Space Shuttle Program
FLIGHT DATA FILE

JSC-48019

Entry Checklist

Mission Operations Directorate
Operations Division

Generic, Rev H
March 15, 2007

NOTE
For STS-118 and subsequent flights

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

Verify this is the correct version for the pending operation (training, simulation or flight).
Electronic copies of FDF books are available. URL: http://mod/jsc/nasa.gov/do3/FDF/index.html

ENTRY C/L	GENERIC, REV H (Mar 15, 2007)

PCN-6 (June 12, 2009) Sheet 1 of 1

List of Implemented Change Requests (482s):

ENT-00880
ENT-00882

NOTE
For STS-128 and subsequent flights

Incorporate the following:

1. Replace vii thru x
2. Replace 4-3 and 4-4
3. Replace 6-3 and 6-4
4. Replace CC 8-15 and CC 8-16

Prepared by: Marcia Irwin
Book Manager

Glenn E. Pogue
Lead, Entry GPO

Approved by: William E. Powers for P. Jeff Bertsch
Chief, Ascent/Descent Dynamics Branch

Encl: 10 pages

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

ENTRY C/L	GENERIC, REV H (Mar 15, 2007)

PCN-5 (Oct 10, 2008) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1824 B
ENT-0869

NOTE
For STS-126 and subsequent flights

Incorporate the following:

1. Replace vii thru x
2. Replace 3-5 and 3-6
3. Replace 4-3 and 4-4
4. Replace CC 8-15 and CC 8-16

Prepared by: Gwendolyn D. Jordan-Moore — Book Manager; Tom F. Schmidt — Lead, Entry GPO

Approved by: _____
Chief, Ascent/Descent Dynamics Branch

Encl: 10 pages

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ENTRY C/L	GENERIC, REV H (Mar 15, 2007)

PCN-4 (Nov 16, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1809

NOTE
For STS-122 and subsequent flights

Incorporate the following:

1. Replace vii and viii
2. Replace 3-11 and 3-12
3. Replace 5-17 and 5-18
4. Replace 6-1 thru 6-4

Prepared by: Marcia Trump
Book Manager

Joseph Jones 11-3-07
Lead, Entry GPO

Approved by:
Chief, Ascent/Descent Dynamics Branch

Encl: 10 pages

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PAGE CHANGE NOTICE

ENTRY C/L	GENERIC, REV H (Mar 15, 2007)

PCN-3 (Oct 5, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1803

NOTE
For STS-120 and subsequent flights

Incorporate the following:

1. Replace vii and viii
2. Replace 5-7 and 5-8, 5-21 thru 5-24

Prepared by: Marcia Lewis
Book Manager

Glenn E Pope
Lead, Entry GPO

Approved by: R J Bertson
Chief, Ascent/Descent Dynamics Branch

Encl: 8 pages

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ENTRY C/L	GENERIC, REV H (Mar 15, 2007)

PCN-2 (Aug 8, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

ENT-867 MULTI-1788
MULTI-1799

NOTE
For STS-120 and subsequent flights

Incorporate the following:

1. Replace v thru x
2. After 5-6, delete TEMP 5-7 and TEMP 5-8
   After 5-20, delete TEMP 5-21 and TEMP 5-22
   After 5-22, delete TEMP 5-23 and TEMP 5-24
3. Replace 6-1 and 6-2

Prepared by: Marcia Trump
Book Manager

Doyle W. Hensley
Lead, Entry GPO

Approved by: Richard B. Mezynski FOR P.J. BERTSCH
Chief, Ascent/Descent Dynamics Branch

Encl: 8 pages

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ENTRY C/L	GENERIC, REV H (Mar 15, 2007)

PCN-1 (July 17, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

ENT-865
ENT-866

NOTE
For STS-118 and subsequent flights

Incorporate the following:

1. Replace v thru viii
2. Replace 5-7 and 5-8 with TEMP 5-7 thru 5-8 (4 pages)
   Replace 5-21 and 5-22 with TEMP 5-21 thru 5-22 (4 pages)
   Replace 5-23 and 5-24 with TEMP 5-23 thru 5-24 (4 pages)

Prepared by: Allison McCagg — Book Manager; Glenn E Pogue 7/6/07 — Lead, Entry GPO

Approved by: Michael A. Collins for — Chief, Ascent/Descent Dynamics Branch

Encl: 16 pages

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

JSC-48019

MISSION OPERATIONS DIRECTORATE

ENTRY CHECKLIST

GENERIC, REVISION H
March 15, 2007

PREPARED BY:

Gwendolyn D. Jordan-Moore
Book Manager

APPROVED BY:

Lead Entry GPO

P.J. Bertsch
Chief, Ascent/Descent
Dynamics Branch

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes must be submitted via FDF Workflow Crew Procedure Change Request (CR) 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#:	ENT-0859	MULTI-1776
	ENT-0862A(P)	MULTI-1777
	ENT-0863	MULTI-1783
	ENT-0864	

P – Partial

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DM43/G. Jordan-Moore	281-483-1261
	DM43/M. Trump	281-483-8029
Deorbit Burn to Entry Interface	DM43/J. Patterson	281-483-1987
Entry Interface thru Rollout Post Landing	DM43/J. Patterson	281-483-1987

Replace this page with page(s) from Flight Supplement

Replace this page with page(s) from Flight Supplement

NOTES

1. This checklist is an all-vehicle book and is not complete for a specified flight without a Flight Supplement. To obtain complete checklist, incorporate Flight Supplement for specific flight of interest using instructions in Flight Supplement List of Effective Pages.

2. Entry related cue cards are contained in this document. Cue cards are listed in Entry Cue Card Config section. Some cue cards are printed in the body of checklist for MS use and also in the Entry Cue Card Config section for reference of crop marks and fabrication instructions.

3. Velcro placement, size, and shape of cue cards are controlled by Book Manager.

4. Vehicle configuration or procedural steps that are applicable to a specific vehicle are indicated by xxx.

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ENTRY CHECKLIST

LIST OF EFFECTIVE PAGES

GENERIC	02/01/88	PCN-3	10/05/07
REV H	03/15/07	PCN-4	11/16/07
PCN-1	07/17/07	PCN-5	10/10/08
PCN-2	08/08/07	PCN-6	06/12/09

Sign Off ..... *	ALL/GEN H	3-7.....Δ	ALL/GEN H
ii..... *	ALL/GEN H	3-8.....Δ	ALL/GEN H
iii..... *Δ	ALL/GEN H	3-9.....	ALL/GEN H
iv..... *Δ	ALL/GEN H	3-10.....	ALL/GEN H
v.....*	ALL/GEN H,2	3-11.....	ALL/GEN H
vi..... *	ALL/GEN H	3-12.....	ALL/GEN H,4
vii .....*	ALL/GEN H,6	3-13.....	ALL/GEN H
viii.....*	ALL/GEN H,6	3-14.....	ALL/GEN H
ix .....*	ALL/GEN H,6	3-15.....Δ	ALL/GEN H
x ..... *	ALL/GEN H	3-16.....Δ	ALL/GEN H
xi..... *Δ	ALL/GEN H	FS 3-17	flt suppl
xii..... *Δ	ALL/GEN H	FS 3-18	flt suppl
FS xiii ..... *	flt suppl	3-19.....	ALL/GEN H
FS xiv ..... *	flt suppl	3-20.....	ALL/GEN H
xv.....	ALL/GEN H	3-21.....	ALL/GEN H
xvi.....	ALL/GEN H	3-22.....	ALL/GEN H
1-1 (3 pgs)..... †	ALL/GEN H	3-23.....	ALL/GEN H
1-2 (3 pgs)..... †	ALL/GEN H	3-24.....	ALL/GEN H
2-1	ALL/GEN H	3-25.....	ALL/GEN H
2-2 (6 pgs)..... †	ALL/GEN H	3-26.....	ALL/GEN H
2-3 (6 pgs)..... †	ALL/GEN H	3-27.....	ALL/GEN H
2-4	ALL/GEN H	3-28.....	ALL/GEN H
2-5 ..... Δ	ALL/GEN H	3-29.....Δ	ALL/GEN H
2-6 ..... Δ	ALL/GEN H	3-30.....Δ	ALL/GEN H
3-1 ..... Δ	ALL/GEN H	3-31.....	ALL/GEN H
3-2 ..... Δ	ALL/GEN H	3-32.....	ALL/GEN H
FS 3-3	flt suppl	3-33.....Δ	ALL/GEN H
FS 3-4	flt suppl	3-34.....Δ	ALL/GEN H
3-5	ALL/GEN H	3-35.....	ALL/GEN H
3-6	ALL/GEN H,5	3-36.....	ALL/GEN H

***** – Omit from flight book
Δ – Replace with page from Flight Supplement
† – Extra pages in crew copy only

3-37 ..... ALL/GEN H
3-38 ..... ALL/GEN H
3-39 ..... ALL/GEN H
3-40 ..... ALL/GEN H
3-41 ..... ALL/GEN H
3-42 ..... ALL/GEN H
3-43 ..... ALL/GEN H
3-44 ..... ALL/GEN H
4-1 ..... ALL/GEN H
4-2 ..... ALL/GEN H
4-3 ..... ALL/GEN H
4-4 ..... ALL/GEN H,6
4-5 ..... Δ ALL/GEN H
4-6 ..... Δ ALL/GEN H
FS 4-7 ..... flt suppl
FS 4-8 ..... flt suppl
FS 4-9 ..... flt suppl
FS 4-10 ..... flt suppl
4-11 ..... ALL/GEN H
4-12 ..... ALL/GEN H
5-1 ..... ALL/GEN H
5-2 ..... ALL/GEN H
5-3 ..... ALL/GEN H
5-4 ..... ALL/GEN H
5-5 ..... ALL/GEN H
5-6 ..... ALL/GEN H
5-7 ..... ALL/GEN H
5-8 ..... ALL/GEN H,3
5-9 ..... ALL/GEN H
5-10 ..... ALL/GEN H
5-11 ..... ALL/GEN H
5-12 ..... ALL/GEN H
5-13 ..... ALL/GEN H
5-14 ..... ALL/GEN H
5-15 ..... ALL/GEN H
5-16 ..... ALL/GEN H
5-17 ..... ALL/GEN H
5-18 ..... ALL/GEN H,4
5-19 ..... Δ ALL/GEN H
5-20 ..... Δ ALL/GEN H
5-21 ..... ALL/GEN H
5-22 ..... ALL/GEN H,3
5-23 ..... ALL/GEN H,3
5-24 ..... ALL/GEN H
6-1 ..... ALL/GEN H
6-2 ..... ALL/GEN H,4
6-3 ..... ALL/GEN H,6
6-4 ..... ALL/GEN H,4
7-1 ..... * ALL/GEN H
7-2 ..... * ALL/GEN H
8-1 ..... *Δ ALL/GEN H
8-2 ..... *Δ ALL/GEN H
FS CC 8-3 ..... * flt suppl
FS CC 8-4 ..... * flt suppl
CC 8-5 ..... * ALL/GEN H
CC 8-6 ..... * ALL/GEN H
CC 8-7 ..... * ALL/GEN H
CC 8-8 ..... * ALL/GEN H
CC 8-9 ..... * ALL/GEN H
CC 8-10 ..... * ALL/GEN H
CC 8-11 ..... * ALL/GEN H
CC 8-12 ..... * ALL/GEN H
CC 8-13 ..... * ALL/GEN H
CC 8-14 ..... * ALL/GEN H
CC 8-15 ..... * ALL/GEN H
CC 8-16 ..... * ALL/GEN H,6
CC 8-17 ..... *Δ ALL/GEN H
CC 8-18 ..... *Δ ALL/GEN H
CC 8-19 ..... * ALL/GEN H
8-20 ..... * ALL/GEN H
CC 8-21 ..... * ALL/GEN H
CC 8-22 ..... * ALL/GEN H
8-23 ..... *Δ ALL/GEN H
8-24 ..... *Δ ALL/GEN H

Δ – Replace with page from Flight Supplement
* – Omit from flight book

ENTRY CUE CARDS

Title	Ref. Page	Card No.
DEORBIT BURN FLIGHT RULES (Front)	see flt suppl	flt suppl
(Back)	see flt suppl	flt suppl
DEORBIT BURN (RCS)		
(Front) (Top)	see flt suppl	flt suppl
(Front) (Bottom)	CC 8-5	ENT-3aa/D/M
(Back) (Top)	CC 8-6	ENT-3b/D/E
(Back) (Bottom)	CC 8-7	ENT-3bb/D/E
DEORBIT BURN (2 ENG)		
(Front) (Top)	CC 8-8	ENT-4a/D/L
(Front) (Bottom)	CC 8-9	ENT-4aa/D/K
DEORBIT BURN (1 ENG)		
(Back) (Top)	CC 8-10	ENT-4b/D/J
(Back) (Bottom)	CC 8-11	ENT-4bb/D/L
UNBALANCED PRPLT DEORBIT BURN		
(Front) (Top)	CC 8-12	ENT-5a/D/M
(Front) (Bottom)	CC 8-13	ENT-5aa/D/O
DEORBIT BURN (MIXED XFEED)		
(Back) (Top)	CC 8-14	ENT-5b/D/J
(Back) (Bottom)	CC 8-15	ENT-5bb/D/K
ENTRY MANEUVERS		
(Front)	CC 8-16	ENT-6a/E/R
(Back)	see flt suppl	flt suppl
ENTRY NO-GO CHECKLIST		
(Front)	see flt suppl	flt suppl
EMERGENCY EGRESS (Back)	CC 8-19	ENT-7b/E/S
ENTRY CONTROL		
(Front)	CC 8-21	ENT-10a/A,E/B
(Back)	CC 8-22	ENT-10b/A,E/B
DEORBIT BURN MONITOR		
(Front)	see flt suppl	flt suppl
OMS FAILURES (Back)	see flt suppl	flt suppl

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(Replace with pages FS xii thru FS xiv)

CONTENTS PAGE

DEORBIT MNVR PADS 1-1

OMS PRPLT AND DEL PADS 2-1

DEORBIT BURN 3-1
OMS BURN PREP (CIL) 3-9
OMS/RCS POST BURN RECONFIG (CIL)..... 3-32

ENTRY CUE CARDS 4-1
h = 10K LES VISORS (HC) ..... flt suppl

POST LANDING PROCEDURES 5-1

1-ORBIT LATE DEORBIT PROCEDURES..... 6-1

SWITCH LIST AT WHEEL STOP EGRESS..... deleted

ENTRY CUE CARD CONFIG 8-1

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DEORBIT MNVR PAD

OMS BOTH	1	
L	2	
R	3	
RCS SEL	4	
TV ROLL	5	
TRIM LOAD		
P	6	( ) .
LY	7	( ) .
RY	8	( ) .
WT	9	
TIG	10	/ : : .
TGT PEG 4		
C1	14	
C2	15	( ) .
HT	16	.
θT	17	.
PRPLT	18	( )

BURN ATT	
R	24
P	25
Y	26
REI	
TXX	:

ΔVTOT		.
TGO		:
VGO	X	( ) .
VGO	Y	( ) .
VGO	Z	( ) .
TGT	HA	
	HP	( )

NOTES

RCS I'CNCT:

- [ ] L OMS → RCS
- [ ] R OMS → RCS
- [ ] NONE

DEORBIT MNVR PAD

OMS BOTH 1
L 2
R 3
RCS SEL 4

TV ROLL 5

TRIM LOAD
P 6 ( ) .
LY 7 ( ) .
RY 8 ( ) .

WT 9

TIG 10 / : : .

TGT PEG 4
C1 14
C2 15 ( ) .
HT 16 .
θT 17 .
PRPLT 18 ( )

BURN ATT
R 24
P 25
Y 26

REI

TXX :

ΔVTOT .
TGO :

VGO X ( ) .
VGO Y ( ) .
VGO Z ( ) .

TGT HA HP ( )

NOTES

RCS I'CNCT:
L OMS → RCS
R OMS → RCS
NONE

OMS PRPLT AND DEL PADS

BURN CARD	**OMS PRPLT PAD**
DEORBIT BURN (1 ENG)	OMS XFEED RETURN at ΔVTOT = ☐☐☐ or ☐ ☐☐ at ☐☐ % ☐ OMS He PRESS (two) – OP TK ISOL (two) – OP XFEED (two) – OP Secure ☐ OMS OMS PRPLT LOW: AFT RCS RECONFIG at ΔVTOT = ☐☐☐ OMS ENG FAIL: ☐ OMS He PRESS (two) – OP TK ISOL (two) – OP ☐ OMS XFEED (two) – CL
DEORBIT BURN (RCS)	RCS I'CNCT TK SW at ΔVTOT = ☐☐☐ OMS PRPLT LOW: ΔVTOT = ☐☐☐
UNBALANCED PRPLT DEORBIT BURN	INITIAL CONFIG: ☐ TK ISOLs – CL While feeding 2 OMS from 1 POD: OMS PRPLT FAIL: Secure ☐ OMS Secure ☐ OMS Interconnect ☐ OMS to RCS THC + X for ☐ : ☐☐ If ☐ (XFEED) ENG '↓' When ☐ OMS QTY: 5%: ☐ OMS TK ISOL (two) – OP 4%: ☐ OMS TK ISOL (two) – CL If ☐ (STRAIGHT FEED) ENG '↓' OMS ENG FAIL: At ΔVTOT = ☐☐☐ or ☐ ☐☐ at ☐☐ % ☐ TK ISOL (two) – OP ☐ TK ISOL (two) – CL Return to 2 ENG, 2 POD FLOW: At ΔVTOT = ☐☐☐ ☐ TK ISOLs – OP OMS ENG FAIL: (XFEED CUE) OMS QTY ☐☐ %L or ☐☐ %R
DEORBIT BURN (MIXED XFEED)	FEED FROM GOOD POD: At ΔVTOT = ☐☐☐ or ☐ ☐☐ at ☐☐ % ☐ OMS He PRESS (two) – OP TK ISOL (two) – OP XFEED (two) – OP Secure ☐ OMS OMS PRPLT LOW: AFT RCS RECONFIG at ΔVTOT = ☐☐☐ OMS ENG FAIL: ☐ OMS He PRESS (two) – OP TK ISOL (two) – OP ☐ OMS XFEED (two) – CL

DEL PAD

PRE-DEORBIT

APU START: SINGLE APU START, ATTEMPT ☐ APU(s)

APU START SEQUENCE ☐ THEN ☐

DEORBIT

BURN CUE CARD:

OMS TIG SLIP – NO EXEC > TIG + ☐ : ☐ ☐

RCS DOWNMODING ☐ : ☐ ☐

STOP/CONTINUE CUES: L OMS FAIL HP ☐ ☐ ☐

R OMS FAIL HP ☐ ☐ ☐

OMS ENG FAIL XFEED QTY CUE %L ☐ ☐ %R ☐ ☐

ENG FAIL HP ☐ ☐ ☐

SAFE HP ☐ ☐

TOT AFT QTY 1 (%) ☐ ☐ ☐

TOT AFT QTY 2 (%) ☐ ☐

CAPTURE HP ☐ ☐ PB/FLIP HP ☐ ☐ AFT HP ☐ ☐ B/U SITE ☐ ☐ ☐

FRCS: DUMP TO % (USE TIME AS CUE) ☐ OX ☐ FU ☐ ☐

ENTRY/LANDING

EI - 5 MM303 INRTL ATT R ☐ ☐ ☐ P ☐ ☐ ☐ Y ☐ ☐ ☐

MM304 PREBANK (ENT MNVR Cue Card) ☐ L ☐ R ☐ ☐ ☐

ALTM SET ☐ ☐ . ☐ ☐

CLG INIT ☐ ☐ : ☐ ☐ : ☐ ☐

EXPECTED AIL TRIM ☐ L ☐ R ☐ . ☐

VREL 1ST REVERSAL ☐ ☐ ☐ ☐ ☐

XCG AT TD ☐ ☐ ☐ ☐ . ☐

LAND SITE ☐ ☐ RWY ☐ ☐ ☐ ☐ ☐

☐ L ☐ OVHD ☐ ☐ ☐ deg ☐ ☐ MLS

☐ R ☐ STRT ☐ ☐ ☐ ☐ TAC

ΔT MACH < 1 TO HAC ☐ : ☐ ☐

MAX Nz ☐ . ☐

Nz LIMIT ☐ . ☐

ΔT HAC INIT to H = 20K ☐ : ☐ ☐

AIMPOINT

☐ NOM

☐ CLOSE-IN

SPEEDBRAKE

☐ NOM

☐ S.F.

☐ ☐ % @ 3K

50K	/
38K	/
28K	/
20K	/
12K	/
7K	/
3K	/
1K	/
SURFACE	/

REMARKS:

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(Replace with pages FS 3-1 thru FS 3-4)

1: GNC DEORB MNVR COAST | 2: GNC DEORB MNVR COAST
3: BFS, GNC DEORB MNVR COAST

TIG-45

B **DEORB UPDATE/UPLINK**

1: GNC 50 HORIZ SIT
3: BFS, GNC 50 HORIZ SIT

CRT1,3 GPS INH – ITEM 43 EXEC

1: GNC DEORB MNVR COAST
3: BFS, GNC DEORB MNVR COAST

MCC UPDATE:
DEL PAD
OMS PRPLT PAD
MCC UPLINK:
PASS, BFS SV
PASS, BFS TGT
BFS IMU GYRO/ACCEL

C G50 √LAND SITE per DEL PAD

On MCC GO:
C CRT1 LOAD – ITEM 22 EXEC
TIMER – ITEM 23 EXEC

CRT1,3 √PASS & BFS TGTs per MNVR PAD:
BURN ATT
ΔVTOT
TGO
HA HP

1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST

3: BFS, GNC DEORB MNVR COAST

C **OMS TVC GMBL CHECK**
(Perform during AOS)

CRT1 SECONDARY CHECK
Perform SEC L,R then PRI L,R GMBL CK

* If down arrow(s) or Ms: *
* Select good GMBL *

MS **ACES PRESSURE INTEGRITY CHECK**
Dual Suit Controller, Dial-To-Test Knob – full cw

P **APU PRE-START**
(Perform during AOS)

R4 √HYD BK ISOL VLV (three) tb – CL
√LG EXTD ISO VLV tb – CL

* If tb not CL: *
* R2 (Aff) HYD CIRC PUMP – ON *
* R4 (Aff) ISOL VLV – CL *
* Hold 5 sec, √tb – CL *
* R2 HYD CIRC PUMP – OFF *

R2 BLR N2 SPLY (three) – ON
√PWR (three) – ON
√CNTLR/HTR (three) – B
√cb APU FU TK VLV ENA (six) – cl
√APU FU TK VLV (three) – CL
√AUTO SHTDN (three) – ENA
√SPEED SEL (three) – NORM
√OPER (three) – OFF
HYD MN PUMP PRESS (three) – LO
APU CNTLR PWR (three) – ON

3: BFS, SM SYS SUMM 2

P R2 APU FU TK VLV (three) – OP
√APU/HYD RDY tb (three) – gray
APU FU TK VLV (three) – CL

2: GNC 50 HORIZ SIT

3: BFS, GNC 50 HORIZ SIT

Replace this page with page(s) from Flight Supplement

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P **OMS BURN PREP**

CRT2 OMS ENG TRIMS
2 ENG BURN:
√TRIM LOAD per MNVR PAD or:
L,R – ITEM 6 +0.0 -5.7 +5.7 EXEC

1 ENG BURN:
√TRIM LOAD per MNVR PAD or:
P – ITEM 6 +0.0 EXEC
Good eng Y:
LY – ITEM 7 +5.2 EXEC
RY – ITEM 8 -5.2 EXEC
XFEED: Failed engine prop to good engine

RCS DEORBIT OR RCS He/PRPLT TK FAIL
Do not terminate OMS/RCS Interconnect

O7 AFT L,R RCS
He PRESS (four) – OP (tb-OP)
TK ISOL (six) – GPC (tb-OP)
MANF ISOL (eight) – OP (tb-OP)
XFEED (four) – GPC (tb-CL)
√MSTR RCS XFEED – OFF

O8 L,R OMS
√He PRESS/VAP ISOL (four) – CL
√TK ISOL (four) – OP (tb-OP)
√XFEED (four) – CL (tb-CL)
FWD RCS
He PRESS (two) – OP (tb-OP)
MANF ISOL (four) – OP (tb-OP)

1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST

3: BFS, GNC DEORB MNVR COAST

RCS BURN PREP
DAP: INRTL/PULSE
P O7 AFT L,R RCS
TK ISOL (six) – CL (tb-CL)
XFEED (four) – OP (tb-OP)
O8 L,R OMS
√He PRESS/VAP ISOL (four) – CL
√TK ISOL (four) – OP (tb-OP)
√R OMS XFEED (two) – CL (tb-CL)
L OMS XFEED (two) – OP (tb-OP)
DAP: AUTO/DISC

WARNING
Eye and skin UV damage can occur in as little as 10 sec

Don Sunglasses

MS3 Remove and stow Side Hatch UV Filter and Locking Device, and Pyro Box Safing Pin

TIG-25 **VENT DOOR CLOSE**

NOTE
VENT DOOR CLOSE must be performed prior to MM302 transition

2: GNC 51 OVERRIDE

P CRT2 VENT DOOR CNTL CLOSE – ITEM 44 EXEC (*), wait 1 min, then

C CRT1 GNC, OPS 302 PRO

MS1/MS2 SEAT INGRESS

1: GNC DEORB MNVR EXEC	2: GNC DEORB MNVR EXEC
3: BFS, GNC DEORB MNVR EXEC	

MCC/CREW GO/NO-GO FOR DEORBIT BURN

```
*                    IF NO-GO FOR DEORBIT BURN: *
* P        R2        HYD MN PUMP PRESS (three) – *
*                      NORM                      *
* C        CRT1      GNC, OPS 301 PRO            *
```

IF 1 ORBIT DELAY:
Go to section 6, 1-ORB LATE

IF 24-HR EXTENSION

```
P    O7      AFT L,R RCS
                 He PRESS A (two) – GPC (tb-OP)
                            B (two) – CL (tb-CL)
                 TK ISOL (six)       – OP (tb-OP)
                 MANF ISOL (eight)– GPC (tb-OP)
                 XFEED (four)        – CL (tb-CL)
     O8      FWD RCS
                 He PRESS A – GPC (tb-OP)
                            B – CL (tb-CL)
                 MANF ISOL (four) – GPC (tb-OP)
     C6      Unstow ORB PKT C/L
             Terminate Deorbit Procedures, go to
              DEORB PREP, D/O PREP BACKOUT
```

1: GNC DEORB MNVR EXEC	2: GNC DEORB MNVR EXEC
3: BFS, GNC DEORB MNVR EXEC	

TIG-20> **MNVR TO DEORBIT BURN ATT**

C C3 √DAP: AUTO
B F6/F8 √ADI ATT (two) – INRTL
√ERR (two) – MED
√RATE (two) – MED
C CRT1 MNVR – ITEM 27 EXEC (*****)
(√ADI ATT with CRT BURN ATT)
B Copy last DEL PAD and OMS PRPLT PAD data on <u>DEORBIT BURN</u> Cue Cards
F6/F8 √<u>DEORBIT BURN</u> and <u>DEORBIT BURN MONITOR</u> Cue Cards installed
A14 RCS/OMS HTR
FWD RCS – OFF
L POD (two) – A OFF,B OFF
R POD (two) – A OFF,B OFF
OMS CRSFD LINES (two) – A AUTO,B AUTO
FWD RCS JET 5 (one) – OFF
AFT RCS JET 5 (one) – OFF

1: GNC DEORB MNVR EXEC	2: GNC DEORB MNVR EXEC

3: BFS, SM SYS SUMM 2

▶TIG-5 P **SINGLE APU START** (Attempt one APU)

> WARNING
> Do not start APU while APU TEMP INJ > 437 or APU TEMP GG BED > 456

```
*  If APU TEMP INJ > 437 or APU  *
*    TEMP GG BED > 456:          *
*       ♦ Start any available APU *
*           within temperature limits *
```

R2 APU FU TK VLV – OP
OPER – START/RUN
MDU √HYD PRESS ind – LO green

```
*  If no start:                  *
*   • Do not execute Deorbit Burn *
*   • Shut down APU:              *
*       APU SHUTDN (ENT PKT,      *
*         APU/HYD)  >>            *
```

R2 √HYD CIRC PUMP (three) – OFF

3: BFS, GNC SYS SUMM 2

C √BURN ATT ± 5°

B Go to DEORBIT BURN (Cue Card)

1: GNC DEORB MNVR EXEC	2: GNC DEORB MNVR EXEC

3: BFS, SM SYS SUMM 2

▶TIG-5 P **SINGLE APU START** (Attempt two APUs)

> WARNING
> Do not start APU while APU TEMP INJ > 437 or APU TEMP GG BED > 456

```
*  If APU TEMP INJ > 437 or APU  *
*    TEMP GG BED > 456:          *
*       ♦ Start any available APU *
*           within temperature limits *
```

R2 APU FU TK VLV – OP
OPER – START/RUN
MDU √HYD PRESS ind – LO green

```
*  If no start:                          *
*      APU OPER – OFF                    *
*      Start another APU                 *
*                                        *
*      If second APU starts,             *
*      | shut down unstarted APU:        *
*      |    APU SHUTDN (ENT PKT,         *
*      |     APU/HYD)                    *
*      If neither starts:                *
*        • Do not start third APU        *
*        • Do not execute Deorbit Burn   *
*        • Shut down unstarted APUs:     *
*              APU SHUTDN (ENT PKT,      *
*               APU/HYD)  >>             *
```

R2 √HYD CIRC PUMP (three) – OFF

3: BFS, GNC SYS SUMM 2

C √BURN ATT ± 5°

B Go to DEORBIT BURN (Cue Card)

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Replace this page with page(s) from Flight Supplement

(Replace with pages FS 3-15 thru FS 3-18)

RCS COMPLETION:

THC +X to TGT HP or TOT AFT QTY 1 [ ][ ][ ] %

At AFT QTY 1 If CUR HP:

THC +X to CAPTURE HP or TOT AFT QTY 2 [ ][ ] % then PREBANK/FRCS COMPLETION to downrange site

CAPTURE HP [ ][ ] PREBANK/FRCS COMPLETION to downrange site

PREBANK/FLIP HP [ ][ ] PREBANK/FRCS COMPLETION

AFT HP [ ][ ] THC +X to TGT HP

TGT HP [ ][ ]

FRCS COMPLETION (if applicable)**:**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF
+ :02 OMS ENG(s) – OFF (if < 3 IMU, at [ ]:[ ][ ])

* AFT RCS RECONFIG if INTERCONNECT *

Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ENT-4aa/D/K

DEORBIT BURN (1 ENG)

√MM302 √OMS L or R
√OMS BURN CONFIG (L or R XFEED)
Enter TGO + 10 sec
√TRIM per MNVR PAD or P +0.0, LY +5.2, RY -5.2
L,R OMS He PRESS/VAP ISOL A (two) – OP
. . . . . Wait 2 sec . . . . . B (two) – OP
√DAP – AUTO(PASS)/DISC
ADI – LVLH(REF)/HI/MED
FLT CNTLR PWR (two) – ON

TIG-2	Good OMS ENG – ARM/PRESS
- :15	EXEC (NO EXEC > TIG + [ ] : [ ][ ])
- :15	If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
:00	TIG Start watch (√P_C, ΔVTOT, ENG VLVs)

* If no OMS ignition: APUs – SHUT DN *

OMS XFEED RETURN at ΔVTOT = [ ][ ][ ]
or [ ] [ ][ ] at [ ][ ] %
L,R OMS TK ISOL (four) – OP
XFEED (four) – CL

OMS PRPLT FAIL:

OMS ENG – OFF

SAFE HP [ ][ ]

STOP BURN:
APUs – SHUT DN
Secure aff OMS

CONTINUE BURN:
Secure aff OMS
ITEM 18 +0 EXEC
√ADI – LVLH, center needles
Interconnect good OMS to RCS
THC +X(√OMS% vs RCS Burn Time)
AFT RCS RECONFIG
RCS COMPLETION

OMS ENG FAIL:

OMS ENG – OFF

ENG FAIL HP [ ][ ][ ]

STOP BURN:
APUs – SHUT DN

CONTINUE BURN:
√ADI – LVLH, center needles
Interconnect good OMS to RCS
THC +X(√OMS% vs RCS Burn Time)
RCS I'CNCT TK SW
THC +X(√OMS% vs RCS Burn Time)
AFT RCS RECONFIG
RCS COMPLETION

RCS +X JET FAIL OFF:

SAFE HP [ ][ ]

STOP BURN:
APUs – SHUT DN

CONTINUE BURN:
ITEM 18 +0 EXEC
G23 Resel jets

ENT-4b/D/J

RCS COMPLETION:

THC +X to TGT HP or TOT AFT QTY 1 [ ][ ][ ] %

At AFT QTY 1 If CUR HP:

THC +X to CAPTURE HP or TOT AFT QTY 2 [ ][ ] % then PREBANK/FRCS COMPLETION to downrange site

CAPTURE HP [ ][ ] PREBANK/FRCS COMPLETION to downrange site

PREBANK/FLIP HP [ ][ ] PREBANK/FRCS COMPLETION

AFT HP [ ][ ] THC +X to TGT HP

TGT HP [ ][ ]

FRCS COMPLETION (if applicable)**:**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF + :02 OMS ENG – OFF (if < 3 IMU, at [ ]:[ ][ ])

* AFT RCS RECONFIG if INTERCONNECT *

Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ENT-4bb/D/L

DEORBIT BURN (RCS)

√MM302 √RCS SEL
√RCS BURN CONFIG (L OMS I'CNCT)
L,R OMS He PRESS/VAP ISOL A (two) – OP
. . . . . Wait 2 sec . . . . . B (two) – OP
√DAP – INRTL/DISC
ADI – LVLH(REF)/MED/MED
FLT CNTLR PWR (two) – ON

TIG THC +X (No Deorbit > TIG + [ ] : [ ][ ])
Maintain PITCH ATT ERR ± 3°
Monitor ΔVTOT:
RCS I'CNCT TK SW at ΔVTOT = [ ][ ][ ]
R OMS XFEED (two) – OP
L OMS XFEED (two) – CL

OMS PRPLT LOW
AFT RCS RECONFIG AT ΔVTOT = [ ][ ][ ]
RCS COMPLETION

OMS PRPLT FAIL (MULTIPLE JETS FAIL OFF):
Secure aff OMS
STOP BURN:
SAFE HP [ ][ ] APUs – SHUT DN
CONTINUE BURN:
ITEM 18 +0 EXEC
G23 Resel jets
Interconnect good OMS to RCS
THC +X (√OMS% vs RCS Burn Time)
AFT RCS RECONFIG
RCS COMPLETION

RCS +X JET FAIL OFF:
STOP BURN:
SAFE HP [ ][ ] APUs – SHUT DN
CONTINUE BURN:
ITEM 18 +0 EXEC
G23 Resel jets

ENT-3a/D/L

RCS COMPLETION:

THC +X to TGT HP or TOT AFT QTY 1 [ ][ ][ ] %

At AFT QTY 1 If CUR HP: THC +X to CAPTURE HP or TOT AFT QTY 2 [ ][ ] % then PREBANK/FRCS COMPLETION to downrange site

CAPTURE HP [ ][ ] PREBANK/FRCS COMPLETION to downrange site

PREBANK/FLIP HP [ ][ ] PREBANK/FRCS COMPLETION

AFT HP [ ][ ] THC +X to TGT HP

TGT HP [ ][ ]

FRCS COMPLETION (if applicable)**:**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF: VGOx = 0, release THC
AFT RCS RECONFIG
Trim Inplane X,Z residuals < 2 fps (< 0.5 fps if shallow)

ENT-3aa/D/M

UNBALANCED PRPLT DEORBIT BURN

√MM302 √OMS BOTH
Enter TGO + 5 sec
√TRIM per MNVR PAD or P +0.0, LY -5.7, RY +5.7
√DAP – AUTO(PASS)/DISC
ADI – LVLH(REF)/HI/MED
FLT CNTLR PWR (two) – ON
Feed 2 ENG from 1 POD
L,R OMS He PRESS/VAP ISOL A (two) – GPC
B (two) – OP
[ ] OMS TK ISOL (two) – CL (tb-CL)
L,R OMS XFEED (four) – OP (tb-OP)

TIG-2: OMS ENG (two) – ARM/PRESS
- :15 EXEC (NO EXEC > TIG + [ ] : [ ] [ ])
- :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
:00 TIG Start watch (√P_C, ΔVTOT, ENG VLVs)

If no OMS ignition: APUs – SHUT DN

* While feeding 2 OMS from 1 POD: *

OMS PRPLT FAIL:

Failed OMS ENG(s) – OFF
STOP BURN:
APUs – SHUT DN
Secure [ ] OMS

SAFE HP [ ] [ ] ----------

CONTINUE BURN:
ITEM 18 +0 EXEC
If Both ENGs '↓':
Secure [ ] OMS
√ADI – LVLH, center needles
Interconnect [ ] OMS to RCS
THC +X for [ ] : [ ] [ ]
AFT RCS RECONFIG
RCS COMPLETION
If [ ] (XFEED) ENG '↓':
When [ ] OMS QTY:
5%: [ ] OMS TK ISOL (two) – OP
4%: [ ] OMS TK ISOL (two) – CL
If OMS P_C < 80 or OMS TEMP,
OMS ENG – OFF
√ADI – LVLH, center needles
RCS COMPLETION
If [ ] (STRAIGHT FEED) ENG '↓':
OMS ENG FAIL

OMS ENG FAIL (CONTINUE BURN):

Failed OMS ENG – OFF
at ΔVTOT = [ ] [ ] [ ]
or [ ] [ ] [ ] at [ ] [ ] %
[ ] TK ISOL (two) – OP
[ ] TK ISOL (two) – CL

Return to 2 ENG, 2 POD FLOW at ΔVTOT: [ ] [ ] [ ]
[ ] OMS TK ISOL (two) – OP (tb-OP)
L,R OMS XFEED (four) – CL (tb-CL)

ENT-5a/D/M

OMS PRPLT FAIL:

Failed OMS ENG – OFF

L OMS FAIL HP	R OMS FAIL HP	STOP BURN:
		Good OMS ENG – OFF APUs – SHUT DN Secure aff OMS

CONTINUE BURN:
ITEM 18 +0 EXEC
When good OMS QTY:
5%: L,R OMS XFEED (four) – OP
4%: Good OMS TK ISOL (two) – CL
If OMS P_C < 80 or OMS TEMP,
OMS ENG – OFF
√ADI – LVLH, center needles
RCS COMPLETION

OMS ENG FAIL:

Failed OMS ENG – OFF
OMS XFEED at 1/2 ΔVTOT at fail
or OMS QTY %L or %R

2nd OMS FAIL (ENG or PRPLT):

Failed OMS ENG – OFF
If PRPLT FAIL: Secure aff OMS
ITEM 18 +0 EXEC

Both ENG FAIL HP	Either PRPLT FAIL (SAFE) HP	STOP BURN:
		APUs – SHUT DN

CONTINUE BURN:
√ADI – LVLH, center needles
Interconnect good OMS to RCS
THC +X (√OMS% vs RCS Burn Time)
RCS I'CNCT TK SW (N/A PRPLT FAIL)
THC +X (√OMS% vs RCS Burn Time)
AFT RCS RECONFIG
RCS COMPLETION

RCS COMPLETION:

THC +X to TGT HP or TOT AFT QTY 1 %
At AFT QTY 1 THC +X to CAPTURE HP or TOT AFT QTY 2 %
If CUR HP: then PREBANK/FRCS COMPLETION to downrange site

CAPTURE HP		PREBANK/FRCS COMPLETION to downrange site
PREBANK/FLIP HP		PREBANK/FRCS COMPLETION
AFT HP		THC +X to TGT HP
TGT HP		

FRCS COMPLETION (if applicable)**:**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF
+ :02 OMS ENG(s) – OFF (if < 3 IMU, at :)
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ENT-5aa/D/O

DEORBIT BURN (MIXED XFEED)

√MM302 √OMS L(R) or RCS
Enter TGO + 10 sec
√L,R OMS TK ISOL (four) – GPC
√XFEED (four) – GPC
√tb config from table (OMS SSR-1)
√DAP – AUTO(PASS)/DISC
ADI – LVLH(REF)/HI/MED
FLT CNTLR PWR (two) – ON
Man repress to maintain good OMS Tk Ps > 234 psi (simo)
If OMS BURN INITIATION:

√TRIM per MNVR PAD or: P +0.0, LY +5.2, RY -5.2

TIG-2: Good OMS ENG – ARM/PRESS

- :15 EXEC (No EXEC > TIG + [ ] : [ ])

- :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec

:00 TIG Start watch (√P_C, ΔVTOT, ENG VLVs)

* If no OMS ignition, APUs – SHUT DN *

If RCS BURN INITIATION:

Man repress L,R OMS > L,R RCS TK Ps
L,R RCS XFEED (four) – OP
TK ISOL (six) – CL

:00 THC +X (No Deorbit > TIG + [ ] : [ ])

Maintain PITCH ATT ERR ± 3°

FEED FROM GOOD POD:
at ΔVTOT = [ ]
or [ ] [ ] at [ ] %

[ ] OMS He PRESS/VAP ISOL (two) – OP
TK ISOL (two) – OP (tb-OP)
XFEED (two) – OP (tb-OP)
SECURE [ ] OMS

OMS PRPLT LOW
AFT RCS RECONFIG at ΔVTOT = [ ]
RCS COMPLETION

ENT-5b/D/J

OMS PRPLT FAIL:

OMS ENG – OFF

STOP BURN:
- APUs – SHUT DN
- Secure L,R OMS

SAFE HP [ ][ ]

CONTINUE BURN:
- Secure L,R OMS
- ITEM 18 +0 EXEC
- √ADI – LVLH, center needles
- RCS COMPLETION

OMS ENG FAIL:

OMS ENG – OFF

STOP BURN:
- APUs – SHUT DN

ENG FAIL HP [ ][ ][ ]

CONTINUE BURN:
- Man repress L,R OMS > L,R RCS TK Ps
- FEED FROM GOOD POD:
  - [ ] OMS HE PRESS/VAP ISOL (two) – OP
    TK ISOL (two) – OP
  - [ ] OMS XFEED (two) – CL
  - L,R RCS XFEED (four) – OP
    TK ISOL (six) – CL
- √ADI – LVLH, center needles
- THC +X (√Lowest OMS % vs RCS Burn Time)
- AFT RCS RECONFIG
- RCS COMPLETION

RCS +X JET FAIL OFF:

STOP BURN:
- APUs – SHUT DN

SAFE HP [ ][ ][ ]

CONTINUE BURN:
- ITEM 18 +0 EXEC
- G23 Resel jet

RCS COMPLETION:

THC +X to TGT HP or TOT AFT QTY 1 [ ][ ][ ] %

At AFT QTY 1 If CUR HP: THC +X to CAPTURE HP or TOT AFT QTY 2 [ ][ ] %
then PREBANK/FRCS COMPLETION to downrange site

CAPTURE HP [ ][ ] PREBANK/FRCS COMPLETION to downrange site

PREBANK/FLIP HP [ ][ ] PREBANK/FRCS COMPLETION

AFT HP [ ][ ] THC +X to TGT HP

TGT HP [ ][ ]

FRCS COMPLETION (if applicable)**:**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF + :02 VGOx = 0, Release THC
OMS ENG(s) – OFF (if < 3 IMU, at [ ]:[ ][ ])
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ENT-5bb/D/K

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*            If no OMS IGNITION at TIG:                  *
*              OMS ENG (two) – OFF                       *
*             √APU – SHUT DN                             *
* C3           MSTR MADS PWR – OFF                       *
* O8           L,R OMS                                   *
*                He PRESS/VAP ISOL (four) – CL           *
*              √XFEED (four) – CL                        *
*              GNC, OPS 301 PRO                          *
* F6,F8        FLT CNTLR PWR (two) – OFF                 *
* C3          √DAP:  AUTO                                *
*             √MCC at next AOS                           *
*                                                        *
*            If burn terminated with HP > SAFE HP:       *
*             √OMS ENG (two) – OFF                       *
*             √APU – SHUT DN                             *
* C3           MSTR MADS PWR – OFF                       *
*              OPS 301 PRO                               *
*              If I'CNCT:                                *
*                  DAP:  INRTL/PULSE                     *
* O8           L,R OMS                                   *
*                He PRESS/VAP ISOL (four) – CL           *
*              √XFEED (four) – CL                        *
* O7           AFT L,R RCS                               *
*                He PRESS A (two) – GPC (tb-OP)          *
*                           B (two) – CL (tb-CL)         *
*                TK ISOL (six) – OP (tb-OP)              *
*                XFEED (four) – CL (tb-CL)               *
* O8           FWD RCS                                   *
*                He PRESS A – GPC (tb-OP)                *
*                           B – CL (tb-CL)               *
* F6,F8        FLT CNTLR PWR (two) – OFF                 *
* C3          √DAP:  AUTO                                *
*             √MCC at next AOS on DEORBIT DELAY          *
*               of 24 hr                                 *
```

POST BURN

1: GNC DEORB MNVR EXEC	2: GNC DEORB MNVR EXEC
3: BFS, GNC SYS SUMM 2	

MS Stow Flight Deck SpOC

L10 (VTR) REC pb – press, hold
PLAY pb – press, simo
(√red dot displayed)
Install VIP, VTR covers

B F6,F8 FLT CNTLR PWR (two) – OFF
C3 √DAP: AUTO

OMS/RCS POST BURN RECONFIG

P O7 AFT L,R RCS
√He PRESS (four) – OP (tb-OP)
√TK ISOL (six) – GPC (tb-OP)
√XFEED (four) – GPC (tb-CL)

O8 L,R OMS
He PRESS/VAP ISOL (four) – CL
√TK ISOL (four) – OP (tb-OP)

* If OMS PRPLT FAIL, *
* √Aff TK ISOL (two) – CL *

XFEED (four) – CL (tb-CL)

O3 RCS/OMS PRESS sel – RCS as reqd
PRPLT QTY sel – RCS as reqd

POST BURN

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EI-20 C **SECONDARY ACTUATOR CHECK**
(if not previously performed and time permits)

NOTE

If port does not bypass during check, bypass affected port after check:
SEC ACT BYPASS – ITEM 8 +X X EXEC
If affected port still does not bypass:
SEC ACT RESET – ITEM 9 +X X EXEC

R2 1. HYD MN PUMP PRESS (one) – NORM

CRT3 2. SURF DRIVE ON, ITEM 39 EXEC (*)
Wait at least 5 sec
MDU √SPI: Stop drive test when elevon posns within +12° to -27°
SURF DRIVE OFF, ITEM 40 EXEC (*)

CRT1 3. √POS STIM ENA, ITEM 7 – (no *)

C3 4. √FCS CH 1,2,3,4 – AUTO

CRT1 5. SEC ACT CK, CH 1 – ITEM 1 EXEC (*)
START – ITEM 5 EXEC (*)

6. √All CH 1 PORTS BYPASS, '↓'
STOP – ITEM 6 EXEC (*)

C3 7. FCS CH 1 – ORIDE
CRT1 √All CH 1 PORTS RESET, no '↓'
FCS CH 1 – AUTO

8. Repeat steps 5 thru 7 for CH 2,3,4

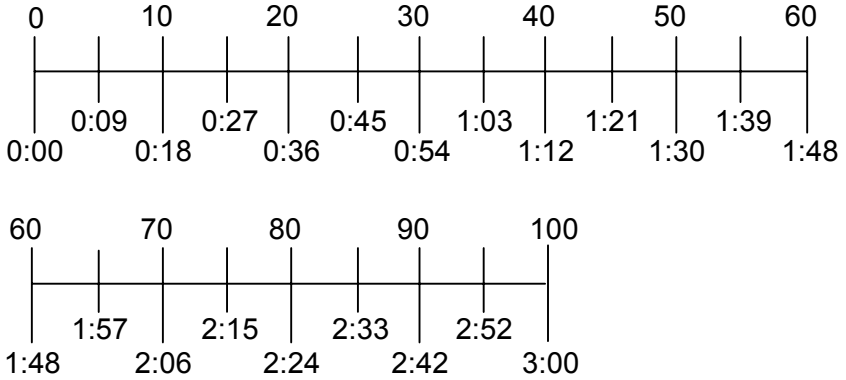
1: GNC 23 RCS	2: GNC DEORB MNVR COAST
3: BFS, GNC SYS SUMM 2	

EI-18 P **FORWARD RCS DUMP**
(Use for off-nominal X cg entry)

Determine FWD RCS 'DUMP TO %' using lowest of Ox or Fu qty (calculator or DEL PAD)

<u>FOUR JET DUMP</u>:

F RCS PRPLT TO BE DUMPED (%)



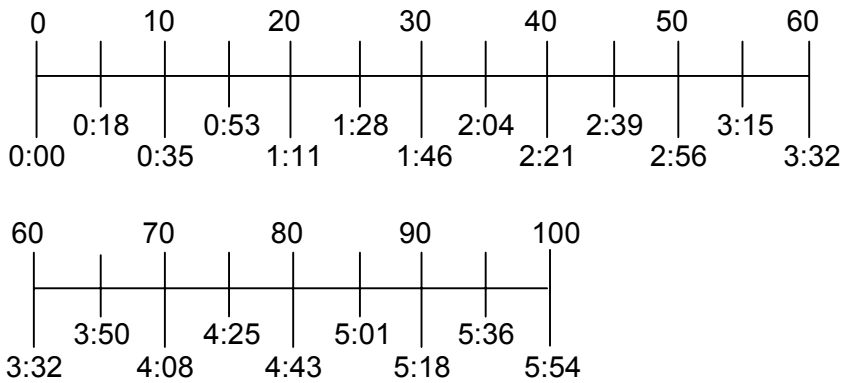
TIME FROM DUMP INITIATION (M:S)

<u>NOTE</u>
During dump, disregard FRCS qty

1: GNC 23 RCS	2: GNC DEORB MNVR COAST
3: BFS, GNC SYS SUMM 2	

TWO JET DUMP:

F RCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

NOTE

During dump, disregard FRCS qty

CRT2 FWD RCS ARM – ITEM 36 EXEC
DUMP – ITEM 37 EXEC
(Start watch)
When dump time achieved:
FWD RCS OFF – ITEM 38 EXEC

1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST

3: BFS, GNC SYS SUMM 2

ENTRY SW CHECK

C	L2	√CAB RELIEF A,B – ENA (tb-ENA)
		√ANTISKID – ON
		√NWS – 1
		√ENTRY MODE – AUTO

X: GNC 51 OVERRIDE

		√ROLL MODE – AUTO
B	L2/C3	√SPD BK – Full Fwd
P	C3	√SRB SEP – AUTO
		√ET SEP – AUTO
B	F6/F8	√AIR DATA – NAV
		ADI ERR – MED
		RATE – MED
		√HSI SEL MODE – ENTRY
C	F6	√SOURCE (two) – NAV, 1
P	F8	√SOURCE (two) – NAV, 2
B	F3	√TRIM RHC/PNL (two) – INH
		√PNL (two) – ON
		Exercise BRAKE PEDALS

1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST
3: BFS, GNC SYS SUMM 2	

NOTE

If NAVAIDS OFF due to PKT C/L PWRDN, switch ON per PWRDN procedure

C	F6	√RADAR ALTM – 1
P	F8	– 2
	O8	√RADAR ALTM (two) – ON √MLS (three) – ON (PASS) √MLS CH (three), FS 3-2
	O7	If OV103, 104: √TACAN MODE (three) – GPC √ANT SEL (three) – AUTO √TACAN CH (three) per DEL PAD or FS 3-2

EI-13 **REMAINING APUs START**

> WARNING
> Do not start APU while APU TEMP INJ > 437 or APU TEMP GG BED > 456

```
                 * If an APU failed to start at TIG-5,  *
                 *   start remaining good APU only      *

*              If remaining APU TEMP INJ > 437 or *
*               APU TEMP GG BED > 456:            *
*  A12            (Aff) APU HTR GAS GEN/FU        *
*                   PUMP – OFF                    *
*                 Start aff APU when within       *
*                   temperature limits            *

   R2          APU FU TK VLV (two)   – OP
              √APU/HYD RDY tb (two) – gray

                 * If tb – bp, attempt normal start *

              APU OPER (two) – START/RUN
   MDU        √HYD PRESS ind (two) – LO green

   R2         √APU/HYD RDY tb (two) – bp

                 * If APU OIL OUT P < 25 and APU *
                 *   TEMP OIL OUT not increasing  *
                 *   after APU start or no start: *
                 *      Perform APU SHUTDN (ENT   *
                 *        PKT, APU/HYD)           *
```

```
*          If two APUs operating:                          *
*          • Delete HYD FLUID THERMAL                      *
*            CONDITIONING                                  *
*          • Delay following until EI-6:                   *
* R2         HYD MN PUMP PRESS (two) – NORM                *
* MDU            √PRESS ind (two) – HI green               *
*            Perform SSME HYD REPRESS                      *
*          • At TAEM:                                      *
* R2         APU SPEED SEL (two) – HI  >>                  *
*                                                          *
*          If only one APU operating:                      *
* R2       • APU AUTO SHTDN (one) – INH                    *
*          • Delete SSME HYD REPRESS and                   *
*            HYD FLUID THERMAL CONDITIONING                *
*          • Delay MM304 trans until EI-2;                 *
*            immediately prior to MM304 trans:             *
*              HYD MN PUMP PRESS (one) – NORM              *
* MDU              √PRESS ind (one) – HI green             *
* R2           APU SPEED SEL (one) – HI  >>                *
```

HYD MN PUMP PRESS (three) – NORM
MDU √PRESS ind (three) – HI green

P **SSME HYD REPRESS**

R2 √HYD MN PUMP PRESS (three) – NORM

```
* If HYD SYS 2 or SYS 1 failed,    *
*   perform following steps using  *
*   SYS 3 in place of failed system *
```

R4 HYD MPS/TVC ISOL VLV
SYS 2 – OP (hold 5 sec, tb-OP) (MA possible)
Wait 10 sec
SYS 2 – CL (hold 5 sec, tb-CL)

SYS 1 – OP (hold 5 sec, tb-OP) (MA possible)
Wait 10 sec
SYS 1 – CL (hold 5 sec, tb-CL)

```
* EI-11> P    HYD FLUID THERMAL CONDITIONING      *
*             (MCC CALL)                          *
*                                                 *
*             CRT2   SURF DRIVE ON – ITEM 39 EXEC *
*                    Start TIMER                  *
*                                                 *
*             MDU    √SPI:  Observe AEROSURFACES  *
*                      CYCLING                    *
*                        ELEV      U33  to  D18 deg *
*                        RUD        R5  to   L5 deg *
*                        SPDBK      15  to   10 %   *
*                        BDY FLP  93.6  to  3.5 %   *
*                                                 *
*                    When SURF DRIVE ON (5 min),  *
*             CRT2     SURF DRIVE OFF – ITEM 40 EXEC *

        B            Stow DEORBIT BURN and DEORBIT BURN
                       MONITOR Cue Cards
                    √ENTRY Cue Cards installed

      *              If 8 psi cabin entry,        *
      *  ALL           √Tabs/Visor – CL/LES O2 – ON *
```

1: GNC DEORB MNVR COAST	2: GNC 50 HORIZ SIT
3: BFS, GNC 50 HORIZ SIT	

G SUIT INFLATION

ALL Load – 1.5 (three turns cw if reqd)

* **FCS CH CONFIG** *

* If less than four PASS GPCs, config FCS *
* CHs so that each GPC cmds equal *
* number of CHs (see table) *
* *
* GNC 53 CONTROLS *
* Config SURF FBK (see table) *

AVAILABLE		FCH CH CONFIG			SURF FDBK	
GPCs	FCS CHs	AUTO	ORIDE	OFF	SEL	DESEL
3	4	3		1	3	1 *
	3	3		1	3	1 *
	2		2	2	2	2
2	4		4		4	
	3		2	2	2	2
	2		2	2	2	2

* * If CH 4 – OFF, do not desel PASS SURF FDBK *

1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST
3: BFS, GNC DEORB MNVR COAST	

B F6,F8 FLT CNTLR PWR (two) – ON

EI-6 Go to <u>ENTRY MANEUVERS</u> (Cue Card)

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ENTRY CUE CARDS

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ENTRY NO-GO CHECKLIST

FAILURE OF:	AERO PTI DTO	AUTO FCS MODE	XWIND DTO ①
APU/HYD: 1 APU			X
2 APUs	X		X
DISPLAYS: 2 ADIs	X		
CDR HUD			X ②
CONTROLLERS:			
RHC: 1L			X
2L & 2R	X		X
RPTA: 2L or 2R			X
GNC: 2 AAs (LAT)	X		X
2 AAs (NORM)	X(M < 2.5)	X ③	
2 RGAs	X		X
2 R DDU PWR SPLY			X
2 IMU (or 1 IMU + BITE)	X		X
2 ADTAs			X
ADTA NOT INCORP OR DLMA		X (M < 2)	
MLS NOT INCORP		X (< 6K ft)	
2 FCS CH (same surface)	X		X
DPS: 1 GPC (not restrung)			X ④
2 GPC (restrung)	X		
2 GPC (not restrung)	X	X ③	X
1 FF			X ④
2 FF	X	X ③	X
2 FA	X		X
RCS: LEAK (AFT – during ENT)	X		
2 YAW JETs (same side)	X		
MIN RCS QTY	X		
TRIM: Ail > ± 2.0 deg	X		
DOWNMODE:			
FCS problem	X	X	X
AOA	X		X
PLB: PLBD Latch Gang	X		
LDG/DECEL:			
Tire Leak			X
HYD BRAKE ISOL VLV			X
< 100% Brakes			X
NWS			X
ENERGY – OFF NOMINAL:			
Roll Ref Alert	X		
Above Upper Traj Line	X		
MCC GCA, or VEL & PSN update	X	X	
No A/L by 6K ft		X	
DATA: SOLID STATE RECORDERS	X (LOS)		
XWIND:			
< 10 Knots Peak			X
> 15 Knots Peak			X
> 10 Knots Gust			X
GROUND SYSTEMS:			
No Runway Aim Point			X

NOTES

① Consider runway redesignation (M > 6) to avoid Xwind landing

② GO if PAPI and BALL BAR available

③ Pitch AUTO mode NO-GO for M < 2.5

④ GO if only string 4 affected

ENTRY MANEUVERS

FLIGHT CONDITIONS	MANEUVER
EI-5	√LVLH ATT GNC, OPS 304 PRO * If PREBANK, R/Y – CSS * * Roll at 1°/sec to * * [1 8 0] if HP ≥ 46 (not AOA), else * * [ ] (from Prebank Table) * * Maintain PREBANK ±5° * If previous OMS OX TK, He TK, or RCS OX TK leak: [G51] VENT DOOR CNTL OPEN – ITEM 43 EXEC (AOA) [SPI] When SB position – 0%: √HYD MN PUMP PRESS (three) – LO
$\bar{q}$ = 1	(AOA) HYD MN PUMP PRESS (three) – NORM
'Guidance Box' @ $\bar{q}$ ~ 8 or D ~ 3	CLOSED LOOP GUIDANCE ____:____:____ * If PREBANK: P,R/Y – AUTO * Begin AIL trim monitoring
V = 24K	If previous OMS OX TK, He TK, or RCS OX TK leak: [G51] VENT DOOR CNTL CLOSE – ITEM 44 EXEC
D = 11	√DRAG H
ΔAz = 10.5°	FIRST ROLL REVERSAL [ ] (DEL PAD)
V = 19K	√HYD MPS/TVC ISOL VLV SYS (three) – CL
V = 15K	√NAVAIDS (I/O RESET if reqd)
V = 12K	RAD BYP VLV MODE (two) – AUTO CNTLR LOOP (two) – AUTO B(A)
V = 10K	√SPDBK to 81%

ENT-6a/E/R

Replace this page with page(s) from Flight Supplement

Replace this page with page(s) from Flight Supplement

(Replace with pages FS 4-6 thru FS 4-10)

ENTRY CONTROL

ARCS QTY (L + R) < 10 %

ARCS QTY = 0 & JETS FAIL OFF		1. ENTRY MODE – NO Y JET (R/Y CSS; expect sluggish control)
$\bar{q} \geq 20$ & M > 6		2. G51 ELEVON FIXED – ITEM 18 EXEC (*)
	CONTROL PROBLEMS* & ARCS QTY > 0	3. ENTRY MODE – AUTO When control regained: 4. ENTRY MODE – NO Y JET 5. √AIL trim
M < 6 & ARCS QTY > 0		6. ENTRY MODE – AUTO
M < 5		7. TRIM/RHC PNL – ENA 8. TRIM ROLL – away from AIL trim (to < 1)

*Region of least margin: M 12-8

AIL TRIM ≥ 3°

TAL		1. G51 WRAP MODE – ITEM 45 EXEC (ACT)
AIL trim = 5		2. BF – MAN 3. BF – UP (to 0%)
	NO Y JET	4. Perform roll reversals at 3°/s (expect sluggish control)
	M < 13 & AIL trim = 5	5. P – CSS 6. Fly α per schedule:

M	12	11	10	9	8-6	5
α	37	36	35	33	30	26

	M < 5	7. TRIM/RHC PNL – ENA 8. TRIM ROLL – away from AIL trim (to < 1) 9. P – AUTO
	M < 2	10. BF – AUTO

ENT-10a/A,E/B

HIGH-FREQ OSC OR SURF/JET CYCLE

	Returning PL > 10K lb	1. G51 √FILTER ALT – ITEM 21 (*)
		2. P, R/Y – CSS
Osc/Cycle continues		3. ENTRY MODE – LO GAIN
	Osc/Cycle stops	4. ENTRY MODE – AUTO 5. P, R/Y – AUTO

ENT-10b/A,E/B

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POST LANDING PROCEDURES

LOSS OF COMM

In event of loss of comm (day or night), the following signals will be utilized to indicate onboard status to convoy:

NOTE

Before declaring loss of comm, attempt to contact convoy on 259.7 using PRC-112 radio channel A

Crew should continue signals until acknowledged by convoy

From Crew (with Mini Mag light stowed in ACES or Spotlight stowed in volume 3b)

Crew OK	Circular motion
OMS/RCS & Hatch safed	Circular motion
APU shutdn	Circular motion
Crew needs assistance; will open/blow hatch	Vertical motion
Crew needs assistance; will not open/blow hatch	Horizontal motion

From Convoy

Convoy will acknowledge crew signals with sequence of three flashes of headlights on convoy vehicle

Continuous flashing – Emer pwrdn and egress

****

EXPEDITED PWRDN

Accomplish for:

- Loss of all comm, including hand signals, with convoy elements
- Loss of telemetry and onboard systems monitoring visibility
- Fuel leak (OMS, RCS, or APU) if:
  - Nonisolatable, or
  - Leak occurs during RTLS, TAL, AOA, or POST D/O TIG
- Fire Suppression Bottle discharged during entry for confirmed or suspected fire

If APU, OMS, RCS Fuel Leak:

APUs OFF ASAP

As time permits:

RCS,OMS SAFING (RJDs), 5-4

GPC DEACT

O6 GPC MODE 1,2,3,4,5 (five) – STBY (tb-bp)
– HALT

ET UMBILICAL DOOR OPENING, 5-5 (RTLS/TAL only)

'MODE 5' POST LANDING EGRESS Cue Card (CDR or MCC call) then EMER PWRDN Cue Card

1: GNC VERT SIT 2	2: GNC SYS SUMM 1
3: BFS, GNC VERT SIT 2	

POST LANDING

> WARNING
> APUs OFF ASAP for APU hydrazine, OMS, RCS (FWD or AFT), or MPS propellant leak

00:00			After orbiter stops:
	C		Report, "WHEELS STOP" Establish COMM with NCC
		L2	SPD BK – MAN, full fwd NWS – OFF
	P		If RTLS or TAL abort: Perform ET UMBILICAL DOOR OPENING, 5-5
		R2	√APU AUTO SHTDN (three) – ENA √SPEED SEL (three) – NORM
		R1	√AC BUS SNSR (three) – AUTO
	C	F6	FLT CNTLR PWR – OFF
	B	F3	HUD PWR (two) – OFF
			If ELS:
	P	C3	MSTR MADS PWR – OFF DoD ELS, MCC call DoD OSC on NCC

> NOTE
> MCC will report "GO/NO-GO TO DOFF SUITS" (post safety assessment)

1: GNC VERT SIT 2	2: GNC SYS SUMM 1
3: BFS, GNC VERT SIT 2	

CDR

NOTE

CDR activities are now on even numbered pages and PLT activities on odd numbered pages

RCS, OMS SAFING (RJDs)

C3	√OMS ENG (two)	– OFF
O14:F	RJD DRIVER (nine)	– OFF
O15:F	LOGIC (eight)	– OFF
O16:F	OMS ENG VLV (two)	– OFF

C,P,MS **DRAG CHUTE SAFING**

(Not performed if ELS)

O15:E	cb MNB DRAG CHUTE SYS 2	– op
O16:E	MNC DRAG CHUTE SYS 1	– op
F2,F3, F4	√DRAG CHUTE pb (six)	– lt off

DEACT AIR DATA PROBE HTRS

C3 √AIR DATA PROBE (two) – DPY

C,P,MS **LANDING GEAR SAFING**

(Not performed if ELS)

R14:F cb ESS 1BC LDG GEAR ARM/DN RESET – cl

NOTE

SM0 TIRE PRESS msgs occur when LG ARM/DN RESET performed

A12 LG ARM/DN RESET – RESET

F6,F8 √LDG GEAR pb (four) – lt off

A12 LG ARM/DN RESET – dn

R14:F cb ESS 1BC LDG GEAR ARM/DN RESET – op

Check with MS3. Report to MCC: “RJDs OFF, SIDE HATCH, DRAG CHUTE, AND LANDING GEAR SAFED” (MCC report to NCC)

PLT **ET UMBILICAL DOOR OPENING**

Report to MCC, "ET UMBILICAL DOORS ARE COMING OPEN"

R2 ET UMB DR
- MODE – GPC/MAN
- R LAT – REL (tb-bp, REL ~6 sec)
  - – OFF
  - DR – OP (tb-bp)
- Wait 12 sec, R DR – OFF (tb-bp)
- L LAT – REL (tb-bp, REL ~6 sec)
  - – OFF
  - DR – OP (tb-bp)
- Wait 12 sec, L DR – OFF (tb-bp)
- MODE – GPC

HYDRAULIC LOAD TEST (ON MCC CALL)

NOTE

Minimum of two operating hyd systems is reqd for this test

F4 BDY FLP pb – MAN

F8 √FLT CNTLR PWR – ON

NOTE

If only two systems are operating, do not depressurize either hyd pump

R2 HYD MN PUMP PRESS 1 – LO (MA)

C3 Run Full Load Test:
- BDY FLP – TRAIL
- RHC – Forward ctr
- Rudder full left

When set, do following simo:
- BDY FLP – UP (to ≤ 6%)
- RHC – move to aft ctr
- Rudder full right

RHC – release

Rudder – neutral

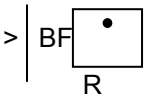
BDY FLP – reset to TRAIL

R2 HYD MN PUMP
- PRESS 1 – NORM
- 3 – LO (MA)

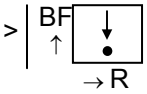
C3 Repeat Load Test

R2 HYD MN PUMP PRESS 3 – NORM

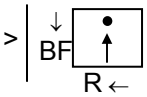
SETUP:



LOAD TEST:



RELEASE:



1: GNC VERT SIT 2	2: GNC SYS SUMM 1

3: BFS, GNC VERT SIT 2

CDR

MCC Report GO/NO-GO for DPS transition

DPS TRANSITION – GNC 9 (If PASS)

NOTE

No keyboard entries or sw throws 10 sec:
Before and after moding PASS GPCs to RUN
Before OPS transition or set expansion/contraction requests until new OPS base page is displayed.

MCC will call for BFS to be taken from RUN to STBY for Solid State Recorder dumping and PL monitoring as reqd

√BFC CRT DISP – ON

CRT3 BFS, GNC, OPS 000 PRO

3: BFS, GNC BFS MEMORY

1: GNC 0 GPC MEMORY

Verify:

CONFIG GPC		9 12340
STR	1	1
	2	2
	3	3
	4	4
PL	1/2	1
CRT	1	1
	2	2
	3	3
	4	0
L	1	1
	2	2
MM	1	1
	2	2

CRT1 GNC, OPS 901 PRO

1: GNC VERT SIT 2	2: GNC SYS SUMM 1

3: BFS, GNC VERT SIT 2

PLT **SET BODY FLAP (Prior to OPS 9)**

F4 BODY FLAP pb – MAN
C3 BODY FLAP – DOWN (100%)

SSME REPO (If PASS, OPS 9, and GO from MCC)

NOTE

Do not resume GNC SPEC 105 until 'VFB 84 – COMPLETE' msg rcvd

2: GNC 105 TCS CONTROL

R4 HYD MPS/TVC ISOL VLV SYS (three) – OP
Hold 5 sec, √tb – OP

* If less than two HYD MPS/TVC *
* ISOL VLVs open, √MCC *

CRT2 CLEAR MSG – ITEM 8 EXEC
SELECT ID – ITEM 1 +0 2 EXEC
√NAME VFB 84 (~15 sec)
MM READ – ITEM 2 EXEC
√'AI MODE 1(0,3) COMPLETE' msg (~2.5 min)
√'VFB 84 – COMPLETE' msg

* If any 'AI MODE X FAILED RETEST' msg: *
* √MCC, report ECP ERROR *
* To terminate: CANCEL – ITEM 5 EXEC *

Go to APU/HYD SHUTDN >>

SPDBK REPO (No SSME REPO, ON MCC GO)

R4 √HYD MPS/TVC ISOL VLV SYS (three) – CL

2: GNC 113 ACTUATOR CONTROL

CRT2 AI MODE 1 MDM – ITEM 23 EXEC (*)
√ACTUATOR GIMBALING STATUS – RUN, CPLT
SB – ITEM 1 EXEC (*)
RATE – ITEM 29 +1 EXEC
FIN POS – ITEM 30 +8 EXEC
√START 31 – → ←
START – ITEM 31 EXEC (*→ ←)
√STATUS – RUN, CPLT (~30 sec)

* If STATUS – STOP or BUSY: *
* √MCC, (To terminate: ITEM 32 EXEC) *

Go to APU/HYD SHUTDN >>

1: AS DESIRED	2: AS DESIRED
3: AS DESIRED	

CDR **RAD RECONFIG**

(On MCC call, unless no COMM)

O1 When FREON EVAP OUT TEMP > 40 degF:
If RTLS/TAL/AOA, go to NH3 RECONFIG, 5-22 >>

L1 RAD OUT TEMP – HI
H2O PUMP LOOP 1 – ON
Proceed to NH3 ACT

NH3 ACT

O1 When FREON EVAP OUT TEMP > 55 degF, select one of the following as specified by MCC:

L1 NH3 CNTLR A – PRI/GPC ( )
– SEC/ON ( )
B – PRI/GPC ( )
– SEC/ON ( )

```
*            During NH3 ops:                          *
*            If EVAP OUT TEMP alarm and               *
* O1         | FREON EVAP OUT TEMP < 32 degF:         *
* L1         |   1.  FREON PUMP LOOP 1,2              *
*            |       (two) – OFF (ASAP)               *
*            |   2. √H2O PUMP LOOP 1 – ON             *
*            |   3.  NH3 CNTLR A(B) – OFF             *
*            |   4.  FLOW PROP VLV LOOP 1,2           *
*            |       (two) – PL HX (tb-PL)            *
*            |   5.  FREON PUMP LOOP 1 – B            *
*            |       Wait 3 min, then:                *
*            |   6.  FREON PUMP LOOP 2 – B            *
*            |   7.  Go to NH3 RECONFIG, 5-22  >>     *
*            If EVAP OUT TEMP alarm and               *
* O1           FREON EVAP OUT TEMP > 65 degF:         *
*              8.  Go to NH3 RECONFIG, 5-22           *
```

1: AS DESIRED	2: AS DESIRED
3: BFS, SM SYS SUM 2	

PLT **APU/HYD SHUTDN**

√SSME REPO complete (if PASS)

R4 HYD MPS/TVC ISOL VLV (1,2,3; 5 sec interval) – CL (hold each 5 sec, tb-CL)

R2 BLR PWR (three) – OFF
N2 SPLY (three) – OFF
APU OPER (1,2,3; 5 sec interval) – OFF (MA)
APU FU TK VLV (three) – CL
√Shutdn (HYD PRESS < 200)
CNTLR PWR (three) – OFF

Report to MCC, "APU/HYD SHUTDOWN"

MCC Report to Convoy 1, "SSME REPO COMPLETE AND APU/HYD SHUTDOWN"
Report, "GO/NO-GO FOR VENT DOOR PURGE POSITIONING"

POST LANDING MPS RECONFIG
(After APU/HYD shutdn + 1 min)

NOTE
Expect multiple MAs for MPS He P as regs bleed down

R2 MPS He ISOL (six) – CL
I'CNCT L – OUT OP
PNEU L ENG He XOVR – CL

1: AS DESIRED	2: AS DESIRED
3: AS DESIRED	

C,MS

C **PCS DEACTIVATION**

L2 O2 SYS 1,2 SPLY (two) – CL (tb-CL)
√EMER tb – bp

MS **GPS PWRDN**

* If landing not at KSC, EDW, or NOR *
* GPS ENCRYPT – ZEROIZE *
* Wait 1 sec *
* GPS ENCRYPT – NORMAL *

If OV103,4:
A13 GPS POWER – OFF
PRE AMPL UC – OFF
LC – OFF

If OV105:
O7 GPS POWER (three) – OFF
PRE AMPL UPPER (three) – OFF
LOWER (three) – OFF

MCC Report, “GO/NO-GO FOR EXTENDED PWR UP”

If GO for EXTENDED PWR UP, go to SYS DEACT FOR EXTENDED PWR UP, 5-14

1: AS DESIRED	2: GNC 105 TCS CONTROL
3: AS DESIRED	

PLT **VENT DOOR PURGE POSITIONING (PASS)**

(on MCC GO, not performed if ELS)
(Do not perform during SYS DEACT FOR EXTENDED PWRUP)

CRT2 CLEAR MSG – ITEM 8 EXEC
SELECT ID – ITEM 1 +0 3 EXEC
√NAME 'VFB89' (~15 sec)
MM READ – ITEM 2 EXEC
After 'VFB89 – ENTERING 30 MIN DELAY' msg, CANCEL – ITEM 5 EXEC

RCS, OMS VALVE TEST

Pause 1 sec between each line

O7 √MSTR RCS XFEED – OFF

O8 L,R OMS He PRESS/VAP ISOL (four) – CL,GPC
L OMS XFEED (two) – OP (tb-OP),
then – CL (tb-CL)
R OMS XFEED (two) – OP (tb-OP),GPC
then – CL (tb-CL),GPC
L,R OMS TK ISOL
(four) – CL (tb-CL),
then – OP (tb-OP),GPC
L OMS XFEED (two) – OP (tb-OP),GPC
FWD RCS
He PRESS (two) – CL (tb-CL),GPC
TK ISOL (two) – CL (tb-CL),
then – OP (tb-OP),GPC
MANF ISOL (five) – CL (tb-CL)
then – OP(tb-OP),GPC

O7 L,R RCS
He PRESS (four) – CL (tb-CL),GPC
MANF ISOL (ten) – CL (tb-CL),
then – OP (tb-OP),GPC
TK ISOL (six) – CL (tb-CL)
XFEED (four) – OP (tb-OP),
then – CL (tb-CL),GPC
TK ISOL (six) – OP (tb-OP),GPC

1: AS DESIRED	2: AS DESIRED
3: AS DESIRED	

C **GPC DEACT (If NO-GO FOR EXTENDED PWR UP)**
(Perform after RCS/OMS VALVE TEST completed by PLT)

O6 GPC MODE 1,2,3,4,5 (five) – STBY (tb-bp) – HALT
Inform MS to proceed with POST LANDING PAYLOAD ACTIVITIES (if reqd), FS 5-19

1: OFF	2: OFF
3: OFF	

C,MS,PS HATCH OPENING (KSC,EDW,NOR)

SEAT EGRESS

C,MS,PS Pull G SUIT controller clip (if inflated)
Lap Belt and Chute – Release
Egress seat (Helmet reqd if ELS)
MS,PS Unstow 'Return to Houston' Bags (except ELS)

HATCH OPENING (not KSC,EDW,NOR)

ALL √Tabs/Visor – CL
Green Apple – PULL
MS Open Hatch/Deploy Slide per decal

C Give PLT GO for VEHICLE PWRDN

C,MS,PS **ORBITER UNAIDED EGRESS**

Egress orbiter
Hand carry Landing Site Data book (if ELS) (reference ELS POST LANDING procedures)

1: OFF	2: OFF
3: OFF	

PLT

NOTE

If GO for EXTENDED PWR UP, go to SYS DEACT FOR EXTENDED PWR UP, 5-15.

If NO-GO for EXTENDED PWR UP, continue ops

HATCH OPENING (not KSC,EDW,NOR)

Before hatch opening:
√Tabs/Visor – CL

Green Apple – PULL

VEHICLE PWRDN (on GO from CDR)

NOTE

All vehicle lighting and orbiter O2 will be lost at pwrdn

R1	MN BUS TIE (three)	– OFF
	FC/MN BUS (three)	– OFF
	ESS BUS SOURCE FC (three)	– OFF

EGRESS

Pull G SUIT controller clip (if inflated)
Egress seat, orbiter
(Helmet reqd if ELS)

MCC TO KSC HANDOVER (at crew egress)

1: GNC 0 GPC MEMORY	2: AS DESIRED
3: AS DESIRED	

CDR **SYS DEACT FOR EXTENDED PWR UP**

(Do not perform during VENT DOOR PURGE POSITION, SSME REPO, or SPDBK REPO sequence)

NOTE

No keyboard entries or sw throws 10 sec:
Before and after moding PASS GPCs to RUN
Before OPS transition or set expansion/contraction requests until new OPS base page is displayed

EXTEND PWR UP

1: GNC 0 GPC MEMORY

CONFIG GPC		9 10000
STR	1	1
	2	1
	3	1
	4	1
PL	1/2	1
CRT	1	1
	2	1
	3	1
	4	0
L	1	1
	2	1
MM	1	1
	2	1

CRT1 GNC, OPS 901 PRO

GPC PWRDN

O6 GPC MODE 2,3,4 (three) – STBY (tb-bp)
– HALT

CRT1 If no GPC failure,
ERR LOG RESET – ITEM 48 EXEC

O6 GPC PWR 2,3,4 (three) – OFF
LTG (five) – OFF

C2 IDP/CRT 2 PWR – OFF

Inform MS2 to proceed with MS Sys Deact activities, 5-18

1: GNC 0 GPC MEMORY	2: AS DESIRED
3: AS DESIRED	

PLT **SYS DEACT FOR EXTENDED PWR UP**

F8	FLT CNTLR PWR – OFF
F3	TRIM PNL – OFF
	√RHC – INH
R4	HYD BK HTR (three) – OFF
O8	LTG (five) – OFF
O17:A	ATVC (four) – OFF

1: AS DESIRED	2: OFF
3: AS DESIRED	

C,MS,PS

C	L2	ANTISKID	– OFF
		√NWS	– OFF
	C3	√FCS CH (four)	– AUTO
	F3	TRIM PNL	– OFF
		√RHC	– INH

IDP/CRT 4 PWRDN

MS	R12	IDP/CRT 4 PWR – OFF

EGRESS
(After MS Sys Deact complete, and ASP Comm check with MCC complete)

C	L5	L COMM PWR – OFF
C,MS,PS		Pull G SUIT controller clip (if inflated) Egress seat
MS MS,PS	A11,A15, MO39M	COMM CCU PWR – OFF
		Unstow ‘Return to Houston’ Bags
C,MS,PS		Egress orbiter

1: AS DESIRED	2: OFF
3: AS DESIRED	

PLT **EGRESS**

(When desired after ground support personnel establishes comm at PS station)

R6 R COMM PWR – OFF
Pull G SUIT controller clip (if inflated)
Egress seat, orbiter

MCC TO KSC HANDOVER

(At crew egress or GSE cooling activation, whichever occurs later)

1: AS DESIRED	2: OFF
3: AS DESIRED	

MS **MS SYS DEACT FOR EXTENDED PWR UP**

MS1 Perform POST LANDING PAYLOAD ACTIVITIES (if reqd), FS 5-19

MS2 **LRU DEACTIVATION**
(After APU/HYD SHUTDN)

	O14,O15, O16	BRAKES (three)	– OFF
		RGA (four)	– OFF
		IMU (three)	– OFF
		ASA (four)	– OFF
		cb ADTA (four)	– op
		cb/sw ACCEL (four)	– op/OFF
		cb DDU (six)	– op
		MNA NWS	– op
		MNB NWS	– op
	O7	TACAN MODE (three) (OV103,104 only)	– OFF
	O8	RADAR ALTM (two)	– OFF
		MLS (three)	– OFF
C	L1	IMU FAN (three)	– OFF

APU HEATER DEACTIVATION
(After APU/HYD SHUTDN)

A12	APU HTR	
	TK/FU LN/H2O SYS (six)	– OFF
	GAS GEN/FU PUMP (three)	– OFF
	LUBE OIL LN (three)	– OFF

RCS/OMS HEATERS PWRDN

A14 OMS CRSFD LINE A,B (two) – OFF
If reqd, install and lock PL Bay Window Shades

MS2 Inform CDR, “POST LANDING PROCEDURE COMPLETE”

Replace this page with page(s) from Flight Supplement

Replace this page with page(s) from Flight Supplement

1: AS DESIRED	2: OFF
3: AS DESIRED	

ASP INTEGRATED POST LANDING PROCEDURES FOR EXTENDED PWR UP

ASP 1	A15	Connect Comm (PS) PS Comm CCU PWR – ON
		Comm ck with MCC
ASP to MCC		Report when “CREW READY TO EGRESS”
		Report “POST LANDING PROCEDURE COMPLETE”

1: AS DESIRED	2: OFF
3: AS DESIRED	

CDR **SYS DEACT FOR EXTENDED PWR UP**

NH3 RECONFIG

(On MCC call; Cooling Cart not ready)

L1 1. NH3 CNTLR A(B) – OFF
If RTLS/TAL/AOA:
2. RAD BYP VLV LOOP 1,2 – RAD FLOW
Wait 1 min
H2O PUMP LOOP 1 – ON

O1 When FREON EVAP OUT TEMP > 55 degF, select one of the following as specified by MCC:

L1 3. NH3 CNTLR A – PRI/GPC (☐)
A – SEC/ON (☐)
B – PRI/GPC (☐)
B – SEC/ON (☐)

ASP EXT PWR UP

```
*          During NH3 ops:                          *
*          If EVAP OUT TEMP alarm and               *
* O1        FREON EVAP OUT TEMP < 32 degF:          *
* L1          1.  FREON PUMP LOOP 1,2               *
*                 (two) – OFF (ASAP)                *
*            2. √H2O PUMP LOOP 1 – ON               *
*            3.  NH3 CNTLR A(B) – OFF               *
*            4.  FLOW PROP VLV LOOP 1,2             *
*                 (two) – PL HX (tb-PL)             *
*            If no comm:                            *
*                5.  Go to VEHICLE PWRDN,           *
*                     5-13  >>                      *
*            6. √MCC                                *
*          If EVAP OUT TEMP alarm and               *
* O1        FREON EVAP OUT TEMP > 65 degF:          *
*            7.  Go to POST LANDING LOSS            *
*                 OF COOLING, 5-24                  *
```

1: AS DESIRED	2: OFF
3: AS DESIRED	

CDR **NH3 DEACT**

(On MCC call if Cooling Cart ready)

L1
1. NH3 CNTLR A(B) – OFF
2. RAD OUT TEMP – NORM

```
*          After NH3 TERMINATION:                  *
*          If EVAP OUT TEMP alarm and              *
* O1        FREON EVAP OUT TEMP < 32 degF:         *
* L1          1.  FREON PUMP LOOP 1,2              *
*                 (two) – OFF (ASAP)               *
*            2. √H2O PUMP LOOP 1 – ON              *
*            3.  FLOW PROP VLV LOOP 1,2            *
*                 (two) – PL HX (tb-PL)            *
*            If no comm:                           *
*                4.  Go to VEHICLE PWRDN,          *
*                     5-13  >>                     *
*            5. √MCC                               *
*          If EVAP OUT TEMP alarm and              *
* O1         FREON EVAP OUT TEMP > 65 degF          *
*            for 5 min:                            *
*            6.  Go to POST LANDING LOSS           *
*                 OF COOLING, 5-24                 *
```

1: AS DESIRED	2: OFF

3: AS DESIRED

POST LANDING LOSS OF COOLING (NH3 FAILED OR DEPLETED)

C	L1	1. NH3 CNTLR A,B (two) – OFF
		2. √RAD BYP VLV MAN SEL (two) – RAD FLOW (tb-RAD, 3 sec)
		3. √RAD CNTLR OUT TEMP – NORM
C,P,MS		4. √Complete post landing procedures thru ENT C/L, 5-18 & FS 5-19 ASAP Assume GO for EXTENDED PWR UP
B	C3	5. √BFC CRT SEL – 3+1 DISP – ON

3: BFS, SM SYS SUMM 2

		Terminate monitoring if ground cooling established (Convoy commander call) >>
	CRT3	6. Monitor AV BAY TEMP (three) When AV BAY TEMP 1 or 2 > 113 or AV BAY TEMP 3 > 107 or no temperature insight:
P		7. Go to VEHICLE PWRDN, 5-13 >>
A		8. Crew egress if not already complete

1-ORBIT LATE DEORBIT PROCEDURES

Refer to DEORBIT BURN FLIGHT RULES Cue Card for failures that require 1-orbit delay

1-ORB LATE

1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST

3: BFS, GNC DEORB MNVR COAST

1-ORBIT LATE DEORBIT PROCEDURES

TRANS B These procedures assume:
DAP
1. All DEORB PREP completed
2. DEORBIT BURN completed up to but not including SINGLE APU START, 3-13. If activities are not complete, then do them during troubleshooting time

C CRT1 GNC, OPS 301 PRO

R2 √HYD MN PUMP PRESS (three) – NORM

B A14 RCS/OMS HTR
FWD RCS – A AUTO
L POD (two) – A AUTO,B OFF
R POD (two) – A AUTO,B OFF
OMS CRSFD LINES (two) – A AUTO,B OFF
FWD RCS JET 5 (one) – AUTO
AFT RCS JET 5 (one) – AUTO

1: GNC 50 HORIZ SIT

3: BFS, GNC 50 HORIZ SIT

CRT1 √GPS, INCORPORATE

TIG-1:10> **IMU/IMU ALIGN**

Perform IMU/IMU alignment using best IMU as reference. √MCC for reference IMU

1: GNC 21 IMU ALIGN

1-ORB LATE

C CRT1 REF IMU – ITEM 14 + __ EXEC
√TYPE, ITEM 15 – TORQUE
ALIGN IMU 1(2,3) – ITEM 10(11,12) EXEC (*****)
If no comm, EXEC – ITEM 16 EXEC (*****)
Rcd MET ___/___:___
√EXEC, ITEM 16 – (no *****) (4-6 min)

1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST

3: BFS, GNC DEORB MNVR COAST

CRT2 GNC, OPS 302 PRO

1: GNC DEORB MNVR EXEC	2: GNC DEORB MNVR EXEC

3: BFS, GNC DEORB MNVR EXEC

ALL FLUID LOADING: 1-ORBIT LATE

Begin Fluid Loading per individual prescription. Fluid Loading should be completed by EI
For 1 rev waveoff, repeat half the protocol
For > 1 rev waveoff, repeat entire protocol

FINAL DEORB UPDATE/UPLINK

1: GNC 50 HORIZ SIT

3: BFS, GNC 50 HORIZ SIT

CRT1,3 GPS INH – ITEM 43 EXEC

1: GNC DEORB MNVR EXEC

3: BFS, DEORB MNVR EXEC

C MCC UPDATE:
DEL PAD
OMS PRPLT PAD
MCC UPLINK:
PASS, BFS SV (if reqd)
PASS, BFS TGT

G50 √LAND SITE as reqd

On MCC GO:
CRT1 LOAD – ITEM 22 EXEC
TIMER – ITEM 23 EXEC
CRT1,3 √PASS & BFS TGTS per MNVR PAD:
BURN ATT
ΔVTOT
TGO
HA HP

1: GNC DEORB MNVR EXEC	2: GNC DEORB MNVR EXEC

3: BFS, GNC DEORB MNVR EXEC

IF WAVEOFF
Go to IF NO-GO FOR
DEORBIT BURN, 3-11

TIG-15> B A14 RCS/OMS HTR
FWD RCS – OFF
L POD (two) – A OFF,B OFF
R POD (two) – A OFF,B OFF
OMS CRSFD LINES (two) –
A AUTO,B AUTO
FWD RCS JET 5 (one) – OFF
AFT RCS JET 5 (one) – OFF

TIG-10> **MNVR TO 1-ORBIT LATE DEORBIT ATT**

C3 √DAP: AUTO
B F6,F8 √ADI ATT (two) – INRTL
√ERR (two) – MED
√RATE (two) – MED
C CRT1 MNVR – ITEM 27 EXEC (*****)
(√ADI ATT with CRT BURN ATT)
B Copy last DEL PAD and OMS PRPLT PAD data on DEORBIT BURN Cue Cards

F6/F8 √DEORBIT BURN and DEORBIT BURN MONITOR Cue Cards installed

3: BFS, SM SYS SUMM 2

R2 HYD MN PUMP PRESS (three) – LO

Return to DEORBIT BURN Cue Cards and SINGLE APU START, 3-13

SWITCH LIST AT WHEELS STOP EGRESS

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(Replace with pages FS CC 8-2 thru FS CC 8-4)

TOP
HINGED AT BOTTOM OF 'DEORBIT BURN (RCS)'
HINGE

RCS COMPLETION:

THC +X to TGT HP or TOT AFT QTY 1 [ ][ ][ ] %

At AFT QTY 1
If CUR HP:

THC +X to CAPTURE HP or
TOT AFT QTY 2 [ ][ ] % then
PREBANK/FRCS COMPLETION
to downrange site

CAPTURE HP [ ][ ] PREBANK/FRCS COMPLETION to downrange site

PREBANK/FLIP HP [ ][ ] PREBANK/FRCS COMPLETION

AFT HP [ ][ ] THC +X to TGT HP

TGT HP [ ][ ]

FRCS COMPLETION (if applicable)**:**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF: VGOx = 0, release THC
AFT RCS RECONFIG
Trim Inplane X,Z residuals < 2 fps (< 0.5 fps if shallow)

ENT-3aa/D/M

(reduced copy)

TOP
BACK OF ‘DEORBIT BURN (RCS)’

HOOK VELCRO

HOOK VELCRO

ENT-3b/D/E

HINGE

(reduced copy)

FAB USE ONLY CC 8-6 ENT/ALL/GEN H

TOP
HINGED AT BOTTOM OF ‘DEORBIT BURN (RCS)’
HINGE

ENT-3bb/D/E

(reduced copy)

TOP

HOOK VELCRO	**DEORBIT BURN (2 ENG)**	HOOK VELCRO

√MM302 √OMS BOTH
Enter TGO + 5 sec
√TRIM per MNVR PAD or P +0.0, LY -5.7, RY +5.7
L,R OMS He PRESS/VAP ISOL A (two) – GPC
B (two) – OP
√DAP – AUTO(PASS)/DISC
ADI – LVLH(REF)/HI/MED
FLT CNTLR PWR (two) – ON

TIG-2 OMS ENG (two) – ARM/PRESS
- :15 EXEC (NO EXEC > TIG + [ ] : [ ])
- :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
:00 TIG Start watch (√P_C, ΔVTOT, ENG VLVs)
If no OMS ignition: APUs – SHUT DN

OMS PRPLT FAIL:
Failed OMS ENG – OFF

L OMS FAIL HP	R OMS FAIL HP
[ ]	[ ]

STOP BURN:
Good OMS ENG – OFF
APUs – SHUT DN
Secure aff OMS

CONTINUE BURN:
ITEM 18 +0 EXEC
When good OMS QTY:
5%: L,R OMS XFEED (four) – OP
4%: Good OMS TK ISOL (two) – CL
If OMS P_C < 80 or OMS TEMP,
OMS ENG – OFF
√ADI – LVLH, center needles
RCS COMPLETION

OMS ENG FAIL:
Failed OMS ENG – OFF
OMS XFEED at 1/2 ΔVTOT at fail [ ]
or OMS QTY [ ] %L or [ ] %R

2nd OMS FAIL (ENG or PRPLT):
Failed OMS ENG – OFF
If PRPLT FAIL:
Secure aff OMS
ITEM 18 +0 EXEC

Both ENG FAIL HP	Either PRPLT FAIL (SAFE) HP
[ ]	[ ]

STOP BURN:
APUs – SHUT DN

CONTINUE BURN:
√ADI – LVLH, center needles
Interconnect good OMS to RCS
THC +X (√OMS% vs RCS Burn Time)
RCS I'CNCT TK SW (N/A PRPLT FAIL)
THC +X (√OMS% vs RCS Burn Time)
AFT RCS RECONFIG
RCS COMPLETION

ENT-4a/D/L

HINGE

(reduced copy)

TOP
HINGED AT BOTTOM OF 'DEORBIT BURN (2 ENG)'
HINGE

RCS COMPLETION:

THC +X to TGT HP or TOT AFT QTY 1 ___ %

At AFT QTY 1 If CUR HP:

THC +X to CAPTURE HP or TOT AFT QTY 2 ___ % then PREBANK/FRCS COMPLETION to downrange site

CAPTURE HP ___ PREBANK/FRCS COMPLETION to downrange site

PREBANK/FLIP HP ___ PREBANK/FRCS COMPLETION

AFT HP ___ THC +X to TGT HP

TGT HP ___

FRCS COMPLETION (if applicable)**:**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF
+ :02 OMS ENG(s) – OFF (if < 3 IMU, at ___ : ___)
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ENT-4aa/D/K

(reduced copy)

TOP
BACK OF 'DEORBIT BURN (2 ENG)'

HOOK VELCRO	**DEORBIT BURN (1 ENG)**	HOOK VELCRO

√MM302 √OMS L or R
√OMS BURN CONFIG (L or R XFEED)
Enter TGO + 10 sec
√TRIM per MNVR PAD or P +0.0, LY +5.2, RY -5.2
L,R OMS He PRESS/VAP ISOL A (two) – OP
. . . . . Wait 2 sec . . . . . B (two) – OP
√DAP – AUTO(PASS)/DISC
ADI – LVLH(REF)/HI/MED
FLT CNTLR PWR (two) – ON

TIG-2	Good OMS ENG – ARM/PRESS
- :15	EXEC (NO EXEC > TIG + [ ] : [ ][ ])
- :15	If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
:00	TIG Start watch (√P_C, ΔVTOT, ENG VLVs)

* If no OMS ignition: APUs – SHUT DN *

OMS XFEED RETURN at ΔVTOT = [ ][ ][ ]
or [ ] [ ][ ] at [ ][ ] %
L,R OMS TK ISOL (four) – OP
XFEED (four) – CL

OMS PRPLT FAIL:
OMS ENG – OFF

SAFE HP [ ][ ]

STOP BURN:
APUs – SHUT DN
Secure aff OMS

CONTINUE BURN:
Secure aff OMS
ITEM 18 +0 EXEC
√ADI – LVLH, center needles
Interconnect good OMS to RCS
THC +X(√OMS% vs RCS Burn Time)
AFT RCS RECONFIG
RCS COMPLETION

OMS ENG FAIL:
OMS ENG – OFF

ENG FAIL HP [ ][ ][ ]

STOP BURN:
APUs – SHUT DN

CONTINUE BURN:
√ADI – LVLH, center needles
Interconnect good OMS to RCS
THC +X(√OMS% vs RCS Burn Time)
RCS I'CNCT TK SW
THC +X(√OMS% vs RCS Burn Time)
AFT RCS RECONFIG
RCS COMPLETION

RCS +X JET FAIL OFF:

SAFE HP [ ][ ]

STOP BURN:
APUs – SHUT DN

CONTINUE BURN:
ITEM 18 +0 EXEC
G23 Resel jets

ENT-4b/D/J

HINGE

(reduced copy)

TOP
HINGED AT BOTTOM OF 'DEORBIT BURN (1 ENG)'
HINGE

RCS COMPLETION:

THC +X to TGT HP or TOT AFT QTY 1 [ ][ ][ ] %

At AFT QTY 1 If CUR HP:

THC +X to CAPTURE HP or TOT AFT QTY 2 [ ][ ] % then PREBANK/FRCS COMPLETION to downrange site

CAPTURE HP [ ][ ] PREBANK/FRCS COMPLETION to downrange site

PREBANK/FLIP HP [ ][ ] PREBANK/FRCS COMPLETION

AFT HP [ ][ ] THC +X to TGT HP

TGT HP [ ][ ]

FRCS COMPLETION (if applicable)**:**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF
+ :02 OMS ENG – OFF (if < 3 IMU, at [ ]:[ ][ ])

* AFT RCS RECONFIG if INTERCONNECT *

Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ENT-4bb/D/L

(reduced copy)

TOP

HOOK VELCRO	UNBALANCED PRPLT DEORBIT BURN	HOOK VELCRO

√MM302 √OMS BOTH
Enter TGO + 5 sec
√TRIM per MNVR PAD or P +0.0, LY -5.7, RY +5.7
√DAP – AUTO(PASS)/DISC
ADI – LVLH(REF)/HI/MED
FLT CNTLR PWR (two) – ON
Feed 2 ENG from 1 POD
L,R OMS He PRESS/VAP ISOL A (two) – GPC
B (two) – OP
[ ] OMS TK ISOL (two) – CL (tb-CL)
L,R OMS XFEED (four) – OP (tb-OP)

TIG-2: OMS ENG (two) – ARM/PRESS
- :15 EXEC (NO EXEC > TIG + [ ] : [ ])
- :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
:00 TIG Start watch (√P_C, ΔVTOT, ENG VLVs)

If no OMS ignition: APUs – SHUT DN

* While feeding 2 OMS from 1 POD: *

OMS PRPLT FAIL:

Failed OMS ENG(s) – OFF
STOP BURN:
APUs – SHUT DN
Secure [ ] OMS

SAFE HP [ ]

CONTINUE BURN:
ITEM 18 +0 EXEC
If Both ENGs '↓':
Secure [ ] OMS
√ADI – LVLH, center needles
Interconnect [ ] OMS to RCS
THC +X for [ ] : [ ]
AFT RCS RECONFIG
RCS COMPLETION
If [ ] (XFEED) ENG '↓':
When [ ] OMS QTY:
5%: [ ] OMS TK ISOL (two) – OP
4%: [ ] OMS TK ISOL (two) – CL
If OMS P_C < 80 or OMS TEMP,
OMS ENG – OFF
√ADI – LVLH, center needles
RCS COMPLETION
If [ ] (STRAIGHT FEED) ENG '↓':
OMS ENG FAIL

OMS ENG FAIL (CONTINUE BURN):

Failed OMS ENG – OFF
at ΔVTOT = [ ]
or [ ] [ ] at [ ] %
[ ] TK ISOL (two) – OP
[ ] TK ISOL (two) – CL

Return to 2 ENG, 2 POD FLOW at ΔVTOT: [ ]
[ ] OMS TK ISOL (two) – OP (tb-OP)
L,R OMS XFEED (four) – CL (tb-CL)

ENT-5a/D/M

HINGE

(reduced copy)

TOP
HINGED AT BOTTOM OF 'UNBALANCED PRPLT DEORBIT BURN'
HINGE

OMS PRPLT FAIL:

Failed OMS ENG – OFF

L OMS FAIL HP [ ][ ][ ] R OMS FAIL HP [ ][ ][ ]

STOP BURN:
Good OMS ENG – OFF
APUs – SHUT DN
Secure aff OMS

CONTINUE BURN:
ITEM 18 +0 EXEC
When good OMS QTY:
5%: L,R OMS XFEED (four) – OP
4%: Good OMS TK ISOL (two) – CL
If OMS P_C < 80 or OMS TEMP,
OMS ENG – OFF
√ADI – LVLH, center needles
RCS COMPLETION

OMS ENG FAIL:

Failed OMS ENG – OFF
OMS XFEED at 1/2 ΔVTOT at fail [ ][ ][ ]
or OMS QTY [ ][ ] %L or [ ][ ] %R

2nd OMS FAIL (ENG or PRPLT):

Failed OMS ENG – OFF
If PRPLT FAIL: Secure aff OMS
ITEM 18 +0 EXEC

Both ENG FAIL HP [ ][ ][ ] Either PRPLT FAIL (SAFE) HP [ ][ ][ ]

STOP BURN:
APUs – SHUT DN

CONTINUE BURN:
√ADI – LVLH, center needles
Interconnect good OMS to RCS
THC +X (√OMS% vs RCS Burn Time)
RCS I'CNCT TK SW (N/A PRPLT FAIL)
THC +X (√OMS% vs RCS Burn Time)
AFT RCS RECONFIG
RCS COMPLETION

RCS COMPLETION:

THC +X to TGT HP or TOT AFT QTY 1 [ ][ ][ ] %
At AFT QTY 1 THC +X to CAPTURE HP or TOT AFT QTY 2 [ ][ ] %
If CUR HP: then PREBANK/FRCS COMPLETION to downrange site

CAPTURE HP [ ][ ] PREBANK/FRCS COMPLETION to downrange site

PREBANK/FLIP HP [ ][ ] PREBANK/FRCS COMPLETION

AFT HP [ ][ ] THC +X to TGT HP

TGT HP [ ][ ]

FRCS COMPLETION (if applicable)**:**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF
+ :02 OMS ENG(s) – OFF (if < 3 IMU, at [ ]:[ ][ ])
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ENT-5aa/D/O

(reduced copy)

TOP

BACK OF 'UNBALANCED PRPLT DEORBIT BURN'

HOOK VELCRO	**DEORBIT BURN (MIXED XFEED)**	HOOK VELCRO

√MM302 √OMS L(R) or RCS
Enter TGO + 10 sec
√L,R OMS TK ISOL (four) – GPC
√XFEED (four) – GPC
√tb config from table (OMS SSR-1)
√DAP – AUTO(PASS)/DISC
ADI – LVLH(REF)/HI/MED
FLT CNTLR PWR (two) – ON
Man repress to maintain good OMS Tk Ps > 234 psi (simo)
If OMS BURN INITIATION:

	√TRIM per MNVR PAD or: P +0.0, LY +5.2, RY -5.2
TIG-2:	Good OMS ENG – ARM/PRESS
- :15	EXEC (No EXEC > TIG + [ ] : [ ][ ])
- :15	If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
:00	TIG Start watch (√P_C, ΔVTOT, ENG VLVs)
	* If no OMS ignition, APUs – SHUT DN *

If RCS BURN INITIATION:

	Man repress L,R OMS > L,R RCS TK Ps
	L,R RCS XFEED (four) – OP
	TK ISOL (six) – CL
:00	THC +X (No Deorbit > TIG + [ ] : [ ][ ])
	Maintain PITCH ATT ERR ± 3°

FEED FROM GOOD POD:
at ΔVTOT = [ ][ ][ ]
or [ ] [ ][ ] at [ ][ ] %

[ ] OMS He PRESS/VAP ISOL (two) – OP
TK ISOL (two) – OP (tb-OP)
XFEED (two) – OP (tb-OP)
SECURE [ ] OMS

OMS PRPLT LOW
AFT RCS RECONFIG at ΔVTOT = [ ][ ][ ]
RCS COMPLETION

ENT-5b/D/J

HINGE

(reduced copy)

TOP
HINGED AT BOTTOM OF 'DEORBIT BURN (MIXED XFEED)'
HINGE

OMS PRPLT FAIL:

OMS ENG – OFF

SAFE HP [ ][ ]

STOP BURN:
APUs – SHUT DN
Secure L,R OMS

CONTINUE BURN:
Secure L,R OMS
ITEM 18 +0 EXEC
√ADI – LVLH, center needles
RCS COMPLETION

OMS ENG FAIL:

OMS ENG – OFF

ENG FAIL HP [ ][ ][ ]

STOP BURN:
APUs – SHUT DN

CONTINUE BURN:
Man repress L,R OMS > L,R RCS TK Ps
FEED FROM GOOD POD:
[ ] OMS HE PRESS/VAP ISOL (two) – OP
TK ISOL (two) – OP
[ ] OMS XFEED (two) – CL
L,R RCS XFEED (four) – OP
TK ISOL (six) – CL
√ADI – LVLH, center needles
THC +X (√Lowest OMS % vs RCS Burn Time)
AFT RCS RECONFIG
RCS COMPLETION

RCS +X JET FAIL OFF:

SAFE HP [ ][ ][ ]

STOP BURN:
APUs – SHUT DN

CONTINUE BURN:
ITEM 18 +0 EXEC
[G23] Resel jet

RCS COMPLETION:

THC +X to TGT HP or TOT AFT QTY 1 [ ][ ][ ] %

At AFT QTY 1 If CUR HP: THC +X to CAPTURE HP or TOT AFT QTY 2 [ ][ ] %
then PREBANK/FRCS COMPLETION to downrange site

CAPTURE HP [ ][ ] PREBANK/FRCS COMPLETION to downrange site

PREBANK/FLIP HP [ ][ ] PREBANK/FRCS COMPLETION

AFT HP [ ][ ] THC +X to TGT HP

TGT HP [ ][ ]

FRCS COMPLETION (if applicable)**:**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF + :02 VGOx = 0, Release THC
OMS ENG(s) – OFF (if < 3 IMU, at [ ]:[ ][ ])
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ENT-5bb/D/K

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TOP

PILE VELCRO

PILE VELCRO

ENTRY MANEUVERS

FLIGHT CONDITIONS	MANEUVER
EI-5	√LVLH ATT GNC, OPS 304 PRO * If PREBANK, R/Y – CSS * * Roll at 1°/sec to * * [1 8 0] if HP ≥ 46 (not AOA), else * * [ ] (from Prebank Table) * * Maintain PREBANK ±5° * If previous OMS OX TK, He TK, or RCS OX TK leak: [G51] VENT DOOR CNTL OPEN – ITEM 43 EXEC (AOA) [SPI] When SB position – 0%: √HYD MN PUMP PRESS (three) – LO
$\bar{q}$ = 1	(AOA) HYD MN PUMP PRESS (three) – NORM
'Guidance Box' @ $\bar{q}$ ~ 8 or D ~ 3	CLOSED LOOP GUIDANCE ____:____:____ * If PREBANK: P,R/Y – AUTO * Begin AIL trim monitoring
V = 24K	If previous OMS OX TK, He TK, or RCS OX TK leak: [G51] VENT DOOR CNTL CLOSE – ITEM 44 EXEC
D = 11	√DRAG H
ΔAz = 10.5°	FIRST ROLL REVERSAL [ ] (DEL PAD)
V = 19K	√HYD MPS/TVC ISOL VLV SYS (three) – CL
V = 15K	√NAVAIDS (I/O RESET if reqd)
V = 12K	RAD BYP VLV MODE (two) – AUTO CNTLR LOOP (two) – AUTO B(A)
V = 10K	√SPDBK to 81%

ENT-6a/E/R

PILE VELCRO

PILE VELCRO

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TOP
BACK OF 'ENTRY NO-GO CHECKLIST'

HOOK VELCRO

HOOK VELCRO

BAILOUT MODE 8

REPORT POSITION
√MACH < 1.0
P, R/Y – CSS
OPS 305/603 PRO (if reqd)
SB – AUTO; BF – AUTO
FLY 185-195 KEAS, Φ = 0°
ABORT MODE – ATO
ABORT PBI – PUSH
P,R/Y – AUTO
FLT CNTLR PWR (two) – OFF

~50K FT
TABS – RELEASE
VISOR – CLOSE/LOCK
SUIT O2 – ON
GREEN APPLE – PULL

~40K FT
MS3 – VENT CABIN
CDR,PLT SEATS – LOWER
KNEEBOARDS – REMOVE
COOLING – DISCONNECT
SEAT RESTRAINT – RELEASE
D-RING – UNCOVER

~30K FT
MS3 – JETTISON HATCH
COMM – DISCONNECT
(G-SUIT CLIP – PULL)
SUIT O2 – DISCONNECT
EGRESS SEAT
POLE – DEPLOY
D-RING – HOOK UP
BAILOUT

POST LANDING MODE 5

TABS – RELEASE
VISOR – CLOSE/LOCK
SUIT O2 – ON
GREEN APPLE – PULL
KNEEBOARDS – REMOVE
COOLING – DISCONNECT
SEAT RESTRAINT – RELEASE
PARACHUTE (four) – RELEASE
COMM – DISCONNECT
(G-SUIT CLIP – PULL)
SUIT O2 – DISCONNECT
PLT – EMER PWR DOWN
EGRESS SEAT
SLIDE/ESCAPE PANEL

HOOK VELCRO

HOOK VELCRO

ENT-7b/E/S

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TOP

HOOK VELCRO

ENTRY CONTROL

ARCS QTY (L + R) < 10 %

ARCS QTY = 0 & JETS FAIL OFF	1. ENTRY MODE – NO Y JET (R/Y CSS; expect sluggish control)
$\bar{q} \geq 20$ & M > 6	2. G51 ELEVON FIXED – ITEM 18 EXEC (*)
CONTROL PROBLEMS* & ARCS QTY > 0	3. ENTRY MODE – AUTO When control regained: 4. ENTRY MODE – NO Y JET 5. √AIL trim
M < 6 & ARCS QTY > 0	6. ENTRY MODE – AUTO
M < 5	7. TRIM/RHC PNL – ENA 8. TRIM ROLL – away from AIL trim (to < 1)

*Region of least margin: M 12-8

AIL TRIM ≥ 3°

TAL	1. G51 WRAP MODE – ITEM 45 EXEC (ACT)
AIL trim = 5	2. BF – MAN 3. BF – UP (to 0%)
NO Y JET	4. Perform roll reversals at 3°/s (expect sluggish control)
M < 13 & AIL trim = 5	5. P – CSS 6. Fly α per schedule:

M	12	11	10	9	8-6	5
α	37	36	35	33	30	26

M < 5	7. TRIM/RHC PNL – ENA 8. TRIM ROLL – away from AIL trim (to < 1) 9. P – AUTO
M < 2	10. BF – AUTO

(Continued on back for 'HIGH-FREQ OSC OR SURF/JET CYCLE')

HOOK VELCRO

TOP
BACK OF 'ENTRY CONTROL'

HOOK VELCRO

HOOK VELCRO

HIGH-FREQ OSC OR SURF/JET CYCLE

	Returning PL > 10K lb	1. G51 √FILTER ALT – ITEM 21 (*)
		2. P, R/Y – CSS
Osc/Cycle continues		3. ENTRY MODE – LO GAIN
	Osc/Cycle stops	4. ENTRY MODE – AUTO 5. P, R/Y – AUTO

HOOK VELCRO

ENT-10b/A,E/B

HOOK VELCRO

FAB USE ONLY

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Space Shuttle Program
FLIGHT DATA FILE

JSC-48019
GENERIC, REV H

SPACE SHUTTLE

ENTRY CHECKLIST

STS
ALL

Flight Cover (trim bottom to expose tabs)