

# Payload Powerdown

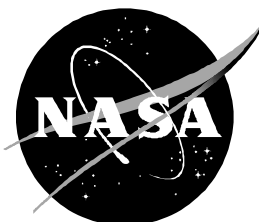
## STS-109

**Mission Operations Directorate  
Operations Division**

**Final  
September 27, 2001**

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas



***United Space Alliance***

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PAYLOAD POWERDOWN STS-109

FINAL (Sept 27, 2001)

## PCN-1 (Feb 4, 2002) Sheet 1 of 1

List of Implemented Change Requests (482s):

PL PWR-059B  
PL PWR-064  
PL PWR-065

Incorporate the following:

1. Replace PL iii thru PL vi
2. Replace section 2 (6 pages)
3. Replace section 3 (2 pages)

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Encl: 12 pages

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

JSC-48097-109

MISSION OPERATIONS DIRECTORATE

**PAYLOAD POWERDOWN  
STS-109**

FINAL  
September 27, 2001

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PL PWR/109/FIN

Incorporates the following:

482#: PL PWR-059A

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DO35/Y. Fuller	281-244-1174
Powerdowns	DF73/C. Sweitzer	281-483-6355
PL PWRDN	DO5/T. McCracken	281-244-0214

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-109

**LIST OF EFFECTIVE PAGES**

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PCN-1 02/04/02

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\* - Omit from flight book

PL iii

PL PWR/109/FIN 1

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PL PWRDN – ASCENT

PL PWRDN MATRIX .....	PL 1-2
ACTION .....	PL 1-2
PWRDN A (N/A) .....	PL 1-2

PL PWRDN  
ASC

PL PWRDN  
ASC

**PL PWRDN MATRIX**

PROCEDURE	ACTION
PWRDN FOR LOSS OF:	
2 CAB FANS	N/A
CAB PRESS	
(MINOR PWRDN; from step 4)	N/A
(MAJOR PWRDN; from step 5)	N/A
2 H2O LOOPS	
[PLT PWRDN, SYS AOA,	
<u>2 H2O LOOPS (AOA);</u>	
(CDR/PLT PWRDNS)]	N/A
(POST OMS-2)	N/A
1 FREON LOOP	N/A
HI LOAD EVAP	N/A
2 FREON LOOPS	
[PLT PWRDN, SYS AOA,	
<u>2 FREON LOOPS (AOA);</u>	
(CDR/PLT PWRDNS)]	N/A
(POST OMS-2)	N/A
FES/1 FC	N/A
2nd FC	N/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
	N/A	

PL PWRDN – ORBIT

PL PWRDN MATRIX .....	PL 2-2
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PRIORITY PWRDN PP3A .....	PL 2-3
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HST .....	PL 2-5
PWRUP A .....	PL 2-6
HST .....	PL 2-6

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
1 FC	PP3A*,PP3B* (on MCC call) as reqd until ORB kW < 17
FES (ON ORBIT)	N/A
(DEORBIT PREP)	N/A
MN BUS UNDERVOLTS/FC VOLTS	
(from step 6; permanent loss of PL PRI)	A
(from step 14; temporary loss of PL PRI)	A
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)	PWRUP
	<u>PGSCs</u>  1. Perform CONFIGURE PRIME COMM STRING FOR PSP-BYPASS ONLY (PL OPS, <u>IN-BAY OPS</u> ), then: 2. Pwr off unused PGSCs and DC util outlets	✓MCC
	<u>SSE</u>  L12U 3. CCTV HTR PWR – OFF (tb-bp) 4. FSS HTR PWR – OFF (tb-bp) L12L 5. ASIPE HTR B PWR – OFF (tb-bp) 6. SAP HTR B PWR – OFF (tb-bp) 7. SAC OPA HTR A PWR – OFF (tb-bp) 8. SAC EPDSU HTR PWR – OFF (tb-bp) L11U 9. KEEL CAM HTR/ILLUM – OFF 10. SURV HTR A PWR – OFF (tb-bp) 11. ESM HTR A PWR – OFF (tb-bp) 12. SOPE HTR A PWR – OFF (tb-bp) 13. MULE FMDM-A PWR – OFF (tb-bp)	
	<u>HST</u>  L12U 14. FHST SHUTTER – OP (tb-bp)	
	<u>NOTE</u> Battery charge attitude and SA slews reqd to maintain HST pwr margin	
	15. ESS/MN SW ENA – ON (tb-gray) ESS BUS INT PWR – ON (tb-UP) MAIN BUS EXT PWR – OFF (tb-bp) ESS BUS EXT PWR – OFF (tb-bp) ESS/MN SW ENA – OFF (tb-bp) <u>SM 211 SSE OVERVIEW</u> PCU OFF – ITEM 2 EXEC (*)	

PP3B	PRIORITY PWRDN (Non-Recoverable) (On MCC call only)	PWRUP
<p><u>HST</u></p> <p>If HST berthed:</p> <ol style="list-style-type: none"> <li>1. Rotate/pivot FSS to berthing/90 deg posn (if reqd):  Perform ROTATE HST (PL OPS, <u>IN-BAY OPS</u>), then:  Perform PIVOT HST (PL OPS, <u>IN-BAY OPS</u>)</li> <li>2. Perform HST GRAPPLE (HST DPY, <u>GRAPPLE</u>), then:</li> <li>3. Perform HST UMB DISCONNECT, steps 3, 4, and 5 (HST DPY, <u>UNBERTH</u>), then:</li> <li>4. Perform HST UNBERTH, steps 1 thru 9 (HST DPY, <u>UNBERTH</u>), then:</li> <li>5. Perform FSS STOW WITH BSP INSTALLED (PL OPS, <u>IN-BAY OPS</u>), then:</li> <li>6. Perform HST UNBERTH, steps 10 and 11 (HST DPY, <u>UNBERTH</u>), then:</li> <li>7. Perform HST RELEASE PREP (HST DPY, <u>RELEASE OPS</u>), then:</li> <li>8. Perform RELEASE (RMS &amp; HST SYSTEMS) (HST DPY, <u>RELEASE OPS</u>), then:</li> <li>9. Perform RELEASE AND SEP BURNS (ORBITER) (HST DPY, <u>RELEASE OPS</u>)</li> </ol> <p>L12U R1</p> <ol style="list-style-type: none"> <li>10. FSS FMDM-A PWR – OFF (tb-bp), then:</li> <li>11. PL PRI MNC – OFF (tb-OFF) CAB – OFF</li> </ol>		N/A

A	PWRDN (PL PRI permanently or temporarily lost)
<u>HST</u>	<p>If HST comm lost (TLM COUNT not incr on SM 210):</p> <ol style="list-style-type: none"> <li>1. Perform COMM SSR-1 PI RF REACQ (PL SYS, <u>PLCOMM</u>)</li> </ol> <p>If HST berthed:</p> <ol style="list-style-type: none"> <li>2. ESS/MN SW ENA – ON (tb-gray) ESS BUS EXT PWR – OFF (tb-bp) ESS/MN SW ENA – OFF (tb-bp)</li> <li>3. ✓PCU POWER CONTR-A(B) – OFF CCTV HTR PWR – OFF (tb-bp) FSS FMDM-A(B) PWR – OFF (tb-bp) HTR PWR – OFF (tb-bp)</li> </ol> <p>L12L</p> <ol style="list-style-type: none"> <li>4. ASIPE HTR A(B) PWR – OFF (tb-bp) SAP HTR A(B) PWR – OFF (tb-bp) SAC OPA HTR A(B) PWR – OFF (tb-bp) EPDSU HTR PWR – OFF (tb-bp)</li> </ol> <p>L11U</p> <ol style="list-style-type: none"> <li>5. MULE FMDM-A(B) PWR – OFF (tb-bp) SURV HTR A(B) PWR – OFF (tb-bp) ESM HTR A(B) PWR – OFF (tb-bp) SOPE HTR A(B) PWR – OFF (tb-bp)</li> </ol>
<p>-----</p> <p>Cont next page</p>	

A (Cont)	PWRUP (PL PRI recovered)
<u>HST</u>	
L12U L11U CRT	1. FSS FMDM-A(B) PWR – ON (tb-gray) MULE FMDM-A(B) PWR – ON (tb-gray) SM I/O RESET EXEC
	2. If HST berthed: On MCC GO: SM 211 SSE OVERVIEW PCU ON – ITEM 1 EXEC (*) ✓DPC 1-12 – * ✓VOLTS: 33.8 to 35.2 ✓AMPS: 2 to 7
L12U	✓MAIN BUS EXT PWR tb – gray ESS/MN SW ENA – ON (tb-gray) ESS BUS EXT PWR – ON (tb-UP)
	3. On MCC GO: ESS BUS INT PWR – OFF (tb-bp)
	4. ESS/MN SW ENA – OFF (tb-bp)
CRT	5. CCTV HTR PWR – ON (tb-gray)
L12U	✓POWER FSS CCTV HTR AMPS: ≤0.9
CRT	FSS HTR PWR – PRI (RED) (tb-gray)
	✓POWER FSS HTR AMPS: ≤0.4 (all)
L12L	6. ASIPE HTR A(B) PWR – ON (tb-UP)
	SAC EPDSU HTR PWR – B ON(A ON) (tb-gray)
CRT	✓POWER SAC EPDSU AMPS: ≤17
L11U	7. SURV HTR A(B) PWR – ON (tb-gray)
CRT	✓POWER MULE HTR AMPS: ≤11
L11U	SOPE HTR A(B) PWR – ON (tb-gray)
CRT	✓POWER MULE SOPE 1A/2A(1B&2B): ≤2.2/≤2.7(≤4.9)
	✓3A(3B): ≤3.0(≤3.0)
L12L	8. If reqd: SAP HTR B(A) PWR – ON (tb-gray)
	SAC OPA HTR A(B) PWR – ON (tb-gray)
CRT	✓POWER SAC EPDSU AMPS: ≤35
L11U	ESM HTR A(B) PWR – ON (tb-gray)
CRT	✓POWER MULE ESM 1&2/3 AMPS: ≤4/≤2



PL SAFING – ORBIT

PL SAFING MATRIX .....	PL 3-2
ACTION .....	PL 3-2
PL SAFING .....	PL 3-2
HST .....	PL 3-2

PL SAFING  
ORB

**PL SAFING MATRIX**

PROCEDURE	ACTION
PWRDN FOR LOSS OF:	
2 CAB FANS	PL SAFING
2 H2O LOOPS	PL SAFING
CAB PRESS	PL SAFING
2nd FC (TIG < 4 hr) (from step 6)	PL SAFING
(TIG > 4 hr) (from step 16)	PL SAFING
2 FREON LOOPS	PL SAFING

**ACTION**

PL SAFING	
<u>HST</u>	
	If HST berthed: <ol style="list-style-type: none"> <li>1. Perform HST JETTISON FOR RAPID SAFE (PL OPS, <u>CONTINGENCY OPS</u>)</li> </ol>
R1	<ol style="list-style-type: none"> <li>2. PL PRI MNC – OFF (tb–OFF) CAB – OFF</li> </ol>

PL SAFING ORB

PL PWRDN – ENTRY

PL PWRDN MATRIX .....	PL 4-2
ACTION .....	PL 4-2
PWRDN A (N/A) .....	PL 4-2

**PL PWRDN MATRIX**

PROCEDURE	ACTION
PWRDN FOR LOSS OF:	
2 CAB FANS	N/A
2 H2O LOOPS (ENTRY)	N/A
CAB PRESS	N/A
1 FREON LOOP	N/A
HI LOAD EVAP (ENTRY)	N/A
FES	N/A
2 FREON LOOPS (ENTRY)	N/A
1 FC	N/A
2nd FC (ENTRY)	N/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
	N/A	

**PL PWRDN  
ENT**

Space Shuttle Program  
FLIGHT DATA FILE

JSC-48097-109  
FINAL



**PAYLOAD  
POWERDOWN**

**STS  
109**

Flight Cover (trim bottom to expose tabs)