

Payload Powerdown

STS-118

**Mission Operations Directorate
Operations Division**

**Final, Rev A
June 15, 2007**

National Aeronautics and
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United Space Alliance

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MISSION OPERATIONS DIRECTORATE

**PAYLOAD POWERDOWN
STS-118**

FINAL, REVISION A
June 15, 2007


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NOTES

1. Section 1 of this book is inserted at the back of the Ascent Pocket Checklist.
2. Sections 2 and 3 of this book are inserted at the back of the Orbit Pocket Checklist.
3. Section 4 of this book is inserted at the back of the Entry Pocket Checklist.

PAYLOAD POWERDOWN
STS-118

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* – Omit from flight book

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**PL PWRDN
ASC**

PL PWRDN MATRIX

**PL PWRDN
ASC**

PROCEDURE	ACTION
PWRDN FOR LOSS OF:	
2 CAB FANS	A
CAB PRESS	
(MINOR PWRDN; from step 3 for OV-105)	A
(MAJOR PWRDN; from step 4 for OV-105)	A
AV BAY COOLING/AV BAY FIRE	B
2 H2O LOOPS	
[PLT PWRDN, SYS AOA, <u>2 H2O LOOPS</u>	A
<u>(AOA); (CDR/PLT PWRDNS)]</u>	
(POST OMS-2)	A
1 FREON LOOP	N/A
HI LOAD EVAP	N/A
2 FREON LOOPS	
[PLT PWRDN, SYS AOA, <u>2 FREON</u>	A
<u>LOOPS (AOA); (CDR/PLT PWRDNS)]</u>	
(POST OMS-2)	A
FES /1 FC	N/A
2nd FC	A
MN BUS UNDERVOLTS/FC VOLTS	
(from step 6; permanent loss of PL PRI)	N/A
(from step 14; temporary loss of PL PRI)	N/A

ACTION

A	PWRDN	PWRUP
	<p><u>MIDDECK PAYLOADS</u></p> <p style="text-align: center;"><u>NOTE</u> When orbiter pwr removed, science degradation or loss will occur to MERLIN (5 min), all CBTM (15 min) and CCM-A (15 min)</p> <p style="text-align: center;"><u>CBTM</u></p> <p>ML85E 1. DC 10 AMP MNB S2 – OFF</p> <p style="text-align: center;"><u>CCM-A</u></p> <p>ML85E 2. DC 10 AMP MNB S4 – OFF</p> <p style="text-align: center;"><u>MERLIN</u></p> <p>ML85E 3. DC 10 AMP MNB S3 – OFF</p>	N/A

B	PWRDN	PWRUP
	<p><u>MIDDECK REAR-BREATHING PAYLOADS</u></p> <p>IF AV BAY 2:</p> <p style="text-align: center;"><u>MERLIN</u></p> <p>ML85E 1. DC 10 AMP MNB S3 – OFF</p>	N/A

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PL PWRDN
ORB

PL PWRDN MATRIX

**PL PWRDN
ORB**

PROCEDURE	ACTION
PWRDN FOR LOSS OF:	
HI LOAD EVAP	N/A
1 FREON LOOP	PP3A,PP3B (on MCC call) as reqd*
AV BAY COOLING (from MAL GPC FRP-7)	D
1 FC	PP3A, PP3B (on MCC call) as reqd* until TOT FC kW < 17
FES (ON ORBIT)	PP3A*,PP3B** (on MCC call) as reqd*
(DEORBIT PREP)	A
MN BUS UNDERVOLTS/FC VOLTS (from step 6; permanent loss of PL PRI)	B
(from step 14; temporary loss of PL PRI)	C
AV BAY FIRE	D
PRIORITY PWRDN GROUP 3	PP3A,PP3B (on MCC call) as reqd*

* PRIORITY PWRDN 3A (PP3A) contains recoverable PL ops pwrdn Steps

**PRIORITY PWRDN 3B (PP3B) is a total PL pwrdn that may cause PL ops to be nonrecoverable

ACTION

PP3A	PRIORITY PWRDN (Recoverable) (On MCC call only)
<u>FLIGHT DECK/MIDDECK</u>	
	<ol style="list-style-type: none"> 1. Pwr dn non-essential PGSCs 2. Pwr dn unnecessary cabin lighting 3. Pwr dn unnecessary camera equip
<u>SSV</u>	
SSV	4. SSV pwr – 0 (off)
PDIP 2	5. DC PWR 1 CAB PL – OFF
<u>OCAC</u>	
MO52J	6. DC UTIL PWR MNA – OFF
	7. AC UTIL PWR AC1 – OFF
<u>PRINTER</u>	
PRINTER	8. Printer pwr – OFF
<u>SPACEHAB</u>	
FC06	If Subsystem PGSC on: <ol style="list-style-type: none"> 9. Press [ALT]/[Q] to exit software 10. [Shift]/[F10] to confirm 11. Shut down Windows 12. ✓Automatic pwr off PGSC 13. Close PGSC
Pwr Supply	14. A31P 28VDC Pwr Supply INPUT POWER sw – OFF (OUTPUT POWER It off) 15. cb DC3 – OFF Else continue to next step
EXCP1	If portable fluorescent light on: <ol style="list-style-type: none"> 16. Portable fluorescent light sw – OFF 17. cb AC1 – OFF Else continue to next step
<u>OIU</u>	
SSP 1	18. OIU PWR 1(2) – OFF (tb-bp) If addnl pwrdn reqd: 19. Go to PRIORITY PWRDN 3B (PP3B)
----- (Cont next page)	

PP3A (Cont)	PRIORITY PWRDN (Recoverable) (On MCC call only)
PWRUP	
1. On MCC GO	
<u>SPACEHAB</u>	
EXCP1	2. cb DC3 – ON
	3. A31P 28VDC Pwr Supply INPUT PWR
	SW – ON (OUTPUT PWR It - It on)
PGSC	4. PGSC Pwr – on
	5. √Windows displayed
	6. Double-click:
	SHUTTLE APPS folder on desktop
	SPACEHAB folder
	SPACEHAB MONITOR icon
	PGSC: SPACEHAB SUMMARY
	7. √Spacehab tlm is present on display
EXCP1	8. cb AC1 – ON
	9. Portable fluorescent light sw – ON

PP3B	PRIORITY PWRDN (Non-Recoverable) (On MCC call only)	PWRUP
<p><u>MIDDECK PAYLOADS (CCM-A, MERLIN)</u></p> <p style="text-align: center;"><u>NOTE</u></p> <p>When orbiter pwr removed, science degradation or loss will occur to MERLIN (5 min) and CCM-A (15 min)</p> <p style="text-align: center;"><u>CCM-A</u></p> <p>MF71H 1. POWER – OFF (√POWER It – OFF)</p> <p style="text-align: center;"><u>MERLIN</u></p> <p>MF71E 2. cb MAIN – op (√lt – OFF)</p> <p><u>OBSS</u></p> <p>3. LCC DEACT (P/TV Cue Card, <u>LCS</u>) LCH DEACT (P/TV Cue Card, <u>LCS</u>) LDRI/ITVC DEACT (P/TV Cue Card, <u>LDRI/ITVC</u>)</p> <p><u>SPACEHAB</u></p> <p>4. Perform SPACEHAB 30-MIN DEACTIVATION (SH OPS, <u>SH CONTINGENCY PROCS</u>) omitting steps 14 and 25, then:</p> <p>SSP 2 5. MN PWR – KILL – NO-OP</p> <p>If PL AC3 unavailable: SM 214 SPACEHAB ACT/DEACT</p>		N/A

PP3B (Cont)	PRIORITY PWRDN (Non-Recoverable) (On MCC call only)	PWRUP
CRT C3 SSP 1	6. H2O PUMP 1/2 OFF – ITEM 71 EXEC (*) 7. H2O LN HTRS – ON 8. cb SW PWR 2 – cl 9. ORB H2O LINE HTR PWR A – ON 10. √B – OFF (A ENA)	
	SM 215 SPACEHAB ECS	
CRT MA73C:E	11. √H2O LN HTR HAB STATUS – 1 12. √ORB AMPS > 1 13. cb AC3 PL 3Φ – op	
	On MCC GO:	
R1	14. PL PRI MNC(MNB,FC3) – OFF (tb-OFF) AUX – OFF	
	<u>ESP-3</u>	
A15	15. APCU 1 CONV – OFF	
	SM 179 POWER TRANSFER	
CRT A15	√PTU 1 APCU OUT VOLTS: < 10 V APCU 1 OUPUT – OFF	
	<u>MIDDECK PAYLOADS (CBTM)</u>	
	<u>NOTE</u> When orbiter pwr removed, science degradation or loss will occur to all CBTM (15 min)	
	<u>CBTM</u>	
MF43E	16. LIGHTS – OFF FANS – OFF cb MAIN BREAKER – op	
MF57E	17. LIGHTS – OFF FANS – OFF cb MAIN BREAKER – op	
MF43K	18. LIGHTS – OFF FANS – OFF cb MAIN BREAKER – op	

A	PWRDN	PWRUP
	<u>SPACEHAB</u>	N/A
SSP 2	1. MN PWR – KILL – NO-OP	
C3	2. H2O LN HTRS – ON	
SSP 1	3. cb SW PWR 2 – cl	
	4. ORB H2O LINE HTR A – ON	
	5. \sqrt{B} – OFF (A ENA)	
	If spec available: <u>SM 215 SPACEHAB ECS</u>	
CRT	6. $\sqrt{H2O LN HTR HAB STATUS - 1}$	
	7. $\sqrt{ORB AMPS > 1}$	
R1	8. PL PRI MNC(MNB,FC3) – OFF (tb-OFF)	

B	PWRDN (PL PRI permanently lost)	PWRUP
	<u>SPACEHAB</u>	N/A
	If PL AC3 unavailable:	
C3	1. H2O LN HTRS – ON	
SSP 1	2. cb SW PWR 2 – cl	
	3. ORB H2O LINE HTR PWR A – ON	
	4. \sqrt{B} – OFF (A ENA)	
	<u>SM 215 SPACEHAB ECS</u>	
	5. $\sqrt{H2O LN HTR HAB STATUS - 1}$	
	6. $\sqrt{ORB AMPS > 1}$	
	<u>SM 214 SPACEHAB ACT/DEAC</u>	
	7. FANS ARS OFF – ITEM 61 EXEC (*)	
	8. H2O PUMP 1/2 OFF – ITEM 71 EXEC (*)	
MA73C:E	9. cb AC3 PL 3 Φ – op	
	10. Perform SPACEHAB 30-MIN DEACTIVATION (SH OPS, SH CONTINGENCY PROCS)	
SSP 2	11. MN PWR – KILL – NO-OP	
R1	12. $\sqrt{PL PRI MNC, MNB, FC3 (three) - OFF}$ (tb-OFF)	

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C	PWRDN (PL PRI temporarily lost)
<u>SPACEHAB</u>	
	If PL AC3 unavailable:
C3	1. H2O LN HTRS – ON
SSP 2	2. cb SW PWR 2 – cl
	3. ORB H2O LINE HTR PWR A – ON
	4. √B – OFF (A ENA)
	SM 215 SPACEHAB ECS
	5. √H2O LN HTR HAB STATUS – 1
	6. √ORB AMPS > 1
MA73C:E	7. cb AC3 PL 3Φ – op
SSP 2	8. MN PWR – KILL – NO-OP
	9. Return to calling procedure: MN BUS UNDERVOLTS/FC VOLTS, 1.1c '214 SH MN BUS V ↑↓' or '214 SH SEC BUS V ↑↓' (SH MAL, <u>EPS</u>)

C (Cont)	PWRUP (PL PRI recovered)
PWRUP (PL PRI recovered)	
R1	1. PL PRI MNC(MNB,FC3) – ON (tb-ON)
<u>SPACEHAB</u>	
If PL PRI recovered and PL AC3 not available:	
2. Perform MN PWR KILL RECOVERY – ARS FAN AND PUMP ON INVERTER AC (SH OPS, <u>SH CONTINGENCY PROCEDURES</u>)	
If PL PRI recovered and PL AC3 never lost:	
3. Perform MN POWER KILL RECOVERY ARS FAN AND PUMP ON ORB AC (SH OPS, <u>SH CONTINGENCY PROCS</u>)	
If PL PRI and PL AC3 recovered:	
<u>SM 214 SPACEHAB ACT/DEAC</u>	
CRT	4. FANS ARS OFF – ITEM 61 EXEC (*)
MA73C:E	5. cb AC3 PL 3Φ – cl
CRT	6. \sqrt{HX} H2O FLOW ARS > 75 \sqrt{CAB} > 250
<u>NOTE</u> Expect SM ALERT msgs: '215 SH H2O HTR ORB' '215 SH H2O HTR HAB'	
C3	7. H2O LN HTRS – OFF
SSP 1	8. ORB H2O LINE HTR PWR A – OFF (B ENA) \sqrt{B} – OFF (A ENA)
9. cb SW PWR 2 – op	
CRT	10. FANS ARS ON – ITEM 67 EXEC (*)
11. Perform MN PWR KILL RECOVERY – ARS FAN AND PUMP ON ORBITER AC (SH OPS, <u>SH CONTINGENCY PROCS</u>)	

D	PWRDN	PWRUP
	<u>MIDDECK REAR-BREATHING PAYLOADS</u> IF AV BAY 2: <u>MERLIN</u> ML85E 1. DC 10 AMP MNB S3 – OFF	N/A

PL SAFING – ORBIT

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PL SAFING
ORB

PL SAFING MATRIX

PROCEDURE	ACTION
9.101 JOINT EXPEDITED UNDOCKING AND SEPARATION, from step 17b (SODF: JOINT OPS, <u>EMERGENCY RESPONSE</u> ; JEUS)	PL SAFING A,B
PWRDN FOR LOSS OF:	
2 CAB FANS	PL SAFING A,B
2 H2O LOOPS	PL SAFING A,B
CAB PRESS	PL SAFING A,C
2nd FC (TIG < 4 hr) (from step 5)	PL SAFING A,C,D
(TIG > 4 hr) (from step 15)	PL SAFING A,C,D
2 FREON LOOPS	PL SAFING A,C,D

ACTION

A	PL SAFING
	<u>MIDDECK TRANSFER (IF NOT ALREADY PERFORMED)</u>
	If transfer hardware in ODS:
	1. Complete transfer to ISS
	Else:
	2. Stow in Middeck
	<u>MIDDECK PAYLOADS</u>
	<u>CBTM</u>
ML85E	3. DC 10 AMP MNB S2 – OFF
	<u>CCM-A</u>
ML85E	4. DC 10 AMP MNB S4 – OFF
	<u>MERLIN</u>
ML85E	5. DC 10 AMP MNB S3 – OFF

PL SAFING
ORB

A (Cont)	PL SAFING
<u>SPACEHAB TRANSFER (IF NOT ALREADY PERFORMED)</u>	
<p>If one of the following is loose in SPACEHAB,</p> <p>6. STOW ASAP:</p> <p>a. OBSS OSE Boom Stand secure at AS01</p> <p>b. OBSS OSE Boom Stand secure at AS03</p>	
<u>OIU</u>	
SSP1	7. OIU PWR 1(2) – OFF (tb-bp)

B	PL SAFING
<u>SPACEHAB</u>	
<p>If AOS:</p> <p>1. Perform <u>SPACEHAB EMERGENCY EGRESS</u> (Cue Card)</p> <p>If LOS:</p> <p>2. Perform <u>SPACEHAB EMERGENCY DEACTIVATION</u> (Cue Card), then:</p>	
L1	3. \sqrt FLOW PROP VLV LOOP 1,2 (two) – ctr (tb-ICH)

C	PL SAFING
<u>SPACEHAB</u>	
<p>1. Perform <u>SPACEHAB EMERGENCY DEACTIVATION</u> (Cue Card), then:</p>	
L1	2. \sqrt FLOW PROP VLV LOOP 1,2 (two) – ctr (tb-ICH)
R1	3. PL PRI MNC(MNB,FC3) – OFF (tb-OFF) AUX – OFF

D	PL SAFING
<u>APCU</u>	
A15	1. APCU 1,2 CONV (two) – OFF
	2. OUTPUT (two) – OFF

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PL PWRDN – ENTRY

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PL PWRDN MATRIX

PROCEDURE	ACTION
PWRDN FOR LOSS OF:	
2 CAB FANS	D,E
2 H2O LOOPS (ENTRY)	D,E
CAB PRESS	D,E
AV BAY COOLING (ENTRY)	E
1 FREON LOOP/HI LOAD EVAP (ENTRY)	A
FES	A
1 FC (ENTRY)	A
2 FREON LOOPS (ENTRY)	A,D,E
2nd FC (ENTRY)	A,D,E
MN BUS UNDERVOLTS/FC VOLTS	
(from step 6; permanent loss of PL PRI)	B
(from step 14; temporary loss of PL PRI)	C

**PL PWRDN
ENT**

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ACTION

A	PWRDN/PWRUP
<u>SPACEHAB</u>	
R1	1. PL CAB – OFF PRI MNC – OFF (tb-OFF) AUX – OFF AFT MNB – OFF
If time to TIG is greater than 20 minutes:	
R1	2. PL CAB – MNA(MNB) AFT MNB – ON
C3	3. H2O LN HTRS – ON
SSP 1	4. cb SW PWR 2 – cl 5. ORB H2O LINE HTR PWR A – ON 6. √B – OFF (A ENA)
If spec available: <div style="border: 1px solid black; padding: 2px; display: inline-block;">SM 215 SPACEHAB ECS</div>	
CRT	7. √H2O LN HTR HAB STATUS – 1 8. √ORB AMPS > 1

R1	1. PL AUX – ON
SSP 2	2. MN PWR – KILL – NO-OP
3. √MCC for further action	

B	PWRDN	PWRUP
<u>SPACEHAB</u>		N/A
SSP 2	1. MN PWR – KILL – NO-OP	

C	PWRDN/PWRUP	
<u>SPACEHAB</u>		
SSP 2	1.	MN PWR – KILL
	2.	Return to MN BUS UNDERVOLTS/FC VOLTS

R1	1.	√PL PRI MNC – ON (tb-ON)
		On MCC GO:
SSP 2	2.	MN PWR – NO-OP
		ORB SEC DC BUS – OFF,ON (tb-gray)
		INVERTER – ON,NO-OP (tb-gray)
		EXP DC BUS – ON,ctr (tb-gray)
		SS DC BUS – ON (tb-gray)

D	PWRDN	PWRUP
<u>MIDDECK PAYLOADS</u>		N/A
<u>NOTE</u>		
When orbiter pwr removed, science degradation or loss will occur to CBTM (15 min) and CCM-A (15 min)		
<u>CBTM</u>		
ML85E	1.	DC 10 AMP MNB S2 – OFF
<u>CCM-A</u>		
ML85E	2.	DC 10 AMP MNB S4 – OFF

E	PWRDN	PWRUP
<u>MIDDECK REAR-BREATHING PAYLOADS</u>		N/A
IF AV BAY 2:		
<u>MERLIN</u>		
ML85E	1.	√DC 10 AMP MNB S3 – OFF

Space Shuttle Program
FLIGHT DATA FILE

JSC-48097-118
FINAL, REV A



**PAYLOAD
POWERDOWN**

**STS
118**

Flight Cover (trim bottom to expose tabs)