

Not Performed:_____

126-4 **JBPN**

IF back-up air compressor fails to start,

THEN while the control point is still open,
Depress the override button for the primary compressor.

Support: CPNS

Not Performed:_____

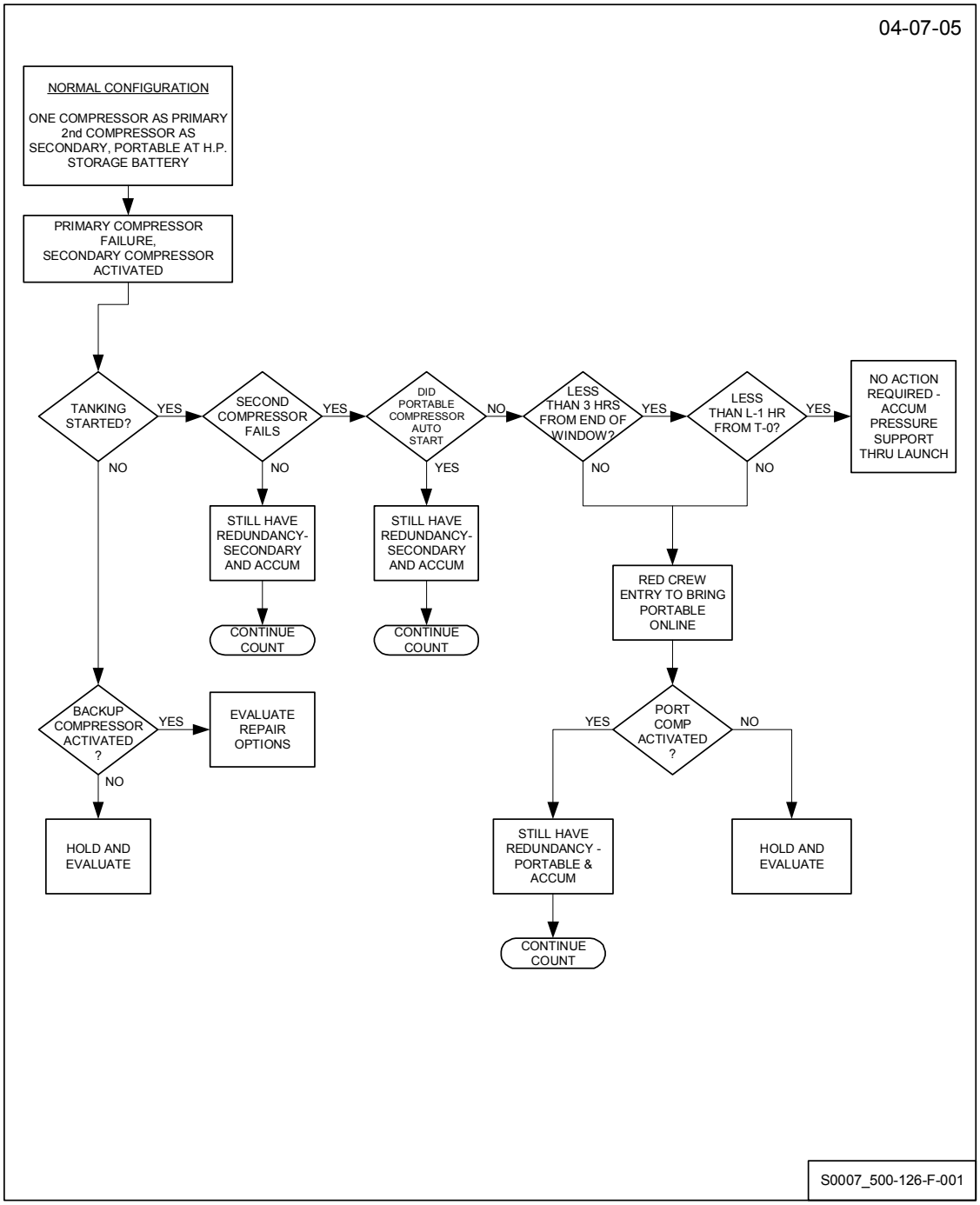
126-5 **JBPN** **STM**

Report status of primary/back-up/portable compressors.

Support: CPNS

126-6

Pad Compressor Failure



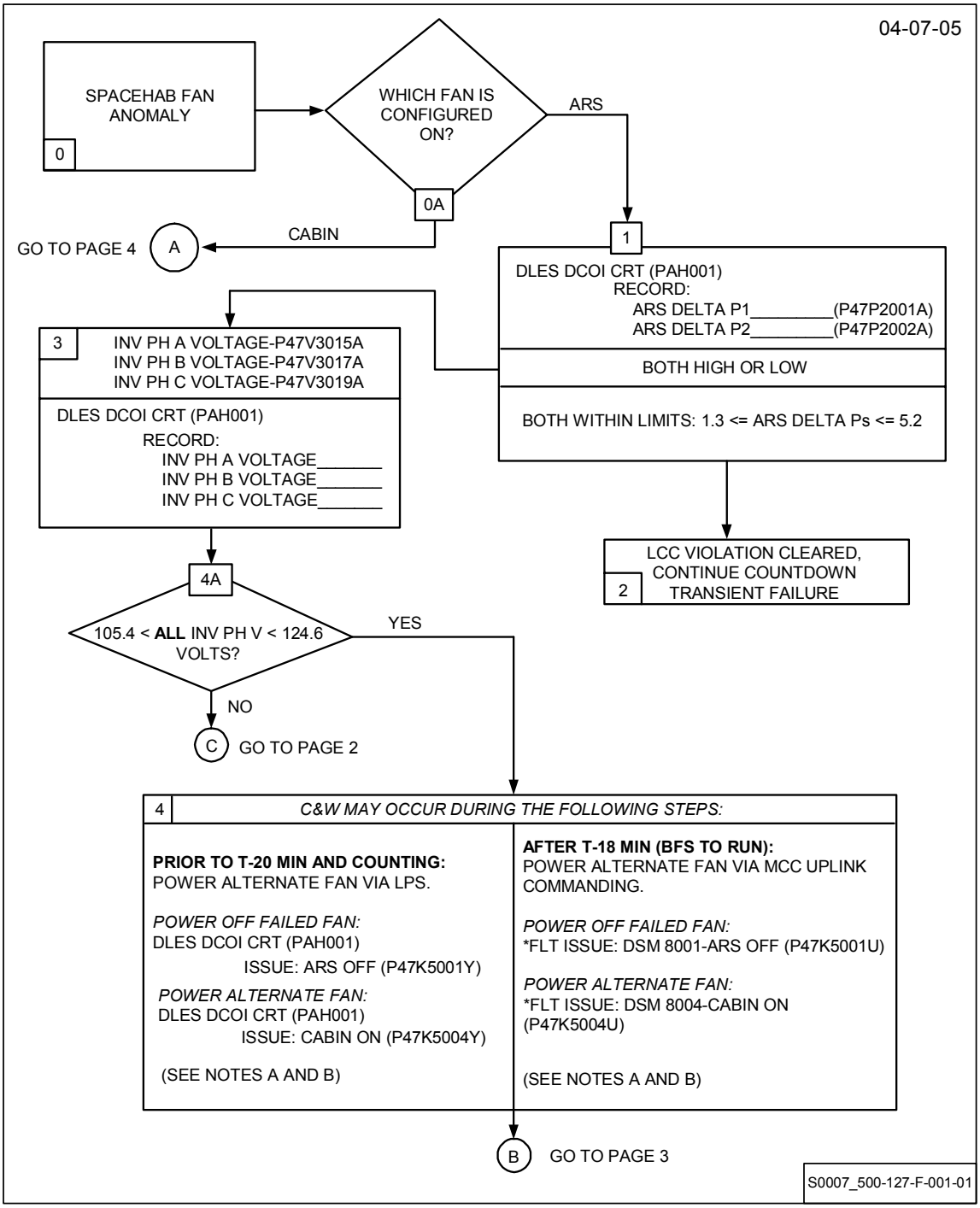
*** End of Operation **126** ***

OPERATION 127 Payload Procedures

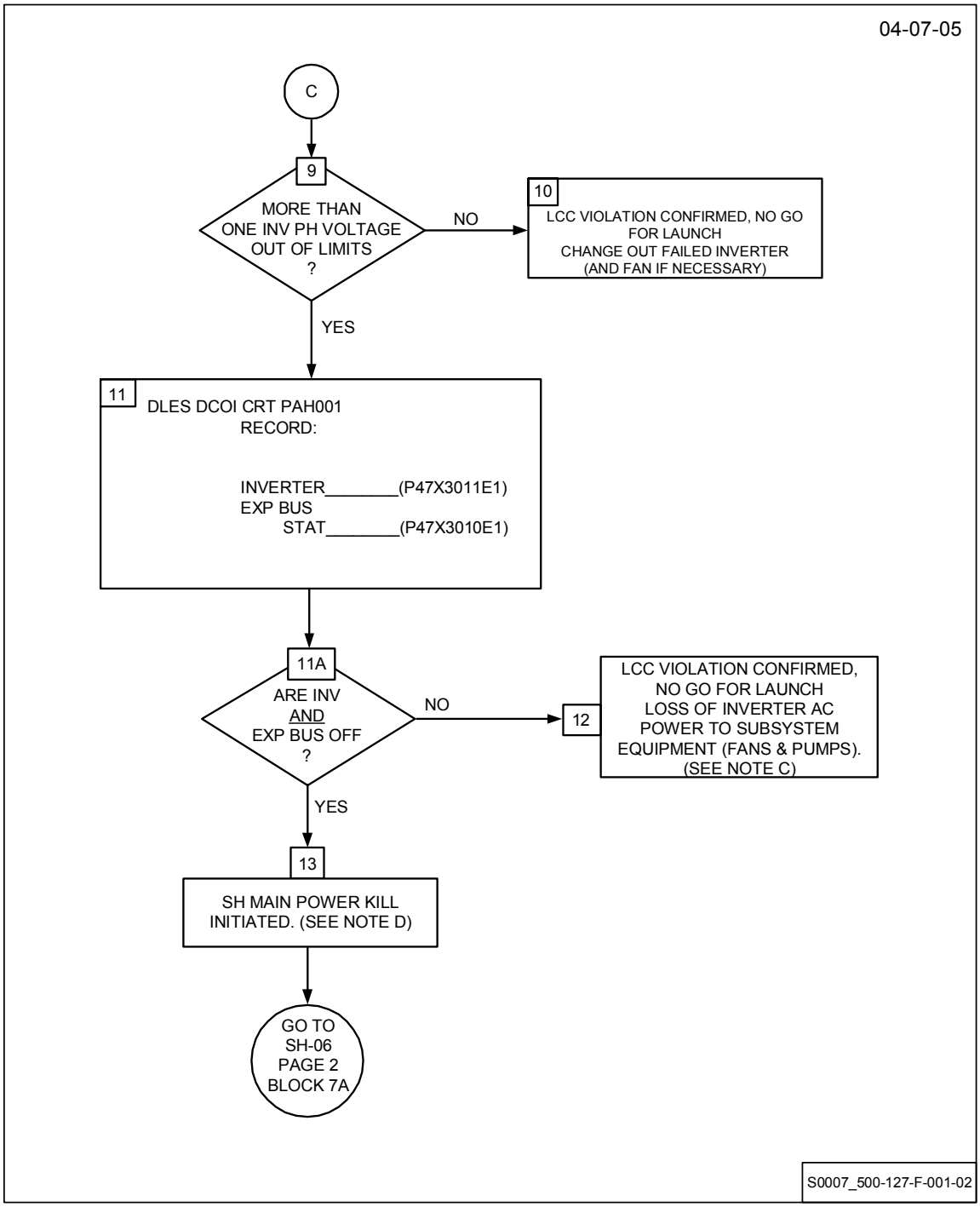
Shop: **PTC**
Cntrl Rm Console: **C1**
OPR: **PTC**
Zone: **40**
Hazard (Y/N): **N**
Duration (Hrs): **1.0**

127-1

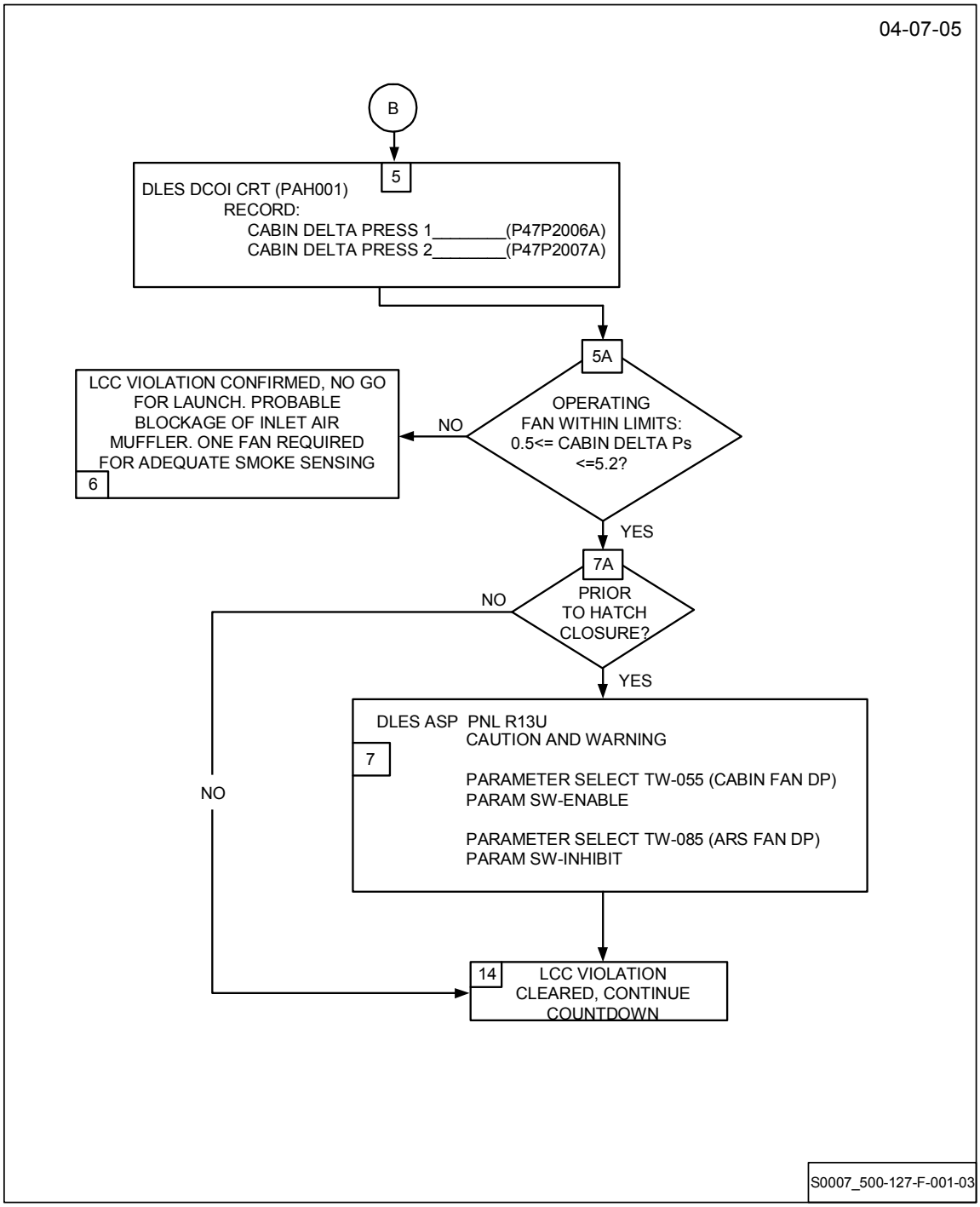
Spacehab Cabin (ARS) Fan Anomaly (SSID SH-01) (Page 1 of 7)



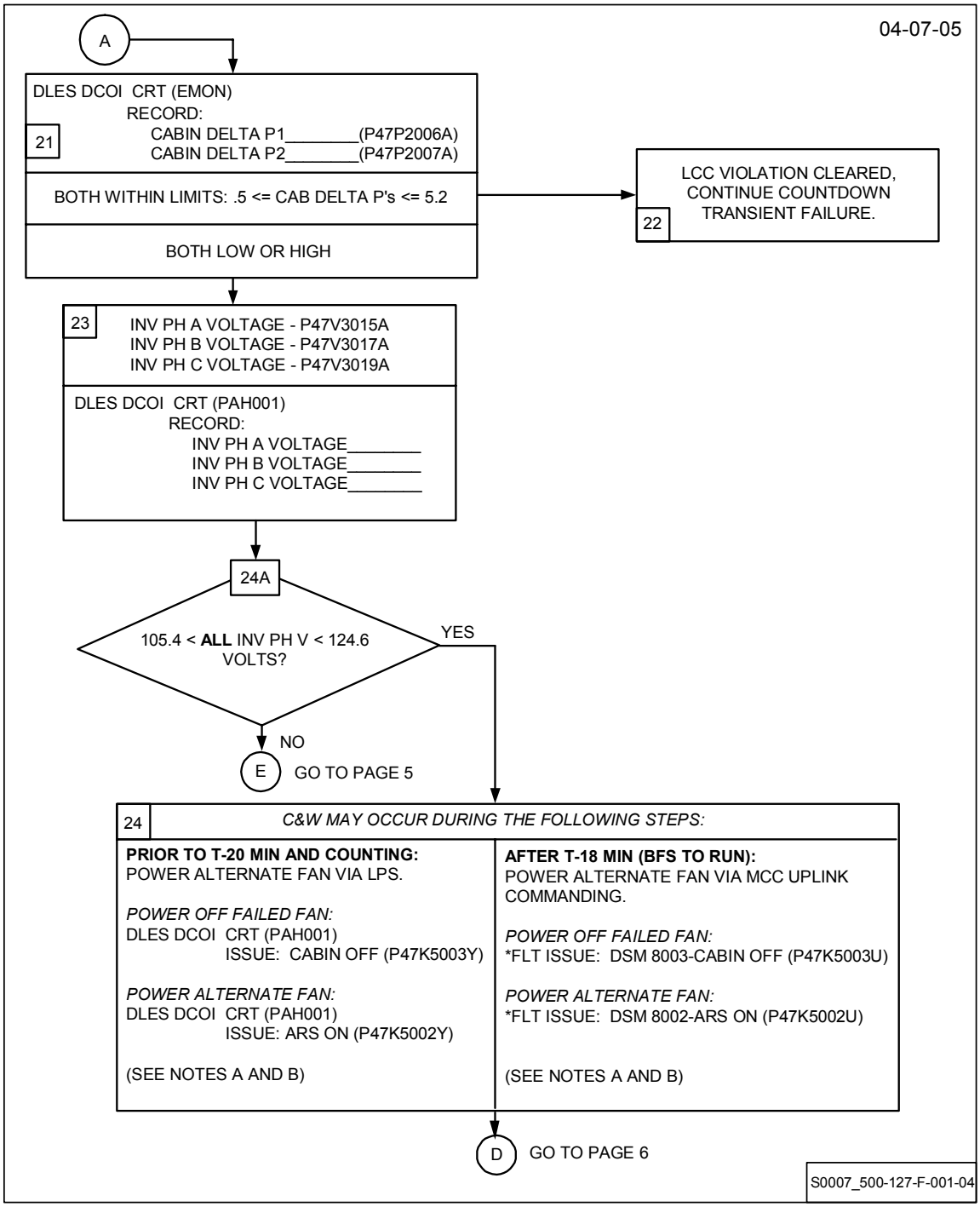
Spacehab Cabin (ARS) Fan Anomaly (SSID SH-01) (Page 2 of 7)



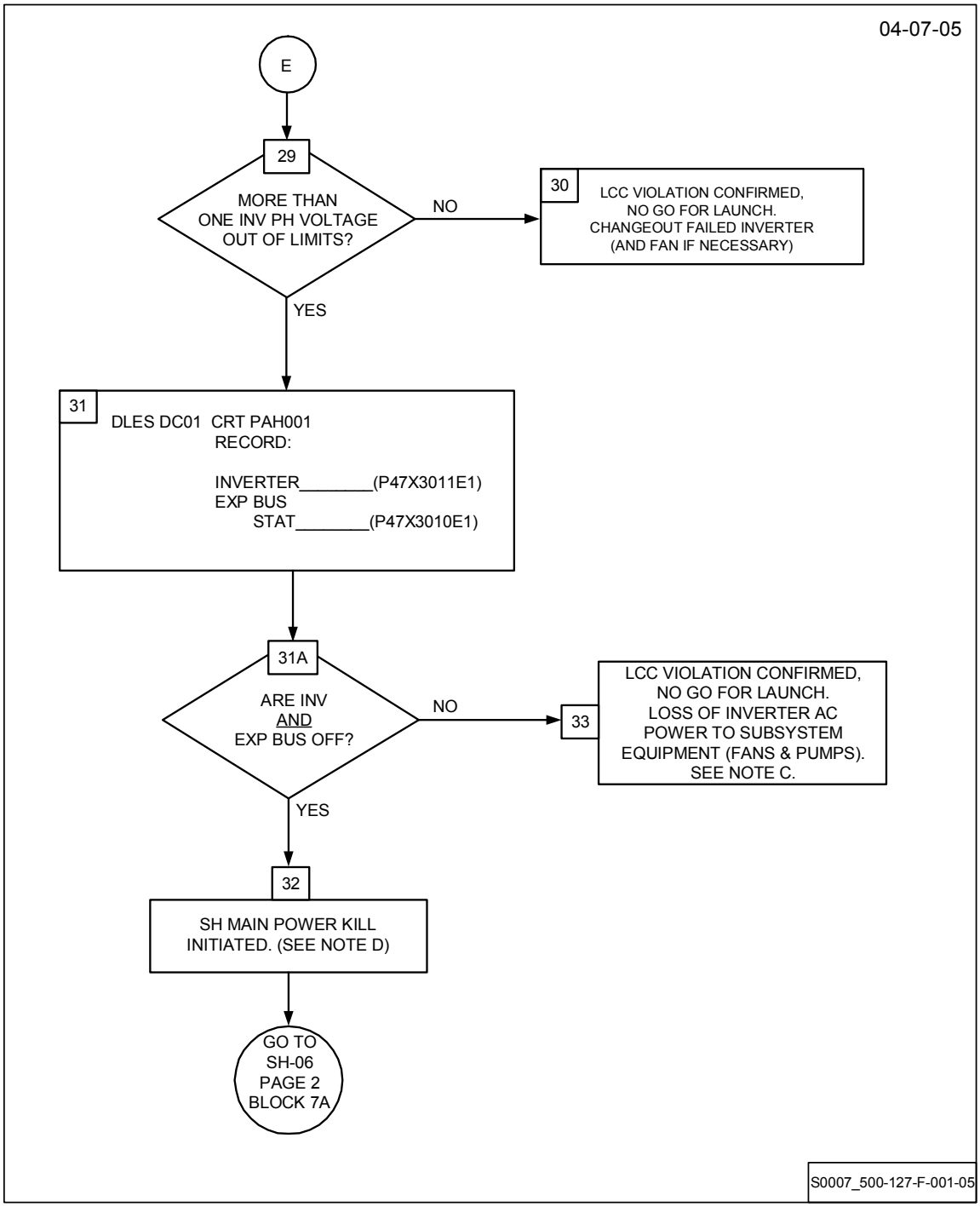
Spacehab Cabin (ARS) Fan Anomaly (SSID SH-01) (Page 3 of 7)



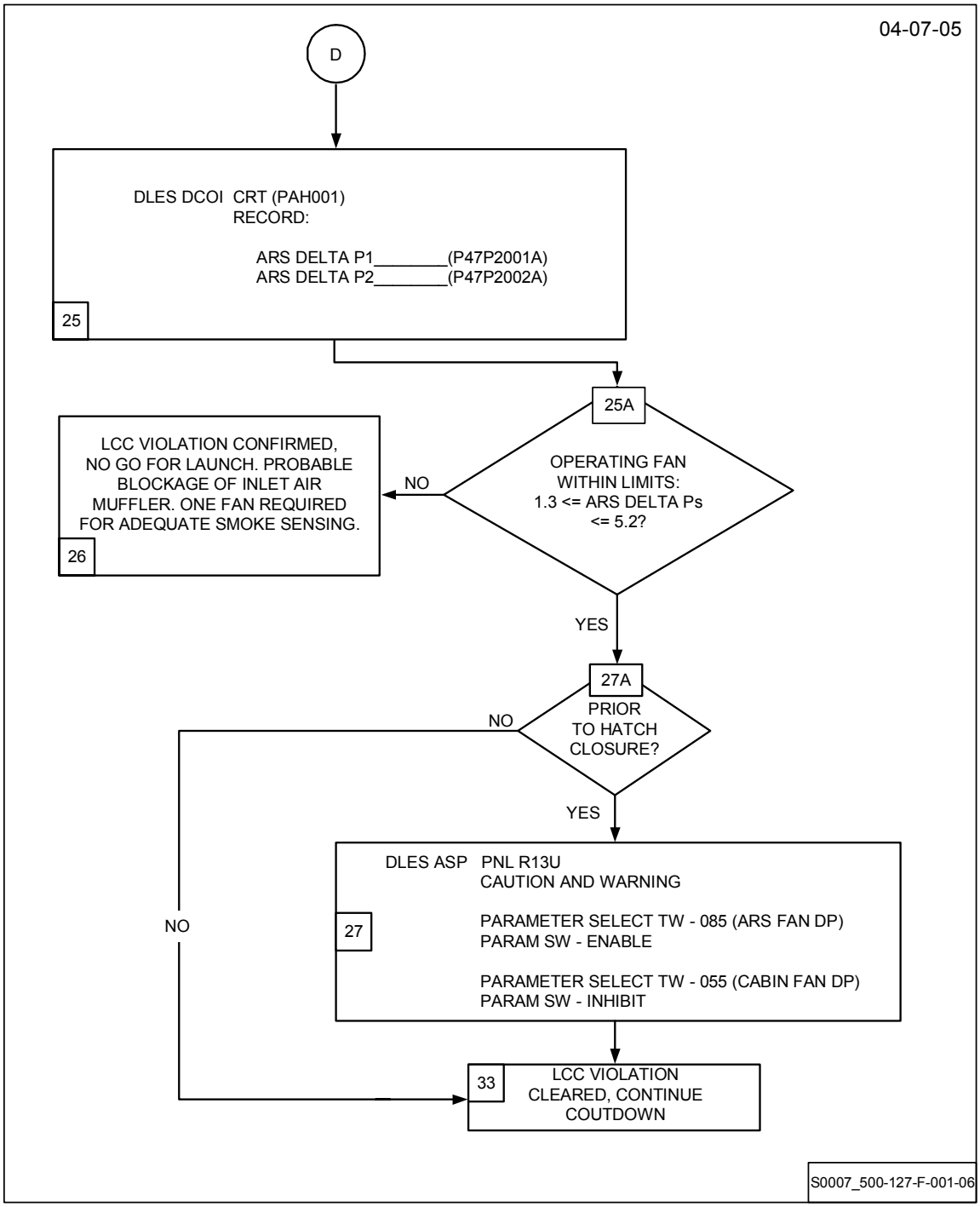
Spacehab Cabin (ARS) Fan Anomaly (SSID SH-01) (Page 4 of 7)



Spacehab Cabin (ARS) Fan Anomaly (SSID SH-01) (Page 5 of 7)



Spacehab Cabin (ARS) Fan Anomaly (SSID SH-01) (Page 6 of 7)



Spacehab Cabin (ARS) Fan Anomaly (SSID SH-01) (Page 7 of 7)

NOTE

A. Commanding of fans via LPS is not available after T-20 min and counting. No commanding is available between T-20 and T-18 min (OPS 101 transition). Commanding after T-18 min available via MCC uplink commands.

B. Possible failure of following: ARS (cabin)

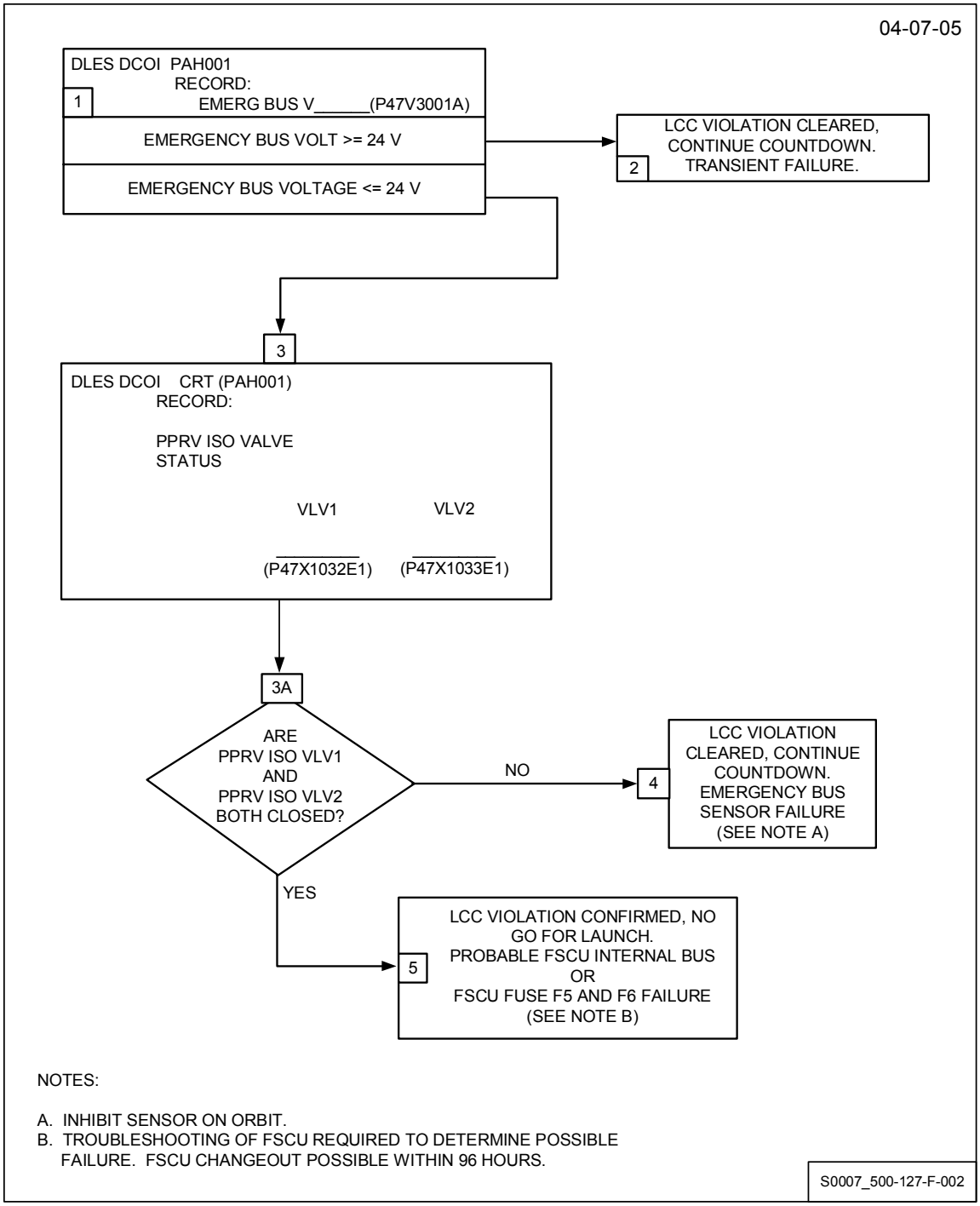
- Low Delta P
  - PDU relays K22 (K23) and/or K30 (K31) - (Open)
  - PDU fuses F4 (F7), F5 (F8), or F6 (F9)
  - ARS (cabin) fan internal problem
  - Fan filter blockage
- High Delta P
  - Inlet air muffler blockage
  - Ascent/descent inlet stub screen blockage (Config 1)
  - Ventbox air inlet fitting screen blockage (Config 2&3)
  - Floor debris screen blockage

C. Possible loss of inverter master sync, Phase A Inverter overvoltage shutdown, PDU K1 relay failure, or PDU F94 fuse failure (feeds inverter Phase A). K1 relay failure can be determined by checking inverter DC Bus current (P47C3012A) and inverter DC Bus voltage (P47V3013A) measurements. 0 volt condition for inverter Bus voltage is 18V, while 0 current condition for inverter Bus current is 0 amps. F94 fuse failure, Inverter overvoltage shutdown and inverter master sync failures all give same failure signature. All inverter phase voltage out of limits (Phase A controls sync for other two inverter phases).

D. ARS fan delta pressure low anomaly caused by SH main power kill. SH module remains in a safe configuration following a main power kill. Smoke detection is slowed due to lack of fan air circulation.

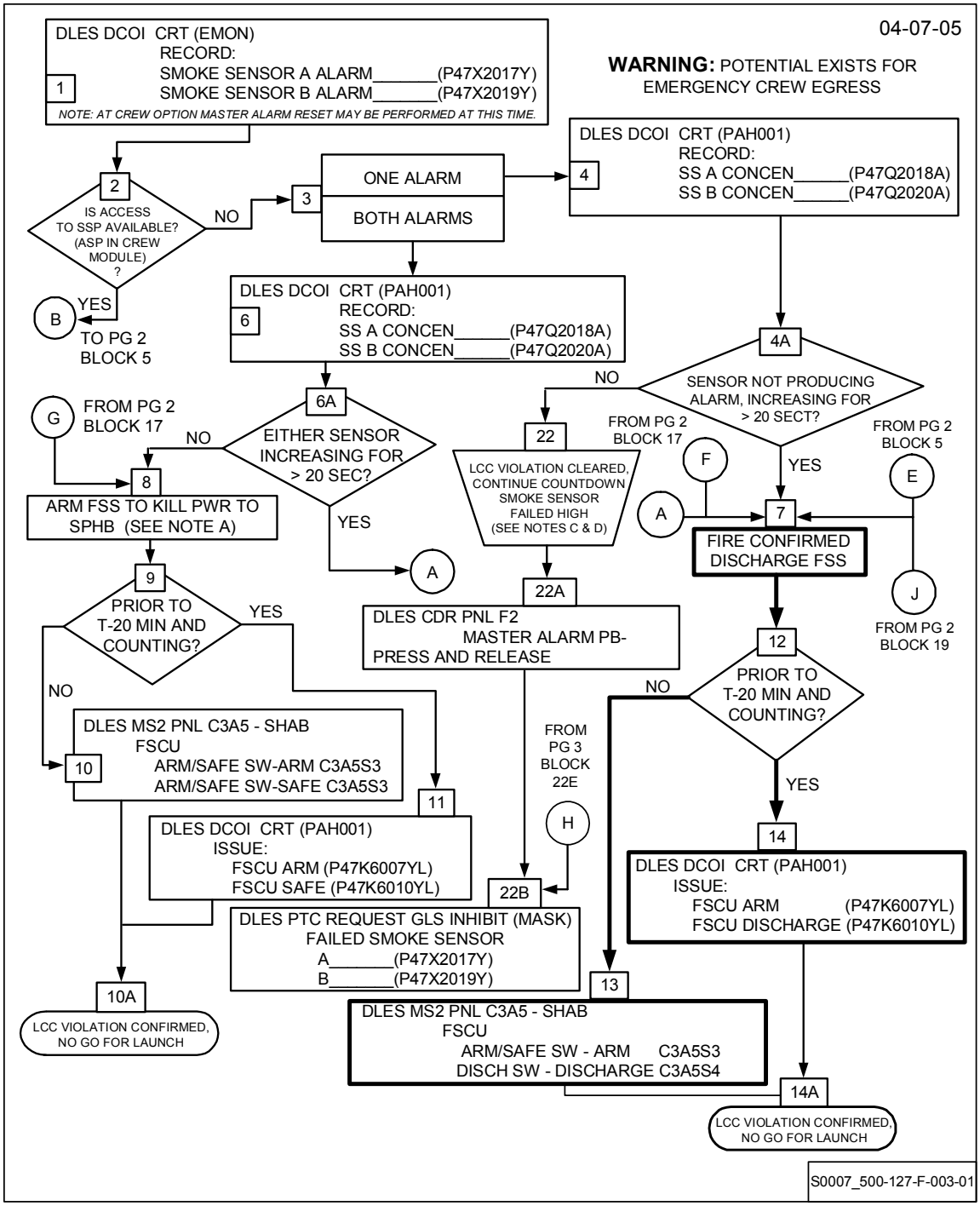
127-2

Spacehab Emergency Bus Voltage Anomaly (SSID SH-02)

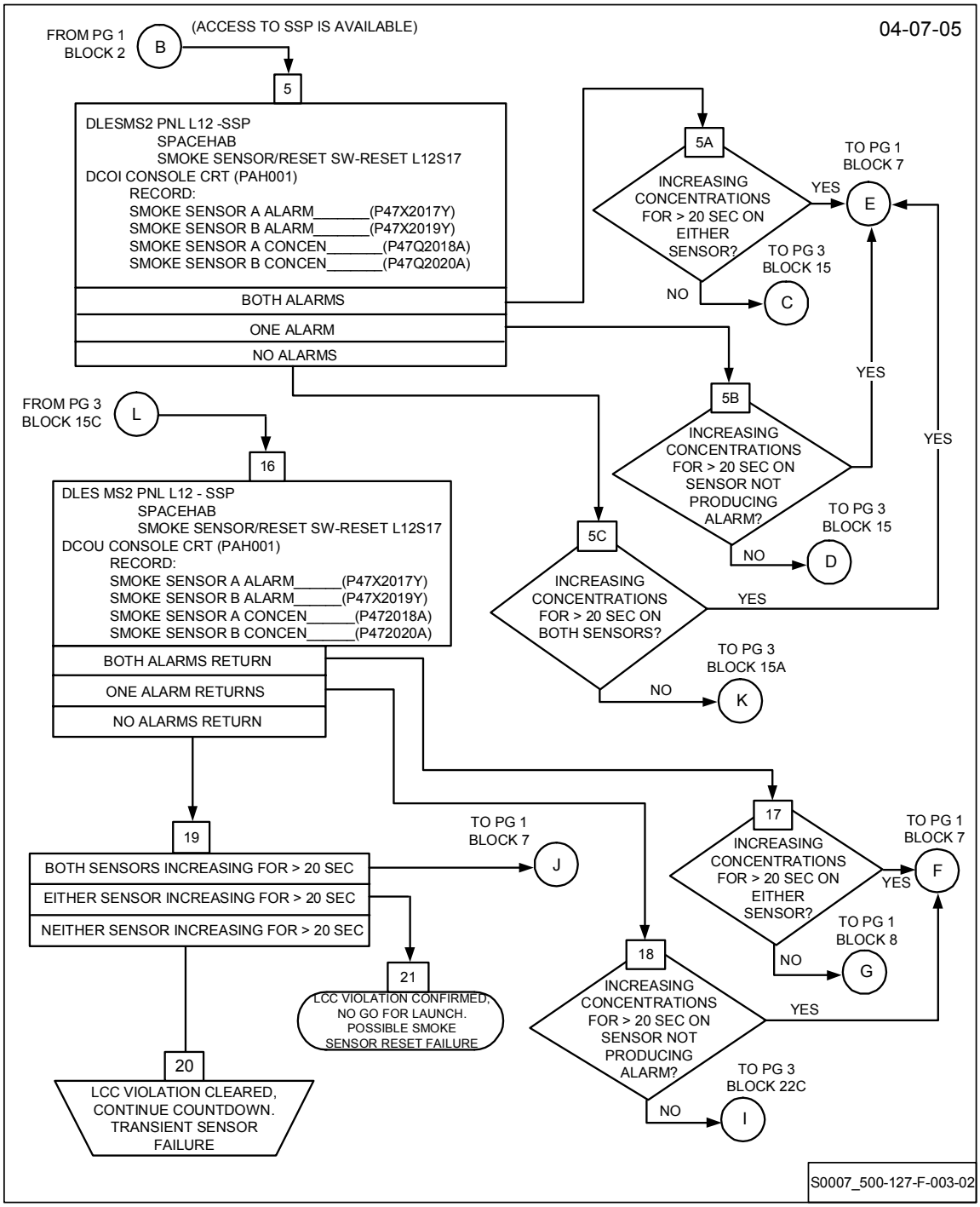


127-3

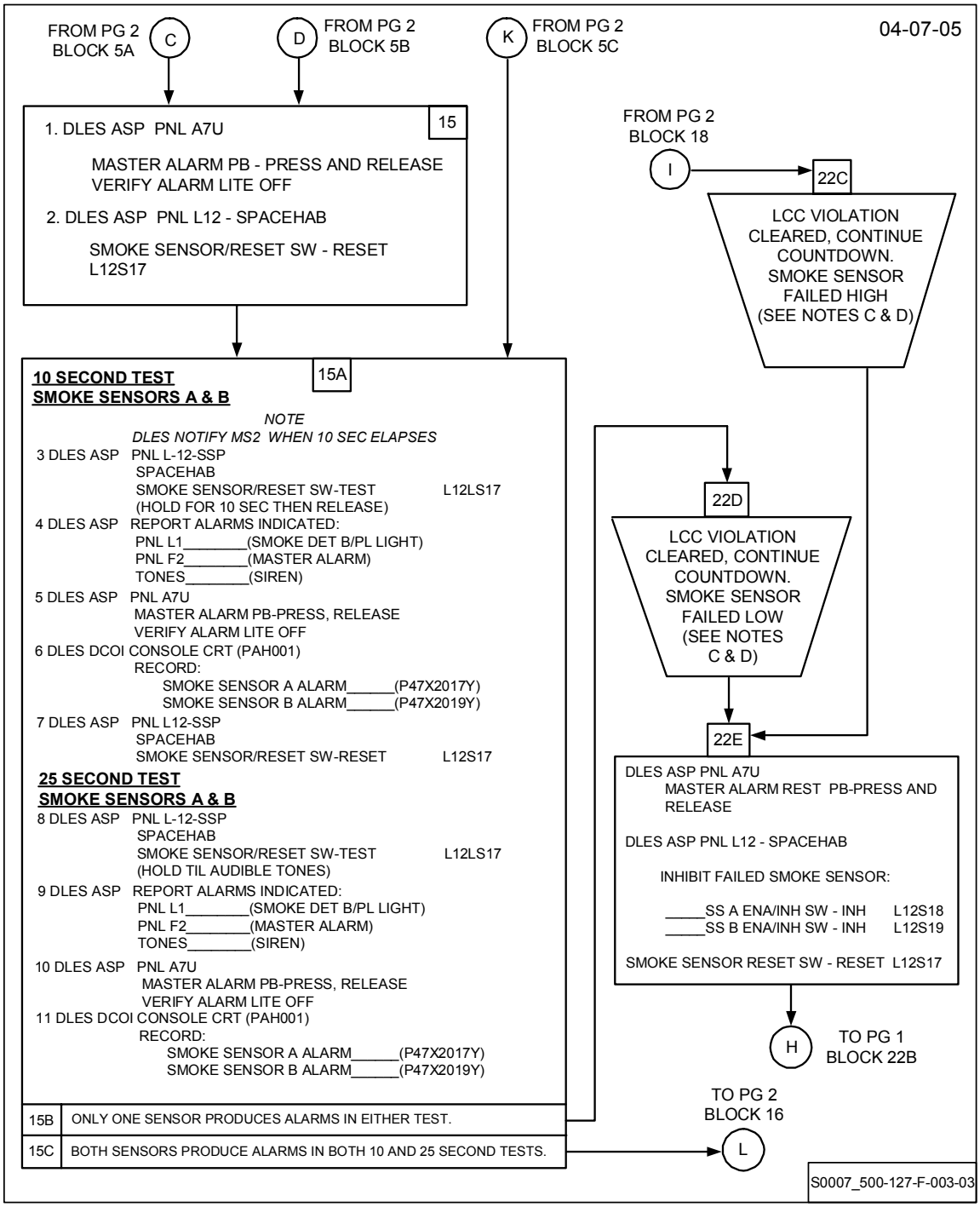
Spacehab Smoke/Fire Anomaly (SSID SH-03) (Page 1 of 4)



Spacehab Smoke/Fire Anomaly (SSID SH-03) (Page 2 of 4)



Spacehab Smoke/Fire Anomaly (SSID SH-03) (Page 3 of 4)



Spacehab Smoke/Fire Anomaly (SSID SH-03) (Page 4 of 4)

NOTE

A. FSS discharge will only occur upon Firing Room configuration of increasing smoke sensor concentrations (increase for greater than or equal to 20 sec). Since no increase in either smoke sensor concentration measurement was identified, main power to the module is removed (via FSS arming) but the FSS is not discharged. Smoke sensors and DMU powered by emergency Bus. Smoke sensor concentration data is provided by DMU. SH module remains in a safe configuration following main power kill caused by FSS arming. Smoke sensor detection is slowed due to lack of fan air circulation.

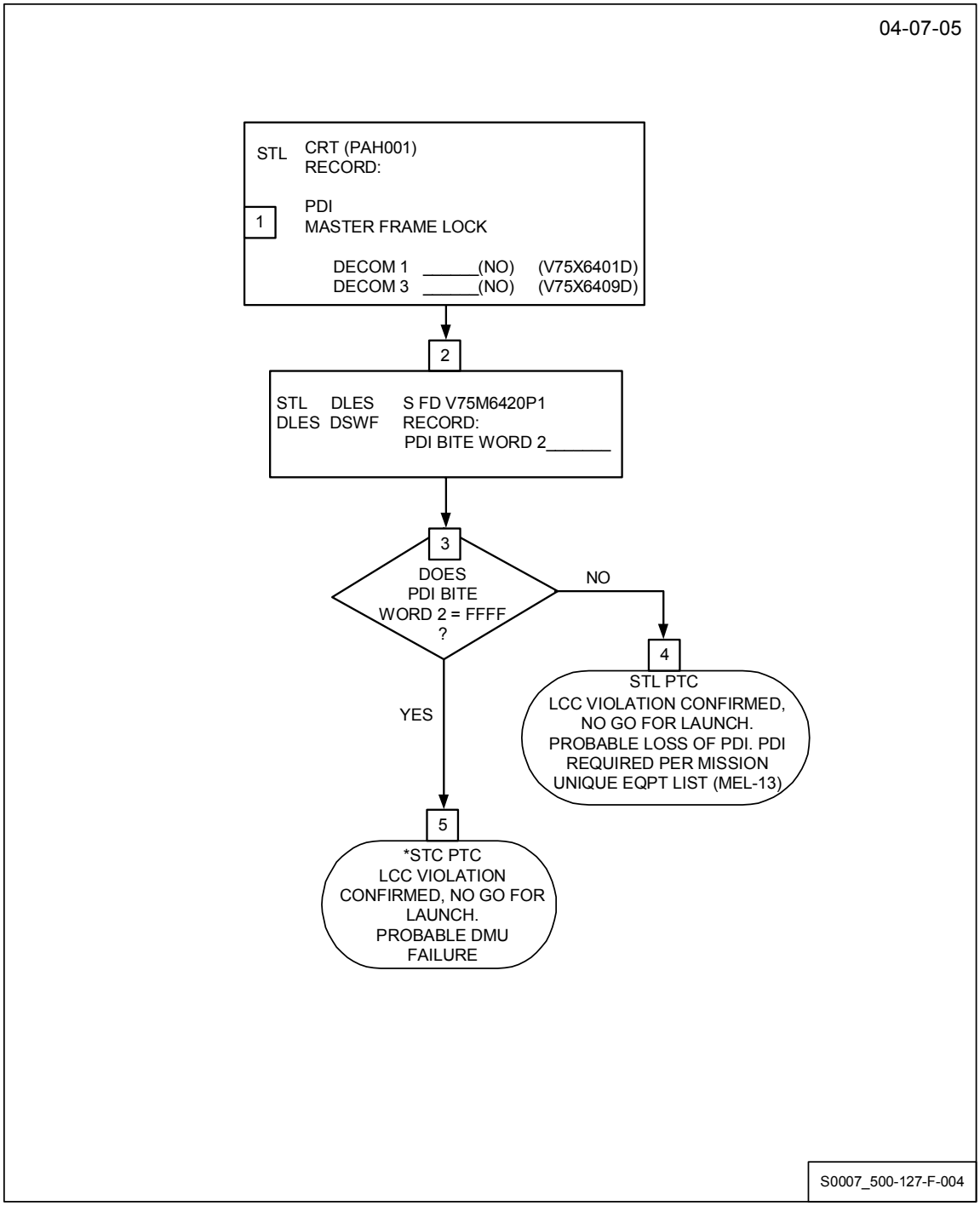
B. The following are fire configuration cues:
   - Both smoke sensor alarms with increasing concentrations for greater than 20 sec.
   - One sensor alarm and the other smoke sensor concentration increasing for greater than 20 sec.
   - Both concentrations increasing for greater than 20 sec.

C. Inhibit failed sensor alarm if possible via SSP. Concentration data for sensor may still be valid. Any subsequent alarms should be treated as if both alarms annunciated.

D. Panel L1 smoke detector barber pole light will remain lit during ascent if failed smoke sensor alarm cannot be inhibited from the SSP prior to Launch.

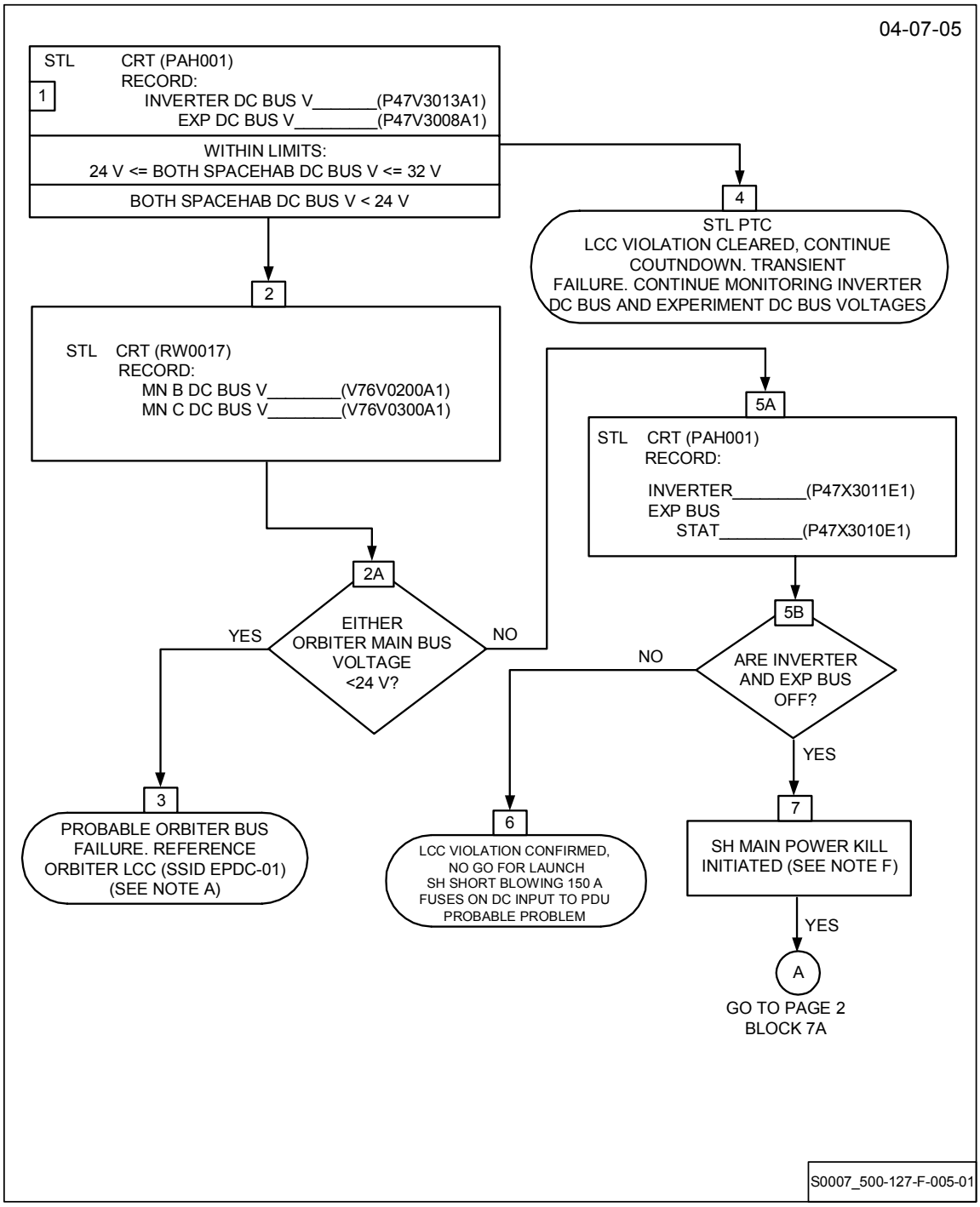
127-4

Spacehab DMU Interface/Power Failure (SSID SH-04)

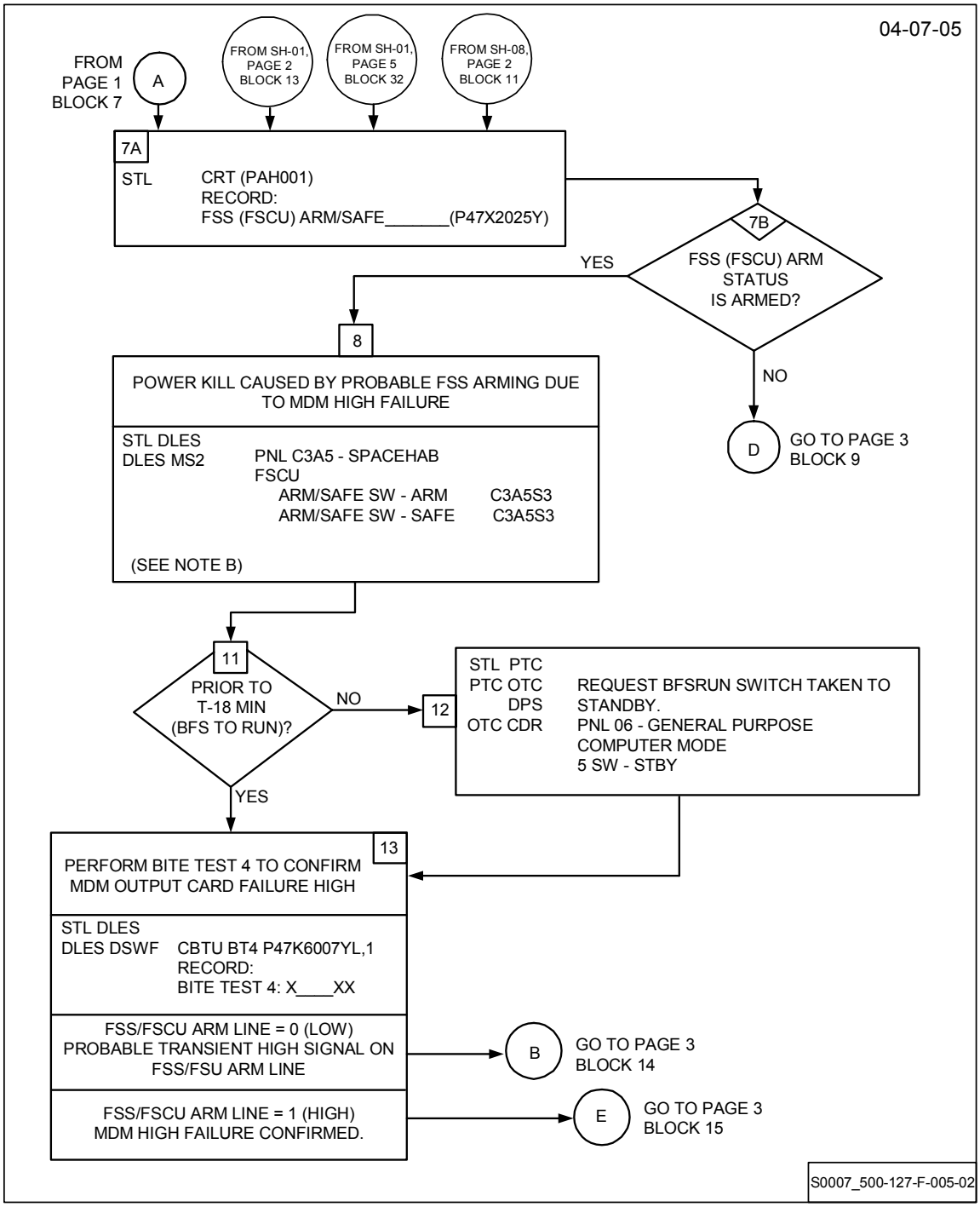


127-5

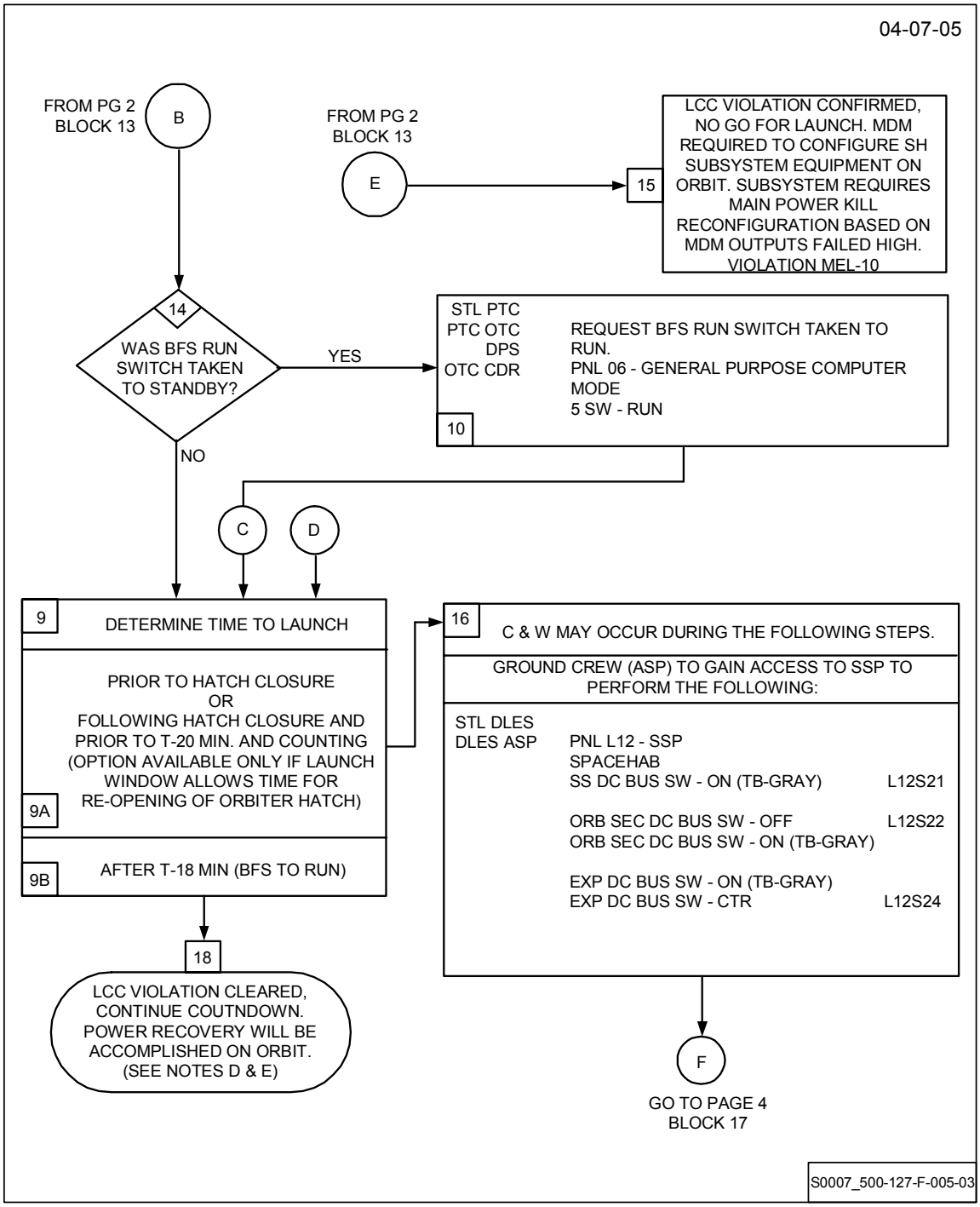
Spacehab Main DC Bus Voltage (High/Low) Anomaly (SSID SH-06) (Page 1 of 5)



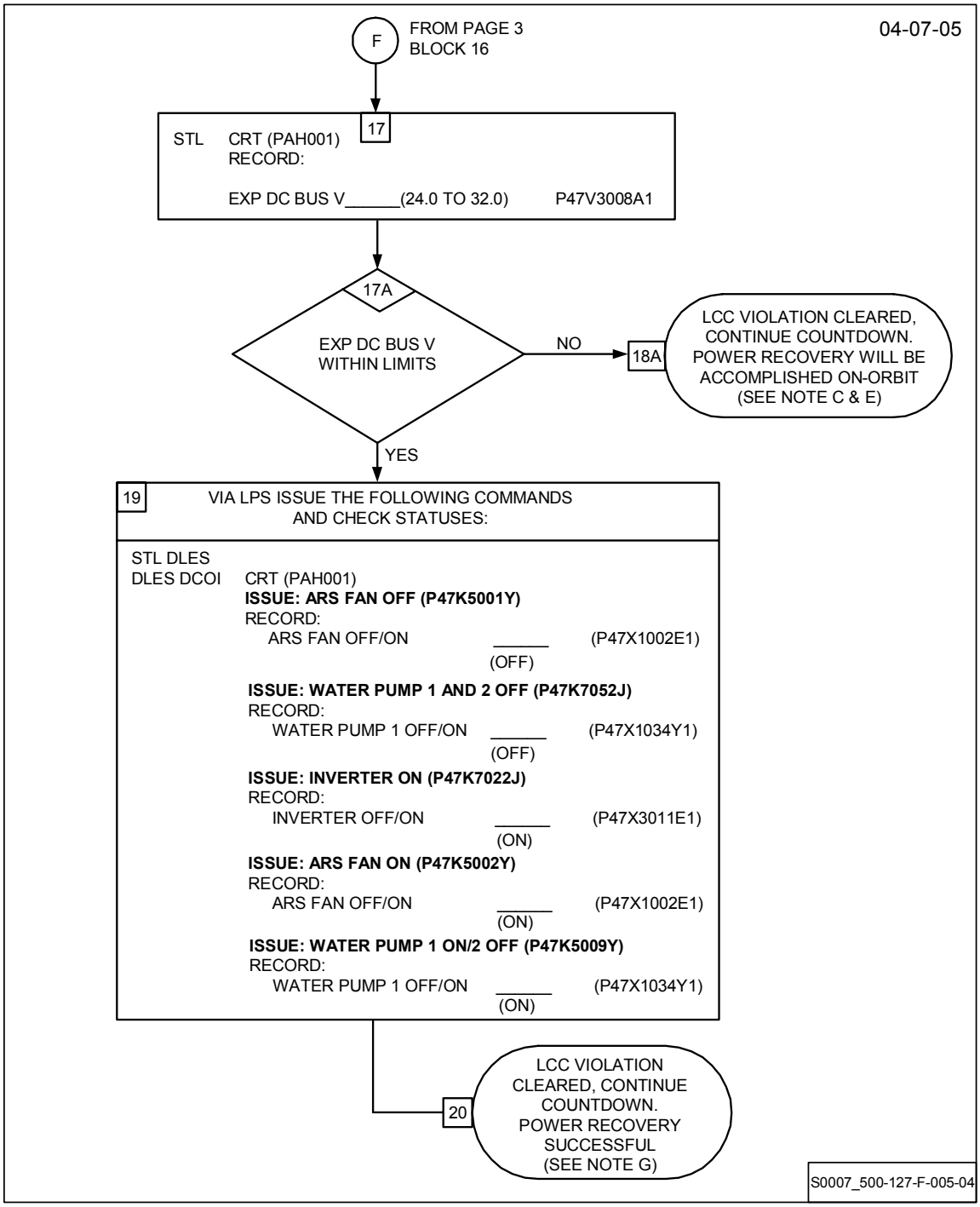
Spacehab Main DC Bus Voltage (High/Low) Anomaly (SSID SH-06) (Page 2 of 5)



Spacehab Main DC Bus Voltage (High/Low) Anomaly (SSID SH-06) (Page 3 of 5)



Spacehab Main DC Bus Voltage (High/Low) Anomaly (SSID SH-06) (Page 4 of 5)



Spacehab Main DC Bus Voltage (High/Low) Anomaly (SSID SH-06) (Page 5 of 5)

NOTE

A. Orbiter LCC (EPDC-1) would be invoked if Orbiter Main Bus is less than 28.3 V.

B. Switch throw will bring system back to safe configuration such that the FSS bottles cannot be discharged via a discharge command (gate reset to nominal configuration which will require both an arm one-shot command and discharge command prior to halon bottle firing). Prior to recovery of MDM FSS arm capability via MDM commanding is lost. Arming of FSS prior to MDM recovery requires access to the C3A5 panel or standard switch panel (SSP).

C. This note is applicable to non FSS-arming via MDM cases only. Hard failure of main power kill top circuitry in FSCU, MCP, SSP, or PDU causing a Main power kill. All hard main power kill cases can be recovered by performing an IFM to disconnect the jiffy junctions at the power distribution unit (PDU) interface in the SH subfloor on-orbit.

D. Since LPS commanding is unavailable, and Crew access to SSP commanding is not easily accomplished, power recovery will be accomplished on-orbit. In case of an inadvertent (FSS Arm via MDM high), intermittent (Power kill circuitry in MCP,FSCU, or PDU), or power supply ramping/transient power kill, basic commanding will recover power. For a hard power kill, an IFM to disconnect jiffy junctions at the SH power distribution unit will be performed to allow recovery of system power.

E. Prior to flow proportioning valve repositioning on-orbit, the SH power should be recovered to the WFCEU for control of the water flow control valve motors. Recovery of the WFCEU is required to prevent possible transients in SH water loop. Power to the water flow control valve motors allows the SH water loop to correct for a situation where a large slug of cold water is released from the payload heat exchanger.

F. The SH module remains in a safe configuration following a main power kill. Smoke sensor detection is slowed due to lack of fan air circulation.

G. This note is applicable to non-FSS arming via MDM cases only. Ability to recover from a main power kill indicates one of the following conditions occurred:

- Intermittent failure of main power kill circuitry in the MCP, FSCU, or PDU.
- Power supply ramping/transient causing main power kill.

127-6

Spacehab Individual Halon Bottle Discharge Indication (SSID SH-07)

04-07-05

1

STL CRT (PAH001)
RECORD:
HALON BOTTLE 1 DISCHARGE_____(P47X1020E)
HALON BOTTLE 2 DISCHARGE_____(P47X1021E)
HALON BOTTLE 3 DISCHARGE_____(P47X1022E1)
HALON BOTTLE 4 DISCHARGE_____(P47X1023E)
HALON BOTTLE 5 DISCHARGE_____(P47X1024E)
HALON BOTTLE 6 DISCHARGE_____(P47X1025E)
HALON BOTTLE 7 DISCHARGE_____(P47X1026E)
HALON BOTTLE 8 DISCHARGE_____(P47X1027E)
HALON BOTTLE 9 DISCHARGE_____(P47X1028E)
HALON BOTTLE 10 DISCHARGE_____(P47X1029E1)

NOTE A: "YES" = DISCHARGED
"NO" = NOT DISCHARGED

2

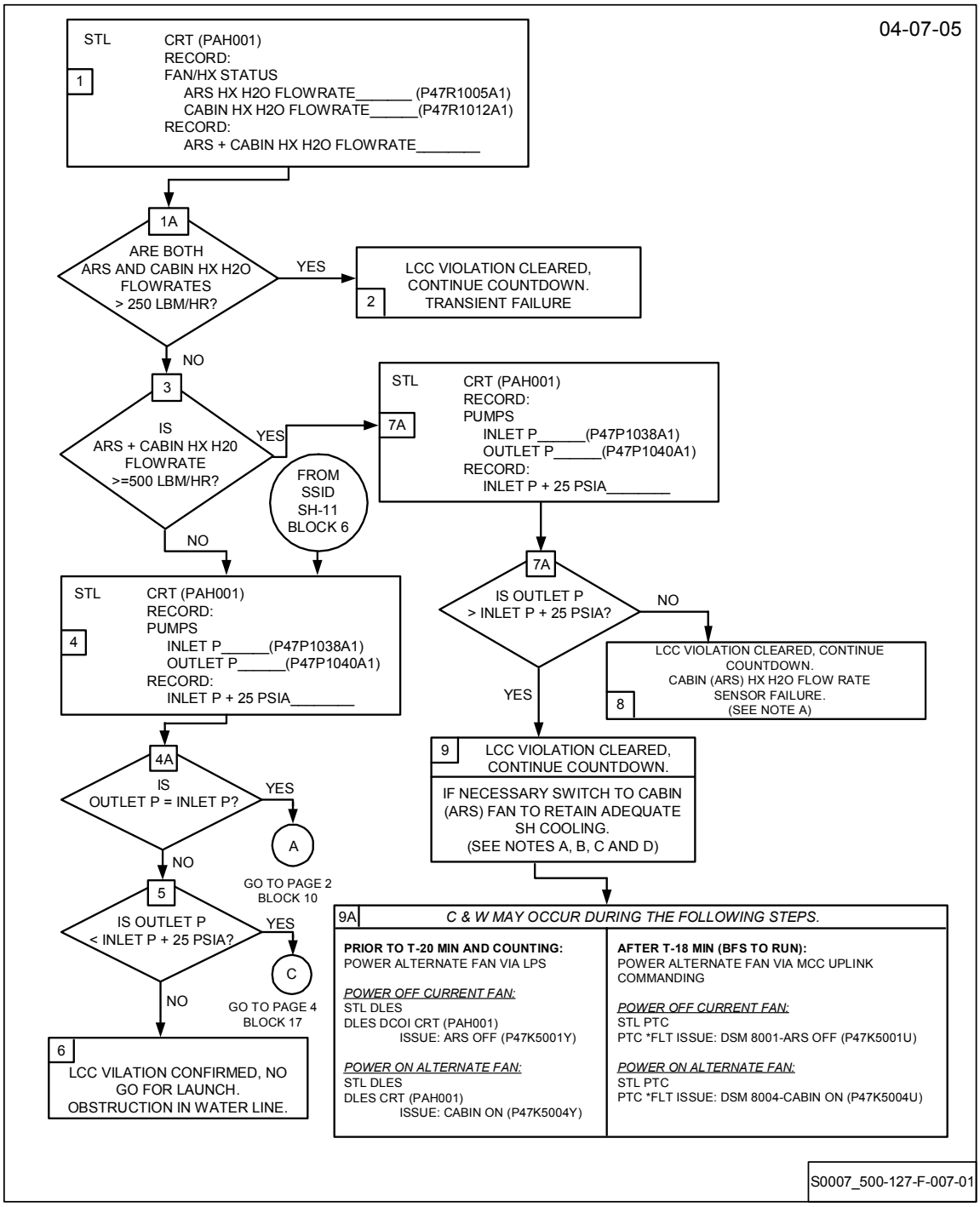
STL PTC

LCC VIOLATION CONFIRMED, NO GO FOR LAUNCH. CONFIRMED DISCHARGE OF AT LEAST ONE HALON BOTTLE.

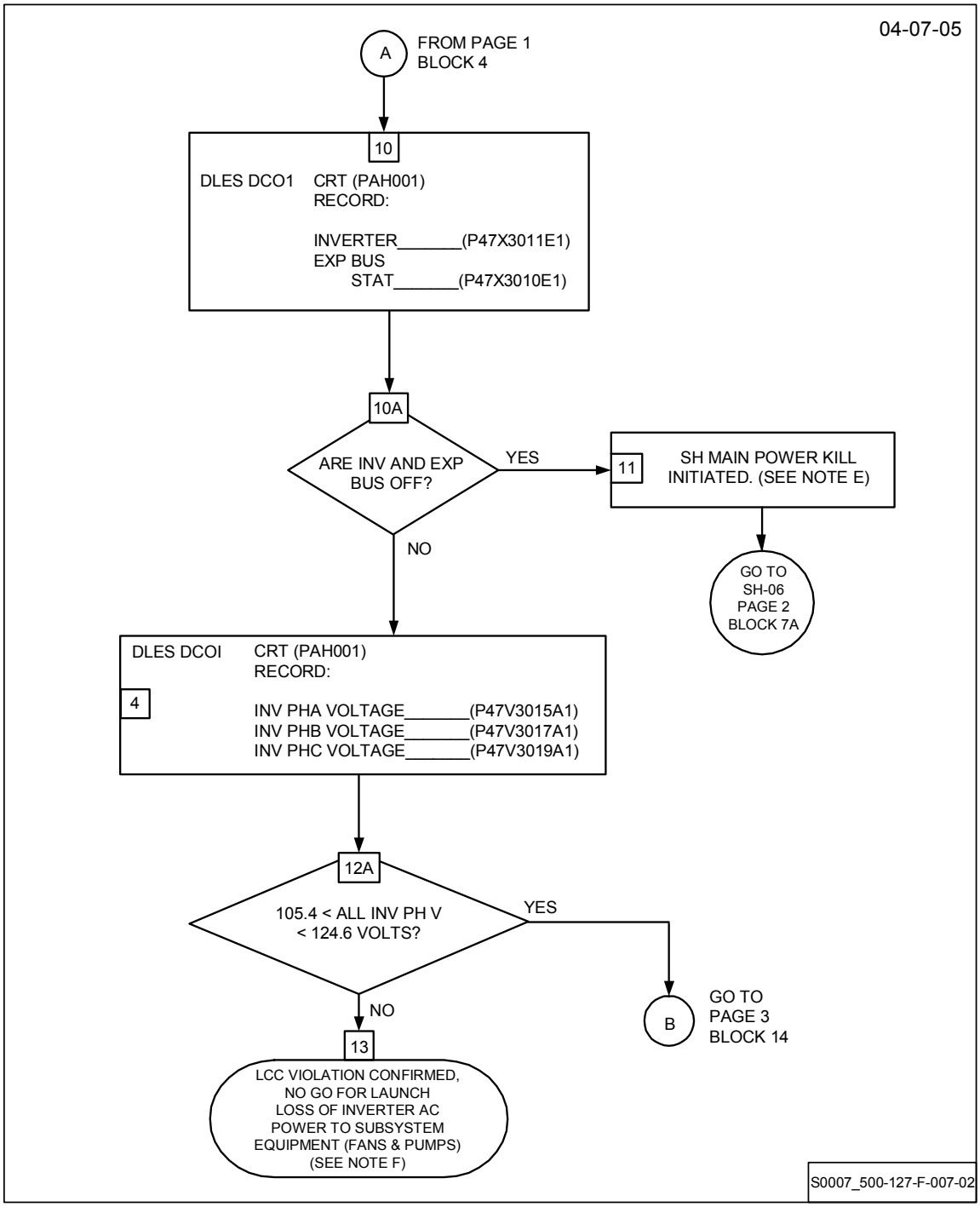
S0007_500-127-F-006

127-7

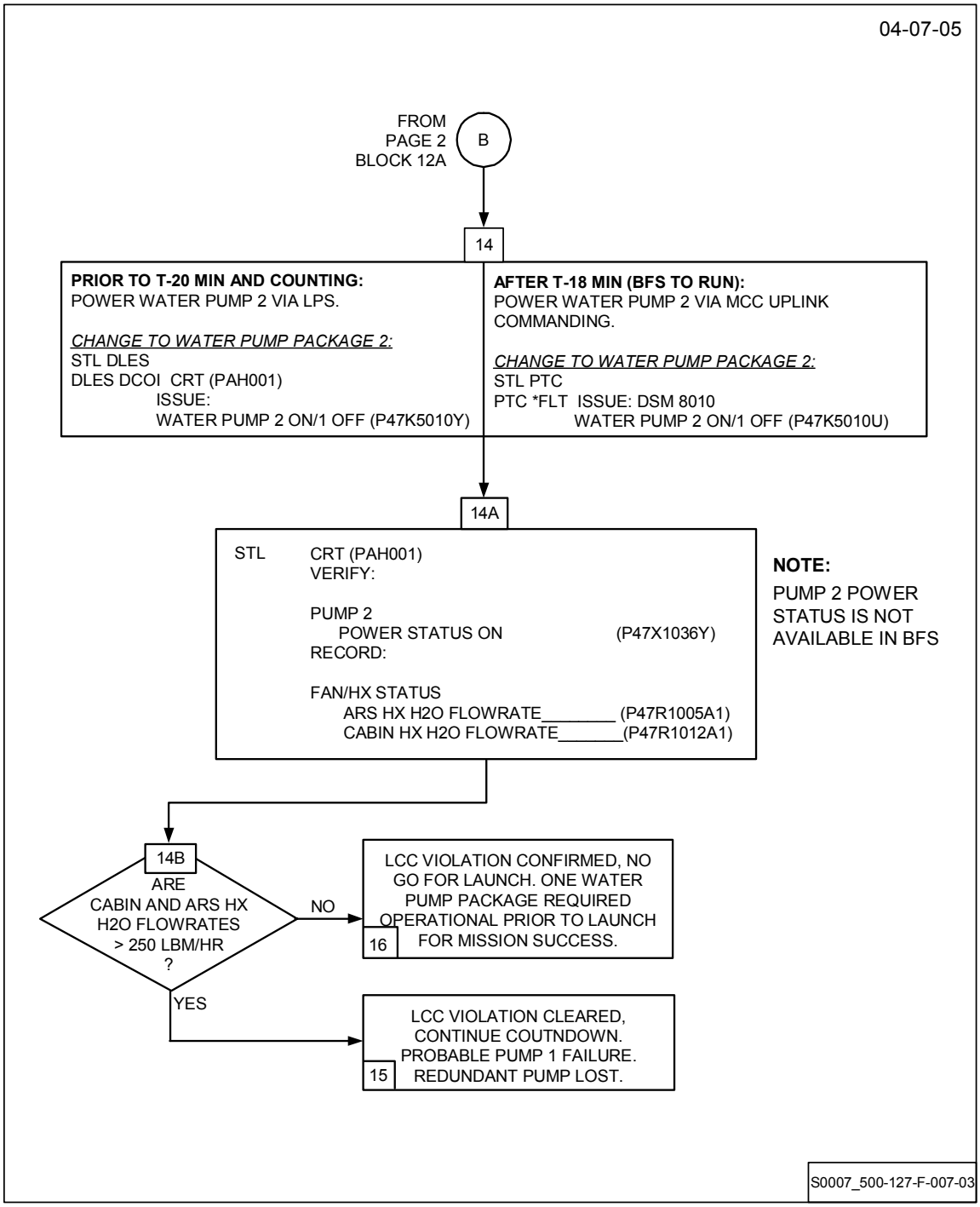
Spacehab Cabin (ARS) Hx Flow Rate (Low) Anomaly (SSID SH-08) (Page 1 of 6)



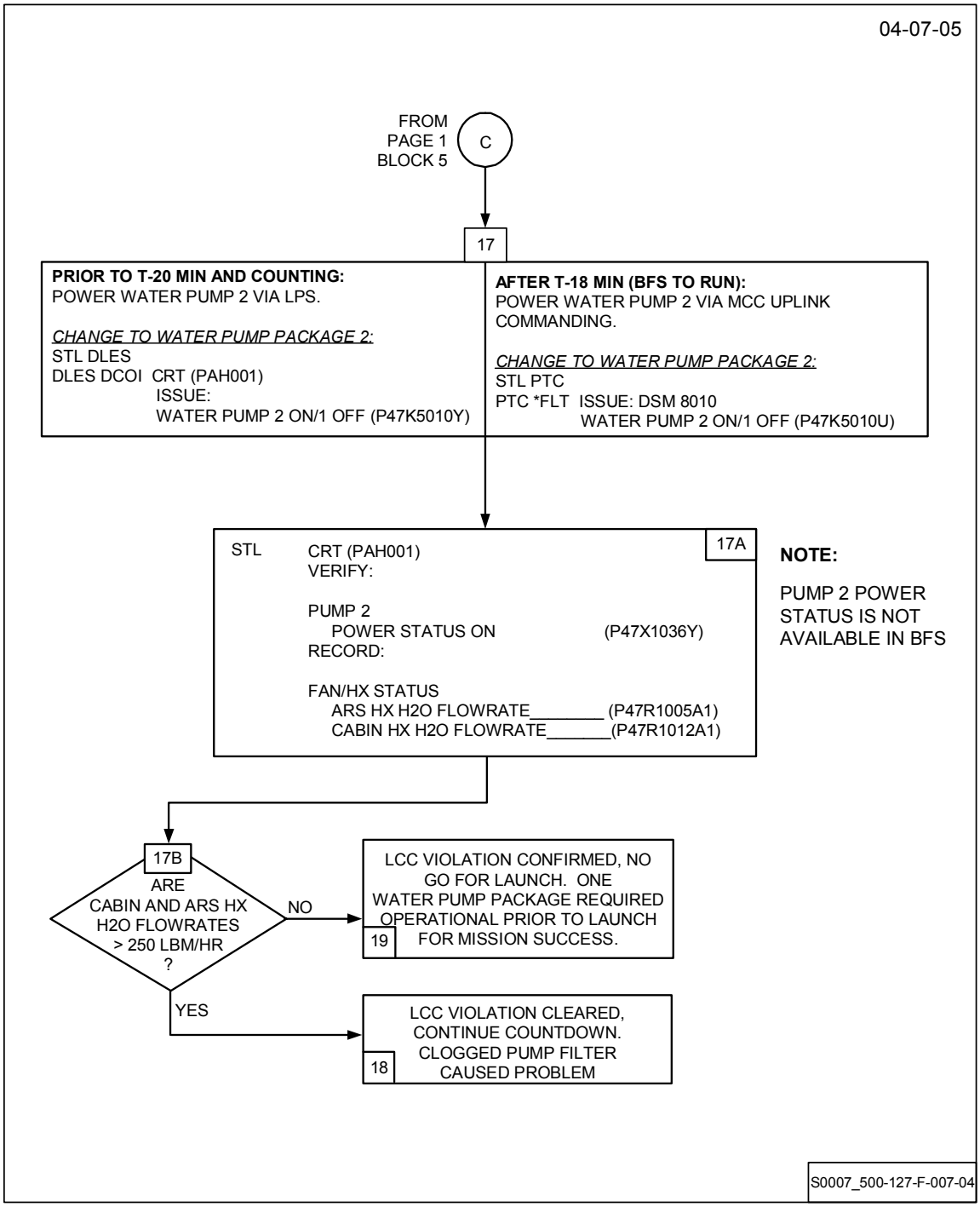
Spacehab Cabin (ARS) Hx Flow Rate (Low) Anomaly (SSID SH-08) (Page 2 of 6)



Spacehab Cabin (ARS) Hx Flow Rate (Low) Anomaly (SSID SH-08) (Page 3 of 6)



Spacehab Cabin (ARS) Hx Flow Rate (Low) Anomaly (SSID SH-08) (Page 4 of 6)



Spacehab Cabin (ARS) Hx Flow Rate (Low) Anomaly (SSID SH-08)
(Page 5 of 6)

NOTE

A. Measurement which was originally out of limits (Cabin ARS HX H_2O flow rate) determines which side of loop (cabin or ARS) has failure.

B. Obstruction in either ARS or cabin loop will decrease system heat rejection capability, however margins are adequate for Spacehab 4 to continue with single heat exchanger operations.

C. If cabin side of loop fails and cabin fan is powered during Pre-Launch:
- Turn cabin fan Off, ARS fan On

If ARS side of loop fails and ARS fan is powered during Pre-Launch:
- Turn ARS fan Off, cabin fan On.

Power according to the following:

Prior to T-20 min and counting	After T-18 min (BFS to Run)
Power alternate fan via LPS	Power alternate fan via MCC uplink commanding
Power Off ARS (Cabin fan) (ARS fan Off P47K5001Y) (Cabin fan Off P47K50003Y)	Power Off ARS (Cabin fan) (ARS fan Off P47K5001U/ DSM8001) (Cabin fan Off P47K5003U/DSM8003)
Switch to cabin (ARS) fan (Cabin fan On P475004Y) (ARS fan On P475002Y)	Switch to cabin (ARS) fan (Cabin fan On P47K5004U/ DSM8004) (ARS fan On P47K5002U/DSM8002)

D. Commanding of fans via LPS is not available after T-20 min and counting. No commanding is available between T-20 and T-18 min (OPS 101 transition). Commanding after T-18 min available via MCC uplink commands.

E. SH cabin (ARS) HX flow rate anomaly caused by SH main power kill. Power loss to the water pump package results from a main power kill.

Spacehab Cabin (ARS) Hx Flow Rate (Low) Anomaly (SSID SH-08) (Page 6 of 6)

NOTE

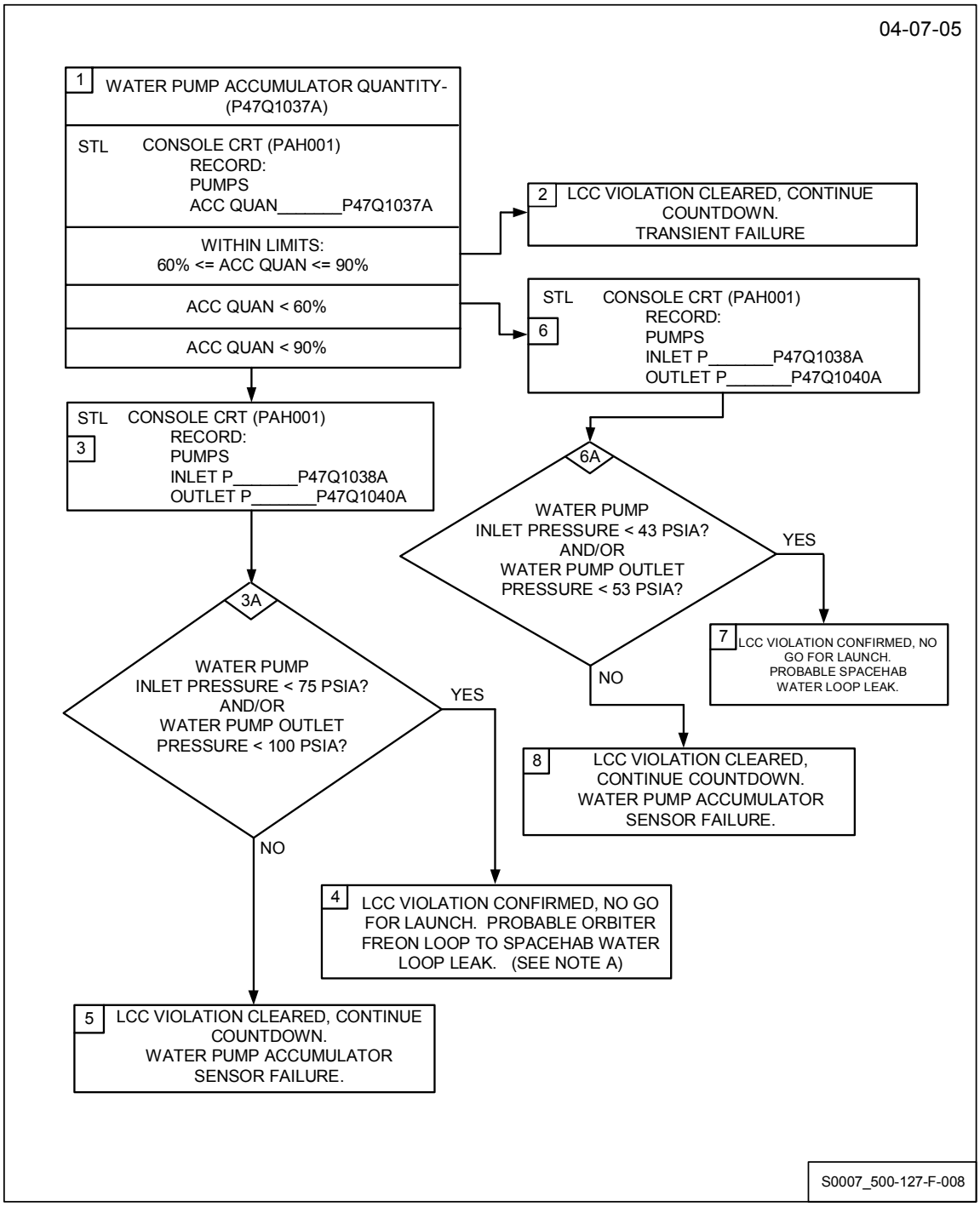
F. Possible loss of inverter master sync, Phase A inverter overvoltage shutdown, PDU K1 relay failure, or PDU F94 fuse failure (feeds inverter Phase A). K1 relay failure can be determined by checking inverter DC Bus current (P47C3012A) and inverter DC Bus voltage (P47V3013A) measurements. 0 volt condition for inverter Bus voltage is 18v, while 0 current condition for inverter Bus current is 0 amps. F94 fuse failure, inverter overvoltage shutdown, and inverter master sync failures all give same failure signature: all inverter phase voltage out of limits (Phase A controls sync for other two inverter phases).

G. Accumulator quantity, water pump inlet pressure, and water pump outlet pressure valves may change after flow proportioning valve repositioning at approximately L-6 hrs.

H. Any changes in water pump package sensors (accumulator quantity, water pump inlet pressure, water pump outlet pressure) or ARS or cabin HX H_2O flow rates should be investigated for possible anomalies after allowing for temperature change effects.

127-8

Spacehab Water Pump Accumulator Quantity (High/Low) Anomaly (SSID SH-09) (Page 1 of 2)



Spacehab Water Pump Accumulator Quantity (High/Low) Anomaly (SSID SH-09) (Page 2 of 2)

NOTE

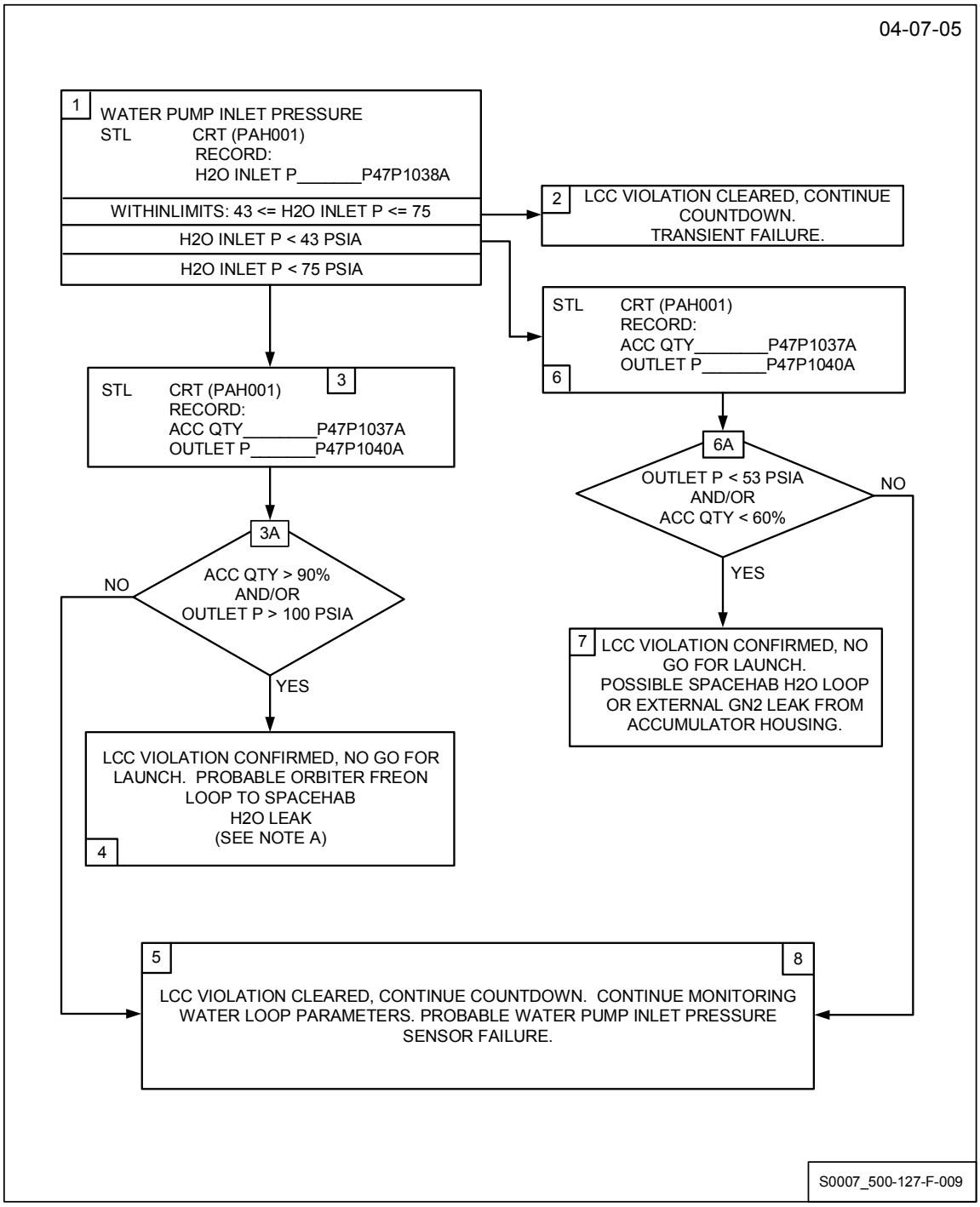
A. Orbiter Freon loop operates at higher pressure than SH water loop. A leak in Orbiter heat exchanger would cause the mass in the SH water loop to increase. Orbiter Freon loop leak would be confirmed with Orbiter LCC SSID ECL-41.

B. Accumulator quantity, water pump inlet pressure, and water pump outlet pressure valves may change after flow valve repositioning at approx L-6 hrs.

C. Any changes in water pump package sensors (accumulator quantity, water pump inlet pressure, water pump outlet pressure) or ARS or Cabin HX H_2O flow rates should be investigated for possible anomalies after allowing for temperature change effects.

127-9

Spacehab Water Pump Inlet Pressure (High/Low) Anomaly (SSID SH-10) (Page 1 of 2)



Spacehab Water Pump Inlet Pressure (High/Low) Anomaly (SSID SH-10) (Page 2 of 2)

NOTE

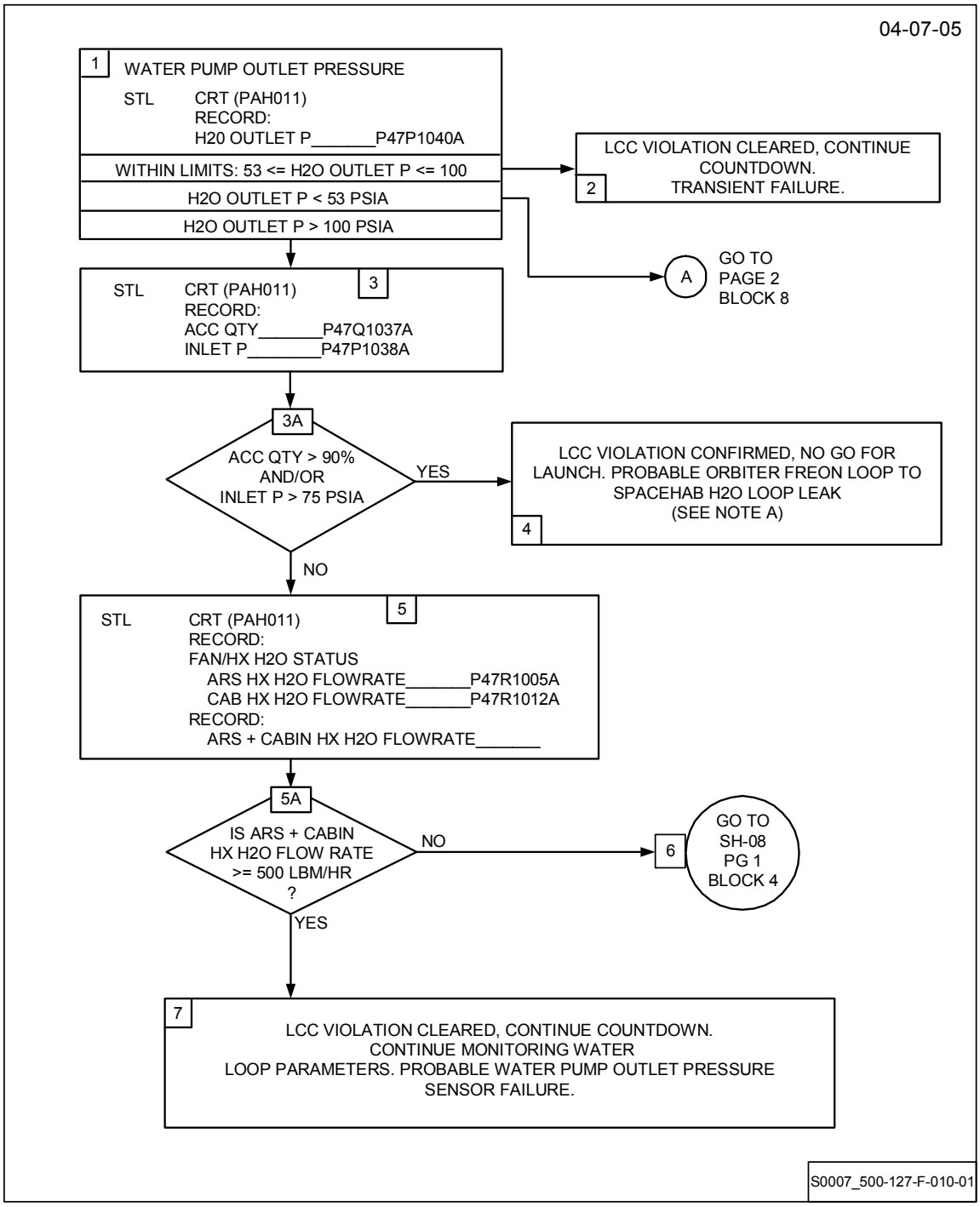
A. Orbiter Freon loop operates at higher pressure than SH water loop. A leak in Orbiter heat exchanger would cause the mass in the SH water loop to increase. Orbiter Freon loop leak would be confirmed with Orbiter LCC SSID ECL-41.

B. Accumulator quantity, water pump inlet pressure, and water pump outlet pressure valves may change after flow proportioning valve repositioning at approx L-6 hrs.

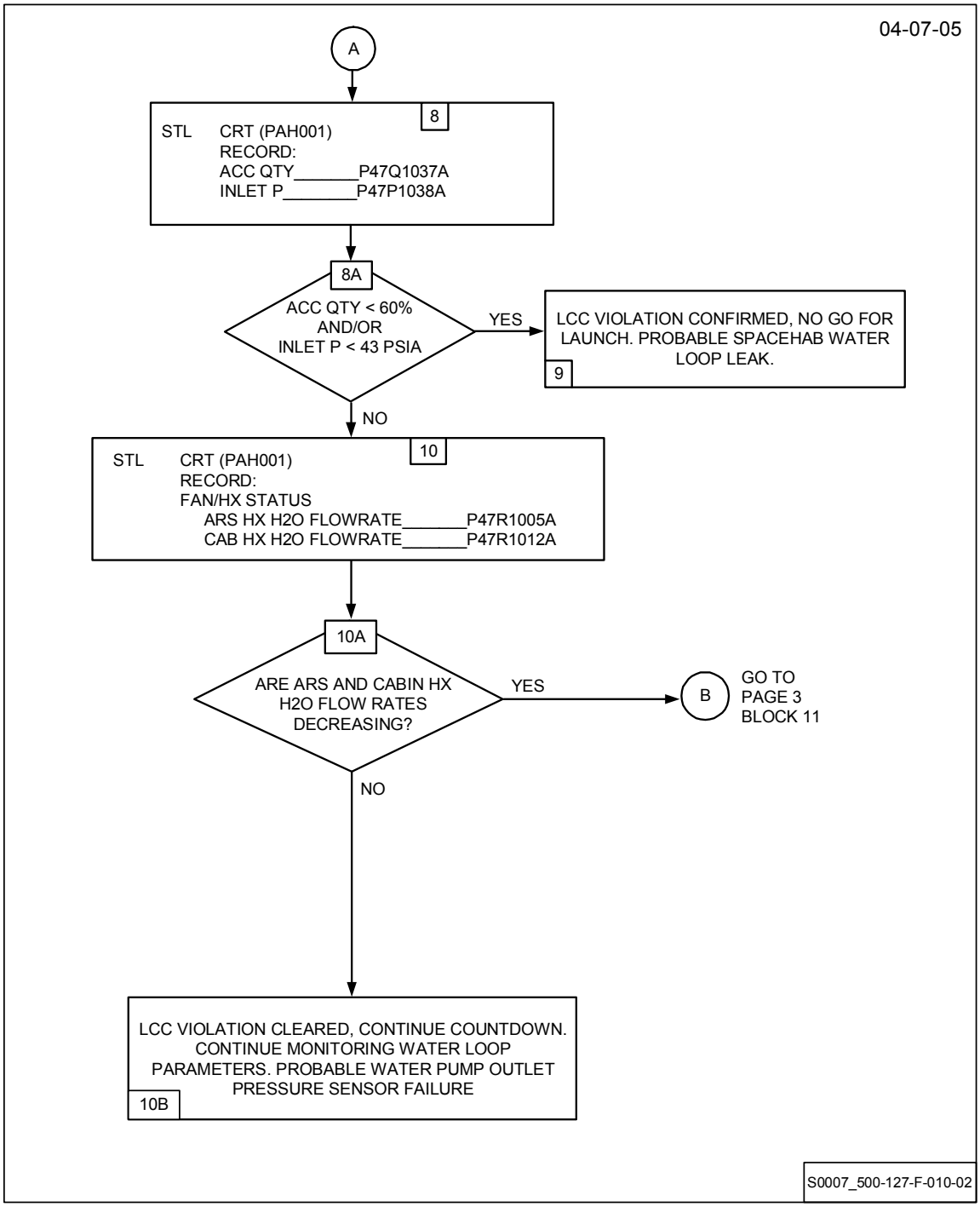
C. Any changes in water pump package sensors (accumulator quantity, water pump inlet pressure, water pump outlet pressure) or ARS or Cabin HX H_2O flow rates should be investigated for possible anomalies after allowing for temperature change effects.

127-10

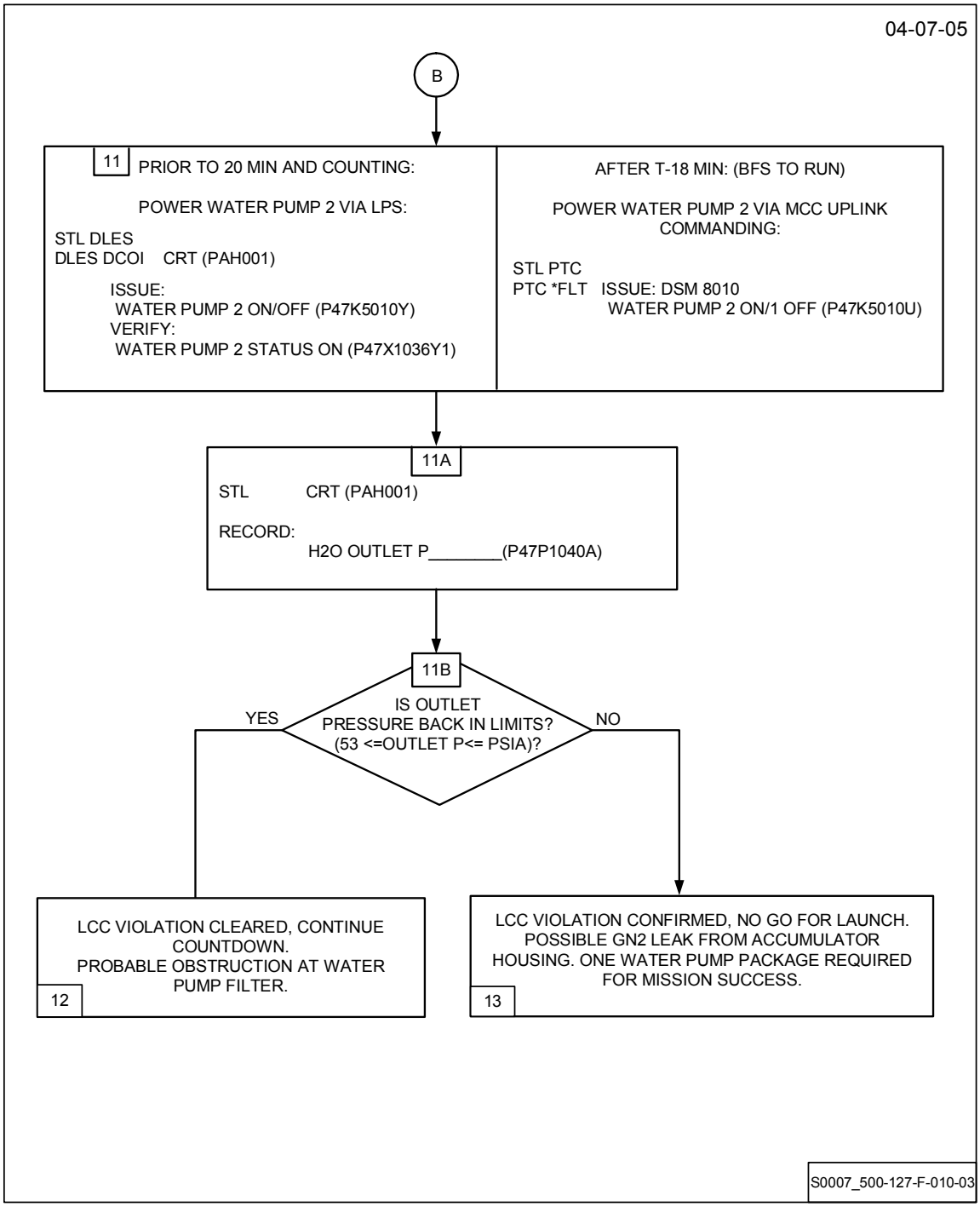
Spacehab Water Pump Outlet Pressure (High/Low) Anomaly (SSID SH-11) (Page 1 of 4)



Spacehab Water Pump Outlet Pressure (High/Low) Anomaly (SSID SH-11) (Page 2 of 4)



Spacehab Water Pump Outlet Pressure (High/Low) Anomaly (SSID SH-11) (Page3 of 4)



Spacehab Water Pump Outlet Pressure (High/Low) Anomaly (SSID SH-11) (Page 4 of 4)

NOTE

A. Orbiter Freon loop operates at higher pressure than SH water loop. A leak in Orbiter heat exchanger would cause the mass in the SH water loop to increase. Orbiter Freon loop leak would be confirmed with Orbiter LCC SSID ECL-41.

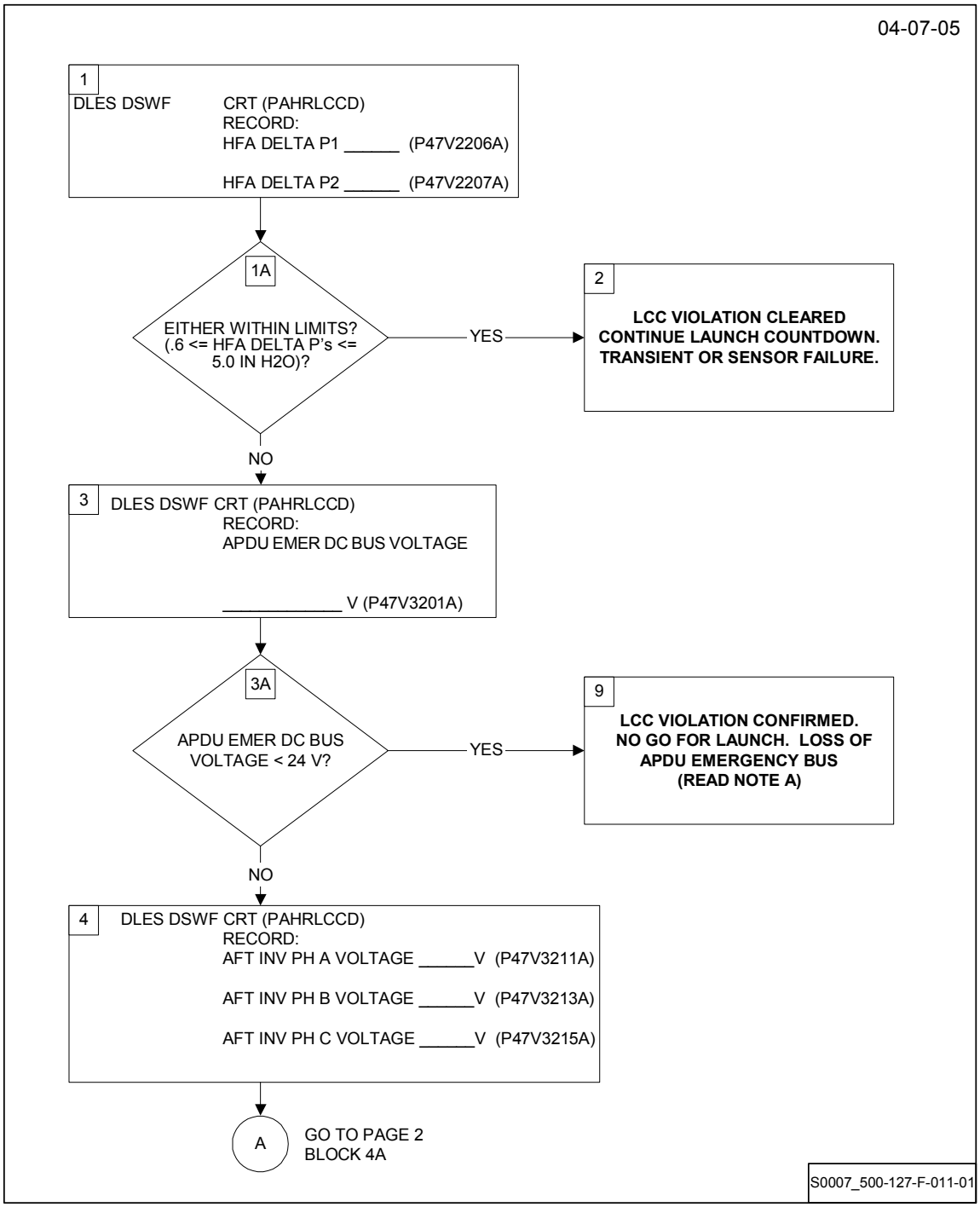
B. Commanding of pumps via LPS is not available after T-20 min and counting. No commanding is available between T-20 and T-18 min (OPS 101 transition). Commanding after T-18 min available via MCC uplink commands.

C. Accumulator quantity, water pump inlet pressure, and water pump outlet pressure valves may change after flow proportioning valve repositioning at approx L-6 hrs.

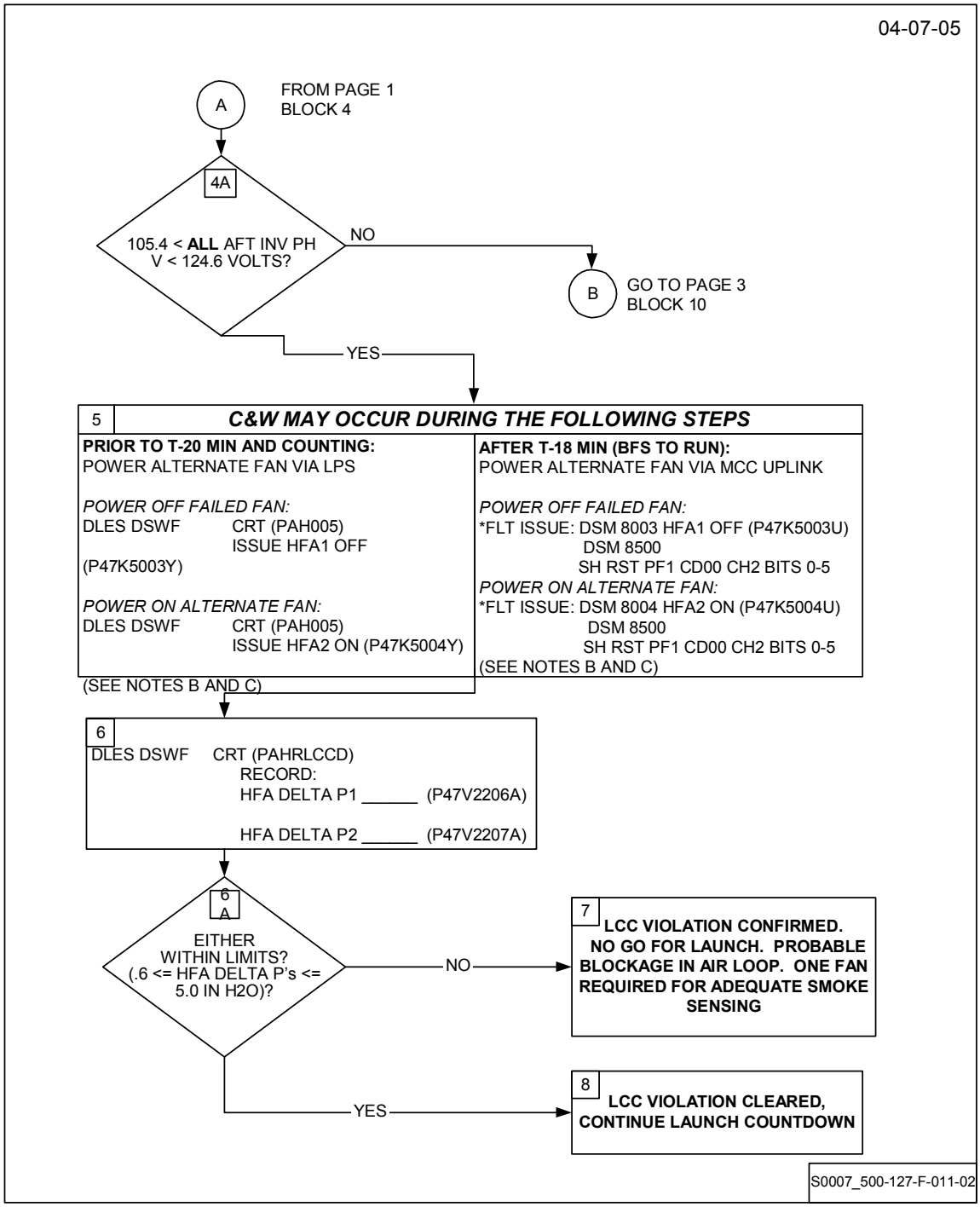
D. Any changes in water pump package sensors (accumulator quantity, water pump inlet pressure, water pump outlet pressure) or ARS or Cabin HX H_2O flow rates should be investigated for possible anomalies after allowing for temperature change effects.

127-11

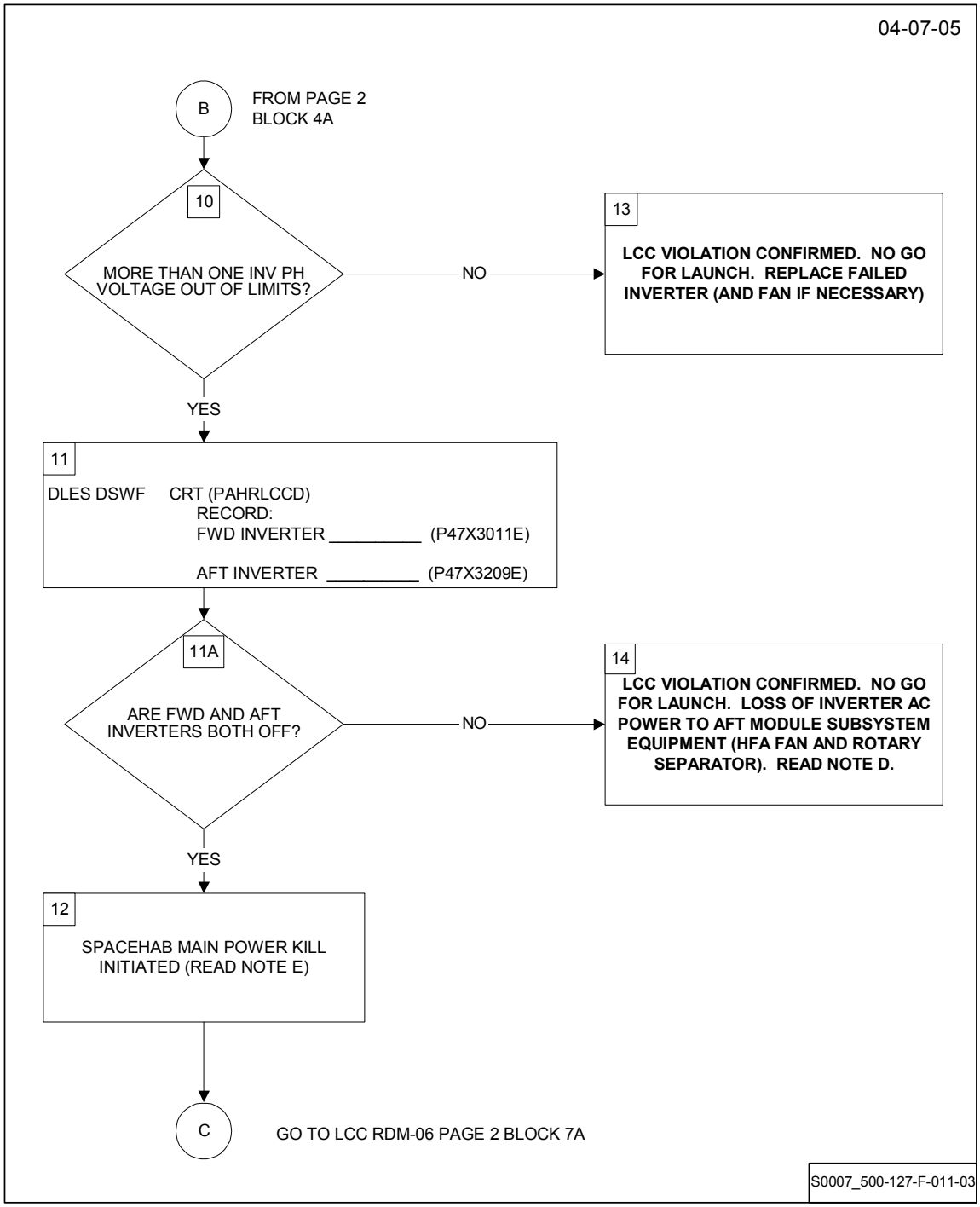
Spacehab HFA Fan Anomaly (T-6 hrs - T-31 sec) (SSID RDM-01) (Page 1 of 4)



Spacehab HFA Fan Anomaly (T-6 hrs - T-31 sec) (SSID RDM-01) (Page 2 of 4)



Spacehab HFA Fan Anomaly (T-6 hrs - T-31 sec) (SSID RDM-01) (Page 3 of 4)



Spacehab HFA Fan Anomaly (T-6 hrs - T-31 sec) (SSID RDM-01)
(Page 4 of 4)

NOTE

A. Both HFA Delta pressure sensors receive power from the APDU Emergency Bus. HFA Fan would remain operational. IF PDU Emergency Bus Voltage (P47V3001A) is within limits, then possible short in APDU Emergency Bus powered equipment causing APDU CB15 and CB16 to trip.

B. Commanding of fans via LPS is not available after T-20 min and counting. No commanding is available between T-20 and T-18 minutes (OPS 101 Transition). Commanding after T-18 min available via MCC uplink commands.

C. Possible failure of HFA Fan 1:

LOW Delta P
- APDU Relays AK17 and/or AK27 - (Open)
- APDU Circuit Breakers CB5
- HFA fan internal problem
- Inlet air blockage in Air Balancing Box

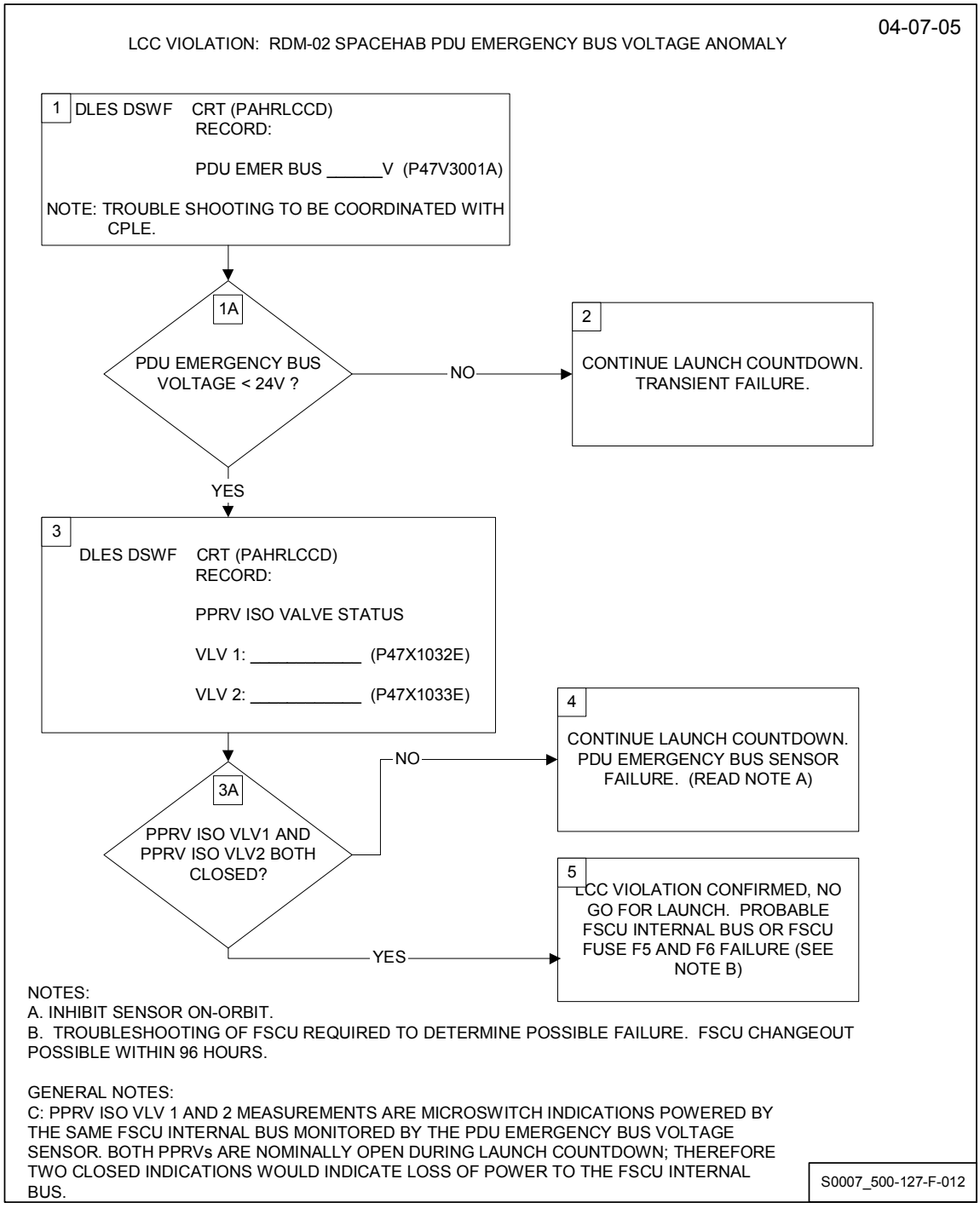
HIGH Delta P
- Floor debris screen blockage

D. Possible loss of Inverter Master Sync, Phase A Inverter Overvoltage shutdown, APDU K7 relay failure, APDU CB2 (A/B/C) tripped/failed or APDU CB 18/19/20 failure (CB18 feeds Inverter Phase A). All give same failure signature: All inverter phase voltages out of limits (Phase A controls sync for other two inverter phases) and AFT INV DC BUS CURRENT (P47C3210A) at 0 amps (0 current condition). If APDU Main DC Voltage (P47V3204A) is 18 V (0 current condition) then short blowing 100 amp fuses on DC input to the APDU is possible cause.

E. HFA Fan Delta Pressure Low Anomaly caused by SH Main power kill. SH module remains in a safe configuration following a main power kill. Smoke detection is slowed due to lack of fan air circulation.

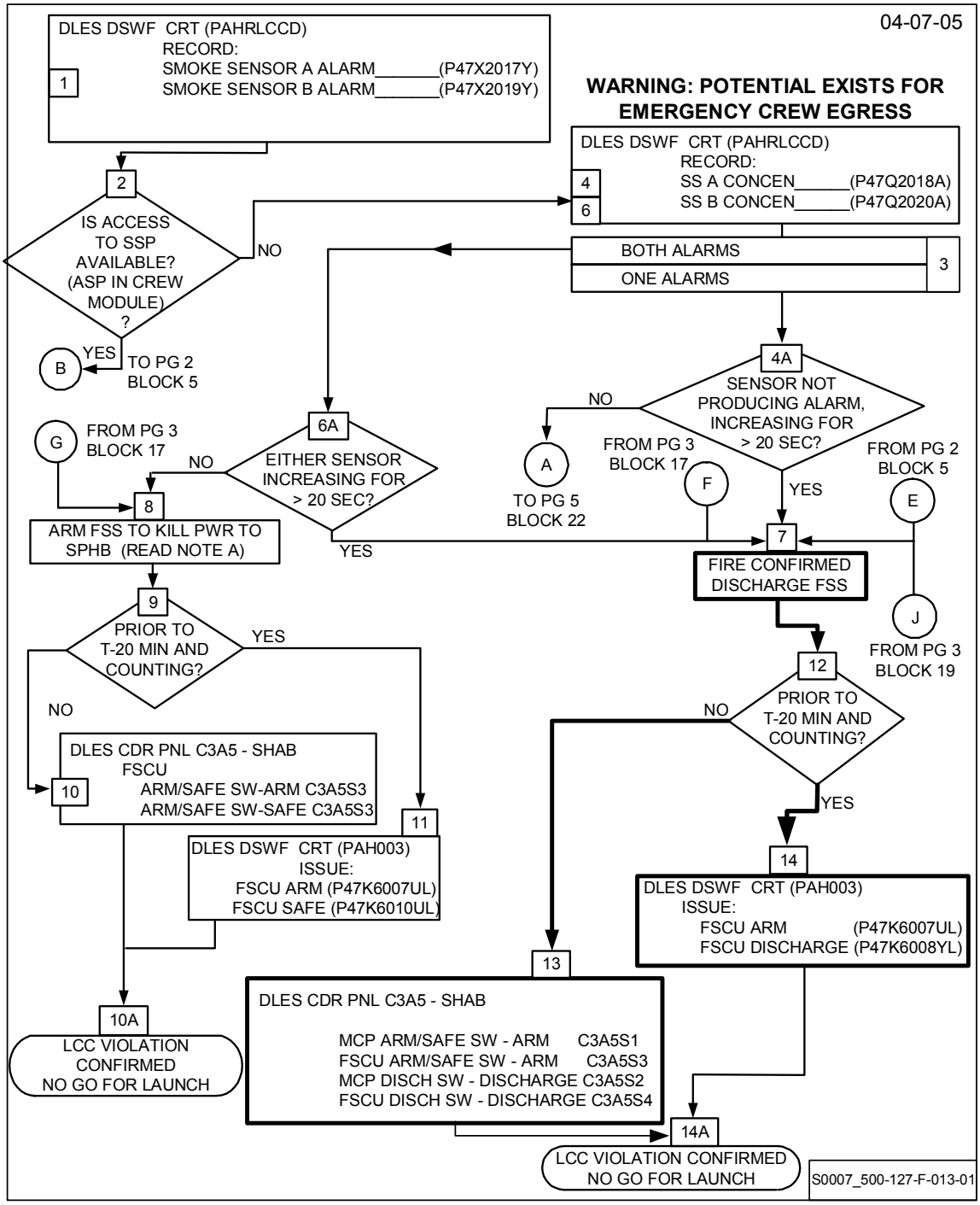
127-12

Spacehab PDU Emergency Bus Voltage Anomaly (SSID RDM-02)

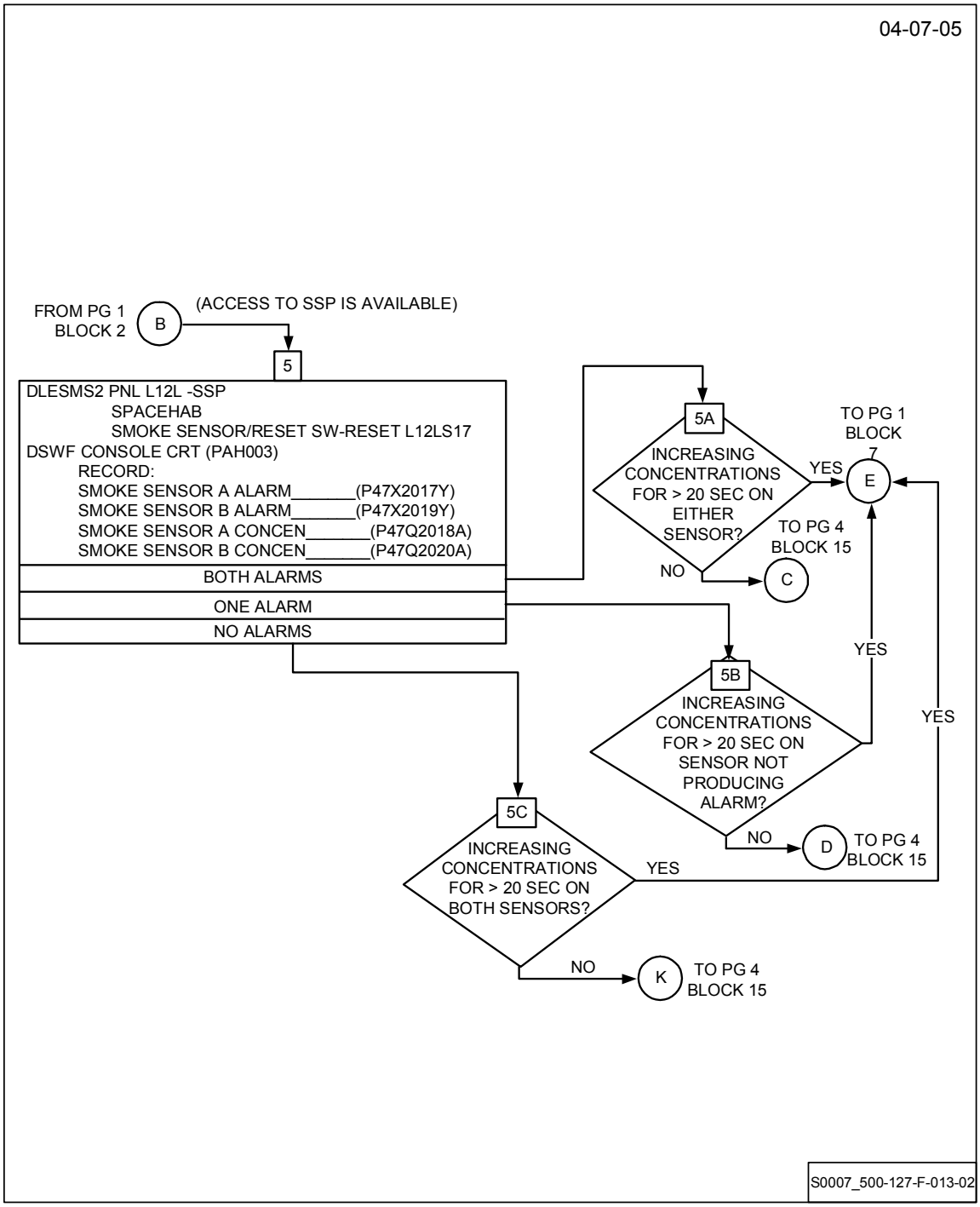


127-13

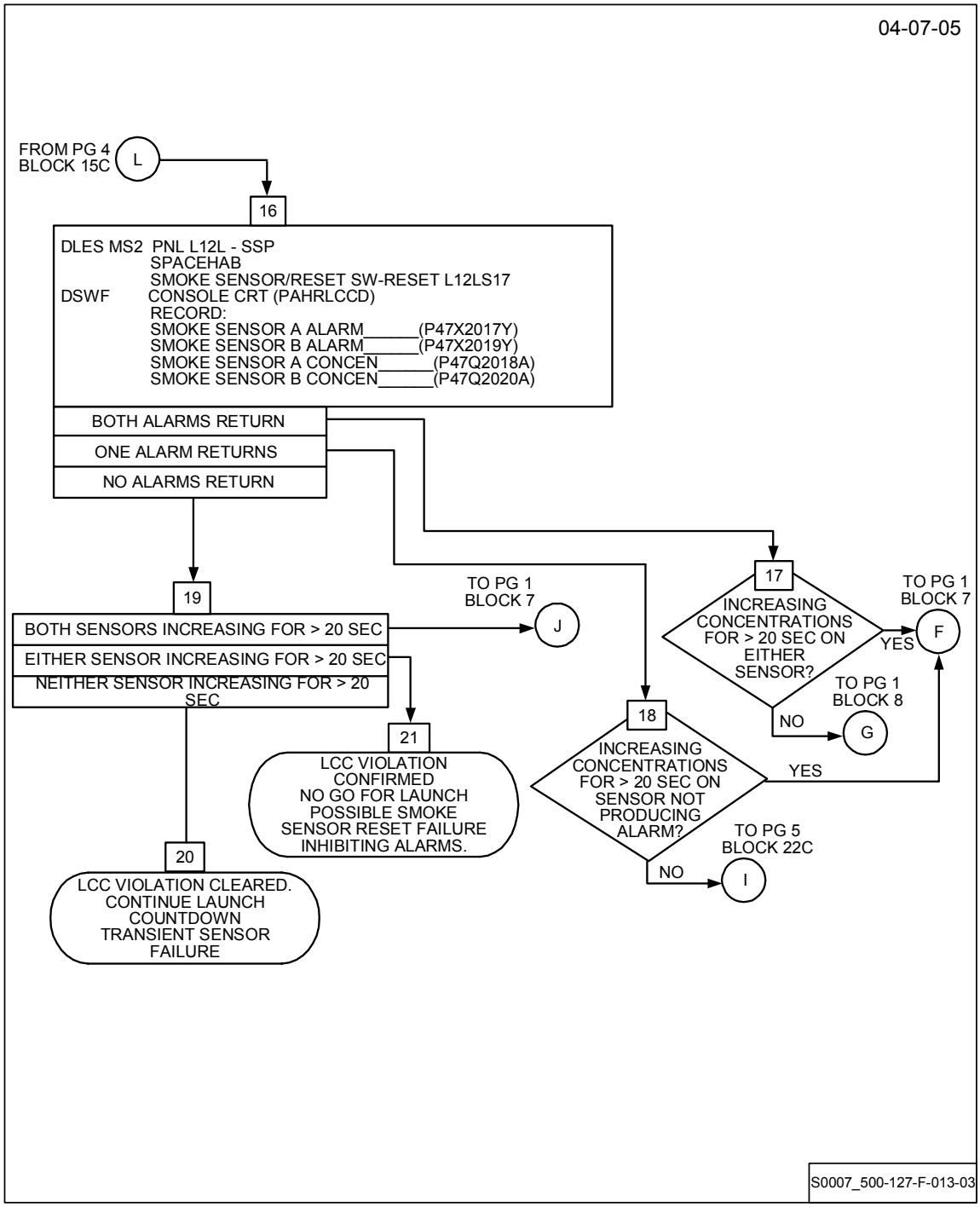
Spacehab Smoke/Fire Anomaly (T-6 hrs - T-31 sec) (SSID RDM-03) (Page 1 of 6)



Spacehab Smoke/Fire Anomaly (T-6 hrs - T-31 sec) (SSID RDM-03) (Page 2 of 6)



Spacehab Smoke/Fire Anomaly (T-6 hrs - T-31 sec) (SSID RDM-03) (Page 3 of 6)



Spacehab Smoke/Fire Anomaly (T-6 hrs - T-31 sec) (SSID RDM-03) (Page 4 of 6)

04-07-05

FROM PG 2 BLOCK 5A (C) | (D) FROM PG 2 BLOCK 5B | (K) FROM PG 2 BLOCK 5C

15

1. DLES ASP PNL F2
   MASTER ALARM PB - PRESS AND RELEASE
   VERIFY ALARM LITE OFF

2. DLES ASP PNL L12L - SPACEHAB
   SMOKE SENSOR/RESET SW - RESET L12LS17

15A

10 SECOND TEST
SMOKE SENSORS A & B

NOTE
C + W TONES MAY OCCUR
NOTE
DLES NOTIFY ASP/CDR WHEN 10 SEC ELAPSES

3. DLES ASP PNL L-12L-SSP
   SPACEHAB
   SMOKE SENSOR/RESET SW-TEST L12LS17
   (HOLD FOR 10 SEC THEN RELEASE)
4. DLES ASP REPORT ALARMS INDICATED:
   PNL L1_____(SMOKE DET B/PL LIGHT)
   PNL F2_____(MASTER ALARM)
   TONES_____(SIREN)
5. DLES ASP PNL F2
   MASTER ALARM PB-PRESS, RELEASE
   VERIFY ALARM LITE OFF
6. DLES DSWF CONSOLE CRT (PAH003)
   RECORD:
   SMOKE SENSOR A ALARM_____(P47X2017Y)
   SMOKE SENSOR B ALARM_____(P47X2019Y)
7. DLES ASP PNL L12L-SSP
   SPACEHAB
   SMOKE SENSOR/RESET SW-RESET L12LS17

25 SECOND TEST
SMOKE SENSORS A & B

8. DLES ASP PNL L-12L-SSP
   SPACEHAB
   SMOKE SENSOR/RESET SW-TEST L12LS17
   (HOLD TIL AUDIBLE TONES)
9. DLES ASP REPORT ALARMS INDICATED:
   PNL L1_____(SMOKE DET B/PL LIGHT)
   PNL F2_____(MASTER ALARM)
   TONES_____(SIREN)
10. DLES ASP PNL F2
    MASTER ALARM PB-PRESS, RELEASE
    VERIFY ALARM LITE OFF
11. DLES DSWF CONSOLE CRT (PAH003)
    RECORD:
    SMOKE SENSOR A ALARM_____(P47X2017Y)
    SMOKE SENSOR B ALARM_____(P47X2019Y)

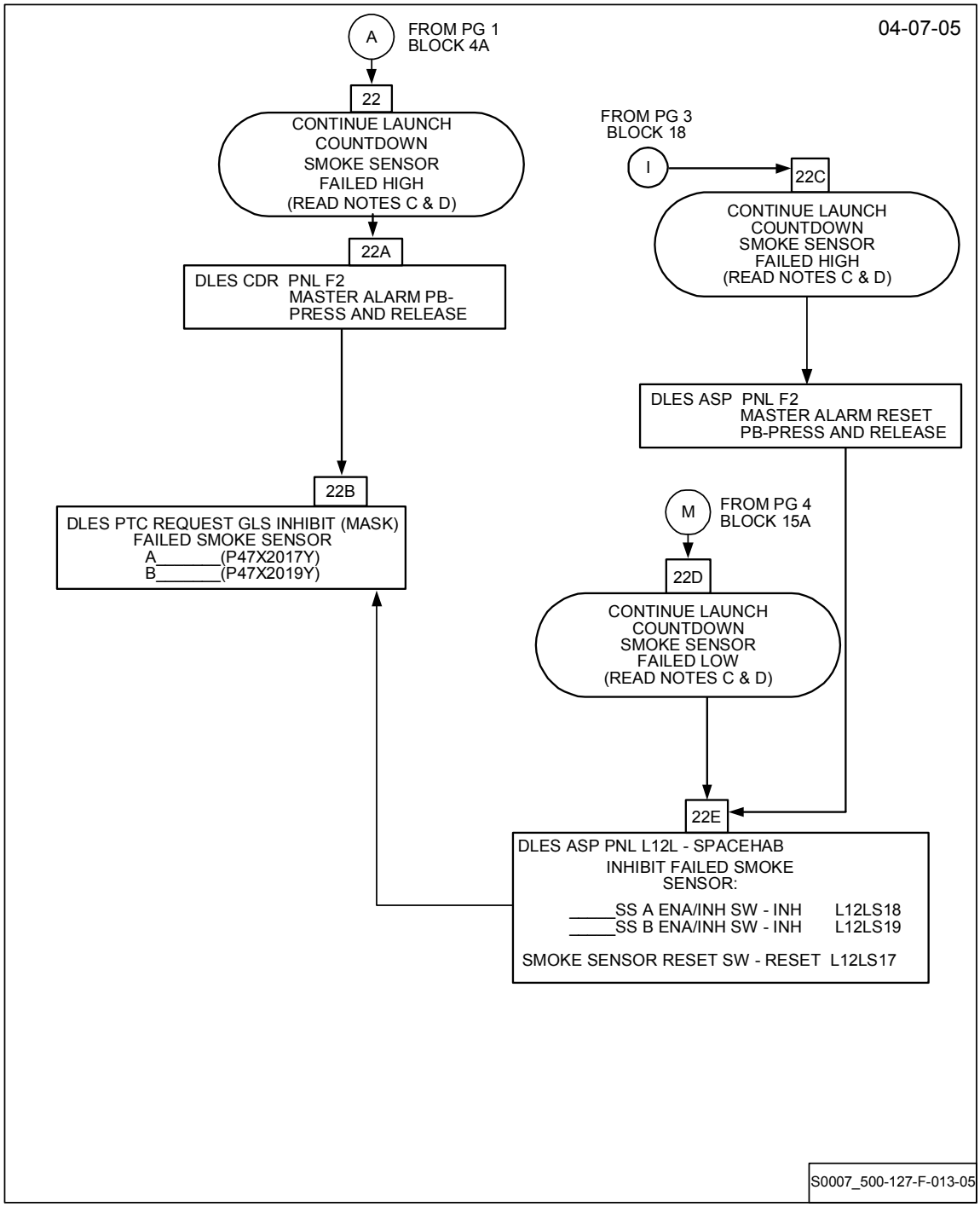
15B	ONLY ONE SENSOR PRODUCES ALARMS IN EITHER TEST.
15C	BOTH SENSORS PRODUCE ALARMS IN BOTH 10 AND 25 SECOND TESTS.

(M) PG 5 BLOCK 22D

(L) TO PG 3 BLOCK 16

S0007_500-127-F-013-04

Spacehab Smoke/Fire Anomaly (T-6 hrs - T-31 sec) (SSID RDM-03) (Page 5 of 6)



Spacehab Smoke/Fire Anomaly (T-6 hrs - T-31 sec) (SSID RDM-03) (Page 6 of 6)

NOTE

A. FSS Discharge will only occur upon Firing Room confirmation of increasing smoke sensor concentrations (Increase for > or = 20 sec). Since no increase in either smoke sensor concentration measurement was identified, main power to the module is removed (via FSS Arming), but the FSS in NOT discharged. Smoke sensors and DMU powered by Emergency Bus. Smoke sensor concentration data is provided by DMU. SH module remains in a safe configuration following Main Power Kill caused by FSS Arming. Smoke detection is slowed due to lack of fan air circulation.

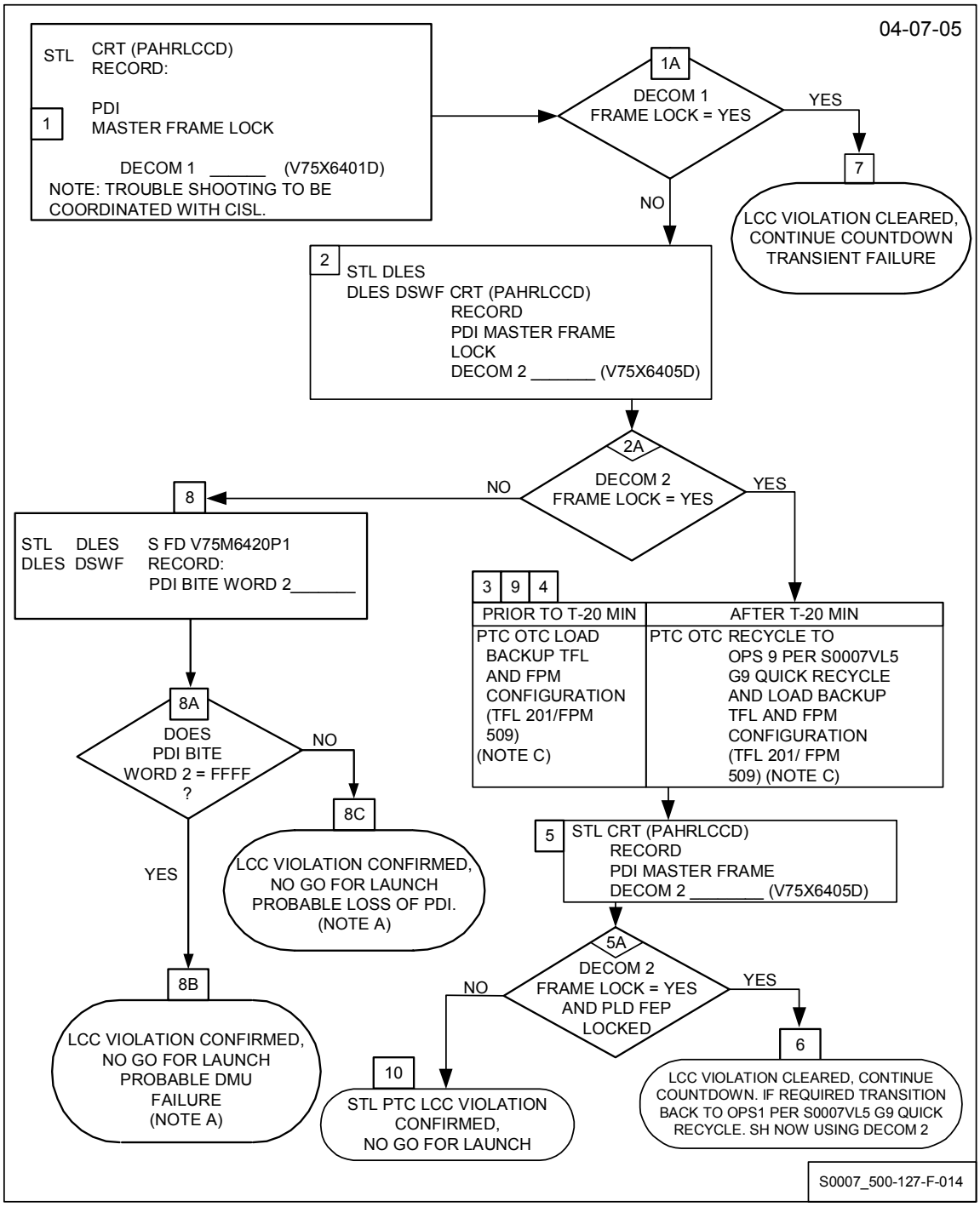
B. The following are fire confirmation cues:
- Both smoke sensor alarms with increasing concentration(s) for > 20 sec
- One sensor alarm and the other smoke sensor concentration increasing for > 20 sec.
- Both concentrations increasing for > 20 sec.

C. Inhibit failed sensor alarm if possible via SSP. Concentration data for sensor may still be valid. Any subsequent alarms should be treated as if both alarms enunciated.

D. Panel L1 SMOKE DET B/PL LIGHT will remain lit during ascent if failed smoke sensor alarm cannot be inhibited from the SSP prior to Launch.

127-14

Spacehab DMU Interface Power Failure (T-6 hrs - T-31 sec) (SSID RDM-04) (Page 1 of 2)



Spacehab DMU Interface Power Failure (T-6 hrs - T-31 sec) (SSID RDM-04) (Page 2 of 2)

NOTE

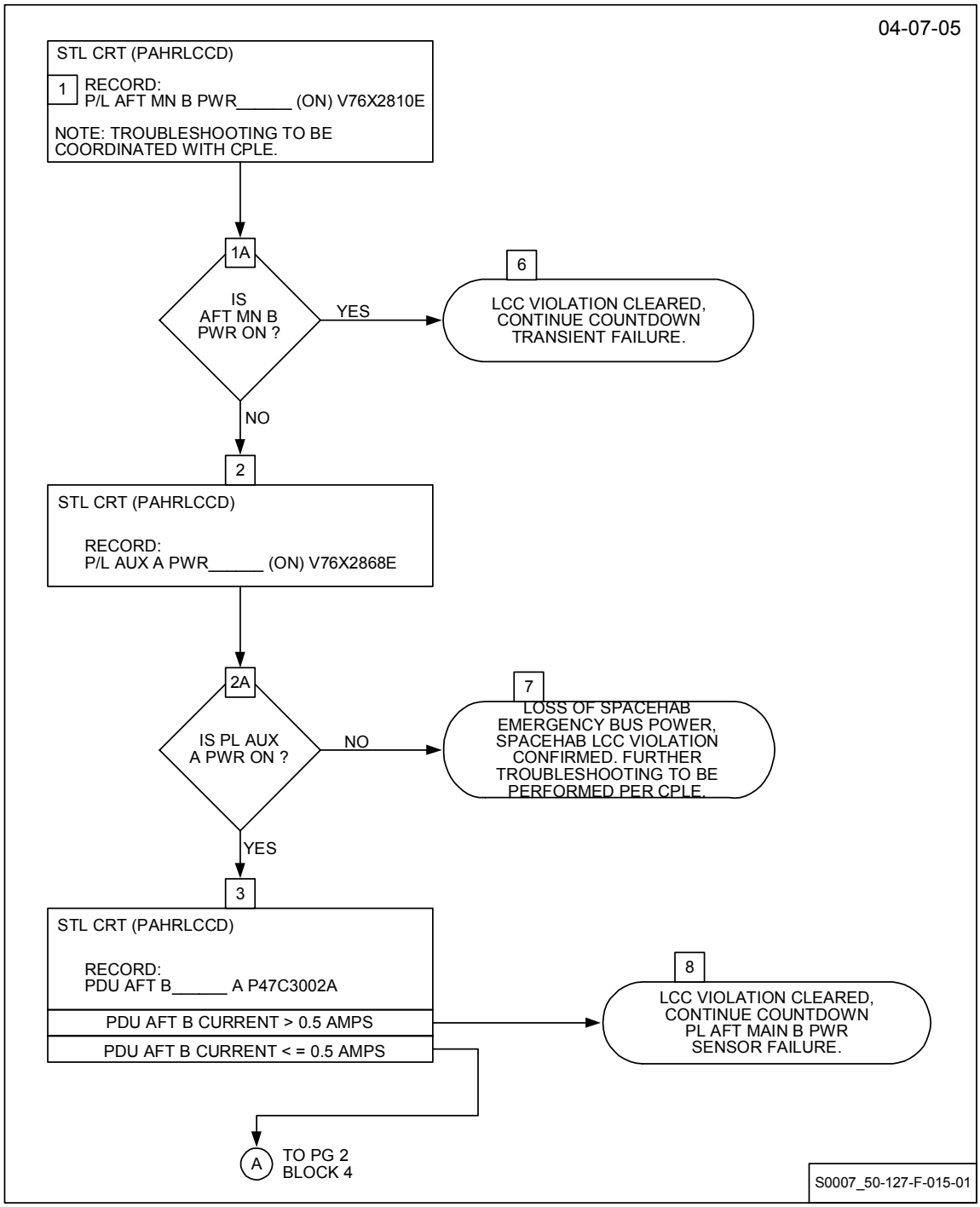
A. The prime ascent/entry TFL will have Spacehab data in DECOM1. Although PCMMU does not have the bandwidth to downlink data from DECOM2, DECOM2 will be loaded with the FPM from the primary ascent TFL in order to verify bit and frame lock, which will help rule out a DMU failure. If PDI Bite Word 2 (V75M6420P) = FFFF with active master frame lock = Off (On), probable DMU failure. If PDI Bite Word 2 is other than FFFF with master frame lock = Off (On), probable PDI failure (PDI required per MEL-13). The mission specific SH TFL/DFL configuration will be documented in the Boeing mission specific Launch Commit Criteria console support document.

B. PDI frame lock yes (on LCC display) = On

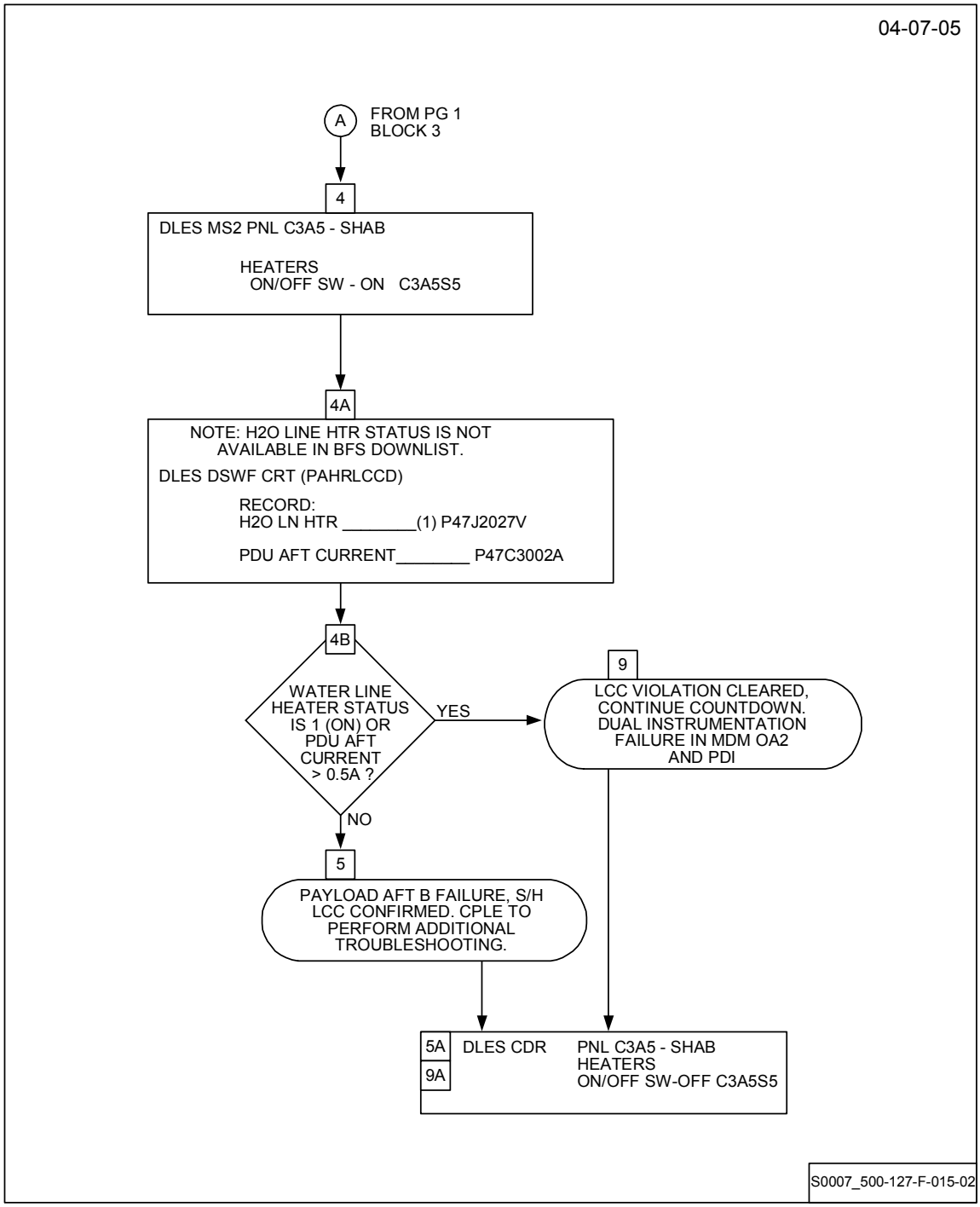
C. Loading of backup TFL requires OMRS waiver for S00FA0.301

127-15

Payload AFT MN B Power Anomaly (T-6 hrs - T-9 min) (SSID RDM-05) (Page 1 of 2)

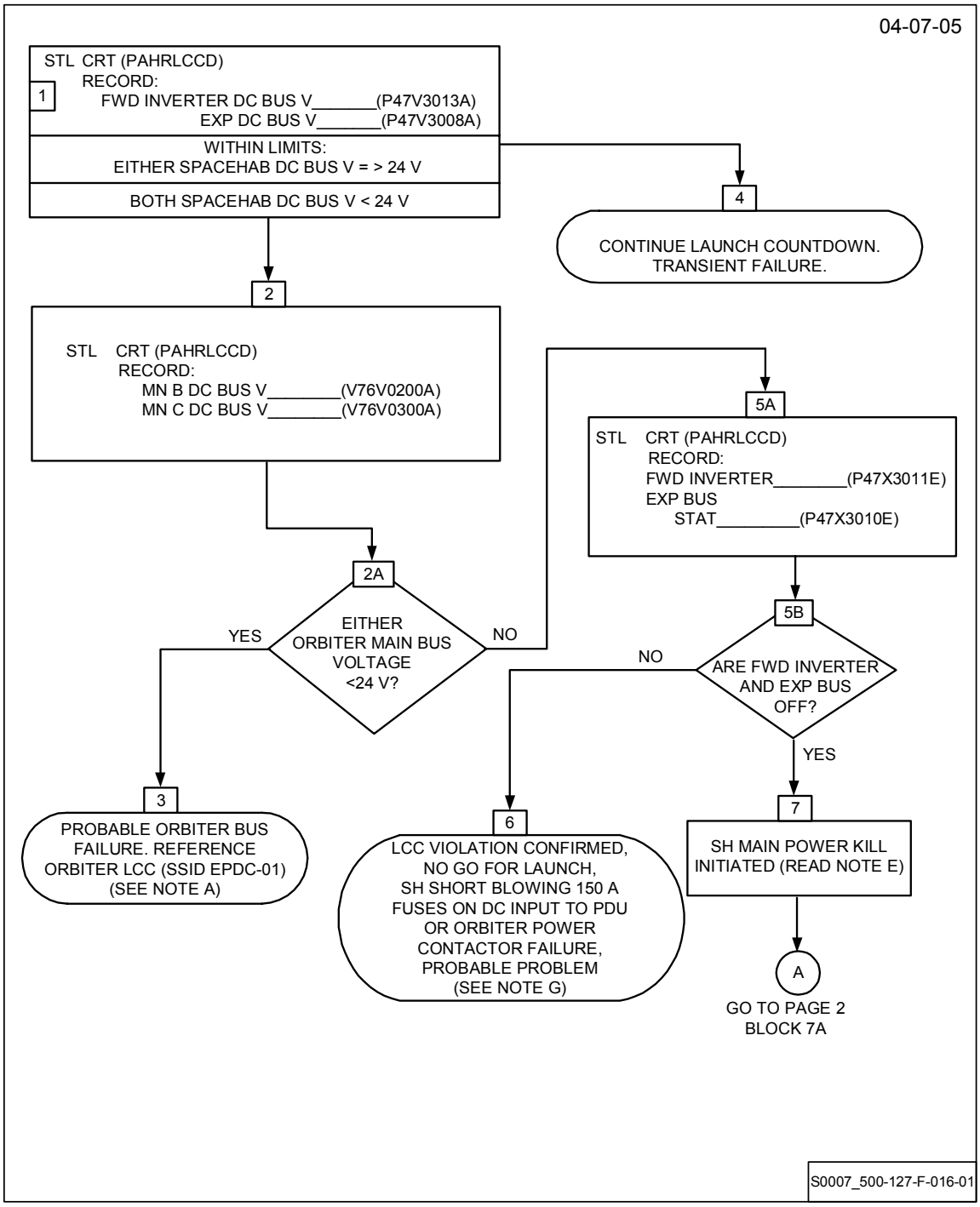


Payload AFT MN B Power Anomaly (T-6 hrs - T-9 min) (SSID RDM-05) (Page 2 of 2)

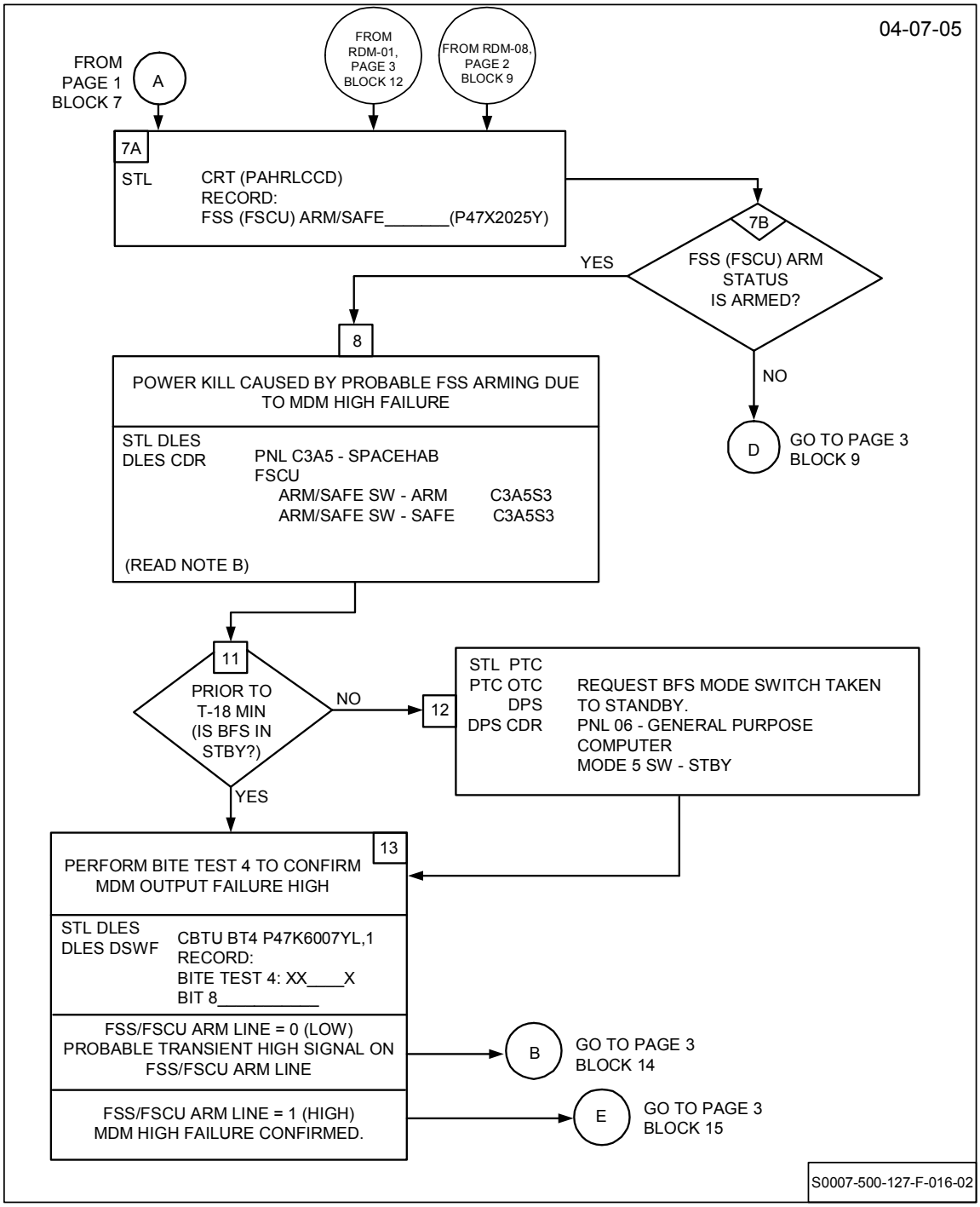


127-16

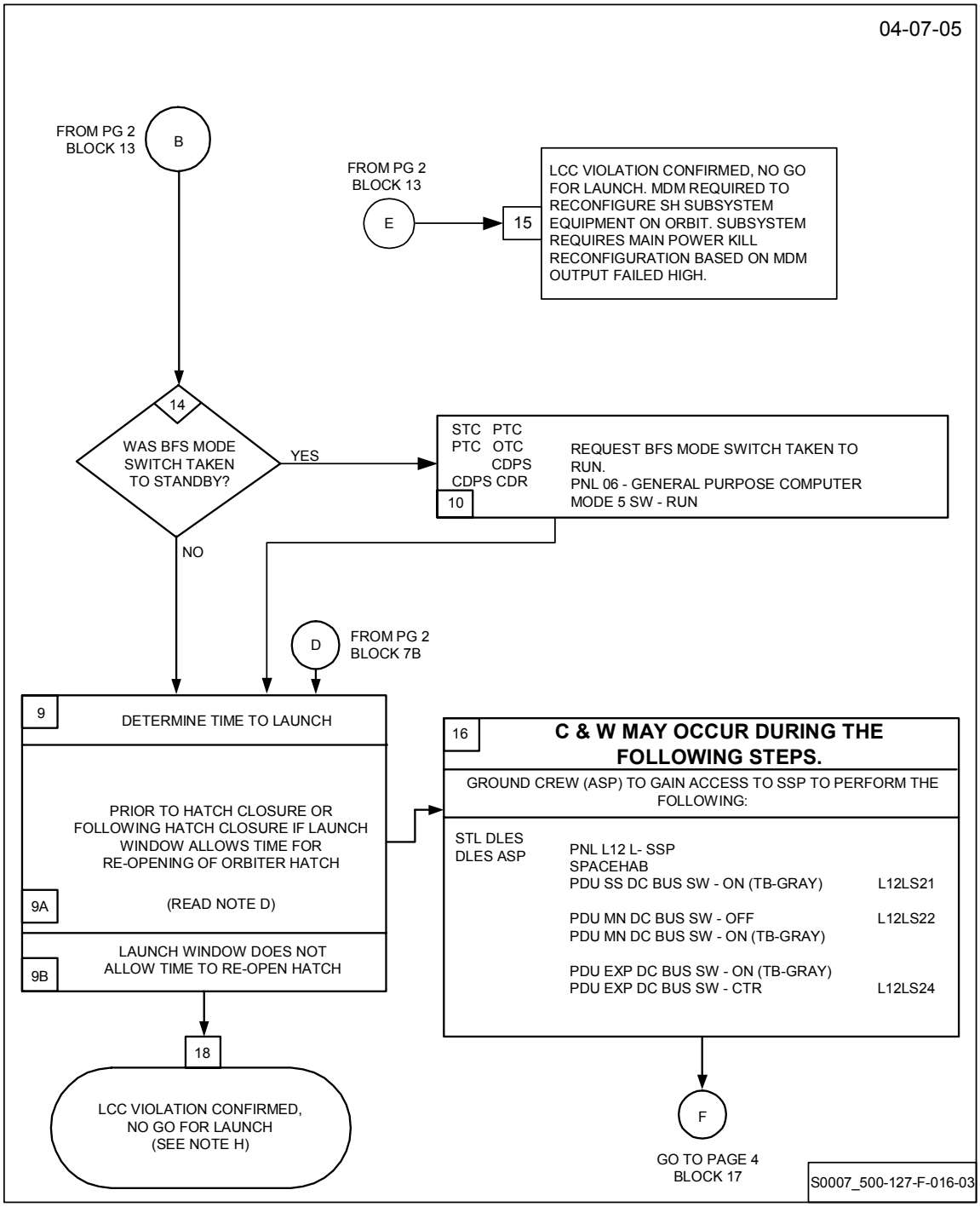
Spacehab Main Power Anomaly (T-6 hrs - T-31 sec) (SSID RDM-06) (Page 1 of 6)



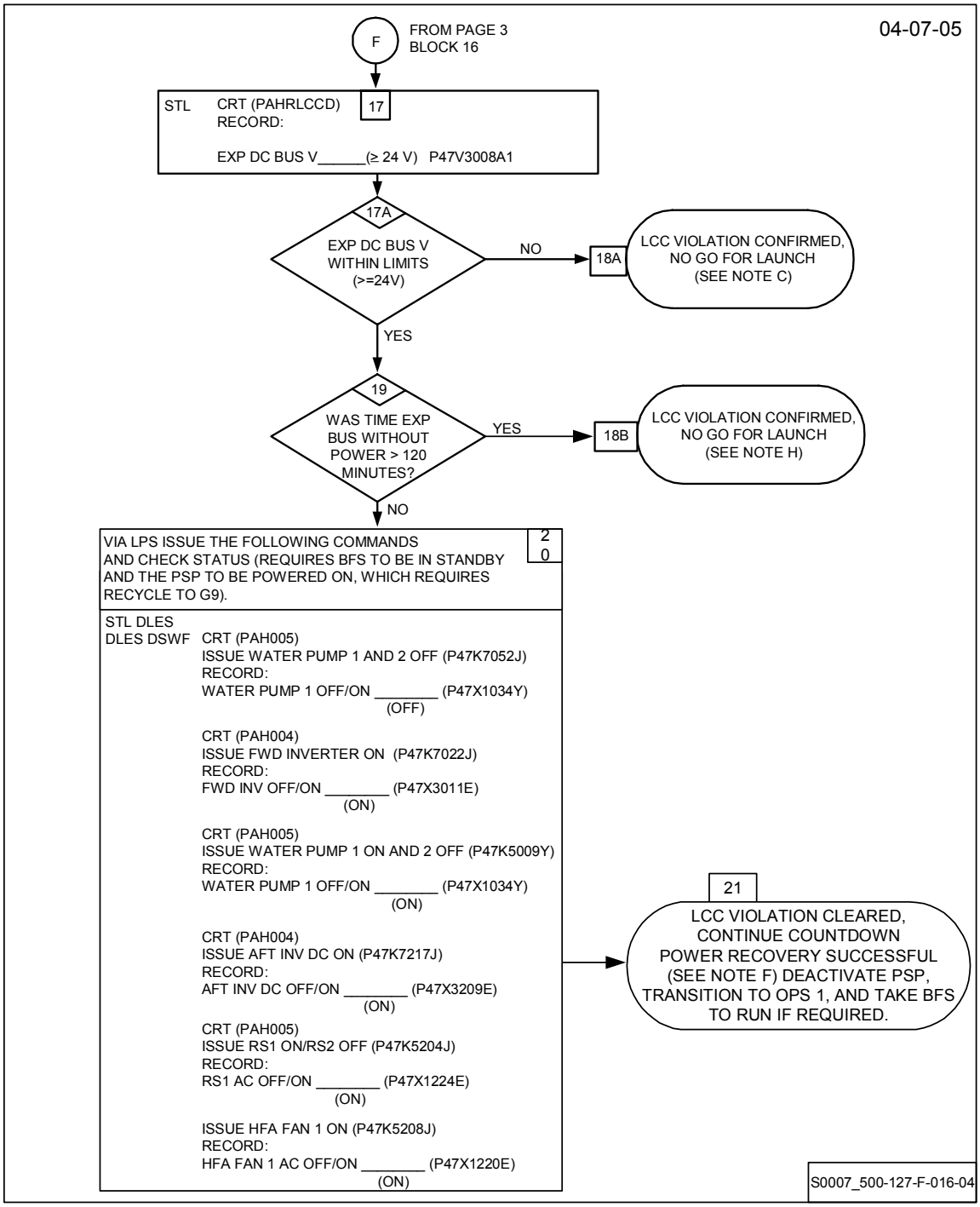
Spacehab Main Power Anomaly (T-6 hrs - T-31 sec) (SSID RDM-06) (Page 2 of 6)



Spacehab Main Power Anomaly (T-6 hrs - T-31 sec) (SSID RDM-06) (Page 3 of 6)



Spacehab Main Power Anomaly (T-6 hrs - T-31 sec) (SSID RDM-06) (Page 4 of 6)



Spacehab Main Power Anomaly (T-6 hrs - T-31 sec) (SSID RDM-06) (Page 5 of 6)

NOTE

A. Orbiter LCC (EPDC-01) would be invoked if Orbiter Main Bus Voltage is less than 28.3 V.

B. Switch throw will bring system back to safe configuration such that the FSS Bottles cannot be discharged via a discharge command (Gate reset to nominal configuration which will require both an arm one-shot command and discharge command prior to Halon bottle firing). Prior to recovery of MDM, FSS Arm capability via MDM commanding is lost. Arming of FSS prior to MDM recovery requires access to the C3A5 panel or Standard Switch Panel (SSP).

C. This note is applicable to non FSS-arming via MDM cases only. Hard failure of Main Power Kill Circuitry in FSCU, MCP, SSP, or PDU causing a Main Power Kill. All hard Main Power Kill cases can be recovered by disconnecting the Jiffy Junctions at the Power Distribution Unit (PDU) interface in the SH subfloor.

D. Access to the SSP is required to perform SH power recovery steps in Block 16. Re-opening of the Orbiter Hatch is required since the SSP is not accessible by the Crew. LPS commanding is required to perform SH power recovery steps in Block 20. In case of inadvertent (FSS Arm via MDM high), intermittent (power kill circuitry in MDP, FSCU, or PDU), or power supply ramping/transient power kill, basic commanding will recover power. For a hard kill, disconnection of Jiffy Junctions at the SH Power Distribution Unit will be required to allow recovery of system power.

E. The SH Module remains in a safe configuration following a Main Power Kill. Smoke detection is slowed due to lack of fan air circulation.

F. This note is applicable to non FSS-Arming via MDM cases only. Ability to recover from Main Power Kill indicates one of the following conditions occurred:

- Intermittent failure of Main Power Kill Circuitry in MCP, FSCU, or PDU
- Power Supply ramping/transient causing Main Power Kill.

Spacehab Main Power Anomaly (T-6 hrs - T-31 sec) (SSID RDM-06) (Page 6 of 6)

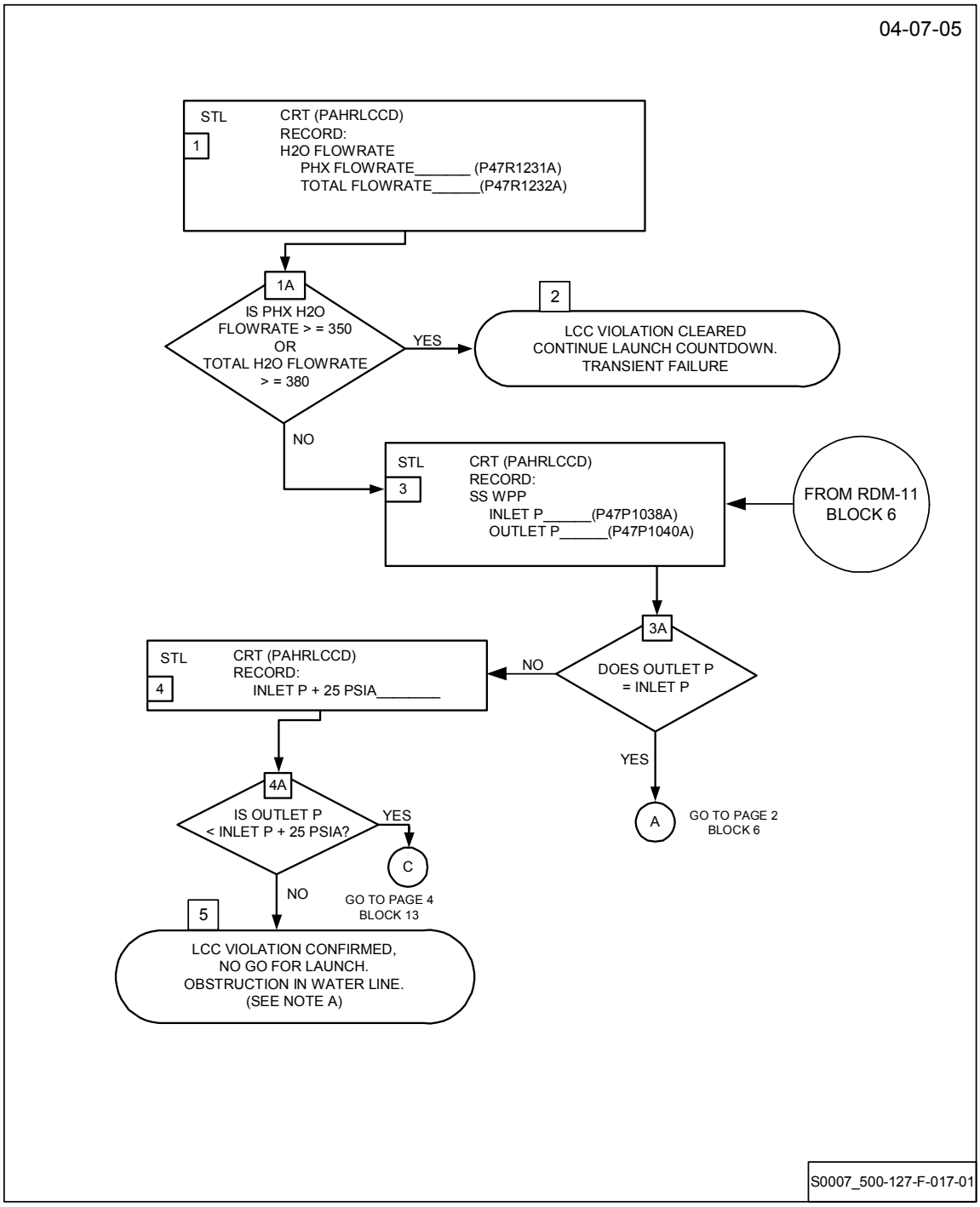
NOTE

G. Verify PL PRI MN C V76X2838E (PL PRI MN B V76X2833E) is On. If OFF, PL PRI power contactor failure is confirmed. If On, probable SH short blowing 150 amp fuses on DC input to PDU.

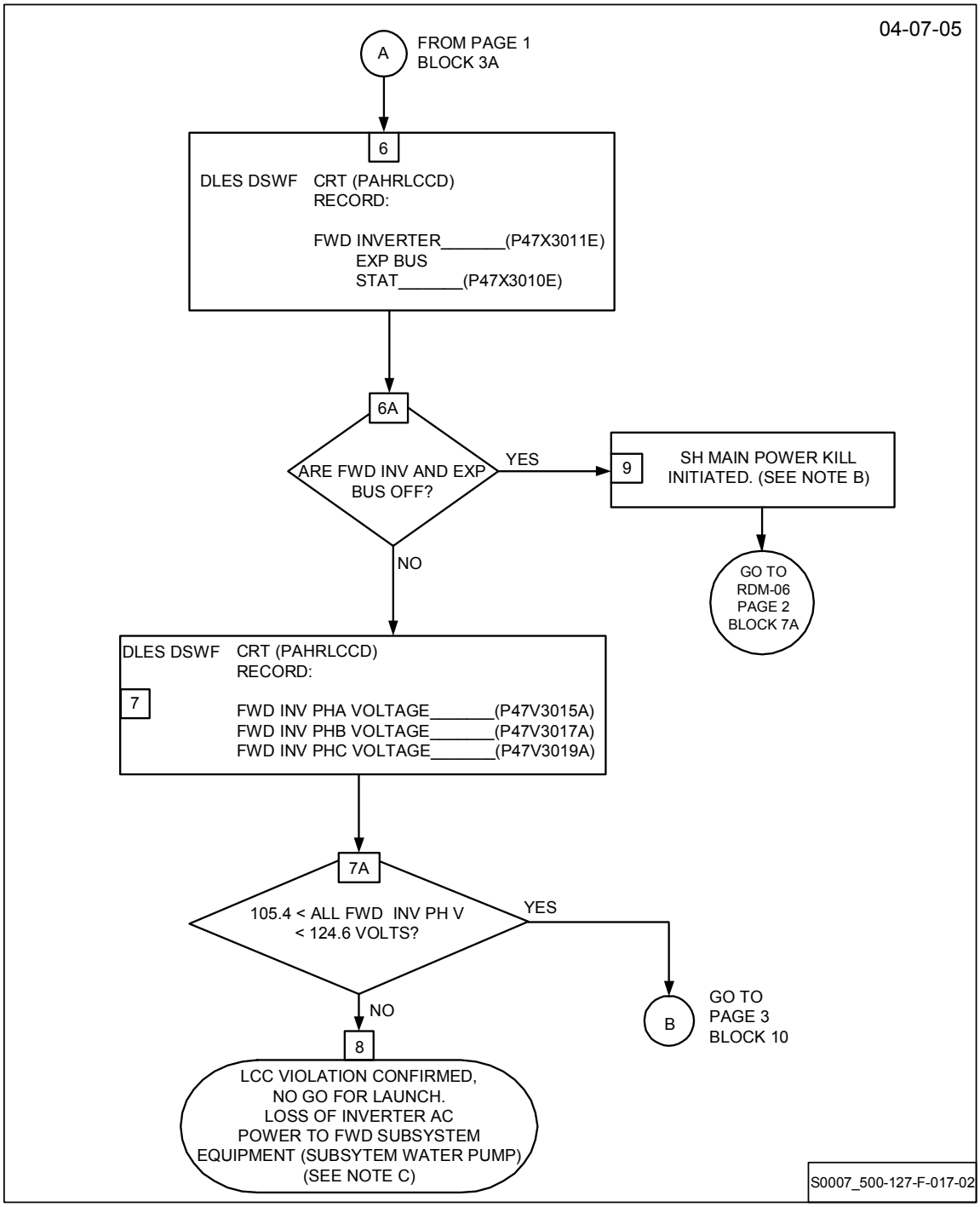
H. It is desirable to minimize the time without power for the SH Experiment Bus. If the time without power is greater than 120 minutes (mission specific), then multiple payloads within the Spacehab Module will experience significant loss of Science or total loss of payload objectives. Science loss begins when time without power exceeds 15 minutes (mission specific) for some payloads.

127-17

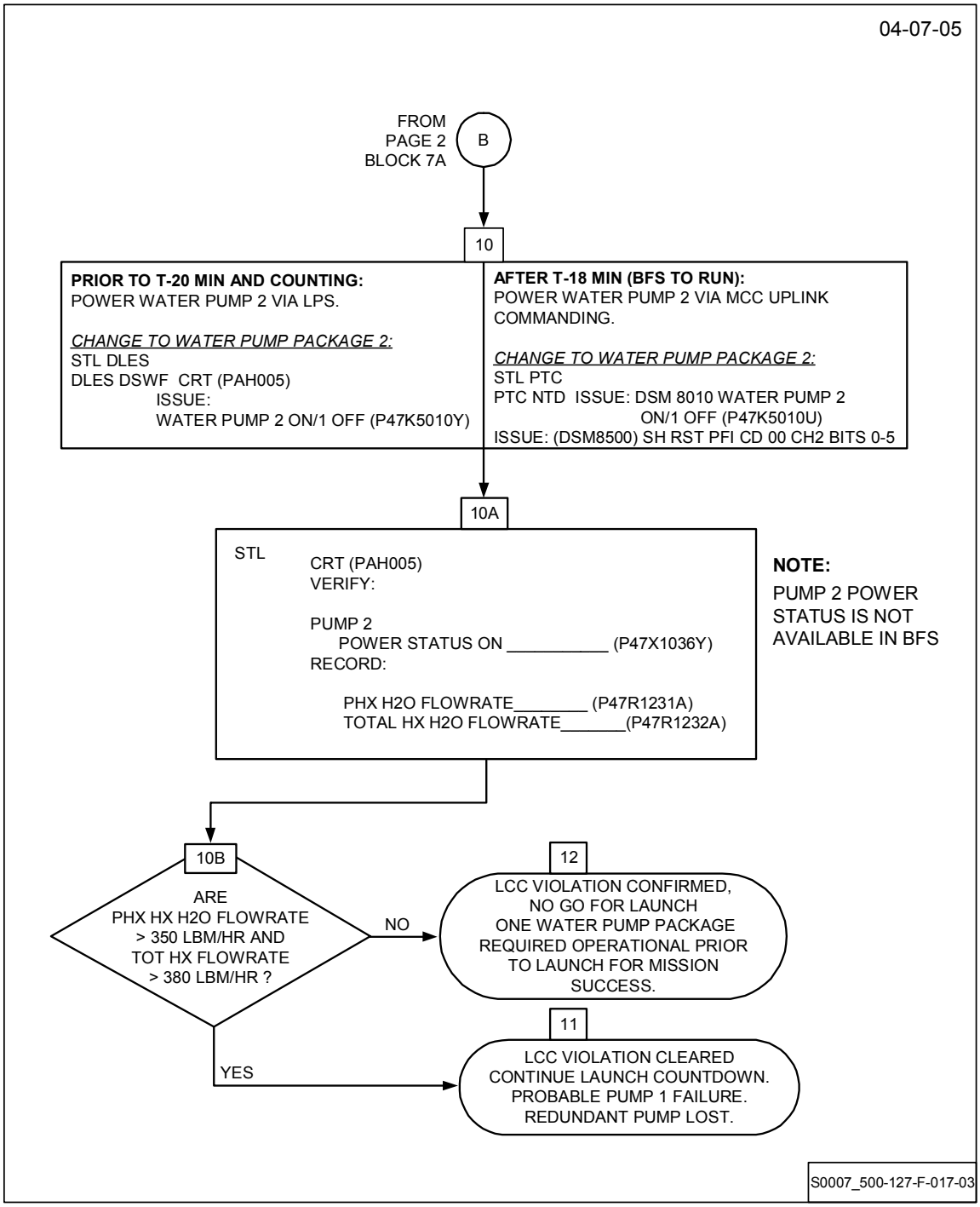
Spacehab Subsystem Waterloop Flow Rate (Low) Anomaly (T-6 hrs - T-31 sec) (SSID RDM-08) (Page 1 of 5)



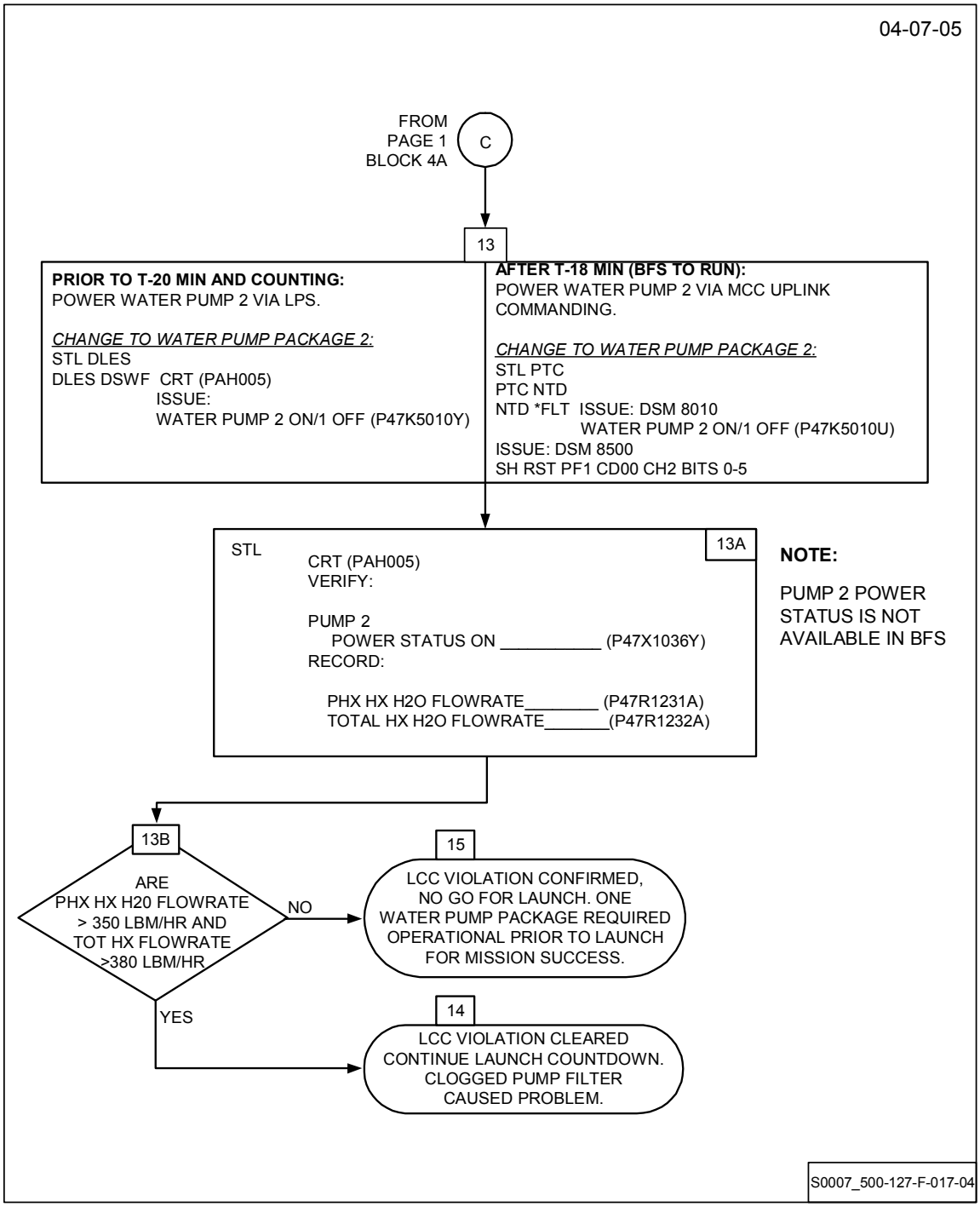
Spacehab Subsystem Waterloop Flow Rate (Low) Anomaly (T-6 hrs - T-31 sec) (SSID RDM-08) (Page 2 of 5)



Spacehab Subsystem Waterloop Flow Rate (Low) Anomaly (T-6 hrs - T-31 sec) (SSID RDM-08) (Page 3 of 5)



Spacehab Subsystem Waterloop Flow Rate (Low) Anomaly (T-6 hrs - T-31 sec) (SSID RDM-08) (Page 4 of 5)



Spacehab Subsystem Waterloop Flow Rate (Low) Anomaly (T-6 hrs - T-31 sec) (SSID RDM-08) (Page 5 of 5)

NOTE

A. Obstruction in subsystem waterloop will decrease system heat rejection capability.

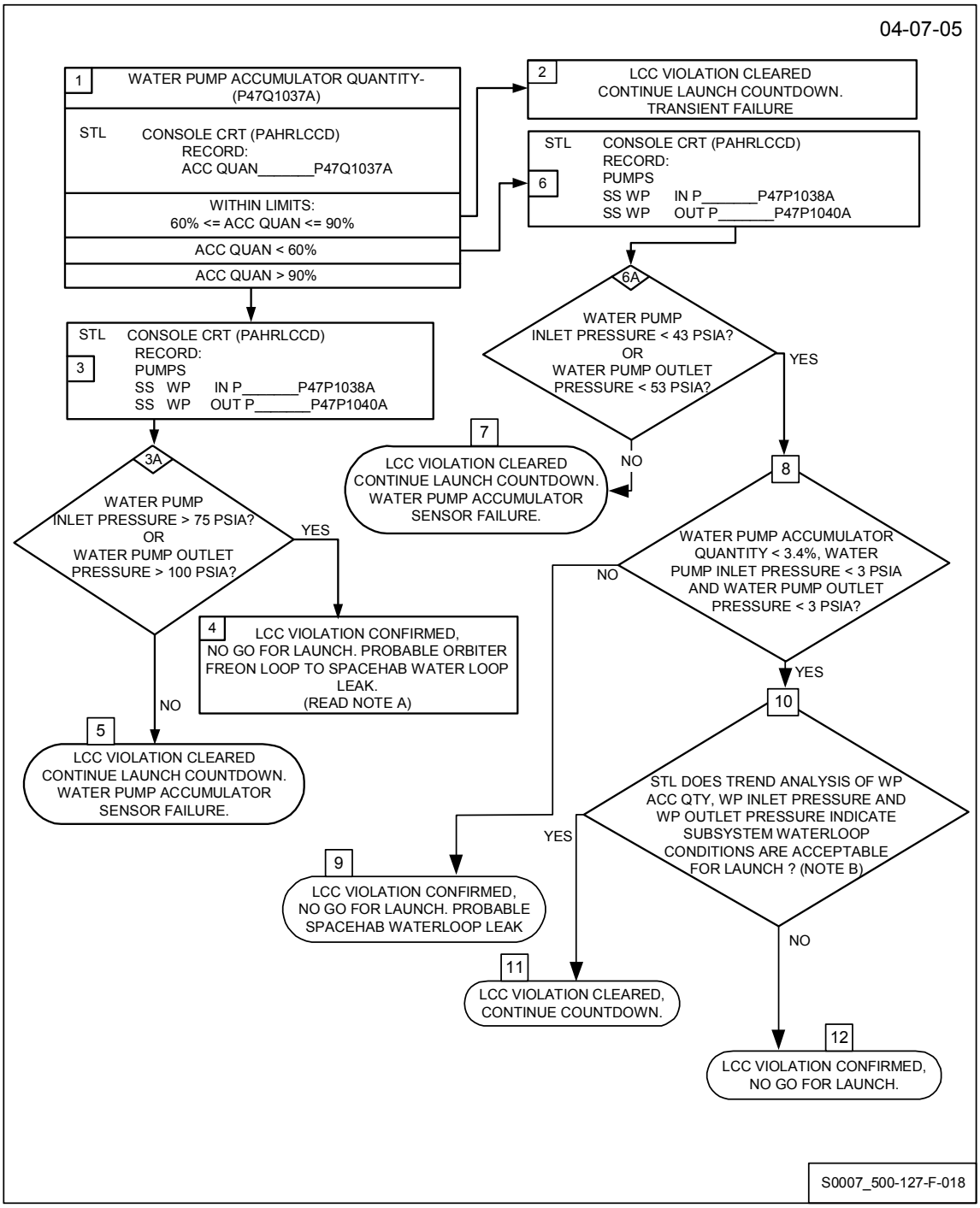
B. Flow rate (Low) anomaly caused by SH main power kill. Power loss to the water pump package results from a power kill.

C. Possible loss of FWD inverter master sync, Phase A inverter overvoltage shutdown, PDU K1 relay failure, or PDU F94 fuse failure (feeds inverter Phase A). K1 relay failure can be determined by checking FWD inverter DC Bus current (P47C3012A) and FWD inverter DC Bus voltage (P47V3013A) measurements. 0 volts condition for inverter Bus voltage is 18v, while 0 current condition for inverter Bus current is 0 amps. F94 fuse failure, inverter overvoltage shutdown and inverter master sync failures all give the same failure signature: All inverter phase voltage out of limits (Phase A controls sync for other two inverter phases).

D. Commanding of fans via LPS is not available after T-20 min and counting. No commanding is available between T-20 and T-18 min (OPS 101 transition). Commanding after T-18 min available via MCC uplink commands.

127-18

Spacehab Water Pump Accumulator Quantity (High/Low) Anomaly (T-6 hrs - T-5 min) (SSID RDM-09) (Page 1 of 2)



Spacehab Water Pump Accumulator Quantity (High/Low) Anomaly (T-6 hrs - T-5 min) (SSID RDM-09) (Page 2 of 2)

NOTE

A. Orbiter Freon loop operates at higher pressure than SH water loop. A leak in Orbiter heat exchanger would cause the mass in the SH water loop to increase. Orbiter Freon loop leak would be confirmed with Orbiter LCC SSID ECL-41.

B. A common DC/DC converter powers the Water Pump Accumulator Quantity, Water Pump Inlet Pressure, and Water Pump Outlet Pressure sensors. Failure of this converter will cause the three sensor outputs to go to their 0 volt (Low) value. The mission specific data and criteria used to determine acceptable Subsystem Water Loop status for Launch after loss of Water Pump Accumulator Quantity, Water Pump Inlet Pressure, and Water Pump Outlet Pressure sensor readings will be documented in the Boeing mission specific Launch Commit Criteria console support document.

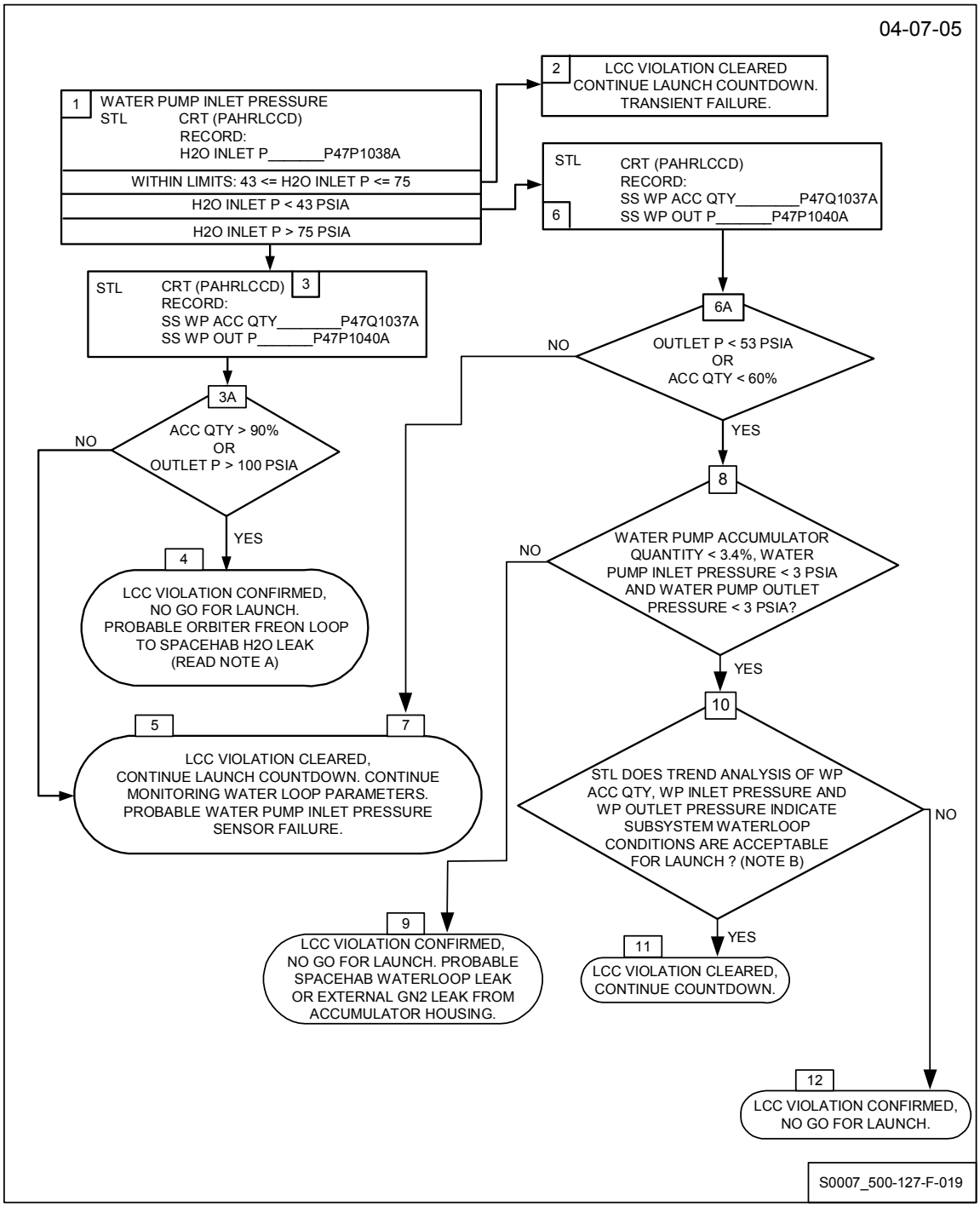
General Notes:

C. Accumulator Quantity, Water Pump Inlet Pressure, and Water Pump Outlet Pressure values may change after Flow Proportioning Valve repositioning at approximately L-6 to L-2 hrs.

D. Any changes in Water Pump package sensors (Accumulator Quantity, Water Pump Inlet Pressure, Water Pump Outlet Pressure) or PHX or Total H_2O Flow rates should be investigated for possible anomalies after allowing for temperature change effects.

127-19

Spacehab Subsystem Water Pump Inlet Pressure (High/Low) Anomaly (T-6 hrs - T-5 min) (SSID RDM-10) (Page 1 of 2)



Spacehab Subsystem Water Pump Inlet Pressure (High/Low) Anomaly (T-6 hrs - T-5 min) (SSID RDM-10) (Page 2 of 2)

NOTE

A. Orbiter Freon loop operates at higher pressure than SH water loop. A leak in Orbiter heat exchanger would cause the mass in the SH water loop to increase. Orbiter Freon loop leak would be confirmed with Orbiter LCC SSID ECL-41.

B. A common DC/DC converter powers the Water Pump Accumulator Quantity, Water Pump Inlet Pressure, and Water Pump Outlet Pressure sensors. Failure of this converter will cause the three sensor outputs to go to their 0 volt (Low) value. The mission specific data and criteria used to determine acceptable Subsystem Water Loop status for Launch after loss of Water Pump Accumulator Quantity, Water Pump Inlet Pressure, and Water Pump Outlet Pressure sensor readings will be documented in the Boeing mission specific Launch Commit Criteria console support document.

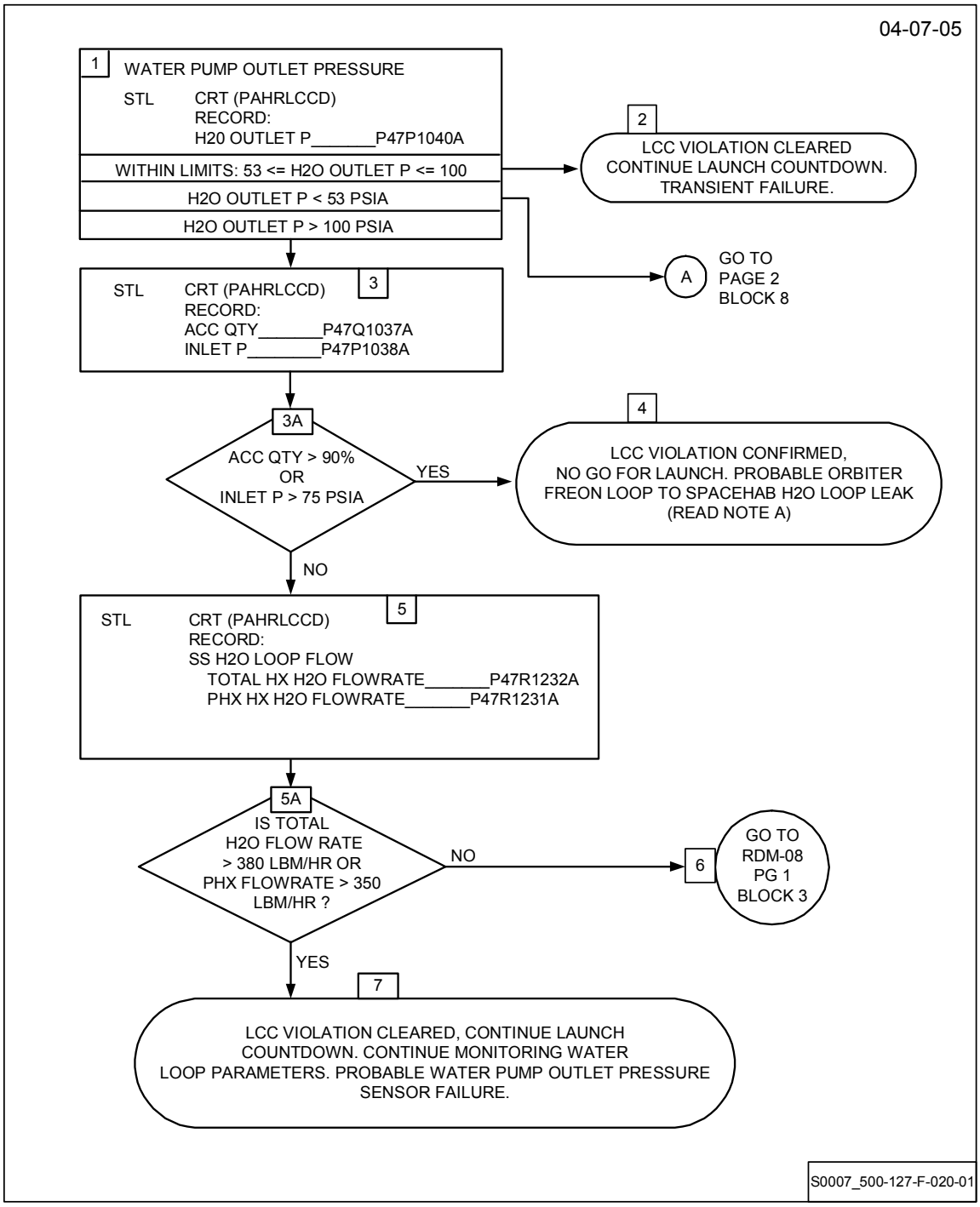
General Notes:

C. Accumulator Quantity, Water Pump Inlet Pressure, and Water Pump Outlet Pressure values may change after Flow Proportioning Valve repositioning at approximately L-6 to L-2 hrs.

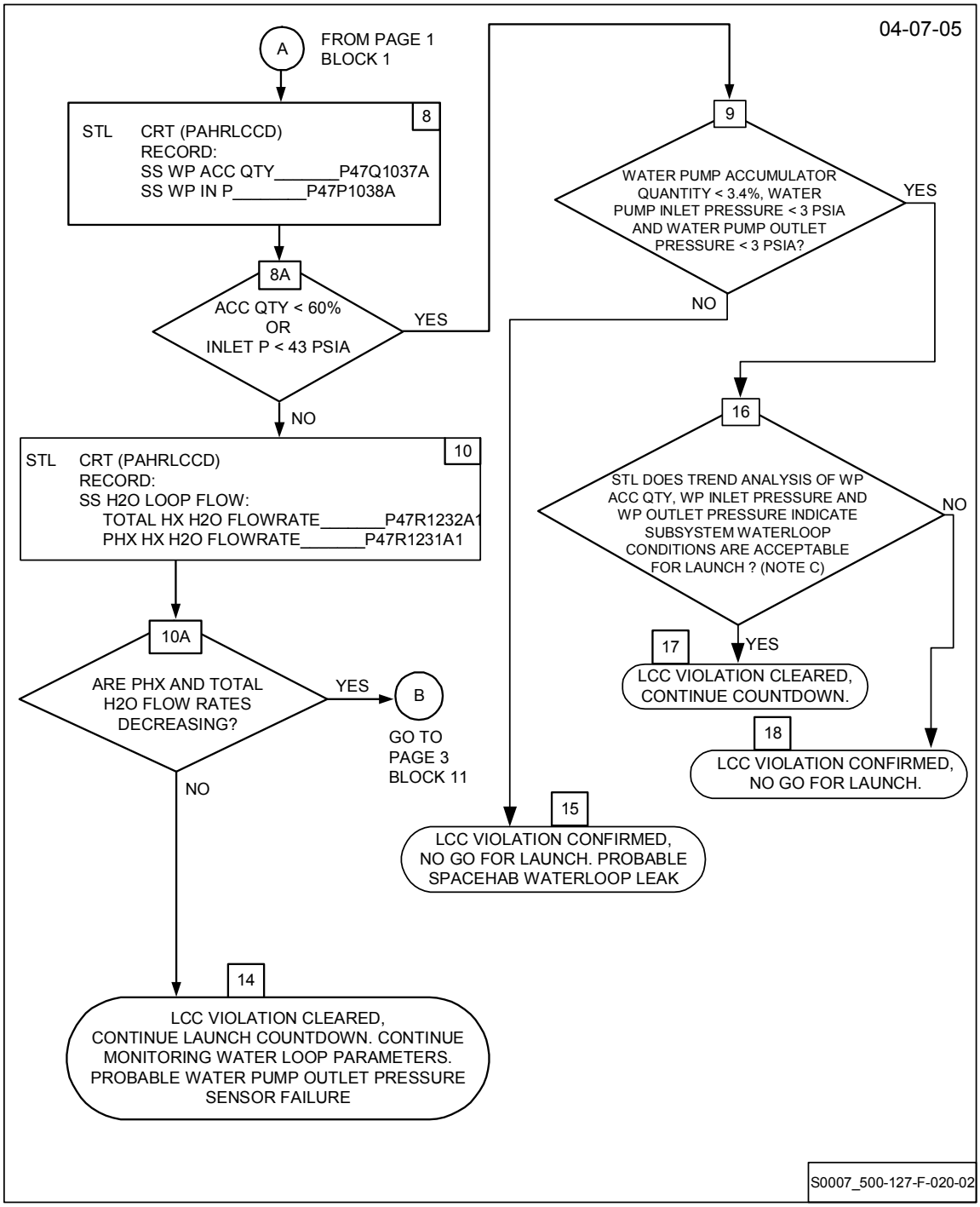
D. Any changes in Water Pump package sensors (Accumulator Quantity, Water Pump Inlet Pressure, Water Pump Outlet Pressure) or PHX or Total H_2O Flow rates should be investigated for possible anomalies after allowing for temperature change effects.

127-20

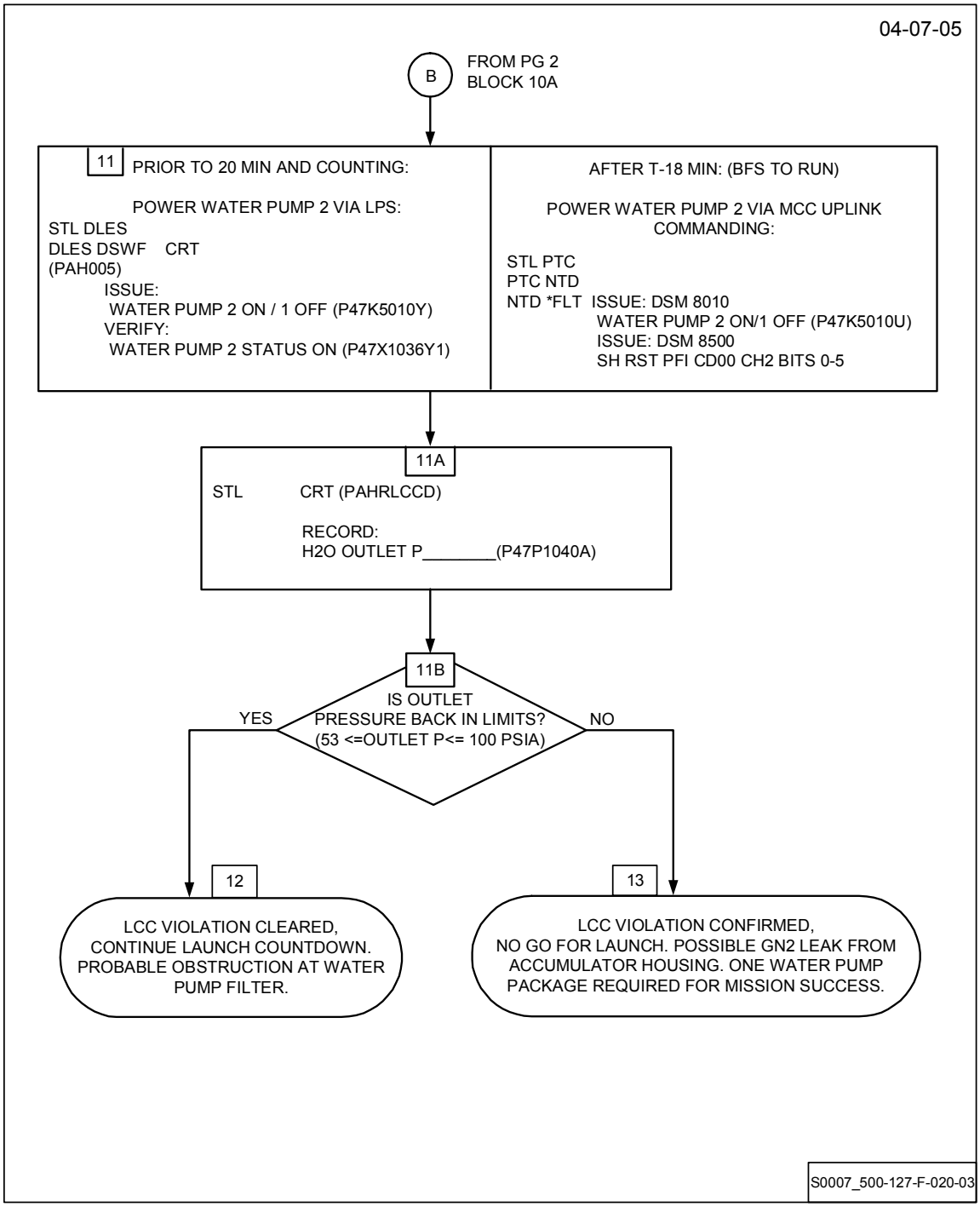
Spacehab Water Pump Outlet Pressure (High/Low) Anomaly (T-6 hrs - T-5 min) (SSID RDM-11) (Page 1 of 4)



Spacehab Water Pump Outlet Pressure (High/Low) Anomaly (T-6 hrs - T-5 min) (SSID RDM-11) (Page 2 of 4)



Spacehab Water Pump Outlet Pressure (High/Low) Anomaly (T-6 hrs - T-5 min) (SSID RDM-11) (Page 3 of 4)



Spacehab Water Pump Outlet Pressure (High/Low) Anomaly (T-6 hrs - T-5 min) (SSID RDM-11) (Page 4 of 4)

NOTE

A. Orbiter Freon loop operates at higher pressure than SH water loop. A leak in Orbiter heat exchanger would cause the mass in the SH water loop to increase. Orbiter Freon loop leak would be confirmed with Orbiter LCC SSID ECL-41.

B. Commanding of pumps via LPS is not available after T-20 min and counting. No commanding is available between T-20 min and T-18 min (OPS 101 transition). Commanding after T-18 min available via MCC uplink commands.

C. A common DC/DC converter powers the Water Pump Accumulator Quantity, Water Pump Inlet Pressure, and Water Pump Outlet Pressure sensors. Failure of this converter will cause the three sensor outputs to go to their 0 volt (Low) value. The mission specific data and criteria used to determine acceptable Subsystem Water Loop status for Launch after loss of Water Pump Accumulator Quantity, Water Pump Inlet Pressure, and Water Pump Outlet Pressure sensor readings will be documented in the Boeing mission specific Launch Commit Criteria console support document.

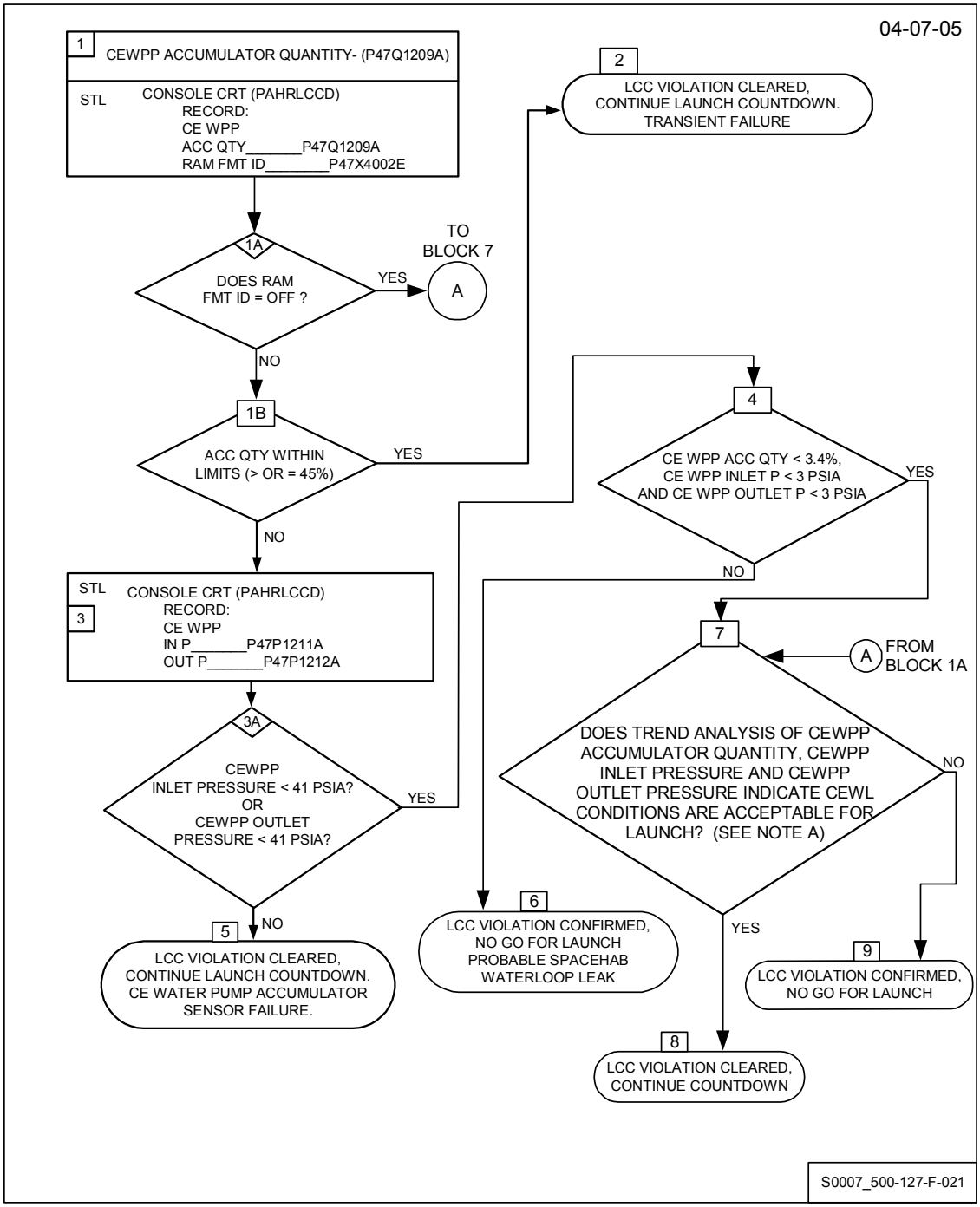
General Notes:

D. Accumulator Quantity, Water Pump Inlet Pressure, and Water Pump Outlet Pressure values may change after Flow Proportioning Valve repositioning at approximately L-6 to L-2 hrs.

E. Any changes in Water Pump package sensors (Accumulator Quantity, Water Pump Inlet Pressure, Water Pump Outlet Pressure) or PHX or Total H_2O Flow rates should be investigated for possible anomalies after allowing for temperature change effects.

127-21

CEWPP Accumulator Quantity Anomaly (T-6 hrs - T-9 min) (SSID RDM-12) (Page 1 of 2)



CEWPP Accumulator Quantity Anomaly
(T-6 hrs - T-9 min) (SSID RDM-12) (Page 2 of 2)

NOTE

A. A common DC/DC converter powers the CEWPP Accumulator Quantity, CEWPP Inlet Pressure, and CEWPP Outlet Pressure sensors. Failure of this converter will cause the three sensor outputs to go to their 0 volt (Low) value.

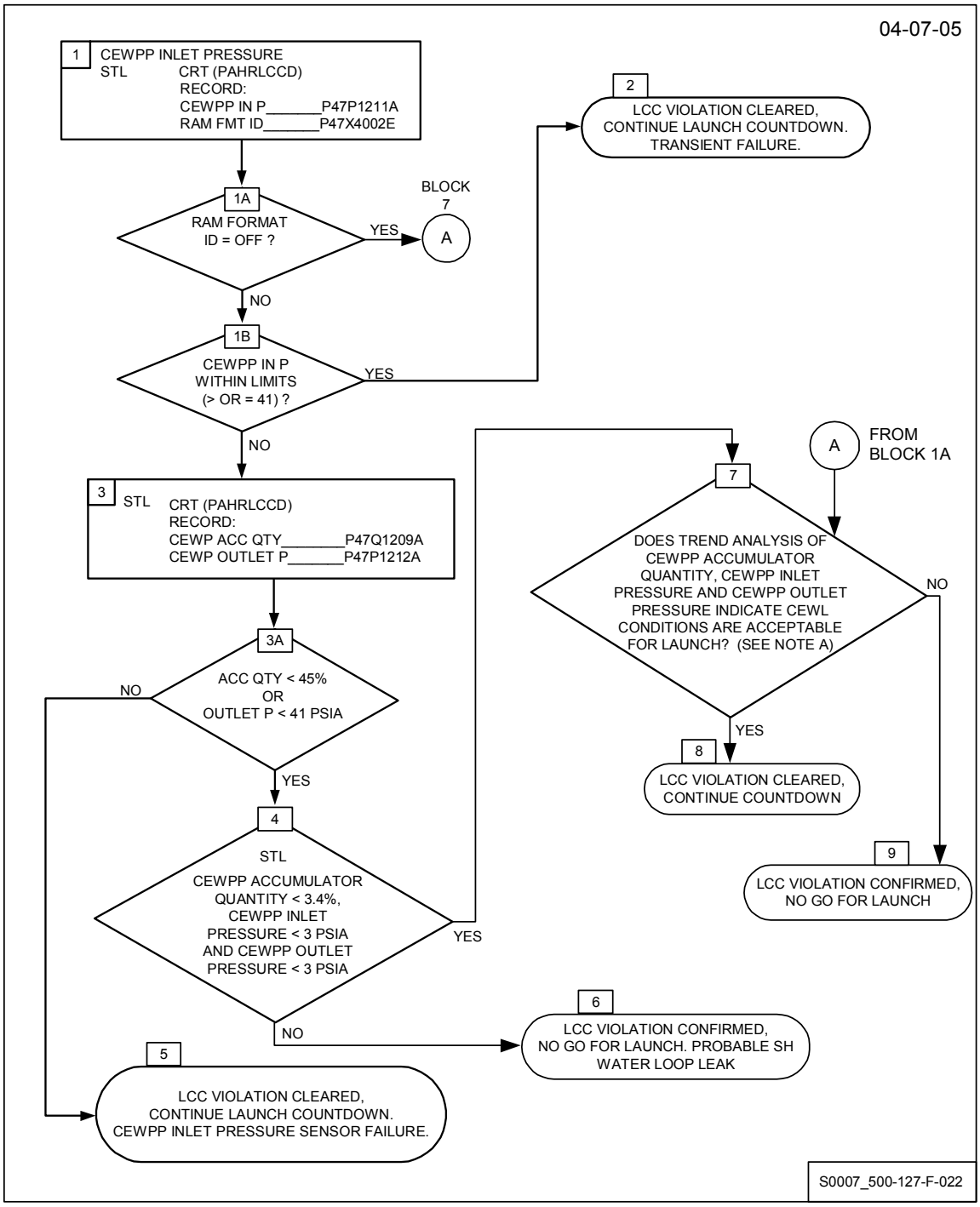
General Notes:

B. The following parameters involved in this LCC are not valid if the SH DMU is in the PROM mode due to previous failure: CEWPP Accumulator Quantity (P47Q1209A), CEWPP Inlet Pressure (P47P1211A), and CEWPP Outlet Pressure (P47P1212A). RAM FORMAT IND (P47X4002E) will read OFF if the SH DMU is in the PROM mode.

C. The mission specific data and criteria used to determine acceptable CEWL status for Launch after loss of CEWPP Accumulator Quantity, CEWPP Inlet Pressure, and CEWPP Outlet Pressure sensor readings will be documented in the Boeing mission specific Launch Commit Criteria console support document.

127-22

Spacehab CEWPP Inlet Pressure Anomaly (T-6 hrs - T-9 min) (SSID RDM-13) (Page 1 of 2)



Spacehab CEWPP Inlet Pressure Anomaly (T-6 hrs - T-9 min) (SSID RDM-13) (Page 2 of 2)

NOTE

A. A common DC/DC converter powers the CEWPP Accumulator Quantity, CEWPP Inlet Pressure, and CEWPP Outlet Pressure sensors. Failure of this converter will cause the three sensor outputs to go to their 0 volt (Low) value.

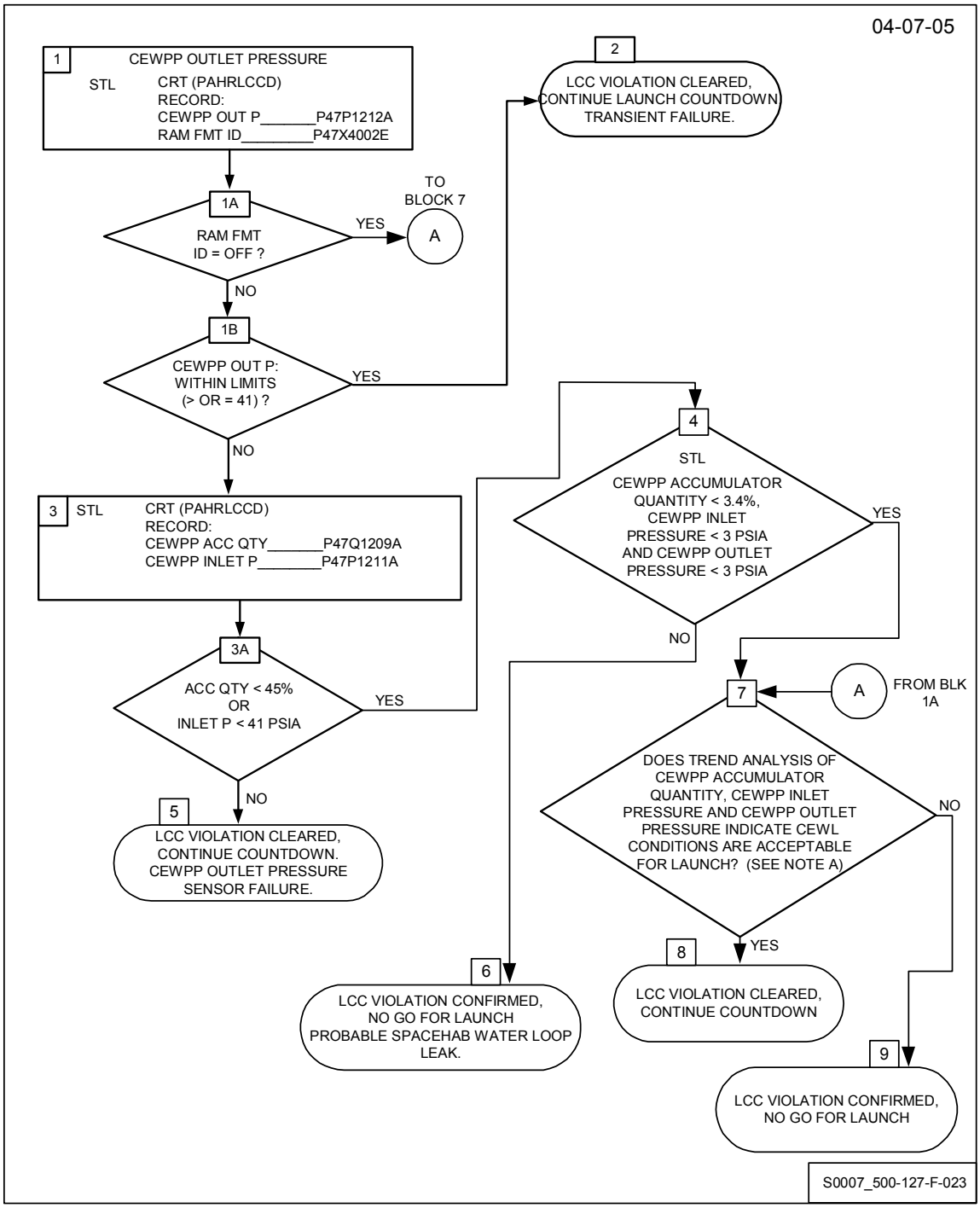
General Notes:

B. The following parameters involved in this LCC are not valid if the SH DMU is in the PROM mode due to previous failure: CEWPP Accumulator Quantity (P47Q1209A), CEWPP Inlet Pressure (P47P1211A), and CEWPP Outlet Pressure (P47P1212A). RAM FORMAT IND (P47X4002E) will read OFF if the SH DMU is in the PROM mode.

C. The mission specific data and criteria used to determine acceptable CEWL status for Launch after loss of CEWPP Accumulator Quantity, CEWPP Inlet Pressure, and CEWPP Outlet Pressure sensor readings will be documented in the Boeing mission specific Launch Commit Criteria console support document.

127-23

Spacehab CEWPP Outlet Pressure Anomaly (T-6 hrs - T-9 min) (SSID RDM-14) (1 of 2)



Spacehab CEWPP Outlet Pressure Anomaly (T-6 hrs - T-9 min) (SSID RDM-14) (2 of 2)

NOTE

A. A common DC/DC converter powers the CEWPP Accumulator Quantity, CEWPP Inlet Pressure, and CEWPP Outlet Pressure sensors. Failure of this converter will cause the three sensor outputs to go to their 0 volt (Low) value.

General Notes:

B. The following parameters involved in this LCC are not valid if the SH DMU is in the PROM mode due to previous failure: CEWPP Accumulator Quantity (P47Q1209A), CEWPP Inlet Pressure (P47P1211A), and CEWPP Outlet Pressure (P47P1212A). RAM FORMAT IND (P47X4002E) will read OFF if the SH DMU is in the PROM mode.

C. The mission specific data and criteria used to determine acceptable CEWL status for Launch after loss of CEWPP Accumulator Quantity, CEWPP Inlet Pressure, and CEWPP Outlet Pressure sensor readings will be documented in the Boeing mission specific Launch Commit Criteria console support document.

GLACIER Error Reset

NOTE
Perform this option if a GLACIER Error Reset is necessary.

GLACIER Error Reset Not Performed:_____

127-24 **XMLE**

Record IPR information:

IPR Number_____

NOTE
Monitor GLACIER and perform the following 3 steps as often as required if Status light is blinking or display toggles "ERROR PENDING".

In the event of an error, Line 2 of the GLACIER display will include the error message (such as "Current Range", "Voltage Range", "Hardware Error") and the error event "X/Y" where X and Y are numbers.

127-25 **PTC (XMLE)** **ASP (XME1)**

GLACIER

1. **Verify** display is toggling "ERROR PENDING" or Status LED is blinking.

2. **Press** right button (EXIT) until the "HOME" display appears.

3. **Press** left button (MENU) once to access main menu display.

4. **Press** left button (NEXT) twice to access error handling 3/5 display.

5. **Press** center button (SELECT) once.

6. **Press** left button (PEND) once.

7. **Record** the following information:

Record Time: _____(Local)

Line 2: _____(Error Message and Error Event)

Line 3: _____(Error Status)

(Substeps 1-7) Not Performed:_____

NOTE
Perform substeps 8 thru 11 if Error Status is "INACTIVE/PENDING".

8. **Press** center button (SELECT) once.

9. **Press** left button (RESET) once.

10. **Verify** line 3 reads:
"INACTIVE/ACK"

11. **Press** left button (NEXT) once.

(Substeps 8-11) Not Performed:_____

NOTE
Perform substeps 12 thru 14 if Error Status is "ACTIVE/PENDNG".

12. **Press** center button (SELECT) once.

13. **Press** center button (ACK) once.

14. **Press** left button (NEXT) once.

(Substeps 12-14) Not Performed:_____

NOTE

If more than one error event is present, (anything but 1/1 indicates multiple events present), repeat substeps 7-14 as necessary and record number of additional iterations below.

127-26 **PTC (XMLE)** **ASP (XME1)**

GLACIER

Record additional iterations of previous step (substeps 7-14) and corresponding data in Table 127-1 (line through unused rows):

Table 127-1

ITERATION	TIME (LOCAL)	LINE 2 (ERROR MESSAGE and ERROR EVENT)	LINE 3 ERROR STATUS

Not Performed:_____

127-27 **PTC (XMLE)** **ASP (XME1)**

GLACIER

Press right button (EXIT) until the "HOME" display appears.

Not Performed:_____

***** End of GLACIER Error Reset *****

GLACIER Removal/Replacement

NOTE

Perform this option if GLACIER is POWERED for Launch, but must be removed from Orbiter power, transferred to battery power, and replaced after refurbishment (and Re-Interface Verification Tested for contingency operations).

GLACIER Removal/Replacement Not Performed:_____

NOTE

GLACIER battery switch will be in the "ON" position during all POWERED GLACIER operations. When GLACIER is not powered, the battery switch light will blink.

127-28 **XMLE** **XME2** **174**

Breakout Box

Set Power Supply/Battery SW – Battery (Down)

Verify voltage on multi-meter is 28 +4/-0 volts

Set Power Supply/Battery SW – None (Center)

CAUTION

Power interruptions greater than 20 minutes may result in damage to temperature sensitive samples.

NOTE

If "HOME" is not shown on the GLACIER display perform the following step.

127-29 **XMLE** **XME1** **174**

GLACIER

Press right button (EXIT) until "HOME" appears.

Not Performed:_____

127-30 **XMLE** **XME1** **174**

GLACIER

Verify/Set GLACIER "BATTERY" SW - ON

127-31 **XMLE** **XME1** **174**

GLACIER

Perform the following:

1. **Record** the following information (BD)

   Curr Temp: _____ deg C

   GPS: _____: _____: _____

2. **Press** left button (MENU) once and verify the following appears:

   "MAIN MENU"
   "QUICK STATUS 1/5"

3. **Press** left button (NEXT) four times and verify the following appears:

   "MAIN MENU"
   "SHUTDOWN 5/5"

4. **Press** center button (SELECT) once and verify the following appears:

   "SHUTDOWN"
   "SHUTDOWN 1/2"

5. **Press** center button (SELECT) once and verify the following appears:

   "CONFIRM SHUTDOWN"
   "SHUTDOWN"

6. **Press** left button (APPLY) once and verify the following appears:

   "GLACIER"
   "SYSTEM"
   "SHUTTING DOWN"
   "PLEASE WAIT…"

7. **Verify** the following appears:

   "GLACIER"
   "SHUTDOWN COMPLETE"
   "TURN POWER OFF"

CAUTION

Wait five seconds before proceeding with substep 8 below.

NOTE

Power CB light can take up to 2 minutes to fully extinguish after the power CB is pulled out.

8. **Pull** "POWER CB" - OPEN (OUT)

9. **Record** time:

   Time: _____ (Local)

127-32 PTC CDR 134

```
PANEL ML86B
ROW E
   MN B
      MAR 1 CB - OPEN (OUT)
```

127-33 **XMLE** **XME1** **174**

GLACIER

Disconnect Orbiter power cable (P/N V213-773918-001) from the GLACIER "POWER J1" connector.

OK to Disconnect XME1:_____

N:_____

Disconnect OK XME1:_____

N:_____

127-34 **XMLE** **XME1** **174**

GLACIER

Connect GSE battery cable (P/N 82K07179-9D1) to GLACIER "POWER J1" connector.

OK to Connect XME1:_____

N:_____

Connect OK XME1:_____

N:_____

127-35 **XMLE** **XME2** **174**

Breakout Box

Set Power Supply/Battery SW – Battery (Down)

127-36 **XMLE** **XME1** **174**

GLACIER

1. "POWER CB" - CLOSED (IN)
2. **Record**

Time:_____ (Local)

Time without power:_____(Min)

127-37 **XMLE** **XME1** **174**

GLACIER

1. **Verify** power LED ("POWER CB" light) illuminated
2. **Verify** display active.

NOTE
GLACIER system initialization may take up to 3 minutes. Initialization complete once line one of display reads "HOME" or "ERROR PENDING". May take 4 minutes longer for line three to read "SET POINT".

NOTE
Perform the following four steps if the display reads "ERROR PENDING".

127-38 **XMLE** **XME1** **174**

GLACIER

Press right button (EXIT) until "HOME" appears.

Not Performed:_____

NOTE

In the event of an error, Line 2 of the GLACIER display will include the error message (such as “current range”, “voltage range”, or “hardware error”) and the error event (“X/Y” where X and Y are numbers).

127-39 XMLE XME1 174

GLACIER

Perform the following:

1. **Press** left button (MENU) once to access main menu quick status 1/5 display.
2. **Press** left button (NEXT) twice to access error handling 3/5 display.
3. **Press** center button (SELECT) once.
4. **Press** left button (PEND) once.
5. **Record** the following information:

Time: _____ (Local)

Line 2: _____ (Error Message and Error Event)

Line 3: _____ (Error Status)

NOTE
Perform substeps 6 thru 9 if error status is "INACTIVE/PENDING" .

6. **Press** center button (SELECT) once.

7. **Press** left button (RESET) once.

8. **Verify** line 3 reads: "INACTIVE/ACK"

9. **Press** left button (NEXT) once.

Substeps 6-9 Not Performed:_____

NOTE
Perform substeps 10 thru 12 if error status is "ACTIVE/PENDING" .

10. **Press** center button (SELECT) once.

11. **Press** center button (ACK) once

12. **Press** left button (NEXT) once.

Substeps 10-12 Not Performed:_____

Entire Step Not Performed:_____

NOTE

If more than one error event is present (anything but 1/1 indicates multiple events present), repeat substeps 5-12 and record number of additional iterations below in Table 127-2.

127-40 XMLE XME1 174

GLACIER

Record additional iterations of previous step (substeps 5-12) and corresponding data in Table 127-2 below.

Not Performed:_____

Table 127-2

Iteration	Time (Local)	Line 2 (Error Message and Error Event)	Line 3 (Error Status)

127-41 XMLE XME1 174

GLACIER

Press right button (EXIT) until “HOME” display appears.

Not Performed:_____

127-42 XMLE XME1 174

GLACIER

1. **Verify** display line 1: “HOME”
2. **Verify** display line 3: “SET POINT”
3. **Verify** cryo-cooler(s) - turned on (audible)

127-43 **XMLE** **XME1** **174**

GLACIER

Record from GLACIER display (BD):

Curr Temp: _____ deg C

Set Point: _____deg C

GPS: _____: _____: _____

127-44 **XMLE** **PTC** **174**

GLACIER transfer to battery power is complete.

127-45 **XMLE**

Direct Flight Crew Equipment to remove GLACIER from Orbiter.

Record Flight Crew procedure information:_____

127-46 **XMLE**

Payloads transport GLACIER from Pad for refurbishment.

Payload PR #:_____

127-47 **XMLE**

Direct Flight Crew Equipment to reinstall GLACIER into Orbiter.

Record Flight Crew procedure information:_____

GLACIER Interface Verification Test

NOTE
The following steps re-perform an Interface Verification Test of the GLACIER payload following GLACIER removal, refurbishment, and re-installation.

127-48 PTC OTC 132

Request CDR and CMQC support on OIS CH 174 for GLACIER IVT.

127-49 PTC XMLE 134

Perform GLACIER Switchover to Orbiter power and IVT on OIS Channel 174.

NOTE
In the following steps, XME1 and XME2 are NASA engineers.

127-50 XMLE XME1 174

MUP PANEL (ML85E)

Verify Orbiter power cable P/N V213-773918-001 labeled "A/E Payload DC Pwr MUP J11 (GLACIER Pwr J1/MF28E/G)" is connected to DC power connector J11 and the other end is routed correctly to support IVT.

127-51 PTC CDR 174

```
PANEL ML86B
ROW E
   MN B
      MAR 1 CB - OPEN (OUT)
```

CAUTION

Power interruptions greater than 20 minutes may result in damage to temperature sensitive samples.

NOTE

GLACIER battery SW will be in the "ON" position during all operations. When GLACIER is not powered, the battery SW light will blink.

Voltage error might occur if the voltage applied to GLACIER dropped below 24 volts during transport. No action is required. Error will be reset after GLACIER is on Orbiter power.

NOTE

Perform the following step if "HOME" is not shown on the GLACIER display.

127-52 **XMLE** **XME1** **174**

GLACIER

Press right button (EXIT) until "HOME" appears.

Not Performed:_____

127-53 **XMLE** **XME1** **174**

GLACIER

Verify/Set GLACIER "BATTERY" SW - ON

127-54 XMLE XME1 174

GLACIER

Perform the following:

1. **Record** the following information (BD)

Curr Temp: _____ deg C

GPS: _____: _____: _____

2. **Press** left button (MENU) once and verify the following appears:

"MAIN MENU"
"QUICK STATUS 1/5"

3. **Press** left button (NEXT) four times and verify the following appears:

"MAIN MENU"
"SHUTDOWN 5/5"

4. **Press** center button (SELECT) once and verify the following appears:

"SHUTDOWN"
"SHUTDOWN 1/2"

5. **Press** center button (SELECT) once and verify the following appears:

"CONFIRM SHUTDOWN"
"SHUTDOWN"

6. **Press** left button (APPLY) once and verify the following appears:

   "GLACIER"
   "SYSTEM"
   "SHUTTING DOWN"
   "PLEASE WAIT…"

7. **Verify** the following appears:

   "GLACIER"
   "SHUTDOWN COMPLETE"
   "TURN POWER OFF"

CAUTION

Wait 5 seconds before proceeding with substep 8 below.

NOTE

Power CB light can take up to two minutes to fully extinguish after the power CB is pulled out.

8. **Pull** "POWER CB" - OPEN (OUT)

9. **Record** time:

Time: _____ (Local)

127-55 **XMLE** **XME2** **174**

Breakout Box

1. **Set** Power Supply/Battery SW - None (Center)

2. **Record:**

Time: _____ (Local)

127-56 **XMLE** **XME1** **174**

GLACIER

Disconnect cable (P/N 82K07179-9D1) from the GLACIER "POWER J1" connector.

OK to Disconnect XME1:_____

N:_____

Disconnect OK XME1:_____

N:_____

127-57 **XMLE** **XME1** **174**

GLACIER

Connect Orbiter power cable (P/N V213-773918-001) to GLACIER "POWER J1" connector.

OK to Connect XME1:_____

N:_____

Connect OK XME1:_____

N:_____

127-58 **PTC** **CDR** **174**

```
PANEL ML86B
ROW E
   MN B
      MAR 1 CB - CLOSED (IN)
```

127-59 **XMLE** **XME1** **174**

GLACIER

1. "POWER CB" - CLOSED (IN)
2. **Record**

Time:_____ (Local)

Time without power:_____(Min)

3. **Verify/Set** GLACIER "BATTERY" SW - ON

127-60 **XMLE** **XME1** **174**

GLACIER

1. **Verify** power LED ("POWER CB" light) illuminated
2. **Verify** display active.

OMRSD P507EB.500

NOTE

GLACIER system initialization may take up to 3 minutes. Initialization complete once line one of display reads “HOME” or “ERROR PENDING”. May take
4 minutes longer for line three to read “SET POINT”.

NOTE

Perform the following four steps if the display reads “ERROR PENDING”.

127-61 **XMLE** **XME1** **174**

GLACIER

Press right button (EXIT) until “HOME” appears.

Not Performed:_____

NOTE

In the event of an error, Line 2 of the GLACIER display will include the error message (such as “current range”, “voltage range”, or “hardware error”) and the error event (“X/Y” where X and Y are numbers).

127-62 XMLE XME1 174

GLACIER

Perform the following:

1. **Press** left button (MENU) once to access main menu quick status 1/5 display.
2. **Press** left button (NEXT) twice to access error handling 3/5 display.
3. **Press** center button (SELECT) once.
4. **Press** left button (PEND) once.
5. **Record** the following information:

Time: _____ (Local)

Line 2: _____ (Error Message and Error Event)

Line 3: _____ (Error Status)

NOTE
Perform substeps 6 thru 9 if error status is "INACTIVE/PENDING" .

6. **Press** center button (SELECT) once.

7. **Press** left button (RESET) once.

8. **Verify** line 3 reads: "INACTIVE/ACK"

9. **Press** left button (NEXT) once.

Substeps 6-9 Not Performed:_____

NOTE
Perform substeps 10 thru 12 if error status is "ACTIVE/PENDING" .

10. **Press** center button (SELECT) once.

11. **Press** center button (ACK) once

12. **Press** left button (NEXT) once.

Substeps 10-12 Not Performed:_____

Entire Step Not Performed:_____

NOTE

If more than one error event is present (anything but 1/1 indicates multiple events present), repeat substeps 5-12 and record number of additional iterations below in Table 127-3.

127-63 XMLE XME1 174

GLACIER

Record additional iterations of previous step (substeps 5-12) and corresponding data below in Table **127**-3.

Not Performed:_____

Table 127-3

Iteration	Time (Local)	Line 2 (Error Message and Error Event)	Line 3 (Error Status)

127-64 XMLE XME1 174

GLACIER

Press right button (EXIT) until "HOME" display appears.

Not Performed:_____

127-65 **XMLE** **XME1** **174**

GLACIER

1. **Verify** display line 1: "HOME"
2. **Verify** display line 3: "SET POINT"
3. **Verify** cryo-cooler(s) - turned on (audible)

127-66 **XMLE** **XME1** **174**

GLACIER

Record from GLACIER display (BD):

Curr Temp: _____ deg C

Set Point: _____deg C

GPS: _____: _____: _____

NOTE
Wait at least 10 minutes and then proceed with the following steps.

127-67 XMLE XME1 174

GLACIER

Perform the following:

1. **Press** left (MENU) button once to access MAIN MENU QUICK STATUS 1/5 display.

2. **Press** left (NEXT) button once to access MAIN MENU STATUS 2/5 display.

3. **Press** center (SELECT) button once to access status Cryogenic 1/3.

4. **Press** center (SELECT) button once to access Cryogenic Cooler 1 Stroke 1/23 and record cooler 1 stroke value in Table 127-4.

5. **Press** center (NEXT) button once to access Cryogenic Cooler 2 Stroke 2/23 and record cooler 2 stroke value in Table 127-4.

6. **Press** center (NEXT) button once to access Cryogenic HX 1 3/23 and record HX 1 value in Table 127-4.

7. **Press** center (NEXT) button once to access Cryogenic HX 2 4/23 and record HX 2 value in Table 127-4.

8. **Press** center (NEXT) button once to access Cold Head 1A 5/23 and record Cold Head 1A value in Table 127-4.

9. **Press** center (NEXT) button once to access Cold Head 1B 6/23 and record Cold Head 1B value in Table 127-4.

10. **Press** center (NEXT) button once to access Cold Head 2A 7/23 and record Cold Head 2A value in Table 127-4.

11. **Press** center (NEXT) button once to access Cold Head 2B 8/23 and record Cold Head 2B value in Table 127-4.

12. **Press** center (NEXT) button 11 times to access Cryogenic Heater 1 Power 19/23 and record heater 1 power value in Table 127-4.

13. **Press** center (NEXT) button once to access Cryogenic Heater 2 Power 20/23 and record heater 2 power value in Table 127-4.

14. **Press** right (EXIT) button once to access status Cryogenic 1/3 display.

15. **Press** left (NEXT) button once to access status Resources 2/3.

16. **Press** center (SELECT) once to access Resources AAA Outlet 1/10.

17. **Press** center (NEXT) button 6 times to access Resources Main Current 7/10 and record main current value in Table 127-4..

18. **Press** center (NEXT) button once to access Resources Main Voltage 8/10 and record Main Voltage value in Table 127-4.

19. **Press** right (exit) button until "HOME" is displayed.

Table 127-4

Parameter	Value	Comment
Cooler 1 Stroke		
Cooler 2 Stroke		
HX 1		
HX 2		
Heater 1 Power		
Heater 2 Power		
Cold Head 1A		
Cold Head 1B		
Cold Head 2A		
Cold Head 2B		
Main Current		
Main Voltage		

127-68 **XMLE** **XME1** **174**

GLACIER

Record from GLACIER display (BD)

Curr Temp: _____ deg C

Set Point: _____deg C

GPS: _____: _____: _____

127-69 **XMLE** **XME1** **174**

GLACIER

Verify with FCE that the Orbiter cable will not be routed over the GLACIER door.

127-70 **XMLE** **PTC** **174**

GLACIER IVT is complete.

127-71 **PTC** **OTC** **132**

GLACIER IVT is complete. CDR and CMQC support are released.

***** End of GLACIER Interface Verification Test *****

***** End of GLACIER Removal/Replacement *****

*** End of Operation **127** ***

OPERATION 128 HIMS Loss After T-6 Hours

Shop: **TPE**
Cntrl Rm Console: **ALL**
OPR: **INTG**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **2.0**

NOTE

The following Operation is a summary of HIM utilization during terminal Countdown (T-6 hrs to T-0). This data is to be used as a guideline only. All work will be documented on an IPR.

HIMs are not mandatory unless otherwise noted. However, in most cases correction of the problem is desirable if time permits.

After coordination with the affected systems, a HIM may be released to LPS for HIM card R&R (requires approximately 20 minutes) unless otherwise noted. Reconfiguration by these systems may be required prior to release. Retest driven by a system HIM card R&R will be documented on the LPS PR. HIMS installed at Pad B. For Pad A, see Operation 138.

LPS Red Crew access requirements are defined in S0007.500 Operation 120, "Pad Rescue Team Support Operations."

HIM: 5512, Octal Address 167 (Pad A), Octal Address 170 (Pad B)

Location: LCC 2nd floor, Room 2P20

Systems: INTG

System	HIM Functions	Effectivity	Workaround or Safing
INTG (TPE)	Weather measurements	CTS to end of S0007 support Requirements	Use Non-LPS weather measurements

HIM: 5976, Octal Address 205 (Pad B)

Location: PTCR, Room 210

Systems: LH_2, INTG, HAZGAS

System	HIM Functions	Effectivity	Workaround or Safing
HAZGAS/ LH_2/MPS (TPROP)	LH_2 leak and fire detectors (primary measurements) MPS fire detector FD 44/45 (ORB/ET LH_2 Disc) primary indicators	ET Load (T-6 hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy. (LCC HAZ-09) (T-6hr thru T-1min57sec)	Use secondary (HIM redundant) measurements on HIM 5977.
HAZGAS/ CGSS (CGSS)	Emergency Egress Fire Detection System (secondary measurements)	T-6 hrs through Launch/Scrub (LCC SAFE-01, EGR-05 thru 09)	HIM 5977 contains fully redundant indications
INTG (TPE)	Pad B LIVIS PCR measurements	Required during lightning advisory	None

HIM: 5977, Octal Address 204 (Pad B)

Location: PTCR, Room 210

Systems: HAZGAS, CGSS, CMEC, ARMS, GOXARM, WATER

System	HIM Functions	Effectivity	Workaround or Safing
HAZGAS/ LH_2/MPS (TPROP)	LH_2 leak and fire detectors (secondary measurements) MPS fire detector FD44/45 (ORB/ET LH_2 Disc) secondary measurements	ET Load (T-6 hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements functional for redundancy.	Use primary (HIM redundant) measurements on 5976.
HAZGAS/ CGSS (CGSS)	Emergency Egress Fire Detection System	T-6 hrs through Launch/Scrub (LCC SAFE-01, EGR-05 thru 09)	HIM 5976 contains fully redundant indications

HIM: 5980, Octal Address 151 (Pad B)

Location: PTCR, Room 210

Systems: GOXARM, ARMS, EPDC

System	HIM Functions	Effectivity	Workaround or Safing
GOXARM (CMEC)	GOX vent arm primary commands and measurements	T-13 hrs through Launch/Scrub (LCC GSE-13)	HIM 5981 contains fully redundant commands and indications. GLS uses the redundant command path if the primary fails.
ARMS (CGSS)	Orbiter access arm power supply current indications	T-16 hrs through Launch/Scrub	HIM 5981 contains redundant indications
EPDC	Power supply functions not normally used during terminal Countdown.		

HIM: 5981, Octal Address 155 (Pad B)

Location: PTCR

Systems: GOXARM, ARMS, WATER, COMM, SSME

System	HIM Functions	Effectivity	Workaround or Safing
GOXARM (CMEC)	GOX vent arm secondary commands and measurements	T-13 hrs through Launch/Scrub (LCC GSE-13)	HIM 5980 contains fully redundant commands and indications. GLS uses the redundant command path if the primary fails.
ARMS (CGSS)	Orbiter access arm power supply current indications	T-16 hrs through Launch/Scrub	HIM 5980 contains redundant indications.
WATER (CGSS)	Sound suppression system commands and indicators	T-9 hrs 15 min through T-0 (LCC GSE-14 thru 19)	HIM 5984, 5988 and 5983 contain redundant indicators and commands, except for SS transfer to the CCC. GLS issues commands beginning at approx. T-1 minute.
COMM	Functions not required during S0007.		
SSME (CPROP)	FIREX Orbiter skin open command	During propellant loading through Liftoff/Drain complete.	Activate FIREX for Orbiter skin via hardwire safing panel.
SSME (CPROP)	FIREX Transfer of control to CCC CMD #2	During propellant loading through Liftoff/Drain complete	Activate/monitor FIREX for T-0/Heatshields/Orbiter Skin via hardwire safing switches

HIM: 5982, Octal Address 161 (Pad B)

Location: ECS Room

Systems: ECS

System	HIM Functions	Effectivity	Workaround or Safing
ECS (CPVD)	ECS automatic control for Orbiter purge	LCC GSE-01, GSE-02, and GSE-03 1 of 2 from start of ET Cryo Tanking until Go for RSLS start. All other times this HIM is highly desirable for control and monitoring of purge for OMRS Requirements V05GEN.020, V05AG0.060, V05AH0.050, V05AI0.060, V05AK0.030, P01000.035 and other payload specific OMRS's.	V1122 operation HIM drop configures to redundant HIM support. (1 of 2 with HIM 6378.) Software auto configures upon failure. GLS monitors I/F pressures. The redundant duct pressure is not a true redundant to the I/F pressure; therefore, the LCC is monitored manually based on empirical data for the specific configuration. The auto monitoring would detect most failures.

HIM: 5983, Octal Address 166 (Pad B)

Location: PTCR, Room 210

Systems: ARMS, WATER, ECLSS, MPS, SSME

System	HIM Functions	Effectivity	Workaround or Safing
ARMS (CGSS)	Orbiter access arm primary commands and measurements	T-6 hrs through Launch/Scrub (LCC GSE-10-12)	HIM 5988 contains fully redundant commands and indications. GLS uses the redundant command path if the primary fails.
WATER (CGSS)	Sound suppression system valve commands and indicators	T-9 hrs 15 min through T-0 (LCC GSE-14-19)	Redundant commands and indicators in HIMS 5981, 5984, 5988. GLS issues commands beginning at approx T-1 minute.
WATER/ MPS/SSME (CPROP)	FIREX T-0 Open command indication/position indicator FIREX heatshields open position indicator FIREX FR enable/ CCC disable indicator	During propellant loading thru Liftoff/Drain complete	Activate/monitor FIREX for T-0/ heatshields via hardwire safing switches.
ECLSS (CECL)	Primary Ground Cooling Unit S70-1203	Continuous	Use hardwire safing panel to control GSE

HIM: 5984, Octal Address 173 (Pad B) (Page 1 of 2)

Location: PTCR, Room 210

Systems: OMS, APU, CPWR, MPS, SSME, WATER, HAZGAS

System	HIM Functions	Effectivity	Workaround or Safing
OMS (COOS)	HIM not required during S0007.		
HAZGAS (CHGD)	No required functions after T-8 hrs.	Only required for PRSD Load/Offload	
APU (CAPU)	HIM not required during S0007.		
WATER (CGSS)	Sound suppression system commands and indications	T-9 hrs 15 min through T-0 (LCC GSE-14-19)	HIMs 5981, 5983 and 5988 contain redundant commands and indications, except for SS transfer to the CCC for Pad B. GLS issues commands beginning at approx. T-1 minute.

HIM: 5984, Octal Address 173 (Pad B) (Page 2 of 2)

Location: PTCR, Room 210

Systems: WATER, COMM, SSME

System	HIM Functions	Effectivity	Workaround or Safing
WATER/ MPS/SSME (CPROP)	FIREX transfer of control to CCC commands 1/3 FIREX heatshields Arm/Open/Close commands and indicators. FIREX T-0 Arm/Open/Close commands and indicators. FIREX Orbiter skin Arm/Close commands and indicators	During propellant loading thru Liftoff/Drain complete	Activate/monitor FIREX for T-0/ heatshields/Orbiter skin via hardwire safing switches.

HIM: 5985, Octal Address 202 (Pad B)

Location: PTCR, Room 210

Systems: EPDC, LH_2, HAZGAS

System	HIM Functions	Effectivity	Workaround or Safing
EPDC (CEPD)	Power supply functions not normally used during terminal Countdown.		
HAZGAS (CHGD)	No required functions after T-8 hrs	Only required for PRSD Load/Offload	
LH_2 (TPROP)	ET H_2 GSE vent valve primary control Flare stack ignition switch primary control GSE pressure measurements Non-critical GSE purge control	Propellant Load preps (T-19 hrs) through Launch Securing or Boiloff/Inert.	HIM loss would require secondary control of ET H_2 GSE vent valve and flare stack ignition system per S1004.
CPWR (CEPD)	Bipod Heater functions include AC2, 23D120X Subbus, LH/RH HTRS 2 and 4 controls, Power and Measurements.	T-3 hrs 45 min through T-1 min 45 sec, Recycle	S0007.500 Operation 102, "Bipod Heater to Alternate Power." GLS issues commands and verifies measurements at approximately T-40 sec. HIM 5988 contains some redundant commands. System can operate nominally (using alternate power) with either HIM 5985 or 5988.

HIM: 5986, Octal Address 206 (Pad B) (Page 1 of 2)

Location: PTCR, Room 210

Systems: LH_2, LO_2, INS

NOTE

This HIM is mandatory due to LO_2/LH_2 functions. HIM cannot be inhibited for HIM card R&R during propellant loading. Most card failures can be tolerated.

System	HIM Functions	Effectivity	Workaround or Safing
LH_2/ INS (TPROP)	Primary GSE valve commands and indicators Primary ET/IT heated purge commands and indicators GSE pressure measurements	Propellant load preps (T-19 hrs) through Launch securing or boiloff/inert. (Mandatory per LCC ET-08) (T-50 sec through T-31 sec)	Perform contingency operation per S1004: - Stop Flow - GSE valve secondary control - ET/IT purge secondary control - Redundant instrumentation for pressure indications - Manual control of LH_2 storage tank pressurization using aux vaporizer supply valve and LH_2 skid inlet pressure ET/IT purge termination capability will be lost

HIM: 5986, Octal Address 206 (Pad B) (Page 2 of 2)

Location: PTCR, Room 210

Systems: LH_2, LO_2, INS

System	HIM Functions	Effectivity	Workaround or Safing
LO_2/INS (TPROP)	Primary pump (A126) control Primary storage area and FSS valve control Primary analogs	Propellant load preps (T-8 hrs) through Launch Securing or Drain. (LCC's, ET-01, ET-02, ET-03)	Perform contingency operation per S1003: - Bypass HIM 5986 measurements - If A126 pump is online, perform pump emergency safing then Revert. - If A127 pump is online, perform Stop Flow. - Remain in Stop Flow/Revert configuration until HIM is restored.

HIM: 5987, Octal Address 213 (Pad B)

Location: ECS Room

Systems: ECS

System	HIM Functions	Effectivity	Workaround or Safing
ECS (CPVD)	ECS direct control HIM for Cooling Subsystem (Affects all purge circuits) and PCR/auxiliary purge support	This HIM is highly desirable for control and monitoring of purge for OMRS Requirements V05GEN.020, V05AG0.060, V05AH0.050, V05AI0.060, V05AK0.030, P01000.035 and other payload specific OMRS.	V1122 operation HIM drop configures control to redundant components and HIM (6377). Software auto configures upon failure.

HIM: 5988, Octal Address 217 (Pad B) (Page 1 of 2)

Location: PTCR, Room 210

Systems: ARMS, WATER, ECLSS, MPS, CPWR, SSME

System	Description	When Required	Workaround or Safing
ARMS (CGSS)	Orbiter access arm secondary commands and indications	T-16 hrs through Launch/Scrub. (LCC GSE-10-12)	HIM 5983 contains fully redundant commands and indications. GLS uses the redundant command path if the primary fails.
WATER (CGSS)	Sound suppression system commands and indications	T-9 hrs 15 min through T-0. (LCC GSE-14-19)	HIMs 5983, 5984 and 5981 contain redundant commands and indications, except for SS transfer to the CCC for Pad A. GLS issues commands beginning at approx T-1 minute
WATER/ MPS/SSME (CPROP)	FIREX transfer of control to CCC command no. 4 FIREX heatshield Close position indication	During propellant loading thru Liftoff/Drain complete	Use functions contained in HIMS 5981/5984 Monitor heatshield FIREX via hardwire indicator lights

HIM: 5988, Octal Address 217 (Pad B) (Page 2 of 2)

Location: PTCR, Room 210

Systems: ARMS, WATER, ECLSS, MPS, CPWR, SSME

System	HIM Functions	Effectivity	Workaround or Safing
CPWR (CEPD)	Bipod Heater functions include: AC1, 23D120 Subbus, LH/RH Htrs1 and 3 Controls, Power and Measurements.	T-3 hrs 45 min thru T-1 min 45 sec, Recycle	S0007.500 Oper, "Bipod Heater to Alternate Power." GLS issues commands and verifies measurements at approx T-40 sec. HIM 5985 contains some redundant commands. System can operate nominally (using alternate power) with either HIM 5985 or 5988.
ECLSS (CECL)	Secondary Ground Cooling Unit, S70-1203	Continuous	Use hardwire safing panel to control GSE.

HIM: 5989, Octal Address 227 (Pad B) (Page 1 of 2)

Location: PTCR, Room 210

Systems: LH_2, INS, LO_2

NOTE

This HIM is mandatory due to LO_2/LH_2 functions. HIM cannot be inhibited for HIM card R&R during propellant loading. Most card failures can be tolerated.

System	HIM Functions	Effectivity	Workaround or Safing
LH_2/INS (TPROP)	Secondary GSE valve commands and indicators Secondary ET/IT heated purge commands and indicators Secondary flare stack ignition system control GSE pressure measurements	Propellant load preps (T-19 hrs) through Launch Securing or Boiloff/Inerting. (LCC ET-08) (T-50 sec through T-31 sec)	ET/IT purge termination capability will be lost

HIM: 5989, Octal Address 227 (Pad B) (Page 2 of 2)

Location: PTCR, Room 210

Systems: LH_2, INS, LO_2

System	HIM Functions	Effectivity	Workaround or Safing
LO_2/INS (TPROP)	Secondary pump (A127) control Secondary storage area and FSS valve control Secondary analogs	Propellant load preps (T-8 hrs) through Launch Securing or Drain. (LCC's ET-01, ET-02, and ET-03)	Perform contingency operation per S1003: - Bypass HIM 5989 measurements - If A127 pump is online, perform pump emergency safing then Revert - If A126 pump is online, perform Stop Flow. - Remain in Stop Flow/Revert configuration until HIM is restored.

HIM: 5996, Octal Address 246 (Pad B)

Location: PTCR, Room 210

Systems: PRSD

System	HIM Functions	Effectivity	Workaround or Safing
PRSD (CFCP)	Provides LPS control to PRSD/FCSS GO_2/LO_2 GSE EICNS: A - S70-0830-1 B - S70-0830-2 C - S70-0817-0 (Partial) D - S72-0694-6 (Partial) E - S70-0697-3 (Partial)	T-8 hrs to Launch Scrub/Post Launch Secure	GO_2 T-0 service Panel (A) would continue to supply GO_2 to vehicle T-0 connection through the primary leg (backup leg redundancy would be lost). A technician would be stationed at the panel to monitor local pressures (T-8 hrs thru T-6 hrs, FC ACT); otherwise, GO_2 T-0 press would be monitored using MLP instrumentation. GLS secures PRSD ground reactants at approximately T-2 min 35 sec Operations would be delayed until HIM repair complete.

HIM: 5997, Octal Address 256 (Pad B)

Location: PTCR, Room 210

Systems: PRSD, HAZGAS

System	HIM Functions	Effectivity	Workaround or Safing
PRSD (CFCP)	Provides LPS control to PRSD/FCSS GH_2/LH_2 GSE EICNS: A - S72-0699-1 B - S72-0699-2 C - S70-0817-0 (Partial) D - S72-0694-6 (Partial) E - S72-0697-3 (Partial)	T-8 hrs to Launch Scrub/Post Launch secure	GH_2 T-0 service Panel (A) would continue to supply GH_2 to vehicle T-0 connection through the primary leg (backup leg redundancy would be lost). A technician would be stationed at the panel to monitor local pressures (T-8 hrs thru T-6 hrs, FC ACT); otherwise, GH_2 T-0 press would be monitored using MLP instrumentation. GLS secures PRSD ground reactants at approximately T-2 min 35 sec. Operations would be delayed until HIM repair complete
HAZGAS (CHGD)	No required functions after T-8 hrs	Only required for PRSD load/offload	

HIM: 6377, Octal Address 365 (Pad B)

Location: ECS Room

Systems: ECS

System	HIM Functions	Effectivity	Workaround or Safing
ECS (CPVD)	ECS auto control HIM for Cooling Subsystem (affects all purge circuits) and PCR/auxiliary purge support	This HIM is highly desirable for control and monitoring of purge for OMRS Requirements V05GEN.020, V05AG0.060, V05AH0.050, V05AI0.030, P01000.035 and other payload specific OMRS.	V1122 HIM drop operation configures control to redundant components and HIM (5987). Software auto configures upon failure.

HIM: 6378, Octal Address 357 (Pad B)

Location: ECS Room

Systems: ECS, ARMS

System	HIM Functions	Effectivity	Workaround or Safing
ECS (CPVD)	ECS direct control HIM for Orbiter purge	(LCC GSE-01, GSE-02 and GSE-03) 1 of 2 from start of ET Cryo Tanking until Go for RSLS start. All other times this HIM is highly desirable for control and monitoring of purge for OMRS Requirements V05GEN.020, V05AG0.060, V05AH0.050, V05AI0.060, A05AK0.030, P01000.035 and other payload specific OMRS.	V1122 operation HIM drop configures to redundant HIM support. (HIM 5982). Software auto configures upon failure. GLS monitors Orbiter duct pressures.
ARMS (CGSS)	White room O_2 monitor pump commands	Approx T-5 min and upon OAA re-extension	None. Loss of control of pump off commands are not a constraint to Launch. Command is issued by GLS during OAA Ops.

HIM: 6396, Octal Address 275 (Pad B)

Location: PCR 117 ft

Systems: OMS

System	HIM Functions	Effectivity	Workaround or Safing
OMS (COOS)	Hyper GSE not required during S0007.		

HIM: 6397, Octal Address 303 (Pad B)

Location: PCR 117 ft

Systems: OMS, HAZGAS

System	HIM Functions	Effectivity	Workaround or Safing
OMS (COOS)	Hyper GSE not required during S0007.		
HAZGAS (CHGD)	HVDS not required during S0007.		

HIM: 6398, Octal Address 311 (Pad B)

Location: PCR 117 ft

Systems: OMS

System	HIM Functions	Effectivity	Workaround or Safing
OMS (COOS)	Hyper GSE not required during S0007.		

HIM: 6399, Octal Address 316 (Pad B)

Location: PCR 117 ft

Systems: OMS

System	HIM Functions	Effectivity	Workaround or Safing
OMS (COOS)	Hyper GSE not required during S0007.		

HIM: 6689, Octal Address 116

Location: MLP Rm 8A

Systems: HAZGAS

System	HIM Functions	Effectivity	Workaround or Safing
HAZGAS/ MPS (TPROP)	Leak and fire detectors (primary measurements) - MPS fire detector primary indicators FD 35-39 - MPS exposed fire detector FD 36-38 power-off command - MPS leak detector primary concentrations LD28-30, 32, 54-57 - LH_2 ET load leak and fire detectors	ET load (from T-6 hrs) through liftoff/drain complete. It is highly desirable to have both primary and backup measurements functional for redundancy. (LCC HAZ-10) (T-6 hrs thru T-31 sec) (LCC HAZ-11) (T-6 hrs thru T-1 min 57 sec) (LCC HAZ-12) (T-6 hrs thru T-3 hrs)	Use secondary (HIM redundant) measurements on HIM 6691 GLS sets the exposed fire detector Off commands at approximately T-11 sec

HIM: 6691, Octal Address 153

Location: MLP Rm 7A

Systems: HAZGAS, LH_2

System	HIM Functions	Effectivity	Workaround or Safing
HAZGAS/ LH_2/MPS (TPROP)	Leak and fire detectors (secondary measurements) - MPS fire detector secondary indicators FD 35-39 - MPS exposed fire detector FD 39 power-off command - MPS leak detector secondary concentrations LD28-30, 32, 54-57 - LH_2 ET load leak and fire detectors	ET load (from T-6 hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements functional for redundancy. (LCC HAZ-10) (T-6 hrs thru T-31 sec) (LCC HAZ-11) T-6 hrs thru T-1 min 57 sec) (LCC HAZ-12) (T-6 hrs thru T-3 hrs)	Use primary (HIM redundant) measurements on HIM 6689 GLS sets the exposed fire detector Off commands at approx T-11 sec.
	HUMS (Hydrogen Umbilical Mass Spectrometer)	T-8 hrs thru Liftoff/ Drain	None required, only data logging via LPS/CDS is lost. HUMS control is not via LPS.

HIM: 6851, Octal Address 046 (Page 1 of 3)

Location: MLP Rm 7A

Systems: EPDC, SSME, HYDSRB, HYD, CPWR, BRS, ECLSS

NOTE
This HIM is mandatory due to EPDC functions.

System	HIM Functions	Effectivity	Workaround or Safing
EPDC/ CPWR (CEPD)	SYS B redundant PIC rack/H_2 burn Power On/Off commands. SYS A CPA/H_2-burn redundant voltage. SYS A redundant HDP, ENG, ETVAS PIC commands/indicators H_2-burn SYS A arm and fire commands. SYS A redundant HDP, ENG, redundant TSM and ETVAS cap volts	T-3 hrs 45 min, recycle, post Launch T-3 hrs 45 min, recycle, post Launch T-55 sec thru T-0 (LCC GSE-04, GSE-05, GSE-06, GSE-07, GSE-08, GSE-09, GSE-20)	No work around available No work around available GLS verifies measurements, issues H_2 burn arm/fire commands.
SSME (CPROP)	SSME main fuel valve heater secondary On commands/indicators	During propellant loading thru T-4 min 30 sec or scrub decision	Use primary heater control on HIM 6896 GLS turns off MFV heaters at T-4 min 30 sec

HIM: 6851, Octal Address 046 (Page 2 of 3)

Location: MLP Rm 7A

Systems: EPDC, SSME, HYDSRB, HYD, CPWR, BRS, ECLSS

System	HIM Functions	Effectivity	Workaround or Safing
HYDSRB (CBHY)	AFT skirt GN_2 supply Off override and HRS (HIM Relay Status)	T-8 hrs to T-4 min	Turn Off AFT skirt GN_2 supply Command thru HIM 6891
	AFT skirt 22D380X Bus On Command and HRS	T-8 hrs to T-4 min	AFT skirt 22D380 Bus On Command and HRS through HIM 6891
	AFT skirt secondary low flow Valve Command and HRS	T-8 hrs to T-4 min	AFT skirt primary low flow Valve Command and HRS thru HIM 6891
	AFT skirt purge secondary pressure	T-8 hrs to T-4 min	AFT skirt purge primary pressure thru HIM 6891
	AFT skirt purge DC Power cur	T-8 hrs to T-4 min	Non-mandatory
	22D380 cur	T-8 hrs to T-4 min	Non-mandatory
	22D380X cur	T-8 hrs to T-4 min	Non-mandatory
	GN_2 sec low flow Valve Open/Close Feedbacks	T-8 hrs to T-4 min	Non-mandatory
	GN_2 main flow Valve Open/Close Feedbacks	T-8 hrs to T-4 min	Non-mandatory

HIM: 6851, Octal Address 046 (Page 3 of 3)

Location: MLP Rm 7A

Systems: EPDC, SSME, HYDSRB, HYD, CPWR, BRS, ECLSS

System	HIM Functions	Effectivity	Workaround or Safing
HYDSRB (CBHY)	AFT skirt heater override command and HRS AFT skirt secondary main flow Valve Command and HRS	T-8 hrs to T-4 min T-8 hrs to T-4 min	Turn off Heater Command thru HIM 6891 AFT skirt primary main flow Valve Command and HRS thru HIM 6891
HYD (CHYD)	Functions not required during S0007.		
BRS (CBRS)	System B Range Safety GSE	T-45 min	Only required if System A Range Safety GSE fails
ECLSS (CECL)	Payload purge	Continuous (Requirement is payload specific)	If the HIM fails, the payload purge will continue. However, LPS visibility and control is lost.

HIM: 6852, Octal Address 201 (Page 1 of 2)

Location: MLP Rm 7A

Systems: BRS, HAZGAS, EPDC, CPWR, ECLSS, SSME

NOTE
HIM is mandatory due to EPDC functions.

System	HIM Functions	Effectivity	Workaround or Safing
BRS (CBRS)	System A Range Safety GSE	T-45 min	Use System B to clear System A signal generator. Cycle SYS A AC power.
HGDS (CHGD)	Backup HGDS	Two HGDS systems required prior to Pad clear (T-6 hrs). One system required after Cryo Load commences (T-6 hrs). However, it is highly desirable to have both prime and Backup HGDS operational for redundancy.	Contains all the Backup HGDS data measurements. HIM is not required to operate the Backup HGDS. Rely on primary HGDS.
EPDC/ CPWR (CEPD)	SYS A PIC rack/H_2 burn Power On/Off commands SYS A CPA/H_2-burn volts SYS B redundant HDP, ENG, ETVAS PIC commands/indicator H_2-burn arm and fire commands, SYS B redundant HDP, redundant TSM, and ENG cap volts	T-3 hr 45 min, recycle, post Launch T-3 hrs 45 min, recycle, post Launch T-55 sec thru T-0 (LCC GSE-04, GSE-05, GSE-06, GSE-07, GSE-08, GSE-09, GSE-20)	No work around available No work around available GLS verifies measurements, issues H_2 burn arm/fire commands.

HIM: 6852, Octal Address 201 (Page 2 of 2)

Location: MLP Rm 7A

Systems: BRS, HAZGAS, EPDC, CPWR, ECLSS, SSME

System	HIM Functions	Effectivity	Workaround or Safing
ECLSS (CECL)	Payload purge	Continuous (Requirement is payload specific)	If the HIM fails, the payload purge will continue. However, LPS visibility and control will be lost.
SSME (CPROP)	SSME MLP GN_2 SCR2 drive current adjust	From -T-8 hrs to T-4 hrs	Use primary GN_2 heater control

HIM: 6860, Octal Address 276 (Page 1 of 2)

Location: MLP Rm 7A

Systems: CPWR, BHPU, EPDC, HYDSRB, BINST

System	HIM Functions	Effectivity	Workaround or Safing
CPWR/ (CEPD)	PRI SRB Joint Heater temperatures, PRI SRB Joint Heater commands/indicator, PRI SRB Joint Heater volt and current	T-8 hrs thru T-1 min (LCC SRM-06, SRM-10)	Secondary measurement available on HIM 6861. S0007.500 "SRB Igniter/Joint Heater Failure Contingency." GLS turns off SRB joint heaters at approximately T-50 sec.
	PRI/SEC IGN temperatures PRI Ignition Heater current	T-11 hrs thru T-5 min	Secondary measurement available on HIM 6861.
BHPU (CHPU)	AFT skirt purge remote set point and set point feedback	T-8 hrs to T-4 min	No work around to issue command, but AFT skirt temperatures will already have been brought to above 75 deg F and remain warm for several hrs. Also, heater commands can be turned On/Off via HIM 6891.

HIM: 6860, Octal Address 276 (Page 2 of 2)

Location: MLP Rm 7A

Systems: CPWR, BHPU, EPDC, HYDSRB, BINST

System	HIM Functions	Effectivity	Workaround or Safing
BINST/ BHPU (CHPU)	Left A gas generator bed temperature (SEC and PRI Backup)	T-2 hrs till T-30 sec	Use redundant measurement thru HIM 6861
	Left B gas generator bed temperature (SEC and PRI Backup)	T-2 hrs till T-30 sec	Use redundant measurement thru HIM 6861
	Right A gas generator bed temperature (SEC and PRI Backup)	T-2 hrs till T-30 sec	Use redundant measurement thru HIM 6861
	Right B gas generator bed temperature (SEC and PRI Backup)	T-2 hrs till T-30 sec	Use redundant measurement thru HIM 6861
BINST (CISL)	GEI case temperatures	Required from start of tanking (T-6 hrs to T-9 min.	None LCC SRM-11

HIM: 6861, Octal Address 312

Location: MLP Rm 7A

Systems: CPWR, BHPU, BINST

System	HIM Functions	Effectivity	Workaround or Safing
CPWR/ (CEPD)	SEC SRB Joint Heater Temperatures, SEC SRB Joint Heater commands/indicator, SEC SRB Joint Heater volt and current	T-8 hrs thru T-1 min (LCC SRM-06, SRM-10)	Primary measurement available on HIM 6860. S0007.500 "SRB Igniter/Joint Heater Failure Contingency." GLS turns off SRB joint heaters at approximately T-50 sec.
	PRI/SEC Ignition temperatures SEC Ignition Heater current	T-11 hrs thru T-5 min	Primary measurement available on HIM 6860.
BINST/ BHPU (CHPU)	Left A gas generator bed temperature (PRI)	T-2 hrs till T-30 sec	Use redundant measurements thru HIM 6860
	Left B gas generator bed temperature (PRI)	T-2 hrs till T-30 sec	Use redundant measurements thru HIM 6860
	Right A gas generator bed temperature (PRI)	T-2 hrs till T-30 sec	Use redundant measurements thru HIM 6860
	Right B gas generator bed temperature (PRI)	T-2 hrs till T-30 sec	Use redundant measurements thru HIM 6860

HIM: 6880, Octal Address 056

Location: MLP Rm 10A

Systems: PLD

System	HIM Functions	Effectivity	Workaround or Safing
PLD	PLD unique HIM not required.		

HIM: 6891, Octal Address 043 (Page 1 of 3)

Location: MLP Rm 7A

Systems: HYDSRB, EPDC, MPS

NOTE
This HIM is mandatory due to EPDC functions.

System	HIM Functions	Effectivity	Workaround or Safing
HYDSRB (CBHY)	AFT skirt heater overtemp On	T-8 hrs to T-4 min	Non-mandatory
	AFT skirt PRI low flow Valve Open/Close feedback indicator	T-8 hrs to T-4 min	Non-mandatory
	AFT skirt (indications)- purge heater power, purge control power, GN_2 supply valve feedbacks, GN_2 PRI valve feedbacks	T-8 hrs to T-4 min	Non-mandatory
	AFT skirt purge GN_2 temperature	T-8 hrs to T-4 min	No workaround, but on-board temperatures can be determined to be above 75 deg F by other on-board measurements.
	AFT skirt PRI main flow Valve Command and HRS	T-8 hrs to T-4 min	AFT skirt SEC main flow Valve Command and HRS thru HIM 6851

HIM: 6891, Octal Address 043 (Page 2 of 3)

Location: MLP Rm 7A

Systems: HYDSRB, EPDC, MPS

System	HIM Functions	Effectivity	Workaround or Safing
	AFT skirt heater command and HRS	T-8 hrs to T-4 min	No work around to issue command On, but AFT skirt temperatures will already have been brought to above 75 deg F and remain warm for several hours.
	AFT skirt Bus 22D380 command and HRS	T-8 hrs to T-4 min	AFT skirt Bus 22D380X command and HRS thru HIM 6851.
	AFT skirt GN_2 supply Off command and HRS	T-8 hrs to T-4 min	Closure of the GN_2 flow control valves (PRI and SEC)
	AFT skirt PRI low flow valve command and HRS	T-8 hrs to T-4 min	AFT skirt SEC low flow valve command and HRS
	AFT skirt purge PRI Pressure	T-8 hrs to T-4 min	AFT skirt purge SEC pressure thru HIM 6851
EPD (CEPD)	MN C On/Off command MN B Off command MN A command/indication	T-45 sec and recycle (LCC EPDC-10)	Workaround via safing panel. GLS turns off ground power at approx T-40 sec.

HIM: 6891, Octal Address 043 (Page 3 of 3)

Location: MLP Rm 7A

Systems: HYDSRB, EPDC, MPS

System	HIM Functions	Effectivity	Workaround or Safing
MPS (CPROP)	MPS LH_2 recirc pump secondary Bus On commands	Contingency during propellant loading thru liftoff/scrub decision. (LCC MPS-33)	Use primary pump Bus commands, HIM 6897, per S1004 contingency operation. GLS turns Off recirc pumps at approximately T-10 sec.

HIM: 6893, Octal Address 253

Location: MLP Rm 7A

Systems: EPDC, HYD, CPWR, HAZGAS, INTG

System	HIM Functions	Effectivity	Workaround or Safing
CPWR (CEPD)	LH and RH SRB OI Bus voltage	T-9hrs thru T-0 (LCC BEI-01)	No workaround available. ALT PCM measurement available. Monitored by GLS
EPDC	Orbiter H/W measurements	CTS to Launch	Backup to PCM measurements
HYD (CHYD)	Functions not required during S0007		
HGDS (CHGD)	Prime HGDS	Two HGDS systems required prior to Pad clear (T-6 hrs). One system required after Cryo Load commences (T-6 hrs). However, it is highly desirable to have both Primary and Backup HGDS operational for redundancy.	HIM contains all the functions required to both operate and receive data from the prime system. Rely on backup system if prime system is down.
INTG (TPE)	Orbiter LIVIS measurements	Required during lightning advisory	None

HIM: 6894, Octal Address 040

Location: MLP Rm 7A

Systems: EPDC, HYDORB, CPWR

NOTE
This HIM is mandatory due to EPDC functions.

System	HIM Functions	Effectivity	Workaround or Safing
EPDC (CEPD)	MN A Voltage adjust	T-6 hrs 30 min to T-15 min	No work around available
	MN A Power On/Off Command MN B Ground Power On indication	T-45 sec and Recycle (LCC EPDC-10)	Workaround via safing panel GLS turns off ground power at approx T-40 sec.
	SYS A Resistance Test Command HDP/TSM/ETVAS Resistance Test Indication	T-3 hrs 45 min (LCC GSE-04, GSE-05, GSE-06, GSE-07, GSE-25)	No workaround available
	T-0 Bus reset	Post Launch	No workaround available
	CPA/PIC Rack Power On/Off	T-3 hrs 45 min, recycle, post Launch	No workaround available
	SYS A HDP, ETVAS, TSM cap volts	T-55 sec thru T-0	GLS verify measurement.
HYDORB (CHYD)	Functions not required during S0007		

HIM: 6895, Octal Address 241 (MLP 1)
Octal Address 104 (MLP 2)
Octal Address 324 (MLP 3)(Page 1 of 2)

Location: MLP Rm 7A

Systems: LH_2, LO_2, INS

NOTE

This HIM is mandatory due to LO_2/LH_2 functions. HIM cannot be inhibited for HIM card R&R during propellant loading. Most card failures can be tolerated.

System	HIM Functions	Effectivity	Workaround or Safing
LH_2 (TPROP)	- MLP GSE commands and indicators - LO_2 and primary LH_2 TSM purges - Pre-press anti-ice purge - Primary ET LH_2 prepress purge - Primary T-0 umbilical purge - GSE purge controls and indicators - GSE pressure and temperature measurements	Propellant load preps (T-19 hrs) through Launch securing or boiloff/inert. (LCC MPS-06) (T-1 min 57 sec thru T-48 sec)	HIM loss would require Stop Flow, secondary control of replenish valve, aux fill valve, aux pre-press anti-ice purge secondary T-0 umbilical purge, and secondary LH_2 TSM/tunnel purge control per OMI S1004 contingency sequences. LH_2 TSM drain valve primary indicators and the Orbiter inlet temperature indication would be lost.

HIM: 6895, Octal Address 241 (MLP 1)
Octal Address 104 (MLP 2)
Octal Address 324 (MLP 3)(Page 2 of 2)

Location: MLP Rm 7A

Systems: LH_2, LO_2, INS

System	HIM Functions	Effectivity	Workaround or Safing
LO_2/ INS (TPROP)	- Primary control of skid valves and most purge valves - Primary analogs	Propellant load preps (T-8 hrs) through Launch securing or drain. (LCC MPS-09)	Perform contingency operations per S1003: - Bypass HIM 6895 measurements - Stop Flow - Revert may be required if conditions dictate - Hold until HIM is restored
MPS/SSME (CPROP)	- LO_2/LH_2 Plate Gap Delta Press Transducer #1	Propellant load preps (T-8 hrs) through Launch Securing or Drain	- Use Transducer #2 on HIM 6898

HIM: 6896, Octal Address 242 (Page 1 of 3)

Location: MLP Rm 7A

Systems: MPS, SSME, BRS, EPDC, DPS

System	HIM Functions	Effectivity	Workaround or Safing
MPS/ SSME (CPROP)	MPS/SSME primary DC power commands/ Indicators	From SSME final preps (T-19 hrs) to T-0	Use secondary DC power control on HIM 6899 (this redundant power is always up in parallel with primary)
	SSME MFV heater Primary commands/ indicators/currents	From T-5 hrs to T-4 min 30 sec including scrub to LH_2 drain complete	Use secondary MFV heater power control on HIM 6851/6899. GLS turn off MFV heaters at T-4 min 30 sec.
	SSME MLP GN_2 panel primary commands/ indicators	From SSME final preps to liftoff/ including drain complete (LCC SSME-03, SSME-05, SSME-44, SSME-25)	Use secondary GN_2 control on HIM 6899/6852 per OMI S1003. GLS terminates Engine GN_2 supply at T-2 min 55 sec.
	MPS MLP GHe panel primary commands/ indicators	From SSME final preps (T-19 hrs) to liftoff including drain and boiloff (LCC MPS-01, MPS-02, SSME-09, SSME-12, SSME-13, SSME-16, SSME-10, SSME-02)	Use secondary GHe control on HIM 6899 GLS terminates GHe fill at approx T-12 sec

HIM: 6896, Octal Address 242 (Page 2 of 3)

Location: MLP Rm 7A

Systems: MPS, SSME, BRS, EPDC, DPS

System	HIM Functions	Effectivity	Workaround or Safing
MPS/SSME (CPROP)	MPS LH_2 recirc pump primary Bus on indicators	From T-5 hrs to liftoff/scrub decision	Indicators only, no workaround required
BRS/ (CBRS)	Terminal count closed loop test GSE RF Relays SRB RSS inhibit/reset commands	T-45 min T-10 sec and breakout safing (LCC BRSS-05)	Switch to System B Turn off System A signal generator RF. Perform Terminal Count Test Inform NTD/SRO hold fire circuits not functional GLS turns off the inhibits at T-10 sec, and sets them On again during breakout. Inhibits will go away at umbilical release, if commands are still On.
EPDC (CEPD)	MN A Power On command MN B Power On indication MN C Power On indication	T-45 sec and recycle (LCC EPDC-10)	Workaround via safing panel. GLS turns off ground power at approx T-40 sec.

HIM: 6896, Octal Address 242 (Page 3 of 3)

Location: MLP Rm 7A

Systems: MPS, SSME, BRS, EPDC, DPS

System	HIM Functions	Effectivity	Workaround or Safing
DPS (CDPS)	MDM LF1 preflight Bus 1 Power On command/indication MDM LA1 preflight Bus 1 Power On command/indication	Required continuously until T-10 sec to maintain power On commands to command decoders LF1/LA1. Actively commanded off at T-10 sec to remove LF1/LA1 power, and commanded on during breakout safing to reapply LF1/LA1 power.	HIM 6897 provides redundant power command to MDM's LF1/LA1. There is no workaround for loss of MDM LF1/LA1 power On/Off capability. Power indications are not mandatory.

HIM: 6897, Octal Address 250 (Page 1 of 2)

Location: MLP Rm 7A

Systems: EPDC, MPS, DPS

NOTE
HIM is mandatory due to EPDC functions.

System	HIM Functions	Effectivity	Workaround or Safing
EPDC (CEPD)	MN B voltage adjust MN C voltage adjust MN B Power On CMD MN A,B,C redundant On indication	T-6 hrs 30 min to T-15 min T-45 sec and Recycle (LCC EPDC-10)	No workaround available Workaround via safing panel. GLS turns off ground power at approx T-40 sec.
MPS/ (CPROP)	MPS LH_2 recirc pump primary Bus On commands MPS LH_2 recirc pump secondary Bus On indicators MPS LH_2 recirc pump currents/voltages	T-5 hrs thru Liftoff/ Drain initiation (LCC MPS-033)	Use secondary recirc pump control On HIM 6891, ref OMI S1004 contingency operation. GLS turns off LH_2 recirc pumps at approx. T-10 sec.

HIM: 6897, Octal Address 250 (Page 2 of 2)

Location: MLP Rm 7A

Systems: EPDC, MPS, DPS

System	HIM Functions	Effectivity	Workaround or Safing
DPS (CDPS)	MDM LF1 Preflight Bus 2 On Command/Indicator MDM LA1 Preflight Bus 2 power On Command/Indicator MDM LM1 Preflight Bus 1&2 Power On Command/Indicator	Required continuously until T-10 sec to maintain Power On commands to command decoders LF1/LA1/LM1. Actively commanded Off at T-10 sec to remove LF1/LA1/LM1 Power, and commanded On during breakout safing to reapply LF1/LA1/ LM1 power.	HIM 6896 provides redundant Power Command to MDM's LF1/LA1. There is no work around for LM1 Power, which is required for EDO missions only. There is no work around for loss of MDM LF1/LA1/ LM1 Power On/Off capability. Power indications are not mandatory

HIM: 6898, Octal Address 051 (MLP 1)
Octal Address 137 (MLP 2)
Octal Address 323 (MLP 3) (Page 1 of 2)

Location: MLP Rm 7A

Systems: LH_2, LO_2, INS

NOTE

This HIM is mandatory due to LO_2/LH_2 functions. HIM cannot be inhibited for HIM card R&R during propellant loading. Most card failures can be tolerated.

System	HIM Functions	Effectivity	Workaround or Safing
LH_2 (TPROP)	MLP GSE valve commands and indicators OTV camera purge Secondary LH_2 TSM purges Aux pre-press anti-ice purge Secondary T-0 umbilical purge Secondary ET LH_2 prepress purge GSE purge controls and indicators GSE pressure and temperature measurements	Propellant load preps (T-19 hrs) through Launch securing or boiloff/inerting (LCC MPS-06) (T-1 min 57 sec through T-48 sec)	LH_2 TSM drain valve secondary indicators and TSM shut-off valve indicators would be lost (Mandatory per LCC MPS-06)

HIM: 6898, Octal Address 051 (MLP 1)
Octal Address 137 (MLP 2)
Octal Address 323 (MLP 3) (Page 2 of 2)

Location: MLP Rm 7A

Systems: LH_2, LO_2, INS

System	HIM Functions	Effectivity	Workaround or Safing
LO_2/ INS (TPROP)	Secondary control of skid valves and some purge valves. Secondary analogs	Propellant load preps (T-8 hrs) through Launch securing or drain.	Perform contingency operation per OMI S1003: - Bypass HIM 6898 measurements - Stop Flow - Revert may be required if conditions dictate - Hold until HIM is restored.
MPS/SSME (CPROP)	- LO_2/LH_2 Plate Gap Delta Pressure Transducer #2	Propellant load preps (T-8 hrs) through Launch Securing or Drain	- Use Transducer #1 on HIM 6895

HIM: 6899, Octal Address 052 (Page 1 of 4)

Location: MLP Rm 7A

Systems: MPS, SSME, BRS, EPDC, CPWR, PRSD

NOTE
This HIM is mandatory due to EPDC functions.

System	HIM Functions	Effectivity	Workaround or Safing
MPS/ SSME (CPROP)	MPS/SSME secondary DC power commands/ indicators	From SSME final preps (T-19 hrs) to T-0	Use primary DC power control on HIM 6896 (this redundant power is always on in parallel with secondary)
	SSME MFV heater secondary power off commands	From T-5 hrs to T-4 min 30 sec including scrub to drain complete (LCC SSME-03, SSME-05, SSME-44, SSME-25)	Use primary MFV heater power control on HIM 6896. GLS turns off MFV heaters at T-4 min 30 sec.
	MPS MLP GHe panel secondary commands/ indicators	From SSME final preps (T-19 hrs) to liftoff/scrub decision (LCC MPS-01, MPS-02, SSME-09, SSME-12, SSME-13, SSME-16, SSME-10, SSME-02)	Use primary GHe control in HIM 6896 GLS terminates GHe fill at approx T-12 sec Use primary GN_2 control in HIM 6896
	SSME MLP GN_2 panel secondary commands/ indicators	From SSME final preps T-19 hrs to liftoff/including scrub to drain and boiloff	GLS terminates Engine GN_2 supply at T-2 min 55 sec.

HIM: 6899, Octal Address 052 (Page 2 of 4)

Location: MLP Rm 7A

Systems: MPS, SSME, BRS, EPDC, CPWR, PRSD

System	HIM Functions	Effectivity	Workaround or Safing
BRS (CBRS)	Hold fire system	T-26 min. thru T-10 sec	None. Inform NTD/SRO range hold fire system will not support Launch Countdown
EPDC/ CPWR (CEPD)	SYS B CPA/PIC rack Power On/Off commands, SYS B resistance test commands, SYS B Hold Down Post Resistance Test indications SYS B T-0 reset MN B/MN C Power On indicator MN C Power on Command SYS B HDP, TSM, ETVAS cap volts	T-3 hrs 45 min, recycle, post Launch (LCC GSE-04) Recycle, post Launch T-45 sec, Recycle (LCC EPDC-10) T-55 sec thru T-0 (LCC GSE-07, GSE-06, GSE-05)	No workaround available No workaround Available No workaround Available GLS issues CMD GLS verify measurement

HIM: 6899, Octal Address 052 (Page 3 of 4)

Location: MLP Rm 7A

Systems: MPS, SSME, BRS, EPDC, CPWR, PRSD

System	HIM Functions	Effectivity	Workaround or Safing
PRSD (CFCP)	Provides LPS control to PRSD/FCSS MLP GOX/GH_2 EICNS: A - S70-0823-1 B - S72-0686-1	T-8 hrs to T-6 hrs (Fuel cell start)	Isolation valve to T-0 back pressure regulator would fail Open which would reduce GSE reactant supply pressure to fuel cell(s). Fuel cell start might have to be aborted depending upon how far fuel cell start has progressed. A Tech would be required on the FSS T-0 panel to raise the back pressure regulator set point in order to continue.

HIM: 6899, Octal Address 052 (Page 4 of 4)

Location: MLP Rm 7A

Systems: MPS, SSME, BRS, EPDC, CPWR, PRSD

System	HIM Functions	Effectivity	Workaround or Safing
PRSD (CFCP)		T-6 hrs to Launch	Loss of T-0 back pressure regulator isolation would require transfer of reactant supply to fuel cells from GSE to onboard tanks. Possible impact on subsequent Launch attempts due to minimum liftoff quantities. GLS secures PRSD ground reactants at approx T-2 min 35 sec.
		Scrub	Delay operations until HIM repaired.
		Post Launch secure	Delay operations until HIM repaired.

HIM: 8020, Octal Address 320 (Pad B)

Location: Fuel Farm

Systems: OMS, APU

System	HIM Functions	Effectivity	Workaround or Safing
OMS/APU (COOS, CAPU)	Hyper GSE not required during S0007.		

HIM: 8022, Octal Address 325 (Pad B)

Location: Ox Farm

Systems: OMS

System	HIM Functions	Effectivity	Workaround or Safing
OMS (COOS)	Hyper GSE not required during S0007.		

*** End of Operation **128** ***

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OPERATION 129 Contingency Plan for Loss of Power to Manually Operated Substations

Shop: **PWRB**
Cntrl Rm Console: **C3**
OPR: **JBEP**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.5**

NOTE

This operation contains contingency procedures to restore power to manually operated substations.

This operation is to be used during the unplanned loss of power to substations listed in this operation.

Operation Not Performed:_____

Section 1

MLP-1: Loss of Primary Power to Substation 928, A-Side

NOTE
This is a contingency operation. Perform in the loss of Primary Power at USS-928A, MLP-1.

Section 1 Not Performed:_____

129-1 **JBEP**

Verify the voltage monitor on the line side of USS-928A is OFF.

Support: PWR
Support: PWRB

129-2 **JBEP STM 111**
STM NTD 232

We have a voltage monitor indicating a loss of primary power on USS-928A.

Support: PWR

129-3 **JBEP**

Send an OPEN command to Breaker 2B at USS-928.
Verify Breaker 2B or USS-928 indicates OPEN.

Support: PWR
Support: PWRB

129-4 **JBEP**

Send an CLOSE command to Breaker 3A at USS-928.
Verify Breaker 3A or USS-928 indicates CLOSED.

Support: PWR
Support: PWRB

129-5 **JBEP STM 111**
STM NTD 232

We have single ended USS-928 to the B Side.

Support: PWR

***** End of MLP-1: Loss of Primary Power to Substation 928, A-Side *****

Section 2

MLP-1: Loss of Primary Power to Substation 928, B-Side

NOTE
This is a contingency operation. Perform in the loss of Primary Power at USS-928B, MLP-1.

Section 2 Not Performed:_____

129-6 **JBEP**

Verify the voltage monitor on the line side of USS-928B is OFF.

Support: PWR
Support: PWRB

129-7 **JBEP STM 111**
STM NTD 232

We have a voltage monitor indicating a loss of primary power on USS-928B.

Support: PWR

129-8 **JBEP**

Send an OPEN command to Breaker 11B at USS-928.
Verify Breaker 11B or USS-928 indicates OPEN.

Support: PWR
Support: PWRB

129-9 **JBEP**

Send an CLOSE command to Breaker 3A at USS-928.
Verify Breaker 3A or USS-928 indicates CLOSED.

Support: PWR
Support: PWRB

129-10 **JBEP STM 111**
STM NTD 232

We have single ended USS-928 to the A Side.

Support: PWR

***** End of MLP-1: Loss of Primary Power to Substation 928, B-Side *****

Section 3

Pad B: Loss of Primary Power to Substation 1031

NOTE

This is a contingency operation. Perform in the loss of Primary Power at USS-1031, Pad B.

Section 3 Not Performed:_____

129-11 **JBEP**

Verify the voltage monitor on the line side of USS-1031 is OFF.

Support: PWR
Support: PWRB

129-12 **JBEP STM 111**
STM NTD 232

We have a voltage monitor indicating a loss of primary power on USS-1031.

Support: PWR

129-13 **JBEP**

Send an OPEN command to Breaker 2B at USS-1031.
Verify Breaker 2B or USS-1031 indicates OPEN.

Support: PWR
Support: PWRB

129-14 **JBEP**

Send an CLOSE command to Breaker 2C at USS-1032.
Verify Breaker 2C or USS-1032 indicates CLOSED.

Support: PWR
Support: PWRB

129-15 **JBEP STM 111**
STM NTD 232

We have transferred USS-1031 load to USS-1032.

Support: PWR

***** End of Pad B: Loss of Primary Power to Substation 1031 *****

Section 4

Pad B: Loss of Primary Power to Substation 1032

NOTE
This is a contingency operation. Perform in the loss of Primary Power at USS-1032, Pad B.

Section 4 Not Performed:_____

129-16 **JBEP**

Verify the voltage monitor on the line side of USS-1032 is OFF.

Support: PWR
Support: PWRB

129-17 **JBEP STM 111**
STM NTD 232

We have a voltage monitor indicating a loss of primary power on USS-1032.

Support: PWR

129-18 **JBEP**

Send an OPEN command to Breaker 2B at USS-1032.
Verify Breaker 2B or USS-1032 indicates OPEN.

Support: PWR
Support: PWRB

129-19 **JBEP**

Send an CLOSE command to Breaker 2C at USS-1031.
Verify Breaker 2C or USS-1031 indicates CLOSED.

Support: PWR
Support: PWRB

129-20 **JBEP STM 111**
STM NTD 232

We have transferred USS-1032 load to USS-1031.

Support: PWR

***** End of Pad B: Loss of Primary Power to Substation 1032 *****

Section 5

Pad B: Loss of Primary Power to Substation 1050, A-Side

NOTE
This is a contingency operation. Perform in the loss of Primary Power at USS-1050A, Pad B.

Section 5 Not Performed:_____

129-21 **JBEP**

Verify the voltage monitor on the line side of USS-1050A is OFF.

Support: PWR
Support: PWRB

129-22 **JBEP STM 111**
STM NTD 232

We have a voltage monitor indicating a loss of primary power on USS-1050A.

Support: PWR

129-23 **JBEP**

Send an OPEN command to Breaker 3B at USS-1050.
Verify Breaker 3B or USS-1050 indicates OPEN.

Support: PWR
Support: PWRB

129-24 **JBEP**

Send an CLOSE command to Breaker 5B at USS-1050.
Verify Breaker 5B or USS-1050 indicates CLOSED.

Support: PWR
Support: PWRB

129-25 **JBEP STM 111**
STM NTD 232

We have single ended USS-1050 to the B Side.

Support: PWR

***** End of Pad B: Loss of Primary Power to Substation 1050, A-Side *****

Section 6

Pad B: Loss of Primary Power to Substation 1050, B-Side

NOTE
This is a contingency operation. Perform in the loss of Primary Power at USS-1050B, Pad B.

Section 6 Not Performed:_____

129-26 **JBEP**

Verify the voltage monitor on the line side of USS-1050B is OFF.

Support: PWR
Support: PWRB

129-27 **JBEP STM 111**
STM NTD 232

We have a voltage monitor indicating a loss of primary power on USS-1050B.

Support: PWR

129-28 **JBEP**

Send an OPEN command to Breaker 7B at USS-1050.
Verify Breaker 7B or USS-1050 indicates OPEN.

Support: PWR
Support: PWRB

129-29 **JBEP**

Send an CLOSE command to Breaker 5B at USS-1050.
Verify Breaker 5B or USS-1050 indicates CLOSED.

Support: PWR
Support: PWRB

129-30 **JBEP STM 111**
STM NTD 232

We have single ended USS-1050 to the A Side.

Support: PWR

***** End of Pad B: Loss of Primary Power to Substation 1050, B-Side *****

*** End of Operation **129** ***

OPERATION 130 Contingency Plan for Total Cooling Loss to Pad/MLP, T-48 Hrs until T-0

Shop: **HVAA**
Cntrl Rm Console: **C-2**
OPR: **JBAC**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.1**

NOTE

This operation contains contingency procedures to restore operation of facility chillers.

This operation is to be used during the unplanned shutdown of an operating chiller supporting Pad/MLP operations.

Operation Not Performed:_____

Loss of Operating Facility Chiller Ch-1, Ch-2, or Ch-3

NOTE

One of three chillers is required to be operating to support Pad/MLP cooling requirements. Temperatures within critical equipment areas will begin rising in approximately two minutes after cooling stops. An "out of specification" condition will follow within approximately 8 to 10 minutes.

Initial Configure for Loss of Facility Chiller

130-1 **JBAC STM 111**
STM NTD 232

IF a Shut Down condition occurs on an operating chiller supporting Pad/MLP operations,

THEN request permission to initiate the preplanned contingency response steps.

Support: HVAA

Not Performed:_____

130-2 **JBAC STM 111**
STM NTD 232

IF permission to implement the preplanned contingency response steps is received,

THEN perform CH-1, CH-2, CH-3 Facility Chiller securing and recovery operations.

Notify STM of the actions taken and configuration status of the chiller.

Support: HVAA

Not Performed:_____

130-3 **JBAC STM 111**
STM NTD 232

IF a Shut Down indication of an operating chiller supporting Pad/MLP operations is a result of a power interruption,

THEN, after power is restored:

Wait for an automatic restart of the down chiller.

Support: HVAA

Not Performed:_____

NOTE
Chiller operation Shut Down will occur if a high or low voltage interruption occurs. The chiller operating will auto-restart after a set two-minute delay once power is restored.

130-4 **JBAC STM 111**
STM NTD 232

IF there has been a Shut Down indication on the chiller supporting Pad/MLP operations,

THEN perform the following:

1. **Implement** the appropriate preplanned contingency response procedure on a known component failure causing the original chiller shut down.

2. **Secure** the "shut down" chiller from the C-2 Console.

3. **Start** the second alternate chiller from the C-2 Console.

4. **Confirm** chiller operation has stabilized.

5. **Notify** STM of the action taken and chiller configuration.

Support: HVAA

Not Performed:_____

130-5 **JBAC STM 111**
STM NTD 232

IF there has been a Shut Down indication on the chiller supporting Pad/MLP operations,

THEN perform the following:

1. **Secure** the "shut down" chiller from C-2 Console.
2. **Start** the third alternate chiller from the C-2 Console.
3. **Confirm** chiller operation has stabilized.
4. **Notify** STM of the action taken and chiller configuration.

Support: HVAA

Not Performed:_____

130-6 **JBAC STM 111**
STM NTD 232

IF starting of all three chillers was unsuccessful,

THEN request permission to enter Pad for investigative troubleshooting.

Support: HVAA

Not Performed:_____

*** End of Operation **130** ***

OPERATION 131 Contingency Plan for Total Chilled Water Flow Loss to Pad A or Pad B, T-48 Hrs until T-0

Shop: **HVAA**
Cntrl Rm Console: **C-2**
OPR: **JBAC**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.1**

NOTE

This operation contains contingency procedures to restore operation of chilled water pumps.

This operation is to be used during the unplanned shutdown of an operating pump supporting Pad operations.

Operation Not Performed:_____

Option A: Loss of Operating Chilled Water Pumps P-4, P-5 and P-6 for Pad A

NOTE
Perform the following option if work is being performed at Pad A.

Option A Not Performed:_____

NOTE
One of the three chilled water pumps is required to be operating to support PAD/MLP cooling requirements. Chilled water flow from the pump is essential to maintain a Chiller operating thus providing cooling through air handling units to critical Launch support electronic equipment.

Upon a pump failure, an "out of specification" condition will be reached in approximately 8 minutes. The following steps are to be performed in the event of a failure of an operating pump.

Initial Configure for Loss of Chilled Water Flow

131-1 **JBAC STM 111**
STM NTD 232

IF a Shut Down condition occurs on an operating pump supporting Pad operations,

THEN request permission to initiate the preplanned contingency response steps.

Support: HVAA

Not Performed:_____

131-2 **JBAC STM 111**
STM NTD 232

IF permission to implement the preplanned contingency response steps is received,

THEN perform P-4, P-5 and P-6 Chilled Water Pump securing and recovery operations.

Notify STM of the actions taken and configuration status of the pump.

Support: HVAA

Not Performed:_____

131-3 **JBAC STM 111**
STM NTD 232

IF a Shut Down indication of an operating pump supporting Pad operations is a result of a power interruption,

THEN, after power is restored:

Issue a start command to the pump that was operating from C-2 Console.

Support: HVAA

Not Performed:_____

NOTE
Pump operation Shut Down will occur if a high or low voltage interruption occurs. The pump operating will auto-restart after a set one-minute delay once power is restored.

131-4 **JBAC STM 111**
STM NTD 232

IF there has been a Shut Down indication on the pump supporting Pad operations,

THEN perform the following:

Implement the appropriate preplanned contingency response procedure on a known component failure causing the original pump shut down.

1. **Secure** the "shut down" pump from the C-2 Console.
2. **Start** the second alternate pump from the C-2 Console.
3. **Confirm** pump operation has stabilized.
4. **Notify** STM of the action taken and pump configuration.

Support: HVAA

Not Performed:_____

131-5	**JBAC**	**STM**	**111**
	STM	**NTD**	**232**

IF starting of the three pumps was unsuccessful,

THEN request permission to have a field technician enter the Pad to reset power breaker or position one of the pump's hand off auto selector switches into the hand position.

Support: HVAA

Not Performed:_____

***** End of Option A: Loss of Operating Chilled Water Pumps P-4, P-5 and P-6 for Pad A *****

Option B: Loss of Operating Chilled Water Pumps P-4 and P-5 for Pad B

NOTE
Perform the following option if work is being performed at Pad B.

Option B Not Performed:_____

NOTE
One of the two chilled water pumps is required to be operating to support PAD/MLP cooling requirements. Chilled water flow from the pump is essential to maintain a Chiller operating thus providing cooling through air handling units to critical Launch support electronic equipment.

Upon a pump failure, an "out of specification" condition will be reached in approximately 8 minutes. The following steps are to be performed in the event of a failure of an operating pump.

Initial Configure for Loss of Chilled Water Flow

131-6 **JBAC STM 111**
STM NTD 232

IF a Shut Down condition occurs on an operating pump supporting Pad operations,

THEN request permission to initiate the preplanned contingency response steps.

Support: HVAA

Not Performed:_____

131-7 **JBAC STM 111**
STM NTD 232

IF permission to implement the preplanned contingency response steps is received,

THEN perform P-4, P-5 Chilled Water Pump securing and recovery operations.

Notify STM of the actions taken and configuration status of the pump.

Support: HVAA

Not Performed:_____

131-8 **JBAC STM 111**
STM NTD 232

IF a Shut Down indication of an operating pump supporting Pad operations is a result of a power interruption,

THEN, after power is restored:

Issue a start command to the pump that was operating from C-2 Console.

Support: HVAA

Not Performed:_____

NOTE
Pump operation Shut Down will occur if a high or low voltage interruption occurs. The pump operating will auto-restart after a set one-minute delay once power is restored.

131-9 **JBAC STM 111**
STM NTD 232

IF there has been a Shut Down indication on the pump supporting Pad operations,

THEN perform the following:

Implement the appropriate preplanned contingency response procedure on a known component failure causing the original pump shut down.

1. **Secure** the "shut down" pump from the C-2 Console.
2. **Start** the second alternate pump from the C-2 Console.
3. **Confirm** pump operation has stabilized.
4. **Notify** STM of the action taken and pump configuration.

Support: HVAA

Not Performed:_____

131-10	**JBAC**	**STM**	**111**
	STM	**NTD**	**232**

IF starting of the two pumps was unsuccessful,

THEN request permission to have a field technician enter the Pad to reset power breaker or position one of the pump's hand off auto selector switches into the hand position.

Support: HVAA

Not Performed:_____

***** End of Option B: Loss of Operating Chilled Water Pumps P-4 and P-5 for Pad B *****

*** End of Operation **131** ***

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OPERATION 132 Contingency Plan for Total Condenser Water Flow Loss to the Pad, T-48 Hrs until T-0

Shop: **HVAA**
Cntrl Rm Console: **C-2**
OPR: **JBAC**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.1**

NOTE

This operation contains contingency procedures to restore operation of condenser water pumps.

This operation is to be used during the unplanned shutdown of an operating pump supporting Pad operations.

Operation Not Performed:_____

Loss of Operating Condenser Water Pumps P-1, P-2, P-3 for the Pad

NOTE

One of the three condenser water pumps is required to be operating to support PAD/MLP cooling requirements. Condenser water flow from the pump is essential to maintain a Chiller operating thus providing cooling through air handling units to critical launch support electronic equipment.

Upon a pump failure, an "out of specification" condition will be reached in approximately 8 minutes. The following steps are to be performed in the event of a failure of an operating pump.

Initial Configure for Loss of Condenser Water Flow

132-1 **JBAC STM 111**
STM NTD 232

IF a Shut Down condition occurs on an operating pump supporting Pad operations,

THEN request permission to initiate the preplanned contingency response steps.

Support: HVAA

Not Performed:_____

132-2 **JBAC STM 111**
STM NTD 232

IF permission to implement the preplanned contingency response steps is received,

THEN perform P-1, P-2, P-3 Condenser Water Pump securing and recovery operations.

Notify STM of the actions taken and configuration status of the pump.

Support: HVAA

Not Performed:_____

132-3 **JBAC STM 111**
STM NTD 232

IF a Shut Down indication of an operating pump supporting Pad operations is a result of a power interruption,

THEN, after power is restored:

Wait for an automatic restart of the down pump.

Support: HVAA

Not Performed:_____

NOTE
Pump operation Shut Down will occur if a high or low voltage interruption occurs. The pump operating will auto-restart after a set one-minute delay once power is restored.

132-4 **JBAC STM 111**
STM NTD 232

IF there has been a Shut Down indication on the pump supporting Pad operations,

THEN perform the following:

1. **Implement** the appropriate preplanned contingency response procedure on a known component failure causing the original pump shut down.
2. **Secure** the "shut down" pump from the C-2 Console.
3. **Start** the second alternate pump from the C-2 Console.
4. **Confirm** pump operation has stabilized.
5. **Notify** STM of the action taken and pump configuration.

Support: HVAA

Not Performed:_____

132-5 **JBAC STM 111**
STM NTD 232

IF there has been a Shut Down indication on the pump supporting Pad operations,

THEN perform the following:

1. **Implement** the appropriate preplanned contingency response procedure on a known component failure causing the original pump shut down.

2. **Secure** the "shut down" pump from the C-2 Console.

3. **Start** the third alternate pump from the C-2 Console.

4. **Confirm** pump operation has stabilized.

5. **Notify** STM of the action taken and pump configuration.

Support: HVAA

Not Performed:_____

132-6 **JBAC STM 111**
STM NTD 232

IF starting of the three pumps was unsuccessful,

THEN request permission to have a field technician enter the Pad to reset power breaker or position one of the pump's hand-off-auto selector switches into the hand position.

Support: HVAA

Not Performed:_____

*** End of Operation **132** ***

OPERATION 133 Contingency Plan for Reduced Chilled Water Flow to LCC, T-48 Hrs until T-0

Shop: **HVAA**
Cntrl Rm Console: **C-2**
OPR: **JBAC**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.1**

NOTE

This operation contains contingency procedures to restore chilled water flow through the LCC.

This operation is to be used during the unplanned shutdown of an operating tertiary pump supporting LCC.

Operation Not Performed:_____

Loss of Operating Tertiary Pumps TCHP-9 and TCHP-10 for LCC

NOTE

Chilled water distribution in the LC-39 area is based on a primary-secondary-tertiary piping loop configuration. Each loop is hydraulically separated or decoupled from the other loops. The hydraulic separation between the piping segments permits the piping loops to act independently of each other.

In the LC-39 area, the primary loop distributes water through the Utility Annex water chillers, the secondary loop distributes water to many of the LC-39 facilities, and the tertiary loops distribute chilled water within the facilities.

The tertiary chilled water pumps that supply chilled water to the LCC Air Handling Units (AHUs) are located on the 4th floor in Tower D of the VAB. The LCC tertiary chilled water pumps (TCHP-9 & TCHP-10) are sized such that one pump will meet the chilled water design flow requirements of the facility. During normal operations, the lead pump operates in a Variable Frequency Drive (VFD) mode and varies the chilled water flow to the LCC based on load requirements.

The LCC tertiary chilled water pumps draw chilled water from the Utility Annex secondary loop which is then sent through numerous air handling units located within the LCC. The resulting cooling support is used for critical launch electronic equipment conditioning and comfort cooling. The pump controller automatically rotates lead pump based on runtime and pump/VFD failures.

Upon a VFD failure of the lead pump, the alternate pump will start automatically in VFD mode. If the VFD on this pump fails, the alternate pump will start in BYPASS mode. BYPASS mode bypasses the respective VFD and starts the pump full speed across the line. Once in this configuration, if the pump operating in BYPASS mode fails, the alternate pump will start in BYPASS mode. Upon a failure of both pumps, an “out of temperature specification” condition will be reached in the LCC within approximately 10 minutes.

The following steps are to be performed in the event of a failure of an operating pump.

Initial Configure for Loss of Chilled Water Flow

133-1 **JBAC STM 111**
STM NTD 232

An unscheduled Shut Down condition on an operating tertiary pump supporting LCC has occurred,

Request permission to initiate the preplanned contingency response steps.

Support: HVAA

133-2 **NTD STM 111**
STM JBAC 232

Implement the preplanned contingency response steps,

Perform Tertiary Pump securing and recovery operations.

1. **Dispatch** an HVAC Technician to the VAB 4th floor D-Tower to confirm failure causing the original pump shutdown.

2. **Notify** STM of the actions taken and configuration status of the pump.

Support: HVAA

133-3	**JBAC**	**STM**	**111**
	STM	**NTD**	**232**

IF the Shut Down indication of the operating pump supporting the LCC is a result of a power interruption,

THEN, after power is restored:

1. **Wait** for an automatic restart of the shut down pump or for an automatic switchover/start-up of the alternate pump.

2. **Instruct** USA HVAC Technician to reset pump controller alarms as required.

3. **Notify** STM of the actions taken and configuration status of the system.

Support: HVAA

Not Performed:_____

NOTE

Pump operation Shut Down will occur if a high or low voltage interruption occurs. One of the two pumps will auto-restart after a set time delay once power is restored.

133-4 **JBAC STM 111**
STM NTD 232

IF the Shut Down indication of the operating pump supporting the LCC is a result of a VFD failure,

THEN perform the following:

1. **Wait** for an automatic restart of the shut down pump or for an automatic switchover/start-up of the alternate pump.

2. **Instruct** USA HVAC Technician to reset pump controller alarms as required.

3. **Notify** STM of the actions taken and configuration status of the system.

Support: HVAA

Not Performed:_____

133-5	**JBAC**	**STM**	**111**
	STM	**JSTC**	
	JSTC	**NTD**	**232**
		JSAC	**114**

IF the Shut Down indication of the operating pump supporting the LCC is a result of a mechanical failure and a Loss of Tertiary Pump redundancy has occurred,

THEN perform the following:

1. **Wait** for an automatic switchover/start-up of the alternate pump.

2. **Station** USA HVAC Technician inside the fence next to the pumps to initiate further action if the alternate (second) pump fails.

3. **Request** Utility Annex Technician report to inside of the fence near the pumps to initiate further emergency action if the alternate (second) pump fails.

4. **Notify** STM of the action taken and configuration status of the system.

5. **Notify** STM of the potential to initiate valve configuration plan to isolate the Tertiary Pumps and utilize the Utility Annex Secondary Pumps to distribute chilled water through the LCC.

Support: HVAA
Support: AC

Not Performed:_____

133-6 **JBAC STM 111**
STM NTD 232

IF a Loss of Tertiary Pump redundancy has already occurred and the remaining operating pump fails as a result of a VFD failure,

THEN perform the following:

1. **Wait** for an automatic restart of the remaining pump in BYPASS mode.

2. **Maintain** manning positions**.**

3. **Notify** STM of the actions taken and configuration status of the system.

Support: HVAA

Not Performed:_____

133-7	**JBAC**	**STM**	**111**
	STM	**JSTC**	
		NTD	**232**

IF a Loss of Tertiary Pump redundancy has already occurred and the remaining operating pump fails as a result of a mechanical failure,

THEN perform the following:

1. **Instruct** the onsite USA HVAC Technician to initiate a field valve configuration change to valve out the tertiary pumps and utilize the Utility Annex Secondary Pumps to distribute chilled water flow through the LCC.

2. **Request** onsite Utility Annnex Technician to close V-146 and open Supply BFV.

3. **Verify** Temperature Control Valve 7 (TCV-7) is Open via PLC Interface or Field Open as required.

4. **Field Open or Verify Open** the 2-position electric supply valve.

5. **Request** Utility Annex Technician to adjust Secondary Load Pressure Setpoint up to 15 psi.

6. **Notify** STM of the actions taken and configuration status of the system.

7. **Monitor** LCC chilled water, AHU supply air and room temperatures and coordinate additional changes or adjustments with the Utility Annex.

8. Update STM as equipment configurations change or as potential temperature problems arise.

Support: HVAA
Support: AC

Not Performed:_____

*** End of Operation **133** ***

OPERATION 134 Contingency Plan for Pressurization Air Loss to PTCR, T-48 Hrs until T-0

Shop: **HVAA**
Cntrl Rm Console: **C-2**
OPR: **JBAC**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.1**

NOTE

This operation contains contingency procedures to restore operation of remote air fans.

This operation is to be used during the unplanned shutdown of an operating fan supporting PTCR operations.

Operation Not Performed:_____

Loss of Operating Facility Remote Air Fans SF-1 or SF-1R

NOTE

One of the two Remote Air Fans is required to be operating to support PTCR pressurization requirements. The minimum design safety purge provided from this fan is 0.5″ H_2O.

Upon a fan failure, an "out of specification" condition will immediately follow. The following steps are to be performed in the event of a failure of an operating fan.

Initial Configure for Loss of Pressurization Fan

134-1 **JBAC STM 111**
STM NTD 232

IF a Shut Down condition occurs on an operating fan supporting PTCR pressurization requirements,

THEN request permission to initiate the preplanned contingency response steps.

Support: HVAA

Not Performed:_____

134-2 **JBAC STM 111**
STM NTD 232

IF permission to implement the preplanned contingency response steps is received,

THEN perform fan securing and recovery operations.

Notify STM of the actions taken and configuration status of the fan.

Support: HVAA

Not Performed:_____

134-3 **JBAC STM 111**
STM NTD 232

IF a Shut Down indication of an operating fan supporting PCTR operations is a result of a power interruption,

THEN, after power is restored:

Wait for an automatic restart of the down fan.

Support: HVAA

Not Performed:_____

NOTE
Fan operation Shut Down will occur if a high or low voltage interruption occurs. The fan that shut down will auto-restart after a minor delay (set for 2 minutes) once power is restored.

134-4 **JBAC STM 111**
STM NTD 232

IF there has been a Shut Down indication on the fan supporting PTCR operations,

THEN perform the following:

1. **Implement** the appropriate preplanned contingency response procedure on a known component failure causing the original fan shutdown.

2. **Secure** the "shut down" fan from the C-2 Console.

3. **Start** the alternate fan from the C-2 Console.

4. **Confirm** fan operation has stabilized.

5. **Notify** STM of the action taken and fan configuration.

Support: HVAA

Not Performed:_____

134-5 **JBAC STM 111**
STM NTD 232

IF starting of both fans was unsuccessful,

THEN request permission to enter Pad for investigative troubleshooting.

Support: HVAA

Not Performed:_____

*** End of Operation **134** ***

OPERATION 135 Contingency Plan for Total Pressurization Air Loss to Pad/MLP, T-48 Hrs until T-0

Shop: **HVAA**
Cntrl Rm Console: **C-2**
OPR: **JBAC**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.1**

NOTE

This operation contains contingency procedures to restore operation of remote air fans.

This operation is to be used during the unplanned shutdown of an operating fan supporting Pad/MLP operations.

Operation Not Performed:_____

Loss of Operating Facility Remote Air Fans SF-2 or SF-2R

NOTE

One of the two Remote Air Fans is required to be operating to support Pad/MLP pressurization requirements. The minimum design safety purge provided from this fan is MLP (3.0″ H_2O), ECS (0.5″ H_2O), and HMR/EMR (0.5″ H_2O).

Upon a fan failure, an "out of specification" condition will immediately follow. The following steps are to be performed in the event of a failure of an operating fan.

Initial Configure for Loss of Pressurization Fan

135-1 **JBAC STM 111**
STM NTD 232

IF a Shut Down condition occurs on an operating fan supporting Pad/MLP operations,

THEN request permission to initiate the preplanned contingency response steps.

Support: HVAA

Not Performed:_____

135-2 **JBAC STM 111**
STM NTD 232

IF permission to implement the preplanned contingency response steps is received,

THEN perform SF-2, SF-2R Facility Remote Air Fan securing and recovery operations.

Notify STM of the actions taken and configuration status of the fan.

Support: HVAA

Not Performed:_____

135-3 **JBAC STM 111**
STM NTD 232

IF a Shut Down indication of an operating fan supporting Pad/MLP operations is a result of a power interruption,

THEN, after power is restored:

Wait for an automatic restart of the down fan.

Support: HVAA

Not Performed:_____

NOTE
Fan operation Shut Down will occur if a high or low voltage interruption occurs. The fan operating will auto-restart after a set two-minute delay once power is restored.

135-4 **JBAC STM 111**
STM NTD 232

IF there has been a Shut Down indication on the fan supporting Pad/MLP operations,

THEN perform the following:

1. **Implement** the appropriate preplanned contingency response procedure on a known component failure causing the original fan shutdown.

2. **Secure** the "shut down" fan from the C-2 Console.

3. **Start** the alternate fan from the C-2 Console.

4. **Confirm** fan operation has stabilized.

5. **Notify** STM of the action taken and fan configuration.

Support: HVAA

Not Performed:_____

135-5	**JBAC**	**STM**	**111**
	STM	**NTD**	**232**

IF starting of both fans was unsuccessful,

THEN request permission to enter Pad for investigative troubleshooting.

Support: HVAA

Not Performed:_____

*** End of Operation **135** ***

OPERATION 136 Contingency Plan for Pressurization Air Loss to Pad Flame Cells, T-48 Hrs until T-0

Shop: **HVAA**
Cntrl Rm Console: **C-2**
OPR: **JBAC**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.1**

NOTE

This operation contains contingency procedures to restore operation of remote air fans.

This operation is to be used during the unplanned shutdown of an operating fan supporting Flame Cell Pressurization operations.

Operation Not Performed:_____

Loss of Operating Facility Remote Air Fans SF-3 or SF-3R

NOTE

One of the two Remote Air Fans is required to be operating to support Flame Cell Pressurization requirements. The minimum design safety purge provided from this fan is 0.5″ H_2O.

Upon a fan failure, an "out of specification" condition will follow immediately. The following steps are to be performed in the event of a failure of an operating fan.

Initial Configure for Loss of Pressurization Fan

136-1 **JBAC STM 111**
STM NTD 232

IF a Shut Down condition occurs on an operating fan supporting Flame Cell Pressurization operations,

THEN request permission to initiate the preplanned contingency response steps.

Support: HVAA

Not Performed:_____

136-2 **JBAC STM 111**
STM NTD 232

IF permission to implement the preplanned contingency response steps is received,

THEN perform fan securing and recovery operations.

Notify STM of the actions taken and configuration status of the fan.

Support: HVAA

Not Performed:_____

136-3 **JBAC STM 111**
STM NTD 232

IF a Shut Down indication of an operating fan supporting Flame Cell Pressurization operations is a result of a power interruption,

THEN, after power is restored:

Wait for an automatic restart of the down fan.

Support: HVAA

Not Performed:_____

NOTE
Fan operation Shut Down will occur if a high or low voltage interruption occurs. The fan that shut down will auto-restart after a set two-minute delay once power is restored.

136-4 **JBAC STM 111**
STM NTD 232

IF there has been a Shut Down indication on the fan supporting Flame Cell Pressurization operations,

THEN perform the following:

1. **Implement** the appropriate preplanned contingency response procedure on a known component failure causing the original fan shutdown.

2. **Secure** the "shut down" fan from the C-2 Console.

3. **Start** the alternate fan from the C-2 Console.

4. **Confirm** fan operation has stabilized.

5. **Notify** STM of the action taken and fan configuration.

Support: HVAA

Not Performed:_____

136-5	**JBAC**	**STM**	**111**
	STM	**NTD**	**232**

IF starting of both fans was unsuccessful,

THEN request permission to enter Pad for investigative troubleshooting.

Support: HVAA

Not Performed:_____

*** End of Operation **136** ***

OPERATION 137 Contingency Plan for Pressurization Air Loss to FSS Elevator Machine Room (EMR) and RSS EMR/Hoist Machine Room (HMR), T-48 Hrs until T-0

Shop: **HVAA**
Cntrl Rm Console: **C-2**
OPR: **JBAC**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.1**

NOTE

This operation contains contingency procedures to restore operation of remote air fans.

This operation is to be used during the unplanned shutdown of an operating fan supporting FSS EMR and RSS EMR/HMR Pressurization requirements.

Operation Not Performed:_____

Loss of Operating Facility Remote Air Fans SF-5 or SF-5R

NOTE

One of the two Remote Air Fans is required to be operating to support FSS EMR and RSS EMR/HMR Pressurization requirements. The minimum design safety purge provided from this fan is 0.5″ H_2O.

Upon a fan failure, an "out of specification" condition will follow immediately. The following steps are to be performed in the event of a failure of an operating fan.

Initial Configure for Loss of Pressurization Fan

137-1 **JBAC STM 111**
STM NTD 232

IF a Shut Down condition occurs on an operating fan supporting FSS EMR and RSS EMR/HMR Pressurization requirements,

THEN request permission to initiate the preplanned contingency response steps.

Support: HVAA

Not Performed:_____

137-2 **JBAC STM 111**
STM NTD 232

IF permission to implement the preplanned contingency response steps is received,

THEN perform fan securing and recovery operations.

Notify STM of the actions taken and configuration status of the fan.

Support: HVAA

Not Performed:_____

137-3 **JBAC STM 111**
STM NTD 232

IF a Shut Down indication of an operating fan supporting FSS EMR and RSS EMR/HMR operations is a result of a power interruption,

THEN, after power is restored:

Wait for an automatic restart of the down fan.

Support: HVAA

Not Performed:_____

NOTE
Fan operation Shut Down will occur if a high or low voltage interruption occurs. The fan that shut down will auto-restart after a minor delay (set for 2 minutes) once power is restored.

137-4 **JBAC STM 111**
STM NTD 232

IF there has been a Shut Down indication on the fan supporting FSS EMR and RSS EMR/HMR operations,

THEN perform the following:

1. **Implement** the appropriate preplanned contingency response procedure on a known component failure causing the original fan shutdown.

2. **Secure** the "shut down" fan from the C-2 Console.

3. **Start** the alternate fan from the C-2 Console.

4. **Confirm** fan operation has stabilized.

5. **Notify** STM of the action taken and fan configuration.

Support: HVAA

Not Performed:_____

137-5 **JBAC STM 111**
STM NTD 232

IF starting of both fans was unsuccessful,

THEN request permission to enter Pad for investigative troubleshooting.

Support: HVAA

Not Performed:_____

*** End of Operation **137** ***

OPERATION 138 INCS LCG/RD Loss After T-6 Hours

Shop: **TPE**
Cntrl Rm Console: **ALL**
OPR: **INTG**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **8.0**

NOTE

The following operation is a summary of Local Control Gateway (LCG) and Remote Distributor (RD) utilization during Terminal Countdown (T-6 Hrs through Post Launch Safing). This data is to be used as a guideline only. All work will be documented on an IPR.

NOTE

INCS Red Crew access requirements are defined in S0007.500, Operation 120, "Pad Rescue Team Support Operations".

INCS LCG Configuration

CCB	FEP	Location	Pad A LCG #	SYS	Octal Addr
1	GS1A/S	210	65003	ARMS	022
		210	65003	ARMS	211
		210	65003	ARMS	013
		210	65003	LOX/LH2/HWS	020
		210	65003	LOX/LH2/HWS	255
		109A	65020	ECS	010
		109A	65020	ECS	165
2	GS3A/S	210	65004	APU/WATER/ ET HEATER	212
		210	65004	FUEL RSS	222*
		210	65004	FUEL RSS	023*
		210	65004	OX RSS	032*
		210	65004	OX RSS	233*
		Fuel Area	65401	FUEL FARM	224*
		Oxid Area	65301	OX FARM	025*
3	GS2A/S	210	65005	ARMS/ECLSS WATER/ ET HEATER	235
		210	65005	ARMS/ECLSS WATER/ET HEATER	230
		210	65005	LOX/LH2/HWS	031
		210	65005	LOX/LH2/HWS	026
		210	65005	LOX/LH2/HWS	034
		210	65005	LOX/LH2/HWS	305
		109A	65021	ECS	221
		109A	65021	ECS	257

* Not required for S0007 support

INCS LCG/RD Configuration

LCG	SYS	RD	Location
65003A1/A3	LH2 (HWS)	65010A1	PTCR 210
65003A1/A3	LOX	65101A1	LOX EE BLDG
65003A1/A3	LH2	65201A1	LH2 EE BLDG
65003A1/A3	LH2 (HWS)	65201A2	LH2 EE BLDG
65003A1/A3	LH2 (HWS)	65601A1	FSS 75’
65003A1/A3	LH2 (HWS)	65602A1	FSS 115’
65003A1/A3	PRSD (HWS)	65604A1	FSS 155’
65003A1/A3	ARMS	65605A1	FSS 175’
65003A1/A3	LOX/LH2	65606A1	FSS 203’
65003A1/A3	LOX/LH2 (HWS)	65607A1	FSS 215’
65003A2/A4	ARMS	65605A1	FSS 175’
65003A2/A4	PRSD (HWS)	65705A1	RSS 167’
65003A2/A4	GSP/ET/H20/SSME	65011A1	PTCR 210
65003A2/A4	ARMS	65019A1	PTCR 103
65003A2/A4	ARMS	65609A1	FSS 255’
65020	ECS	65022A1	ECS Rm
65020	ECS	65023A1	ECS Rm
65020	ECS	65024A1	ECS Rm
65020	ECS	65025A1	ECS Rm
65020	ECS	65026A1	ECS Rm
65020	ECS	65027A1	ECS Rm
65020	ECS	65028A1	ECS Rm
65020	ECS	65703A1	RSS 117’

INCS Lookup Tool located at:
http://usaflwas01.usa-spaceops.ksc.nasa.gov/papps/fl/incs/

INCS LCG/RD Configuration

LCG	SYS	RD	Location
65004A1/A2	ET/H20/SSME	65011A2	PTCR 210
65004A1/A2	PRSD (HWS)	65604A2	FSS 155’
65004A1/A2	APU	65702A1	RSS 117’
65004A1/A2	PRSD (HWS)	65705A2	RSS 167’
65004A3	OX HVDS	65801	RSS 107’*
65004A3	OX HVDS	65802	RSS 107’*
65004A3	FUEL HVDS	65901	RSS 107’*
65004A3	FUEL HVDS	65902	RSS 107’*
65004A3	OX	65804	RSS 117’*
65004A3	OX	65805	RSS 117’*
65004A3	FUEL	65904	RSS 117’*
65004A3	FUEL	65905	RSS 117’*
65004A3	OX	65806	RSS 207’*
65004A3	FUEL	65906	RSS 207’*
65004A1/A2/A3	OX	65301	OX FARM*
65004A1/A2/A3	FUEL	65401	FUEL FARM*

* Not required for S0007 support

INCS LCG/RD Configuration

LCG	SYS	RD	Location
65005A1/A3	LH2 (HWS)	65010A2	PTCR 210
65005A1/A3	LOX	65101A2	LOX EE BLDG
65005A1/A3	LH2	65201A3	LH2 EE BLDG
65005A1/A3	LH2 (HWS)	65201A4	LH2 EE BLDG
65005A1/A3	LH2 (HWS)	65601A2	FSS 75’
65005A1/A3	PRSD	65601A3	FSS 75’
65005A1/A3	HWS	65602A2	FSS 115’
65005A1/A3	PRSD (HWS)	65604A2/A3	FSS 155’
65005A1/A3	LOX/LH2 (HWS)	65606A2	FSS 203’
65005A1/A3	LOX/LH2 (HWS)	65607A3/A4	FSS 215’
65005A1/A3	PRSD (HWS)	65705A2	RSS 167’
65005A1/A3	PRSD/LO2/GH2	65705A3	RSS 167’
65005A1/A3	PRSD/LH2/GH2	65705A4	RSS 167’
65005A2/A4	ARMS	65605A2	FSS 175’
65005A2/A4	H20/SSME	65011A3	PTCR 210
65005A2/A4	ARMS	65019A2	PTCR 103
65005A2/A4	ARMS	65609A2	FSS 255’
65021	ECS	65022A2	ECS Rm
65021	ECS	65023A2	ECS Rm
65021	ECS	65024A2	ECS Rm
65021	ECS	65025A2	ECS Rm
65021	ECS	65026A2	ECS Rm
65021	ECS	65027A2	ECS Rm
65021	ECS	65028A2	ECS Rm
65021	ECS	65703A2	RSS 117’

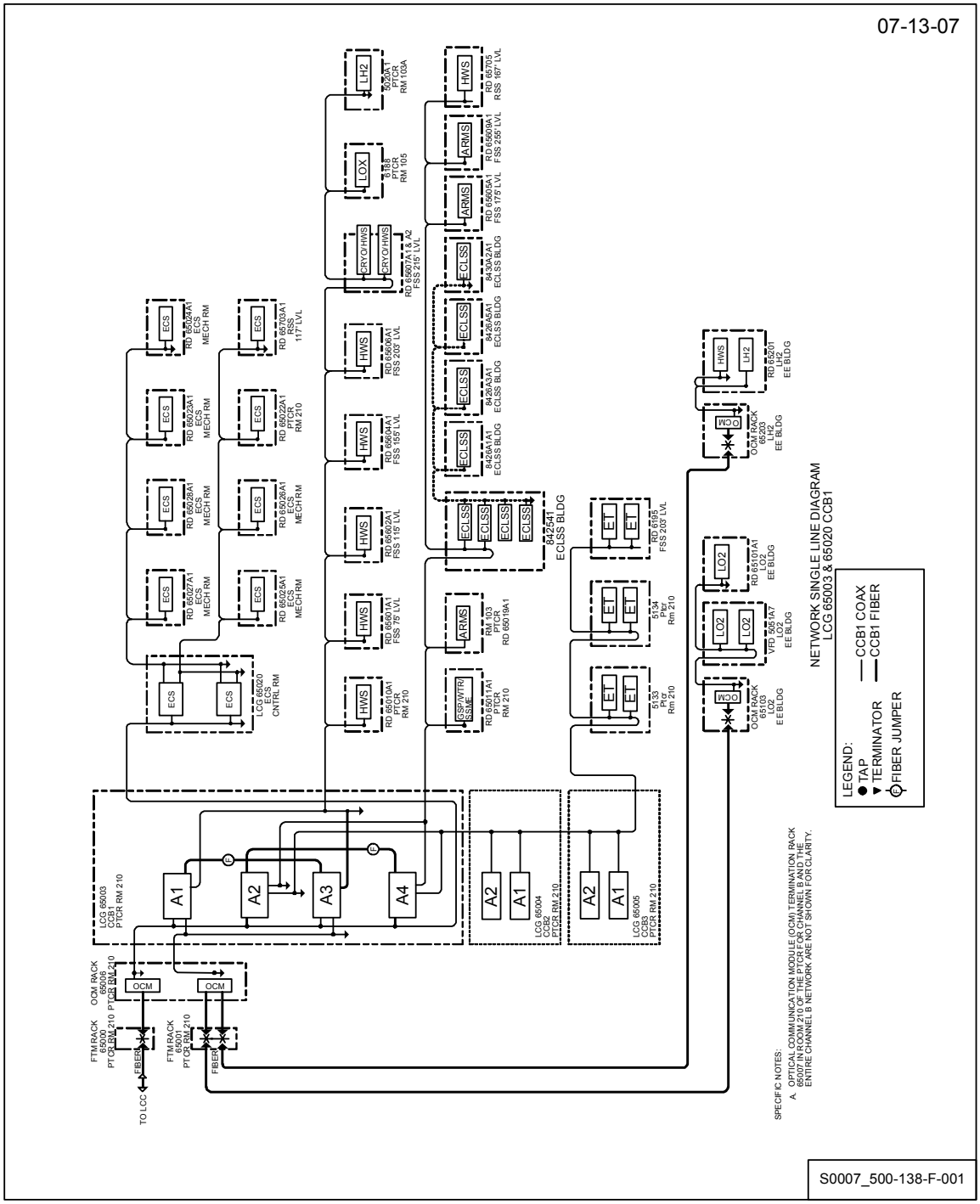

Figure 138-1 - Network Single Line Diagram LCG 65003 & 65020 CCB1

(For Reference Only)

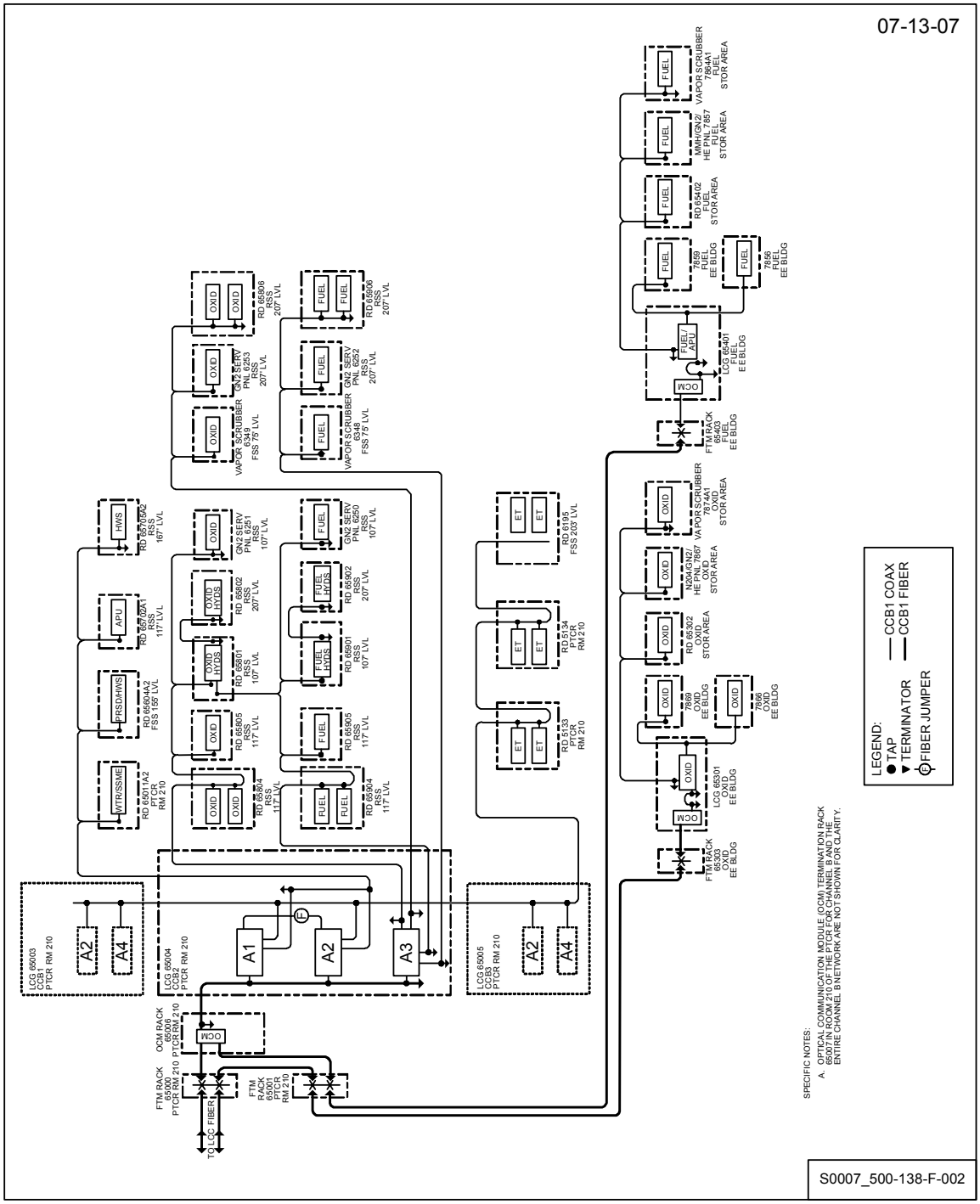

Figure 138-2 - Network Single Line Diagram LCG 65004, 65301 & 65401 CCB2

(For Reference Only)

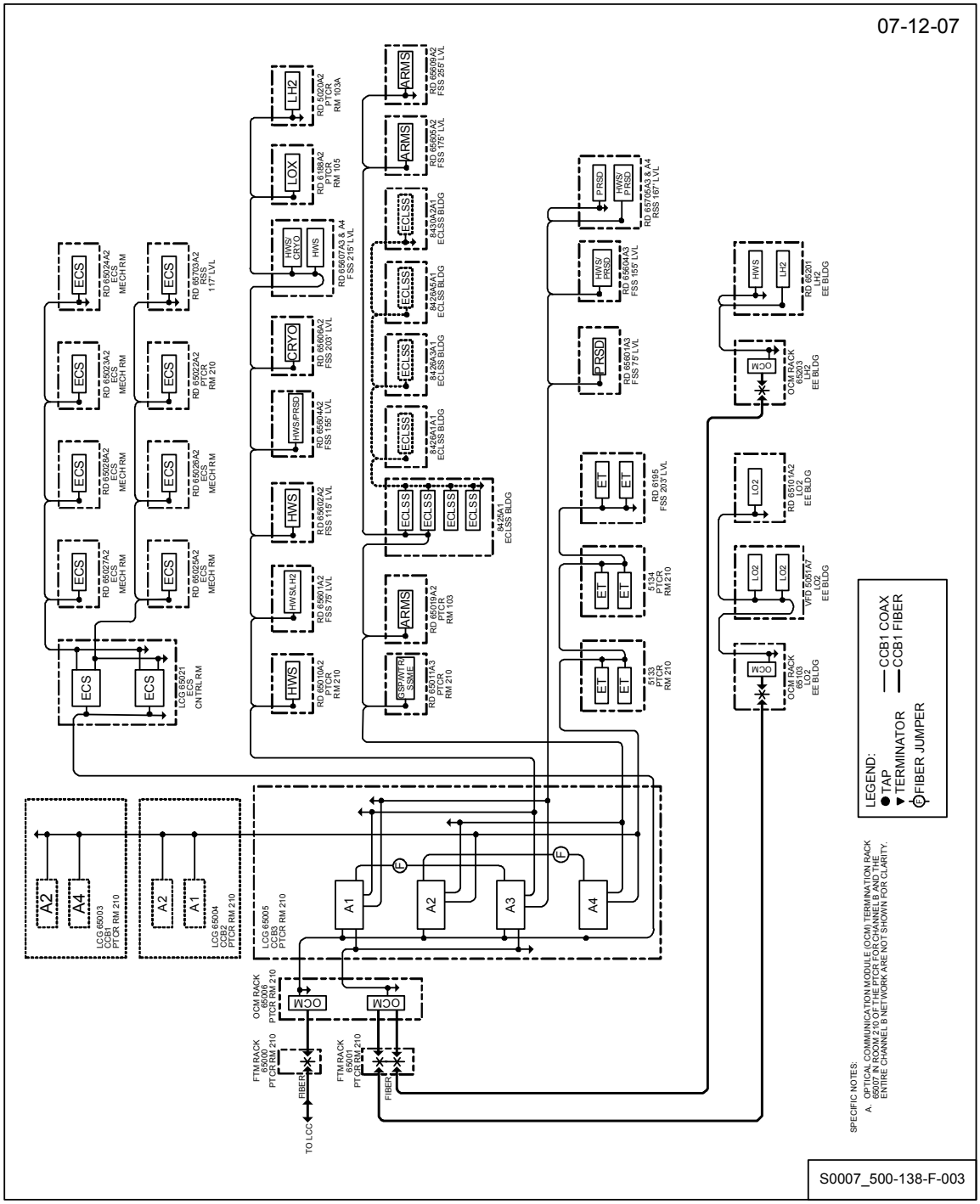

Figure 138-3 - Network Single Line Diagram LCG 65005 & 65021 CCB3

(For Reference Only)

RD: 65010A1

Location: PTCR Room 210

Systems: LH_2, HWS

System	Functions	Effectivity	Workaround or Safing
HWS/ LH_2/MPS (TPROP)	LH2 leak and fire detectors (primary measurements) MPS fire detector FD 13-17, 19-22 Leak detectors LD 7-17, 35, 36, 51, 52 Primary indicators	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65010A2

RD: 65010A2

Location: PTCR Room 210

Systems: LH_2, HWS

System	Functions	Effectivity	Workaround or Safing
HWS/ LH_2/MPS (TPROP)	LH2 leak and fire detectors (secondary measurements) MPS fire detector FD 13-17, 19-22 Leak detectors LD 7-17, 35, 36, 51, 52 Secondary indicators	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65010A1

RD: 65011A1

Location: PTCR Room 210

Systems: GSP, WATER, ET HEATER, SSME

System	Functions	Effectivity	Workaround or Safing
GSP/ WATER/ ET HEATER/ SSME	23D100/300/900 Power Supply Controls and Indicators (A1 only) Bipod Control 23D120X Power Water FX Controls	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65011A2 for Bipod On RD 65011A2/A3 for Water

RD: 65011A2

Location: PTCR Room 210

Systems: WATER, ET HEATER, SSME

System	Functions	Effectivity	Workaround or Safing
GSP/ WATER/ ET HEATER/ SSME	Bipod Control 23D120 Power Water FX Controls	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65011A1

RD: 65011A3

Location: PTCR Room 210

Systems: WATER, SSME

System	Functions	Effectivity	Workaround or Safing
GSP/ WATER/ SSME	Water FX Controls	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65011A1

RD: 65019A1

Location: PTCR Room 103

Systems: ARMS

System	Functions	Effectivity	Workaround or Safing
ARMS	HCU and GVA controls	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65019A2

RD: 65019A2

Location: PTCR Room 103

Systems: ARMS

System	Functions	Effectivity	Workaround or Safing
ARMS	HCU and GVA controls	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65019A1

RD: 65022A1

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65022A2

RD: 65022A2

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65022A1

RD: 65023A1

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65023A2

RD: 65023A2

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65023A1

RD: 65024A1

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65024A2

RD: 65024A2

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65024A1

RD: 65025A1

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65025A2

RD: 65025A2

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65025A1

RD: 65026A1

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65026A2

RD: 65026A2

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65026A1

RD: 65027A1

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65027A2

RD: 65027A2

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65027A1

RD: 65028A1

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65028A2

RD: 65028A2

Location: ECS Mech Room

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65028A1

RD: 65101A1

Location: LO_2 EE Building

Systems: LO_2, INTG

System	Functions	Effectivity	Workaround or Safing
LO_2/MPS (TPROP)	LO_2 (Primary measurements)	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65101A2

RD: 65101A2

Location: LO_2 EE Building

Systems: LO_2, INTG

System	Functions	Effectivity	Workaround or Safing
LO_2/MPS (TPROP)	LO2 (Secondary measurements)	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use primary (redundant) measurements on RD 65101A1

RD: 65201A1

Location: LH_2 EE Building

Systems: LH_2, INTG

System	Functions	Effectivity	Workaround or Safing
LH_2/MPS (TPROP)	LH_2 (Primary measurements)	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65201A3

RD: 65201A2

Location: LH_2 EE Building

Systems: LH_2, HWS

System	Functions	Effectivity	Workaround or Safing
HWS/ LH_2/MPS (TPROP)	LH_2 leak and fire detectors (Secondary measurements) MPS fire detector FD 1-12 Leak detectors LD 1-6 Secondary indicators	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65201A4

RD: 65201A3

Location: LH_2 EE Building

Systems: LH_2, INTG

System	Functions	Effectivity	Workaround or Safing
LH_2/MPS (TPROP)	LH_2 (Primary measurements)	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use primary (redundant) measurements on RD 65201A1

RD: 65201A4

Location: LH_2 EE Building

Systems: LH_2, HWS

System	Functions	Effectivity	Workaround or Safing
HWS/ LH_2/MPS (TPROP)	LH_2 leak and fire detectors (Secondary measurements) MPS fire detector FD 1-12 Leak detectors LD 1-6 Secondary indicators	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use primary (redundant) measurements on RD 65201A2

RD: 65601A1

Location: FSS, 75' Level

Systems: LH_2, HWS

System	Functions	Effectivity	Workaround or Safing
HWS/ LH_2/MPS (TPROP)	LH_2 leak and fire detectors (Primary measurements) MPS fire detectors FD 18/23/24/25/26/27 and leak detectors LD 18/19/20/21 Primary indicators	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65601A2

RD: 65601A2

Location: FSS, 75' Level

Systems: LH_2, HWS

System	Functions	Effectivity	Workaround or Safing
HWS/ LH_2/MPS (TPROP)	LH_2 leak and fire detectors (Secondary measurements) MPS fire detector FD 18/23/24/25/26/27 And Leak detectors LD 18/19/20/21 Secondary indicators	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use primary (redundant) measurements on RD 65601A1

RD: 65602A1

Location: FSS, 115' Level

Systems: LH_2, HWS

System	Functions	Effectivity	Workaround or Safing
HWS/ LH_2/MPS (TPROP)	LH_2 leak and fire detectors (Primary measurements) MPS fire detector FD 44/45 (ORB/ET LH2 Disc) primary indicators	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65602A2
HWS/ CGSS (CGSS)	Emergency Egress Fire Detection System (primary measurements) EEFDS FD 13/14 primary indicators	T-6 hrs through Launch/Scrub	RD 65602A2 contain fully redundant indications

RD: 65602A2

Location: FSS, 115' Level

Systems: LH_2, HWS

System	Functions	Effectivity	Workaround or Safing
HWS/ LH_2/MPS (TPROP)	LH_2 leak and fire detectors (Primary measurements) MPS fire detector FD 44/45 (ORB/ET LH2 Disc) primary indicators	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use primary (redundant) measurements on RD 65602A1
HWS/ CGSS (CGSS)	Emergency Egress Fire Detection System (secondary measurements) EEFDS FD 13/14 secondary indicators	T-6 hrs through Launch/Scrub	RD 65602A1 contain fully redundant indications

RD: 65604A1

Location: FSS, 155' Level

Systems: HWS, PRSD

System	Functions	Effectivity	Workaround or Safing
HWS/ CGSS (CGSS)	Emergency Egress Fire Detection System (Secondary measurements) EEFDS FD 7-12 secondary indicators EEFDS TD 8-10	T-6 Hrs through Launch/Scrub	RD 65604A3 contain fully redundant indications

RD: 65604A2

Location: FSS, 155' Level

Systems: HWS, PRSD

System	Functions	Effectivity	Workaround or Safing
HWS/ CGSS (CGSS)	Emergency Egress Fire Detection System (Secondary measurements) EEFDS FD 7-12 secondary indicators EEFDS TD 8-10	T-6 Hrs through Launch/Scrub	RD 65604A3 contain fully redundant indications

RD: 65604A3

Location: FSS, 155' Level

Systems: HWS, PRSD

System	Functions	Effectivity	Workaround or Safing
HWS/ CGSS (CGSS)	Emergency Egress Fire Detection System (Secondary measurements) EEFDS FD 7-12 secondary indicators EEFDS TD 8-10	T-6 Hrs through Launch/Scrub	RD 65604A1 contain fully redundant indications

RD: 65605A1

Location: FSS, 175' Level

Systems: GOX ARM, ARMS, EPDC

System	Functions	Effectivity	Workaround or Safing
GOXARM (CMEC)	GOX vent arm primary commands and measurements	T-13 Hrs through Launch/Scrub	RD 65605A2 contain fully redundant commands and indications. GLS uses the redundant command path if the primary fails.
ARMS (CGSS)	Orbiter Access Arm power current indications	T-16 Hrs through Launch/Scrub	RD 65605A2 contain fully redundant indications.

RD: 65605A2

Location: FSS, 175' Level

Systems: GOX ARM, ARMS, EPDC

System	Functions	Effectivity	Workaround or Safing
GOXARM (CMEC)	GOX vent arm secondary commands and measurements	T-13 Hrs through Launch/Scrub	RD 65605A1 contain fully redundant commands and indications. GLS uses the redundant command path if the primary fails.
ARMS (CGSS)	Orbiter Access Arm power current indications	T-16 Hrs through Launch/Scrub	RD 65605A1 contain fully redundant indications.

RD: 65606A1

Location: FSS, 203' Level

Systems: LH_2, INS

System	Functions	Effectivity	Workaround or Safing
LH_2/INS (TPROP)	Primary GSE valve commands and indicators Primary ET/IT heated purge commands and indicators GSE pressure measurements	Propellants load preps (T-19 hrs) through Launch securing or Boiloff/inert	Use secondary (redundant) measurements on RD 65606A2

RD: 65606A2

Location: FSS, 203' Level

Systems: LH_2, INS

System	Functions	Effectivity	Workaround or Safing
LH_2/INS (TPROP)	Secondary GSE valve commands and indicators Secondary ET/IT heated purge commands and indicators GSE pressure measurements	Propellants load preps (T-19 hrs) through Launch securing or Boiloff/inert	Use primary (redundant) measurements on RD 65606A1

RD: 65607A1

Location: FSS, 215' Level

Systems: LH_2, HWS

System	Functions	Effectivity	Workaround or Safing
HWS/ LH_2/MPS (TPROP)	LH_2 leak and fire detectors (Primary measurements) MPS fire detector FD 28/29/30 Leak detectors LD 22/23/24/25/30/37 primary indicators	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65607A3
HWS/ CGSS (CGSS)	Emergency Egress Fire Detection System (primary measurements) EEFDS fire detector FD 1 through 6 Temp Detectors EEFDS TD 1 through 7	T-6 hrs through Launch/Scrub	RD 65607A3 contain fully redundant indications

RD: 65607A3

Location: FSS, 215' Level

Systems: LH_2, HWS

System	Functions	Effectivity	Workaround or Safing
HWS/ LH_2/MPS (TPROP)	LH_2 leak and fire detectors (Primary measurements) MPS fire detector FD 28/29/30 Leak detectors LD 22/23/24/25/30/37 secondary indicators	ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use primary (redundant) measurements on RD 65607A1
HWS/ CGSS (CGSS)	Emergency Egress Fire Detection System (secondary measurements) EEFDS fire detector FD 1 through 6 Temp Detectors EEFDS TD 1 through 7	T-6 hrs through Launch/Scrub	RD 65607A1 contain fully redundant indications

RD: 65609A1

Location: FSS, 255' Level

Systems: GOXARM, ARMS, EPDC

System	Functions	Effectivity	Workaround or Safing
GOXARM (CMEC)	GOX Vent Arm secondary commands and measurements.	T-13 Hrs through Launch/Scrub	RD 65609A2 contain fully redundant commands and indications. GLS uses the redundant command path if the primary fails.
ARMS (CGSS)	Orbiter Access Arm power current indications	T-16 hrs through Launch/Scrub	RD 65609A2 contain fully redundant indications

RD: 65609A2

Location: FSS, 255' Level

Systems: GOXARM, ARMS, EPDC

System	Functions	Effectivity	Workaround or Safing
GOXARM (CMEC)	GOX Vent Arm secondary commands and measurements.	T-13 Hrs through Launch/Scrub	RD 65609A1 contain fully redundant commands and indications. GLS uses the redundant command path if the primary fails.
ARMS (CGSS)	Orbiter Access Arm power current indications	T-16 hrs through Launch/Scrub	RD 65609A1 contain fully redundant indications

RD: 65703A1

Location: RSS, 117' Level

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65703A2

RD: 65703A2

Location: RSS, 117' Level

Systems: ECS

System	Functions	Effectivity	Workaround or Safing
ECS		ET Load (T-6 Hrs) through liftoff/drain complete. It is highly desirable to have both primary and secondary measurements available for redundancy.	Use secondary (redundant) measurements on RD 65703A1

RD: 65705A1

Location: RSS, 167' Level

Systems: HWS, PRSD

System	Functions	Effectivity	Workaround or Safing
HWS	OMBUU fire detectors, 6292 Remote Cabinet	T-8 Hrs to Launch Scrub/Post Launch Secure	Use secondary (redundant) measurements on RD 65705A4

RD: 65705A2

Location: RSS, 167' Level

Systems: HWS, PRSD

System	Functions	Effectivity	Workaround or Safing
HWS	OMBUU fire detectors, 6929 Remote Cabinet	T-8 Hrs to Launch Scrub/Post Launch Secure	Use secondary (redundant) measurements on RD 65705A4

RD: 65705A3

Location: RSS, 167' Level

Systems: PRSD

System	Functions	Effectivity	Workaround or Safing
PRSD (CFCP)	Provides LPS control to PRSD/FCSS GO2/LO_2 GSE EICNS: A - S70-0830-1 B - S70-0830-2 C - S70-0817-0 (Partial) D - S72-0694-6 (Partial) E - S70-0697-3 (Partial)	T-8 Hrs to Launch Scrub/Post Launch Secure	GO_2 T-0 service Panel (A) would continue to supply GO_2 to vehicle T-0 connection through the primary leg (backup leg redundancy would be lost). A technician would be stationed at the panel to monitor local pressures (T-8 Hrs through T-6 Hrs, FC ACT); otherwise, GO_2 T-0 press would be monitored using MLP instrumentation. GLS secures PRSD ground reactants at approximately T-2 min 35 Sec

RD: 65705A4

Location: RSS, 167' Level

Systems: HWS, PRSD

System	Functions	Effectivity	Workaround or Safing
PRSD (CFCP)	Provides LPS control to PRSD/FCSS GH_2/LH_2 GSE EICNS: A - S72-0699-1 B - S72-0699-2 C - S70-0817-0 (Partial) D - S72-0694-6 (Partial) E - S70-0697-3 (Partial)	T-8 Hrs to Launch Scrub/Post Launch Secure	GH_2 T-0 service Panel (A) would continue to supply GH_2 to vehicle T-0 connection through the primary leg (backup leg redundancy would be lost). A technician would be stationed at the panel to monitor local pressures (T-8 Hrs through T-6 Hrs, FC ACT); otherwise, GH_2 T-0 press would be monitored using MLP instrumentation. GLS secures PRSD ground reactants at approximately T-2 min 35 Sec
HWS	OMBUU fire detectors, 6929 Remote Cabinet	T-6 Hrs through Launch/Scrub	Use primary (redundant) measurements on RD 65705A1 or RD 65705A2

*** End of Operation **138** ***

OPERATION 139 INCS Equipment Failure After T-6 Hours

Shop: **TPE**
Cntrl Rm Console: **ALL**
OPR: **INTG**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **2.0**

NOTE

This operation contains steps to correct problems associated with the integrated Network Control System (INCS) equipment noted below:

Option A: INCS I/O Module/Fuse Failure
Option B: INCS iBox Redundancy Failure
Option C: INCS Local Control Gateway (LCG) Failure
Option D: INCS Instrumentation Failure and Measurement Force

In the event of failure, attempt will be made to restore function with Test Team concurrence. All work will be documented on an IPR.

NOTE

The following operation contains steps to reset INCS I/O Modules and restore iBox Redundancy.

INCS I/O Modules are remotely resettable. Measurements are not mandatory unless otherwise noted. However, in most cases correction of the problem is desirable if time permits.

NOTE

After coordination with the affected systems, a LCG/RD/IBox may be released to INCS for repair (requires approximately 10 minutes) unless otherwise noted. Reconfiguration of these systems may be required prior to release.

NOTE

INCS Red Crew access requirements are defined in S0007.500, Operation 120, “Pad Rescue Team Support Operations”.

Option A

INCS I/O Module/Fuse Failure

NOTE

Perform this option in the event that there is a confirmed failure on a remotely resettable I/O module.

Upon confirmation of failure, INCS Engineering will coordinate with Test Team an attempt to reset module. System user will verify system is configured to support reset attempt. Upon completion of reset, INCS Engineering will notify Test Team or reset success and Test Team will coordinate retest.

Option A - INCS I/O Module/Fuse Failure Not Performed:_____

139-1 JPEL NTD 232

Verify Test Team concurrence to perform module/fuse reset.

Systems affected: _____

Module location: _____

Rack: _____

Slot: _____

Channel: _____

139-2 **JPEL** **NTD** **232**

Verify Test Team and system user configured for reset attempt.

139-3 **NTD** **JPEL** **232**

Notify INCS Engineering that they can proceed with Module Reset.

139-4 **JPEL**

Reset Module/Fuse a maximum of 2 times.

Results: _____

139-5 **JPEL** **NTD** **232**

Report results to Test Team.

139-6 **JPEL** **NTD** **232**

Coordinate system retest with user.

***** End of Option A - INCS I/O Module/Fuse Failure *****

Option B

INCS iBox Redundancy Failure

NOTE

Perform this option in the event that there is a confirmed failure Redundant iBox.

Upon confirmation of failure, INCS Engineering will coordinate with Test Team an attempt to restore redundancy. System user will verify system is configured to support redundancy restoration. Upon completion of restoration attempt, INCS Engineering will notify Test Team of reset success and Test Team will coordinate retest.

NOTE

No troubleshooting will be performed from T-9 and counting through T-0.

Option B - INCS iBox Redundancy Restore Not Performed:_____

139-7 **JPEL** **NTD** **232**

Verify failure of Redundant iBox.

iBox Number: _____

CCBS affected: _____

Systems affected: _____

139-8 **JPEL** **NTD** **232**

Verify system user configured for Redundant iBox Restoration attempt.

139-9 **NTD** **JPEL** **232**

Notify INCS Engineering that they can proceed with iBox Restore.

Replacement of MV2604 CPU Card

NOTE
Perform this option if this card is not functioning properly.

Replacement of MV2604 CPU Card Not Performed:_____

139-10 **JPEL**

IF iBox is part of an active-standby set,

THEN disable Auto Switchover in the PLC Code.

Not Performed:_____

139-11 **JPEL**

LCC 3R18

Terminate power to the iBox.

TTL:_____

139-12 **JPEL**

LCC 3R18

Remove MV2604 CPU card and place in Anti-static bag and seal with ESD sticker.

TTL:_____

139-13 **JPEL**

LCC 3R18

Install new MV2604 CPU card into iBox in the same location as the old one.

TTL:_____

139-14 **JPEL**

LCC 3R18

Restore power to the iBox and boot to configuration mode.

TTL:_____

139-15 **JPEL**

LCC 3R18

Configure the CPU with the following parameters.

boot device	:scsi = 0,00
processor number	:0
host name	:/sd0
file name	:/sd0:/scid/vxWorks.telnet
inet on Ethernet(e)	:
inet on backplane(b)	:
host inet(h)	:
gateway inet(g)	:
user (u)	:target
ftp password (pw) (blank = use rsh):	password
flags(f)	:0x0
target name (tn)	:target
startup script(s)	:/sd0:idleStart.scr
other (o)	:dc

TTL:_____

139-16 **JPEL**

LCC 3R18

Issue the following commands to restart the INCS software:

1. Cd"/sd0:"

2. <idleStart.scr

TTL:_____

139-17 **JPEL** **NTD** **232**
NTD **OTC**

Report system is ready for operations.

TTL:_____

***** End of MV2604 CPU Card Replacement Operation *****

Replacement of iBox Western Avionics SBII Card

NOTE
Perform this option if this card is not functioning properly.

Replacement of iBox Western Avionics SBII Card Not Performed:_____

139-18 **JPEL**

IF iBox is part of an active-standby set,

THEN disable Auto Switchover in the PLC Code.

Not Performed:_____

139-19 **JPEL**

LCC 3R18

Terminate power to the iBox.

TTL:_____

139-20 **JPEL**

LCC 3R18

Remove Western Avionics SBII card and place in Anti-static bag and seal with ESD sticker.

TTL:_____

139-21 **JPEL**

LCC 3R18

IF Firmware on new card is not the current rev,

THEN obtain and install a chip set with the current rev prior to proceeding to the next step.

Not Performed:_____

139-22 **JPEL**

LCC 3R18

Record revision numbers of the firmware chips.

Chip U12 Rev:_____

Chip U13 Rev:_____

Chip U20 Rev:_____

TTL:_____

139-23 **JPEL**

LCC 3R18

Install new Western Avionics SBII card into iBox in the same location as the old one.

TTL:_____

139-24 **JPEL**

LCC 3R18

Issue the following commands to restart the INCS software:

1. Cd"/sd0:"

2. <idleStart.scr

TTL:_____

139-25 **JPEL** **NTD** **232**
NTD **OTC**

Report system is ready for operations.

TTL:_____

***** End of Western Avionics SBII Card Replacement Operation *****

Replacement of iBox SST Card

NOTE
Perform this option if this card is not functioning properly.

Replacement of iBox SST Card Not Performed:_____

139-26 **JPEL**

IF iBox is part of an active-standby set,

THEN disable Auto Switchover in the PLC Code.

Not Performed:_____

139-27 **JPEL**

LCC 3R18

Terminate power to the iBox.

TTL:_____

139-28 **JPEL**

LCC 3R18

Remove SST card and place in Anti-static bag and seal with ESD sticker.

TTL:_____

139-29 **JPEL**

LCC 3R18

Install new SST card into iBox in the same location as the old one.

TTL:_____

139-30 **JPEL**

LCC 3R18

Restore power to the iBox.

TTL:_____

***** End of Replacement of iBox SST Card *****

***** End of Option B - INCS iBox Redundancy Failure *****

Option C

INCS Local Control Gateway (LCG) Failure

NOTE

Perform this option in the event that there is a confirmed Local Control Gateway failure.

Upon confirmation of failure, INCS Engineering will coordinate with Test Team an attempt to restore redundancy. System user will verify system is configured to support redundancy restoration. Upon completion of restoration attempt, INCS Engineering will notify Test Team of reset success and Test Team will coordinate retest.

NOTE

No troubleshooting will be performed from T-9 and Counting through T-0.

Option C - INCS Local Control Gateway (LCG) Failure Not Performed:_____

Synchronize the Secondary Chassis

NOTE
Perform this option to Synchronize the Secondary Chassis.

Synchronize the Secondary Chassis Not Performed:_____

139-31 JPEL

Perform the following:

1. **Display** RSLinx software
2. **Browse** to Primary SRM module
3. **Expand** the network until you see the 1757-SRM module in the primary chassis.
4. **Right-click** the 1757-SRM module and select Properties.
5. **Click** the Synchronization tab
6. **Choose** Synchronization Secondary
7. **Choose** “Yes” to confirm the switchover

***** End of Synchronize the Secondary Chassis *****

Reboot the Secondary PLC

NOTE
Perform this option toReboot the Secondary PLC.

Reboot the Secondary PLC Not Performed:_____

139-32 **JPEL**

Perform the following:

1. **Navigate** to appropriate Network SCADA Screen
2. **Cycle** power on “SEC” chassis

***** End of Reboot the Secondary PLC *****

Clear LCG Crossloading Fault

NOTE
Perform this option to Clear LGC Crossloading Fault.

Clear LGC Crossloading Fault Not Performed:_____

139-33 JPEL

Perform the following:

1. **Open** the following ControlLogix Project

   A. **Pad A folder** Fault L63 S2
   B. **MLP2/3 folder** Fault L63 S2

2. **Click** the Communications Tab - Who active

3. **Browse** to secondary L63 processor (IP address +1)

4. **Go Online** (DO NOT UPLOAD or DOWNLOAD file)

5. **Clear** "Major Fault"

***** End of Clear LCG Crossloading Fault *****

Restore Offline LCG

NOTE
Perform this option to Restore Offline LCG.

Restore Offline LCG Not Performed:_____

139-34 **JPEL**

Perform the following:

1. **Navigate** to appropriate Network SCADA screen.
2. **Cycle** Power on PRI and SEC chassis.
3. **Resync** SEC chassis per above.

***** End of Restore Offline LCG *****

***** End of Option C - INCS Local Control Gateway Failure *****

Option D

INCS Instrumentation Failure and Measurement Force

NOTE

Perform this option in the event that there is a confirmed instrumentation failure that requires forcing of indication.

Upon confirmation of failure, INCS Engineering will coordinate with Test Team an attempt to force the failed measurement. System user will verify system is configured to support measurement force indicating consideration of potential false pass voting logic effects. Upon completion, INCS Engineering will notify Test Team and Test Team will coordinate retest.

Option D - INCS Instrumentation Failure and Measurement Force

Not Performed:_____

Force Measurement

NOTE

Perform this option to force failed instrumentation.

139-35 NTD JPEL 132

Verify Test Team concurrence to perform measurement force.

Systems affected:_____
Module location:_____
Rack:_____
Slot:_____
Channel:_____
FD/Tag name:_____

139-36 **JPEL** **NTD** **132**

Verify Test Team and system user configured for forcing attempt.

139-37 **NTD** **JPEL** **132**

Notify INCS Engineering that they can proceed with measurement force.

139-38 **JPEL**

Perform measurement force.

139-39 **JPEL** **NTD** **132**

Report results to Test Team.

139-40 **NTD**

Coordinate system retest with user as required.

139-41 **NTD** **232**

Report final system results with Launch Team.

***** End of Force Measurement *****

***** End of Option D - INCS Instrumentation Failure and Measurement Force *****

139-42 **JPEL** **NTD** **232**

Report results to Test Team.

139-43 **JPEL** **NTD** **232**

Coordinate system retest with user.

*** End of Operation **139** ***

OPERATION 140 Contingency Plan for Pneumatics Pressure Adjustment Pad/MLP, T-48 Hrs until T-0

Shop: **PNSA**
Cntrl Rm Console: **C-1**
OPR: **JBPN**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.3**

NOTE

This operation contains contingency procedures to adjust Facility Pneumatics pressure regulation panels.

NOTE

This operaton is to be used during an unexplained out of tolerance pressure condition on systems supporting Pad Operations.

140-1 **JBPN STM 111**
STM NTD 232

IF the Primary GN_2 pressure regulation panel on the FSS 175-ft level is out of tolerance,

THEN request permission to have a field mechanic and engineer enter the Pad to adjust pressures per Doc: JOB PLAN M3011.002 (LI) Operational Check on Primary GN_2 Regulation Pnl, S72-0694-02

Support: PNSA

Not Performed:_____

140-2 **JBPN STM 111**
STM NTD 232

IF the Primary GHe pressure regulation panel on the FSS 175-ft level is out of tolerance,

THEN request permission to have a field mechanic and engineer enter the Pad to adjust pressures per Doc: JOB PLAN M3131.001 (LI) Operational Check on Main GHe Regulation Panel, S72-0697-01

Support: PNSA

Not Performed:_____

140-3 **JBPN STM 111**
STM NTD 232

IF the GN_2 Hazardous and Camera purge panel on the FSS 175-ft level is out of tolerance,

THEN request permission to have a field mechanic and engineer enter the Pad to adjust pressures per Doc: JOB PLAN M3054.001 (LI) Operational Check on Haz and Camera Purge Panel

Support: PNSA

Not Performed:_____

140-4 **JBPN STM 111**
STM NTD 232

IF the 6K to 3K GN_2 pressure regulation station in the High Pressure Gas Storage Battery is out of tolerance,

THEN request permission to have a field mechanic and engineer enter the Pad to adjust pressures per Doc: JOB PLAN M3011.001 (LI) Operational Check of Pad GN_2 Let Down Station

Support: PNSA

Not Performed:_____

140-5 **JBPN STM 111**
STM NTD 232

IF the Cabin Air regulation panel on the FSS 215-ft level is out of tolerance,

THEN request permission to have a field mechanic and engineer enter the Pad to adjust pressures per Doc: JOB PLAN M3067.003 (LI) Cabin Air Panel Ops Check & Contingency Pressure Adjustment

Support: PNSA

Not Performed:_____

140-6 **JBPN STM 111**
STM NTD 232

IF the MLP GN_2 regulation panel in Compartment 1B is out of tolerance,

THEN request permission to have a field mechanic and engineer enter the Pad to adjust pressures per Doc: JOB PLAN M3197.009 (LI) MLP Primary GN_2 Panel Contingency Pressure Adjustment

Support: PNSA

Not Performed:_____

140-7 **JBPN STM 111**
STM NTD 232

IF the MLP GN_2 Tertiary Panel in Compartment 1B is out of tolerance,

THEN request permission to have a field mechanic and engineer enter the MLP to adjust pressures per Doc: JOB PLAN M3197.010 (LI) MLP GN_2 Tertiary Panel Contingency Pressure Adjustment

Support: PNSA

Not Performed:_____

140-8 **JBPN STM 111**
STM NTD 232

IF the MLP GN_2 Purge Panel in Compartment 44A is out of tolerance,

THEN request permission to have a field mechanic and engineer enter the MLP to adjust pressures per Doc: JOB PLAN M3197.003 (LI) Operational Check on MLP GN_2 Purge Panel S72-1107-08

Support: PNSA

Not Performed:_____

*** End of Operation **140** ***

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OPERATION 141 Contingency Plan for Emergency Utility Annex Chiller Start on the EPP

Shop: **ELEC**
Cntrl Rm Console: **C-2**
OPR: **JSEP**
Zone: **NA**
Hazard (Y/N): **N**
Duration (Hrs): **0.5**

NOTE

This operation contains contingency procedures for a Utility Annex Chiller Start on the C5 Emergency Power Plant (EPP). This operation is to be used during the unplanned loss of Industrial power to C5 Substation and applies only to Chillers equipped with "Soft Start" capabilities (Chillers #1 and #2).

Utility Annex: Loss of Primary Power to C5 Substation

NOTE

This is a contingency operation. Perform in the loss of primary power to C5 Substation.

141-1 **JSEP JSTC 114**
JSTC STM 111
STM NTD 232

An unplanned loss of Industrial Power to C5 Substation has occurred, preplanned contingency response steps are being initiated.

141-2 **JSEP**

Verify the megawatt (MW) loads on the EPP at breaker 52M1.

Support: ELEC

NOTE

Perform the next two steps if the load is 3.6MW or less, and four generators are on-line.

141-3 **JSEP JSAC 114**

IF the load at Breaker 52M1 is 3.6 MW or less, and four (4) generators are on-line,

THEN start of chiller in accordance with ISC OMI I3067.

Support: ELEC
Support: AC

Not Performed:_____

141-4	**JSAC**	**JSTC**	**114**
	JSTC	**STM**	**111**
	STM	**NTD**	**232**
	NTD	**CTC**	

Chiller start complete.

Support: AC

Not Performed:_____

> **NOTE**
> Perform the next two steps if the load is less than 6.0 MW but greater than 3.6 MW, and five generators are on-line.

141-5	**JSEP**	**JSAC**	**114**

IF the load at Breaker 52M1 is less than 6.0 MW but greater than 3.6 MW, and all five (5) generators are on-line,

THEN start a chiller in accordance with ISC OMI I3067.

Support: ELEC
Support: AC

Not Performed:_____

141-6	**JSAC**	**JSTC**	**114**
	JSTC	**STM**	**111**
	STM	**NTD**	**232**
	NTD	**CTC**	

Chiller start complete.

Support: AC

Not Performed:_____

141-7	**JSEP**	**JSAC**	**114**
		JSTC	
	JSTC	**NTD**	**232**
	NTD	**STM**	
	STM	**JBAC**	**111**

IF the load at Breaker 52M1 is greater than 6.0 MW, with five (5) generators on-line,
OR greater than 3.6 MW with four (4) generators on-line,

THEN implement A9203, Emergency Load Shedding Plan, to meet criteria in either steps 141-3 or 141-5 prior to starting a chiller.

Support: ELEC
Support: HVAA
Support: AC

Not Performed:_____

NOTE
Perform the next two steps if Load Shedding has reduced the load to within acceptable limits.

141-8	**JSEP**	**JSAC**	**114**

IF load shedding has reduced the load to within acceptable limits,

THEN start a chiller in accordance with ISC OMI I3067.

Support: ELEC
Support: HVAA

Not Performed:_____

141-9	**JSAC**	**JSTC**	**114**
	JSTC	**STM**	**111**
	STM	**NTD**	**232**
	NTD	**CTC**	

Chiller start complete.

Support: AC

Not Performed:_____

CAUTION

If the load cannot be reduced to less than 6.0 MW with 5 generators on-line or 3.6 MW with 4 generators on-line, a chiller **should not** be started on the EPP. Additional load shedding is required prior to chiller start; otherwise damage to hardware could occur.

141-10	**JSEP**	**JSTC**	**114**
	JSTC	**STM**	**111**
	STM	**NTD**	**232**

IF the load cannot be reduced to less than 6.0 MW with 5 generators on-line or 3.6 MW with 4 generators on-line,

THEN request NTD to perform additional load shedding, as required, to support chiller start.

Support: ELEC

Not Performed:_____

141-11	**NTD**	**STM**	**232**
	STM	**JSTC**	**111**
	JSTC	**JSAC**	**114**
		JSEP	

NTD has given concurrence to start a chiller.

Support: AC
Support: ELEC

Not Performed:_____

141-12	**JSAC**	**JSTC**	**114**
	JSTC	**STM**	**111**
	STM	**NTD**	**232**
	NTD	**CTC**	

Chiller start complete.

Support: AC

Not Performed:_____

*** End of Operation **141** ***

Approval Record

SHUTTLE COUNTDOWN - (LPS)

Role:	Signed by:	Date (GMT): Reason for signing:
OMD	Klos Elizabeth C United Space Alliance LLC 93250 Mail:USK-187 Phone:321/861-3352 Documentum User Name : klosec	03/28/2011 18:07: Concur with approval
RPE	Owen Kathy L United Space Alliance LLC 93220 Mail:USK-246 Phone:321/861-3180 Documentum User Name : owenkl	03/28/2011 18:08:11 Concur with approval
SFP-SF	Ross Jerome United Space Alliance LLC 92331 Mail:USK-291 Phone:321/861-6285 Documentum User Name : rossj	03/28/2011 18:08:51 Concur with approval
NTD-NASA	Graeber Jeremy J Nasa Ksc PH-L Mail: Phone: Documentum User Name : Graeber Jeremy J	03/28/2011 18:13:31 Concur with approval
TCO-CTC	Taffet Mark S United Space Alliance LLC 93540 Mail:USK-023 Phone:321/861-7406 Documentum User Name : taffetms	03/28/2011 18:38:43 Concur with approval
TCO-TC	Grotteland Johnny L United Space Alliance LLC 93540 Mail:USK-023 Phone:321/861-7429 Documentum User Name : grottejl	03/29/2011 09:19:53 Concur with approval
TSM-GSS	Dorn Deborah L United Space Alliance LLC 95620 Mail:USK-043 Phone:321/861-4484 Documentum User Name : dorndl	03/29/2011 09:53:22 Concur with approval
SPE-NASA	Campbell Jeffery L Nasa Ksc Mail: Phone: Documentum User Name : Campbell Jeffery L	03/29/2011 12:00:10 Concur with approval