

Payload Powerdown

STS-130

**Mission Operations Directorate
Operations Division**

**Final, Rev A
January 15, 2010**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas




MISSION OPERATIONS DIRECTORATE

**PAYLOAD POWERDOWN
STS-130**

FINAL, REVISION A
January 15, 2010

PREPARED BY:



Yvette L. Dillard
Publication Manager

APPROVED BY:



Manager,
Flight Procedures

ACCEPTED BY:



Michael T. Hurt
FDF Manager

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes must be submitted via Change Request Workflow (CRW) to DO3/FDF Manager.

Additional distribution of this book, for official use only, may be requested in writing to DO3/PMO Administrator. The request must include justification and requester's name, organization, position, and phone number. Contractor requests are made through the NASA or DOD organization supported. Deletions, reduction in quantity, or change of address may be submitted to DO3/FDF Management Office, 281-244-1184.

Incorporates the following:
482#: PL PWR-00153

AREAS OF TECHNICAL RESPONSIBILITY

Publication Manager	DO35/Y. Dillard	281-244-1174
Alternate Publication Manager	DO35/L. Giles	281-244-9068
ORB PWRDNS	DS43/C. Sweitzer	281-483-6355
PL PWRDN	DO5/S. Beisert	281-244-0233

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-130

LIST OF EFFECTIVE PAGES

FINAL 10/23/09
REV A 01/15/10

Sign Off	* 130/FIN A
PL ii	* 130/FIN A
PL iii	* 130/FIN A
PL iv	* 130/FIN A
PL v	* 130/FIN A
PL vi	* 130/FIN A
PL 1-1.....	130/A/FIN A
PL 1-2.....	130/A/FIN A
PL 1-3.....	130/A/FIN A
PL 1-4.....	130/A/FIN A
PL 2-1.....	130/O/FIN A
PL 2-2.....	130/O/FIN A
PL 2-3.....	130/O/FIN A
PL 2-4.....	130/O/FIN A
PL 2-5.....	130/O/FIN A
PL 2-6.....	130/O/FIN A
PL 3-1.....	130/O/FIN A
PL 3-2.....	130/O/FIN A
PL 3-3.....	130/O/FIN A
PL 3-4.....	130/O/FIN A
PL 4-1.....	130/E/FIN A
PL 4-2.....	130/E/FIN A

* – Omit from flight book

PL iii

PL PWR/130/FIN A



This Page Intentionally Blank



CONTENTS

PAGE

<u>PL PWRDN – ASCENT</u>	PL 1-1
PL PWRDN MATRIX.....	PL 1-2
ACTION.....	PL 1-3
PWRDN A.....	PL 1-3
MIDDECK PAYLOADS	PL 1-3
GLACIER.....	PL 1-3
<u>PL PWRDN – ORBIT</u>	PL 2-1
PL PWRDN MATRIX.....	PL 2-2
ACTION.....	PL 2-3
PRIORITY PWRDN PP3A	PL 2-3
PCS.....	PL 2-3
APCU	PL 2-3
OIU.....	PL 2-3
PRIORITY PWRDN PP3B	PL 2-4
MIDDECK PAYLOADS	PL 2-4
GLACIER.....	PL 2-4
OBSS	PL 2-5
PL BUS DEACT	PL 2-5
PWRDN A.....	PL 2-6
ORBITER	PL 2-6
PWRDN B.....	PL 2-6
MIDDECK REAR-BREATHER PAYLOADS	PL 2-6
GLACIER.....	PL 2-6
<u>PL SAFING – ORBIT</u>	PL 3-1
PL SAFING MATRIX	PL 3-2
ACTION.....	PL 3-3
PL SAFING (HC)	PL 3-3
MIDDECK TRANSFER	
(IF NOT ALREADY PERFORMED)	PL 3-3
MIDDECK PAYLOADS	PL 3-3
GLACIER.....	PL 3-3
SPINAL ELONGATION.....	PL 3-4
PAYLOAD BUSES	PL 3-4

<u>PL PWRDN – ENTRY</u>	PL 4-1
PL PWRDN MATRIX	PL 4-2
ACTION	PL 4-2
PWRDN A	PL 4-2
MIDDECK REAR-BREATHING PAYLOADS	PL 4-2
GLACIER	PL 4-2

PL PWRDN – ASCENT

PL PWRDN MATRIX.....	PL 1-2	PL PWRDN ASC
ACTION.....	PL 1-3	
PWRDN A	PL 1-3	
MIDDECK PAYLOADS.....	PL 1-3	
GLACIER	PL 1-3	

PL PWRDN MATRIX

**PL PWRDN
ASC**

PROCEDURE	ACTION
PWRDN FOR LOSS OF:	
2 CAB FANS	A
CAB PRESS	
(MINOR PWRDN; from step 4)	A
(MAJOR PWRDN; from step 5)	A
AV BAY COOLING/AV BAY FIRE	A
	(AV BAY 1 only)
2 H2O LOOPS	
[PLT PWRDN, SYS AOA,	
<u>2 H2O LOOPS (AOA);</u>	
(CDR/PLT PWRDNS)]	A
(POST OMS-2)	A
1 FREON LOOP	N/A
2 FREON LOOPS	
[PLT PWRDN, SYS AOA,	
<u>2 FREON LOOPS (AOA);</u>	
(CDR/PLT PWRDNS)]	A
(POST OMS-2)	A
HI LOAD EVAP	N/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
<u>MIDDECK PAYLOADS</u>		N/A
<p style="text-align: center;"><u>NOTE</u> When orbiter power removed, science degradation or loss will occur to GLACIER (120 min)</p>		
<p style="text-align: center;"><u>GLACIER</u></p>		
MF28E/G	1. √BATTERY – ON (It on) 2. cb POWER – op (It off)	
ML86B:E	3. cb MNB MAR 1 – op	

This Page Intentionally Blank

PL PWRDN – ORBIT

PL PWRDN MATRIX.....	PL 2-2
ACTION.....	PL 2-3
PRIORITY PWRDN PP3A.....	PL 2-3
PCS	PL 2-3
APCU.....	PL 2-3
OIU	PL 2-3
PRIORITY PWRDN PP3B.....	PL 2-4
MIDDECK PAYLOADS.....	PL 2-4
GLACIER	PL 2-4
OBSS.....	PL 2-5
PL BUS DEACT	PL 2-5
PWRDN A	PL 2-6
ORBITER.....	PL 2-6
PWRDN B	PL 2-6
MIDDECK REAR-BREATHING PAYLOADS	PL 2-6
GLACIER	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 required*
AV BAY COOLING (from MAL GPC FRP-7)	B
1 FC	PP3A*, PP3B* (on MCC call) as required until ORB kW < 17
FES (ON ORBIT)	PP3A*,PP3B** (on MCC call) as required*
(DEORBIT PREP)	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
AV BAY FIRE	B (AV BAY 1 only)
PRIORITY PWRDN GROUP 3	PP3A,PP3B (on MCC call) as required*

*PRIORITY PWRDN 3A (PP3A) contains recoverable Payload Operations Powerdown steps

**PRIORITY PWRDN 3B (PP3B) is a total Payload Powerdown that may cause Payload Operations to be nonrecoverable

ACTION

PP3A	PRIORITY PWRDN (Recoverable) (On MCC call only)	PWRUP
<p><u>PCS</u></p> <p>L11(PDIP 2)</p> <p><u>APCU</u></p> <p>A15</p> <p><u>OIU</u></p> <p>L12U (SSP1)</p> <p>If additional powerdown required:</p>	<ol style="list-style-type: none"> 1. Exit programs, power off PCS 2. DC PWR 2 – OFF <p>If APCU 1 is powering NODE 3 LTA Heaters, on MCC GO:</p> <ol style="list-style-type: none"> 3. APCU 1 CONV – OFF OUTPUT – OFF <ol style="list-style-type: none"> 4. OIU PWR – OFF (tb-bp) <ol style="list-style-type: none"> 5. Go to PRIORITY PWRDN 3B (PP3B) 	<p>√MCC</p>

PP3B	PRIORITY PWRDN (Non-Recoverable) (On MCC call only)	PWRUP
<u>MIDDECK PAYLOADS</u>		
<p style="text-align: center;"><u>NOTE</u> When orbiter power removed, science degradation or loss will occur to GLACIER (120 min)</p>		
<p style="text-align: center;"><u>GLACIER</u></p>		
MF28E/G	<ol style="list-style-type: none"> 1. pb Left (MENU) → Press (one time) QUICK STATUS 1/5 2. pb Left (NEXT) → Press (four times) SHUTDOWN 5/5 3. pb Center (SELECT) → Press (one time) SHUTDOWN 1/2 4. pb Center (SELECT) → Press (one time) Confirm Shutdown 5. pb Left (APPLY) → Press (one time) Shutting Down Please Wait 6. √Display Shutdown Complete TURN POWER OFF 7. √BATTERY – ON (It on) 8. cb POWER – op (It – off) 	
ML86B:E	<ol style="list-style-type: none"> 9. cb MNB MAR 1 – op 	

PP3B (Cont)	PRIORITY PWRDN (Non-Recoverable) (On MCC call only)	PWRUP
<u>OBSS</u> ¹ 10. LCC DEACT (Cue Card, <u>LCS</u>) LCH DEACT (Cue Card, <u>LCS</u>) LDRI/ITVC DEACT (Cue Card, <u>LDRI/ITVC</u>) <u>PL BUS DEACT</u> R1	11. PL CAB – OFF AUX – OFF	

¹ APCU 2 provides power to OBSS and NODE 3 LTA heaters
(string 2)

A	PWRDN (to reduce internal cabin heat loads)	PWRUP
<u>ORBITER</u> Exit software programs, powerdown all non-essential PGSCs and orbiter equipment (OCAC, Ergometer, Battery Chargers, etc)		√MCC

B	PWRDN	PWRUP
<u>MIDDECK REAR-BREATHER PAYLOADS</u> <p style="text-align: center;"><u>NOTE</u> When orbiter power removed, science degradation or loss will occur to GLACIER (120 min)</p> <p style="text-align: center;"><u>GLACIER</u></p> MF28E/G 1. √BATTERY – ON (It on) 2. cb POWER – op (It off) ML86B:E 3. cb MNB MAR 1 – op		N/A

PL SAFING – ORBIT

PL SAFING MATRIX.....	PL 3-2
ACTION.....	PL 3-3
PL SAFING (HC).....	PL 3-3
MIDDECK TRANSFER (IF NOT ALREADY PERFORMED).....	PL 3-3
MIDDECK PAYLOADS.....	PL 3-3
GLACIER.....	PL 3-3
SPINAL ELONGATION.....	PL 3-4
PAYLOAD BUSES.....	PL 3-4

PL SAFING
ORB

PL SAFING MATRIX

PROCEDURE	ACTION
9.101 JOINT EXPEDITED UNDOCKING AND SEPARATION, from step 18b (SODF: JOINT OPS, <u>EMERGENCY RESPONSE</u> ; JEUS)	PL SAFING
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 5)	PL SAFING
(TIG > 4 hr) (from step 15)	PL SAFING
2 FREON LOOPS	PL SAFING

**PL SAFING
ORB**

130

PL 3-2

PL PWR/130/O/FIN A

ACTION

PL SAFING

MIDDECK TRANSFER (IF NOT ALREADY PERFORMED)

If transfer hardware in ODS:

1. Complete transfer to ISS

Else:

2. Stow in Middeck

MIDDECK PAYLOADS

GLACIER

MF28E/G If Glacier Door Captive Locks (two) are unlocked perform:

MA16D

3. Unstow Tools
3/16" Hex Head, 1/4" Drive
4" Ext, 1/4" Drive
(40-200 in-lbs) Trq Wrench, 1/4" Drive

MF28E/G

4. ✓Door Latch – Locked (Finger latches fully spread apart and locking flap positioned between finger latches)
5. Fasten Glacier Door Captive Locks (two), torque to 75 in-lbs using 3/16" Hex Head, 1/4" Drive, 4" Ext, 1/4" Drive, (40-200 in-lbs) Trq Wrench, 1/4" Drive

MA16D

6. Stow tools as required, to original locations

ML86B:E

7. cb MNB MAR 1 – op

PL SAFING (Cont)

SPINAL ELONGATION

If Spinal Elongation ops in progress:

8. Remove Spinal Elongation hardware from CDR Seat
9. Re-install Head Rest and Seat Cushion to nominal config
10. Return Shoulder harness and lap belt to nominal config
11. Remove D2X Camera and Multi-use arm, stow

If ISS hatch still open:

12. Return Spinal Elongation hardware to ISS

Else:

13. Stow Spinal Elongation hardware on Shuttle

PAYLOAD BUSES

- | | |
|----|----------------------------------------|
| R1 | 14. √PL PRI MNB,FC3,MNC – OFF (tb-OFF) |
| | 15. AUX – OFF |
| | 16. CAB – OFF |
| | 17. √AFT MNB – OFF |
| | √MNC – OFF |

Once PL SAFING completed, return to calling procedure, if required

Once calling procedure completed, stow all non-essential orbiter equipment (OCAC,Cycle Ergometer,Battery Chargers, etc)

PL PWRDN – ENTRY

PL PWRDN MATRIX.....	PL 4-2
ACTION.....	PL 4-2
PWRDN A	PL 4-2
MIDDECK REAR-BREATHING PAYLOADS	PL 4-2
GLACIER	PL 4-2

PL PWRDN MATRIX

PROCEDURE	ACTION
PWRDN FOR LOSS OF:	
2 CAB FANS	A
2 H2O LOOPS (ENTRY)	A
CAB PRESS	A
AV BAY COOLING (ENTRY)	A (AV BAY 1 only)
1 FREON LOOP/HI LOAD EVAP (ENTRY)	N/A
FES	N/A
1 FC (ENTRY)	N/A
2 FREON LOOPS (ENTRY)	A
2nd FC (ENTRY)	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
	<u>MIDDECK REAR-BREATHING PAYLOADS</u>	N/A
	<u>NOTE</u> When orbiter power removed, science degradation or loss will occur to GLACIER (120 min)	
	<u>GLACIER</u>	
MF28E/G	1. √BATTERY – ON (It on)	
	2. cb POWER – op (It off)	
ML86B:E	3. cb MNB MAR 1 – op	

PL PWRDN
ENT

130

Space Shuttle Program
FLIGHT DATA FILE

JSC-48097-130
FINAL, REV A



**PAYLOAD
POWERDOWN**

**STS
130**

Flight Cover (trim bottom to expose tabs)