NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FINAL
EVA PROCEDURES
APOLLO 11

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PREPARED BY

EVA BRANCH
FLIGHT CREW SUPPORT DIVISION

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PREPARED BY: John H. Covington
John H. Covington
EVA Procedures Section

APPROVED BY: David C. Schultz
David C. Schultz
Chief, EVA Procedures Section

APPROVED BY: Louie G. Richard
Louie G. Richard
Chief, EVA Branch

APPROVED BY: W J North
Warren J. North
Chief, Flight Crew Support Division

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1.0 PURPOSE

1.0 PURPOSE

This document contains the detailed crew procedures to support planned and contingency EVA on Apollo 11.

These procedures are under the control of the Crew Procedures Change Board. Requests for procedural changes should be submitted on the Crew Procedures Change Request (MSC Form 482) to the EVA Branch, Flight Crew Support Division, CF25.

2.0 PLANNED EVA PROCEDURES

SECTION 2.1 LM PREP FOR EVA

LM PREP FOR EVA

CREW STATUS (2 MIN)

BTH	UCTA empty
	Helmets stowed
	Gloves stowed
	PGA flow diverter valves - horizontal
	LM H2O hose connected to PGA
	Inspect PGA Zipper-Verify lock-lock

SYSTEMS PREPARATION FOR EGRESS (5½ MIN)

BTH	Verify status of LM caut and warn lt
	Adjust interior ltg to desired level
	Read Radiation Dosimeter-report to MSFN
	Enable DESA as required
CDR	Perform status check with CMP

PREPARATION FOR EGRESS (9 MIN)

BTH	Clear PGA pockets - stow adjustable
	Stow loose items not require for EVA
CDR	Stow RH armrest
BTH	Remove CDR's LH and LMP's RH and LH Armrest and stow on mid-section step
	LM restraints stowed for SSC access
CDR	Transfer coas to fwd window mount
LMP	Stow DEDA desk
	Verify bacteria filter installed on FWD hatch dump valve
	Remove 16mm data acquisition camera from bracket over window
	Verify cable to camera connection, fresh magazine installed, 10mm lens installed, and adjust settings to (TBD)
CDR	Remove clamp and bracket from LMP's utility light, stow clamp and bracket on AOT guard, and secure utility light and cord to AOT guard
	Unstow RCU/camera brkts(2) from lower overshoe comp and place on engine cover

LMP Install 16mm camera on univ brkt
Mount 16mm camera on RH crash bar
Route cable around brkts to remove slack
Camera seq C/B - close
Verify camera operation
Remove 2 16mm mags/stow in ISA botm pocket
Remove 60mm Hasselblad & mag fm RHSSC (Stow drk slide & prot cvr in LHSSC) & hnd to CDR

CDR Assemble camera-attach RCU/camera brkt

LMP Remv EVA cam hndl fm RHSSC & hand to CDR

CDR Attach hndl to HBLAD
take phot - ver cam ops & stow in ISA top pkt (Cam fail - try manual)

LMP Ass 80mm HBLAD-attach RCU/camera brkt- take phot- ver cam ops & rstw in RHSSC
Unstw LEC/TTHR pkg fm RHSSC - Remv LEC, waist TTHR, & 2 hks - Restw LEC/TTHR pkg att LEC hks to 60mm HBLAD & pulley to PLSS upr donng sta pin & stw LEC bag in ISA top pkt - Att waist tether to 80mm HBLAD, hooks to tiedwn
Unstow YO YO from food bag (rite side) and stow in ISA mid pkt
Position mirror as desired
Secure util lt & cable for PLSS/OPS donning

PLSS/OPS DONNING (58 ½ MIN)

BTH Remove PLSS fm floor, stow floor mounts and position PLSS against forward hatch
Transfer helmet stowage bags to cabin floor

CDR Transfer to AFT cabin area
Remv top OPS & adap fm SRC rk & hand to LMP
Remove 2nd OPS and adapter from SRC rack

BTH Remv OPS fm brkts & temp stow brackets
Verify OPS O2 press 5880 ± 500 psia & O2 hose nozzle locked
Open OPS O2 Shut off valve and verify O2 flow and regulation 3.70±0.30 psig
Press heatr tst butt - Ver at least one lt on
Close OPS O2 shut-off valve
Unstw OPS antenna lead-snap thermal covers
Stow OPS on cabin floor

CDR	Stow brackets with armrest in SRC rack
BTH	Remove and stow PGA plugs in flite data file
CDR	Grasp EVA antenna "T" handle, pull down and rotate handle to detent, release handle
	Remove both RCU's from housing and pass to LMP for stowage on LHSSC
	Unstow top pair of lunar overshoes from L.H. mid-sect & hand to LMP (leave door open)
	Restow helmets in RCU stowage area
LMP	Remove purge valve & stow in ISA middle pocket
CDR	Don lunar overshoes with LMP's assistance
	Unstw 2nd pair overshoes fm LH mid-sect
	Remove purge valve-stow in ISA middle pocket
LMP	Don lunar overshoes with CDR's assistance
	Remv spent ECS cann & brkt- stow at crew station
BTH	Remove LEVVA's and EV gloves from helmet bags and stow aft of engine
CDR	Remove anti-fog fm main kit and stow
	Stow helmet bags in top lunar overshoe comp
	Unstw CSRC fm LHSSC & stow in PGA leg pkt
LMP	Move PLSS fm floor to engine cover
	Route LM umbilicals behind PGA
BTH	Attach OPS to top of PLSS, verify locked
CDR	Hold PLSS/OPS for donning prep
LMP	Remove cover from EVCS antenna connector
	Connect OPS antenna lead to EVCS and lock
	Verify sublimator exhausts are clear
	Unstow upper and lower PLSS donning straps
	Unstow PLSS elec umb O2 & H2O hoses
	Unstow battery cable
	Xfer batt prot cover to cable stowage cnctr
	Connect battery cable to battery
	Remove PLSS RCU cnctr cover & stow in LHSSC
	Verify OPS reg checkout gage reads <2.5 psi
	Unstow OPS O2 hose nozzle
BTH	Secure PLSS thermal cover
	Remv YO YO fm ISA Midl pkt & attch to lwr RH PLSS strap

LMP Turn right and back into PLSS
Don PLSS/OPS by securing PLSS upper and lower straps to PGA
CDR Connect PLSS O2 hoses and verify lock
Unstow RCU

WARNING
Before connecting RCU to PLSS all elec PLSS cont must be in off position

Pump - off
Fan - off
Mode sel sw - 0 (off)

Connect RCU electrical to PLSS and lock
BTH Attach RCU to PLSS straps and PGA
LMP Verify these PLSS switch & valve positions
Diverter vlv - min (up)
O2 shutoff valve - off (up)
Feedwater valve - closed (up)
Pump - off
Fan - off
Mode sel sw - 0 (off)
CDR Remv PLSS fm rechrg sta & put on cab flr
Transfer helmets to recharge station
Place PLSS on engine cover
Route LM umbilicals in front of PGA
BTH Attach OPS to top of PLSS, verify locked
LMP Hold PLSS/OPS for donning prep
CDR Remove cover from EVCS antenna connector
Connect OPS antenna lead to EVCS and lock
Verify sublimator exhausts are clear
Unstow upper and lower PLSS donning straps
Unstow PLSS elec umb O2 & H2O hoses
Unstow battery cable
Xfer batt prot cover to cable stowage cnctr
Connect battery cable to battery
Remov PLSS RCU cnctr cover and stow in LHSSC
Ver OPS reg checkout gage reads <2.5 psi
Unstow OPS O2 hose nozzle
Secure PLSS thermal cover

Turn left and back into PLSS
Don PLSS/OPS by securing PLSS upper and lower straps to PGA
Unstow RCU, hold, and turn right to face LMP

LMP — Connect PLSS O2 hoses and verify lock

WARNING
Before connecting RCU to PLSS, all elec PLSS cont must be in off position

Pump - off
Fan - off
Mode sel sw - 0 (off)

Connect RCU electrical to PLSS and lock
Attach RCU to PLSS straps and PGA

CDR — Verify these PLSS sw and valve positions
- Diverter vlv - min (up)
- O2 shutoff vlv - off (up)
- Feedwater vlv - closed (up)
- Pump - off
- Fan - off
- Mode sel sw - 0 (off)

PLSS/EVCS ELECTRICAL CHECKOUT (6 ½ MIN)

LMP — LMP Audio panel -
- S-band - T/R
- ICS - T/R
- Relay - on
- Mode - VOX
- VHF A - off
- VHF B - T/R

CDR — CDR audio panel -
- S-band - T/R
- S-band tw - as desired
- ICS - T/R
- Relay - off
- Mode - VOX
- VOX sens - max increase
- VHF A - RCV
- VHF B - T/R

LMP VHF ANT SEL sw - EVA
Comm panel -
VHF A XMTR - off
VHF A RCVR - on
VHF B XMTR - voice
VHF B RCVR - off
Squelch A-noise threshold + 1/2 div
Squelch B-noise threshold + 1/2 div
Biomed sw - off
SE audio C/B - open
Disconnect LM comm cable from PGA and secure
Connect PLSS electrical umbilical to PGA
SE audio C/B - close
PLSS mode sel sw - B
Verify -
PLSS warning tone - on (10 sec)
RCU press window - 0 (OPS act-abort)
RCU vent window - P(purge-abort)
Read PLSS O2 bottle press
Verify voice comm with CDR and MSFN

NOTE
Unstow antenna of PLSS which transmits "Garbled" and/or loses TM.

CDR Audio C/B - open
Disc LM comm cable fm PGA and secure
Connect PLSS electrical umbilical to PGA
CDR audio C/B - close
CDR audio panel -
VHF A - off
VHF B - off
LMP PLSS mode sel sw - A
PLSS warning tone - on (10 sec)
CDR PLSS mode sel sw - B
Verify -
PLSS warning tone - on (10 sec)
RCU press window - 0 (OPS act-abort)
RCU vent window - P (purge-abort)
Read PLSS O2 bottle press
Verify voice comm with LMP and MSFN

LMP	LMP audio panel - VHF A - T/R VHF B - off Comm panel - VHF A XMTR - voice VHF A RCVR - on VHF B XMTR - off VHF B RCVR - on Verify voice and TM comm with MSFN Verify voice with CDR PLSS mode sel sw - B PLSS warning tone - on (10 sec)
CDR	PLSS mode sel sw - A PLSS warning tone - on (10 sec) Verify voice and TM comm with MSFN Verify voice with LMP
BTH	PLSS mode sel sw - AR PLSS warning tone - on (10 sec) Verify voice and TM comm with MSFN
CDR	Verify voice with LMP

FINAL EVA EQUIPMENT PREP FOR EGRESS (4 MIN)

BTH	Unstow OPS O2 hose and OPS O2 actuator Attach O2 actuator to RCU Snap OPS O2 hose to side of PLSS with RCU connector flap

FINAL SYSTEMS PREP FOR EGRESS (4 MIN)

NOTE

Do not proceed with the following until T-(TBD) min from sched cabin depressurization

BTH	Confirm "GO" for cabin depress with MSFN
LMP	Cabin fan cont C/B - open
	Verify cabin repress C/B - close
	Suit fan Delta-P C/B - open
	Des H2O vlv - close
CDR	Cabin fan 1 C/B - open
	Suit fan 1 C/B - open
	Verify suit ckt relief vlv - auto
	Suit gas div vlv - egress (pull)
	Cabin gas return vlv - egress
	Verify ECS caut lt & H2O sep comp caut lt on

PREP FOR CABIN DEPRESS (25 MIN)

CDR	B suit isol vlv - suit disc
BTH	Disconnect LM O2 hoses
	Connect OPS O2 hose to RH PGA blue connector
	Retrv purg vlvs fm mid ISA pkt-verif clos & lkd-instl in RH PGA red cnctr - ver lkd.
	PGA flow diverter valves - vertical
LMP	Unstow helmet
	Verify feed port cover installed and locked apply anti-fog to helmet
	Position mikes
	Verify PLSS mode sel sw - AR
	PLSS fan - on
CDR	Place LMP's helmet on LMP, and "LOCK"
LMP	Verify - RCU vent window - clears
CDR	Remove EVVA from engine cover, verify EV visor up, and attach to LMP's helmet
	Unstow helmet
	Verify feed port cover installed and locked apply anti-fog to helmet
	Position mikes
	Verify PLSS mode sel sw - AR
	PLSS fan - on

LMP	Place CDR's helmet on CDR, and "LOCK"
CDR	Verify - RCU vent window - clears
LMP	Remove EVVA from engine cover, verify EV visor up, and attach to CDR's helmet
CDR	Stow S/suit cklist-unstw hrdsuit cklist & EVA CARD No. 1 (AOT Guard)
LMP	LCG pump C/B - open
BTH	Disconnect LM H2O hose
LMP	Stow CDR's and LMP's ECS hoses and comm umb
BTH	Connect PLSS H2O hose to PGA
	Don EV gloves and "LOCK"
	Inspect EMU
	Check connectors and lock-locks
CDR	Press reg A - egress
	Press reg B - egress

suit time begins at beginning of this interval; EVA begins at end of this interval)

PRESSURE INTEGRITY CHECK (5 MIN;

NOTE

Integrity checks to be performed simultaneously

BTH	PLSS O2 shutoff valve - on (down)
	Verify -
	PLSS warning tone - on (10 sec)
	RCU O2 window - 0 (OPS act-abort)
	Verify -
	RCU press window - clears
	RCU O2 window - clears
	Verify 3.85+0.15 psig on PGA gage
	PLSS O2 shutoff valve - off (up)
	Read PGA gage & monitor press decay one min-exercise suit joints during decay period
	EMU circuit decay not to exceed 0.3 psid
	PLSS O2 shutoff valve - on (down) (PLSS HI O2 flow warn may come on)
	Verify stable PGA press of 3.85+0.15 psig
	Verify PLSS diverter vlv - min (up)
	PLSS pump - on
	Verify audible notice of pump operation

CABIN DEPRESS

CDR	Cabin repress valve - close
BTH	Monitor PGA cuff gage during cab depress & Verif PGA press does not drop blow 4.5 psig
	WARNING If PGA press drops below 4.5 psid, CDR return dump valve to auto. If PGA press is below 4.5 psid and decaying, LMP activate cabin repress valve when PGA press drops to 3.7 psid
LMP	FWD hatch relief/dump vlv-dump
CDR	Monitor cabin pressure to 3.5 psia
LMP	At 3.5 psia, place forward hatch relief and dump valve to auto
CDR	Verify cabin pressure at 3.5 psia, and LM suit circuit pressure 3.6 to 4.3 psia
BTH	Verify PGA press above 4.5 psig and decaying slowly
LMP	Fwd Hatch relief/dump vlv - dump
BTH	Verify - PLSS warning tone - on (10 sec) RCU H2O window - A (abort)
CDR	Monitor cabin pressure decrease to 0 psia, and verify LM suit circuit 3.6 - 4.3 psia
BTH	Verify PGA press >4.5 psig & decaying slowly

HATCH OPENING

LMP	Rotate hndl on fwd hatch to unlock position
	Partially open forward hatch
	Fwd hatch relief/dump valve - auto
BTH	PLSS feedwater shutoff valve - open (down)
LMP	Pull forward hatch to full open
BTH	After RCU H2O window clears (∿4min), place PLSS diverter valve to max cooling (down). Rest until cooling sufficient
	Verify stable PGA pressure of 3.85±0.15 psia
	Verify all RCU windows clear
LMP	Verify LM suit ckt maintaining press of 3.6-4.3 psia
BTH	Verify status of LM caut and fail lt
	Release PLSS antenna
CDR	Face aft to commence egress
	Attach LEC to PGA
LMP	Attach pully to overhead handhold
BTH	Lower EV visor as required

SECTION 2.2 EVA

EVA

Reference Lunar Surface Operations Plan

SECTION 2.3 LM POST EVA AND EQUIPMENT JETTISON

LM POST EVA AND EQUIPMENT JET

EXISTING CONDITIONS -

(1) SRC'S stacked in SRC rack
(2) 60mm HBLAD mag & 80mm HBLAD & CSC Cassette in SRC rack
(3) ECS canister and bracket, OPS Brackets, LEC, 60mm HBLAD and armrests (3) jettisoned during EVA

HATCH CLOSING

BTH — PLSS feedwater valve - closed (up)
Stow PLSS antenna
LMP — Close forward hatch

CABIN REPRESS

LMP — Verify fwd hatch relief/dump valve - auto
CDR — Verif ovrhd hatch relief/dump valve - auto

NOTE

PLSS HI O2 flow and LOW PGA press warnings may come on during repress. If PLSS O2 less than 150 psi, manually control cabin repress to maintain positive PGA pressure

CDR — Cabin repress valve - auto
Press Reg A - cabin
Verify Master Alarm - on
Cabin warn lt - on
Verify cabin repress vlv opens
Master Alarm PB/LT - reset
Press Reg B - cabin
BTH — Verify cabin press increasing normally
CDR — Verify cabin repress valve closes
Verify cabin warn lt - off
BTH — Monitor cabin pressure until it stabilizes at 4.8 $\pm$ 0.2 psia
PLSS O2 shutoff valve - off(up)

POST EVA SYSTEMS CONFIGURATION

CDR	Suit fan 1 C/B - close
LMP	Suit fan DELTA-P C/B - close
CDR	Verify ECS caut lt and H2O sep comp Caut lt goes off
BTH	Open purge vlv if req & equal PGA & Cabin pres. Close purge vlv.
	Doff gloves as desired
	Disconnect RCU from PLSS straps and PGA
	Disconnect OPS O2 hose from PGA
	Disconnect purge valves from PGA
LMP	Stow purge valves in ISA middle pockt
BTH	Unstw LM O2 hoses/connect to RH PGA Connectors & lock (red/red blue/blue)
CDR	LMP suit ISOL vlv - suit flow
	CDR suit ISOL vlv - suit flow
BTH	PLSS pump - off
	PLSS fan - off
	Disc PLSS H2O hose and connect LM H2O hose
LMP	LCG pump C/B - close
	SE audio C/B - open
	PLSS mode sel sw - O(off)
CDR	Disc LMP'S PLSS elec umbil from PGA
	Connect LMP'S LM comm cable to PGA
LMP	SE audio C/B - close
	Biomed sw - right
CDR	CDR audio C/B - open
	PLSS mode sel sw - O(off)
LMP	Disc CDR'S PLSS elec umbil from PGA
	Connect CDR'S LM comm cable to PGA
CDR	CDR audio C/B - close
BTH	Comm sws - as desired

PLSS/OPS DOFFING

LMP Disconnect OPS 02 actuator from RCU

WARNING
Before disc RCU from PLSS
All elec PLSS controls
must be in off position -
pump - off
fan - off
mode sel sw - 0 (off)

CDR Disc LMP RCU fm PLSS/place on eng cvr
Disconnect LMP's PLSS 02 hoses from PGA
LMP Remv lwr then upr PLSS strps fm PGA-XFER
PLSS to eng cvr-rout LM umb in front of PGA
Stow OPS 02 actuator and hose
Stow PLSS umbilicals
Stow YO YO in SRC rack
Remove lwr PLSS straps/stow in ISA mid pkt
Stow PLSS/OPS on cabin floor
CDR Disconnect OPS 02 actuator from RCU

WARNING
Before disconnecting RCU from PLSS,
all electrical PLSS controls must
be in off position -
pump - off
fan - off
mode sel sw - 0 (off)

LMP Disc CDR RCU fm PLSS/place on eng cvr
Disconnect CDR's PLSS 02 hoses from PGA
CDR Remv lwr then upr plss strps fm PGA-XFER PLSS
to eng cvr-route LM umb in front of PGA
Stow OPS 02 actuator and hose
Stow PLSS umbilicals
Remv lwr PLSS straps/stow in ISA mid pkt
Stow PLSS/OPS on cabin floor

FINAL SYSTEMS CONFIGURATION

BTH — Verify status of LM sys for cabin depress
- ECS ind pwr fail lts(3) - off
- Comp caut lts(4) - off
- GLYCOL temp ind - 32 deg to 50 deg F
- GLYCOL press ind - 15 to 30 psia
- O2 quantity ind - >20%

Read Radiation Dosimeter - report to MSFN

PREP FOR EQUIPMENT JETTISON

BTH — Remove OPS from PLSS, perform OPS checkout and place OPS on engine cover
Perform feedwater collection procedures

CDR — Remove CDR RH armrest/stow in recharge stat
Remove LHSSC and place on engine cover
Stow YO YO, EVA hooks(2), and RCU's(2) in LHSSC
Remove mag and waist tether fm HBLAD and leave in SRC rack
Stow Hasselblad, RCU/camera bkt and handle in LHSSC

BTH — Doff lunar overshoes

CDR — Stow lunar overshoes in LHSSC

BTH — Verify/stow the following in LHSSC-
- food waste
- used defecation collection devices
- used EMESIS bags
- used small urine collection assy

CDR — Place LHSSC on cabin floor

BTH — Remove PGA protective plugs from Flight Data File and install in LH PGA connectors

PRESSURE INTEGRITY CHECK

CAUTION
To prevent ovrheatg suit ckt fan and/or brkthru of HTS prim sublimator, the ARS/PGA shall not be maint at elev press >5 min

BTH	Verify/perform-PGA diverter valves-Horizontal Helmets and IV gloves donned Check connections and lock-locks
CDR	Suit circuit relief vlv - close
LMP	Press reg A - close
	Press reg B - direct O2
	Monit LM suit ckt press ind til suit ckt press ~8.85 psia & immed set press reg B - close
BTH	Read PGA cuff gage/monitor press decay for 1 min-xrcise suit joints during decay period
	LM suit circuit decay not to exceed 0.3 psig
CDR	Suit circuit relief valve - auto
LMP	Press reg B - egress
	Press reg A - egress

CABIN DEPRESS

CDR	Place one PLSS on engine cover and second PLSS on mid-section step
	Place LHSSC on engine cover
LMP	Cabin repress valve - close
BTH	Monitor suit circuit press during cabin depress and verify press 3.6 - 4.3 psia
LMP	Fwd hatch relief/dump vlv-dump
CDR	Monitor cabin press decrease to 3.5 psia
LMP	At 3.5 psia place forward hatch relief and dump valve to auto
CDR	Verify cab press at 3.5 psia & LM suit ckt press 3.6 - 4.3 psia & decay slwly
LMP	Rot hndl on fwd hatch to unlock position
	Place fwd hatch relief/dump vlv-dump
CDR	Monitor cabin pressure decrease to 0 psia and verify LM suit circuit 3.6 - 4.3 psia

HATCH OPENING

LMP	Partially open forward hatch
	Fwd hatch relief/dump vlv - auto
	Pull forward hatch to full open
BTH	Lower EV visor at required

EQUIPMENT JETTISON

CDR	Jettison the following -
	(Verify items clear ascent stage)
	PLSS on mid-section step
	PLSS on engine cover
	LHSSC
	armrest(1)
LMP	Close forward hatch and lock

CABIN REPRESS

LMP	Verify fwd hatch relief/dump vlv - auto
CDR	Verify ovrhed hatch relief/dump vlv - auto
LMP	Cabin repress valve - auto
	Press reg A - cabin
	Verify Master Alarm - on
	Cabin warn lt - on
	Verify cabin repress valve opens
	Master Alrm PB/lt - reset
	Press reg B - cabin
BTH	Verify cabin press increasing normally
LMP	Verify cabin repress valve closes
	Cabin warn lt - off
BTH	Monit cab press untl stabil at 4.8 $\pm$ 0.2 psia

POST EVA SYSTEMS CONFIGURATION

LMP	Cabin gas return valve - auto
	Suit gas diverter valve - cabin (push)
BTH	Doff IV gloves and place on engine cover
	Doff helmets and EV visors
LMP	Stow hlmet wth visor/glovs on mid-sec step
CDR	Stow hlmet wth visor & glovs in rchrg sta
	Cabin fan 1 C/B - close
LMP	Cabin fan cont C/B - close

FINAL SYSTEMS CONFIGURATION

BTH	Verify ECS basic(unstaged)
	Verify EPS basic(unstaged)
	Verify Comm basic(unstaged)
LMP	Verify ATT dir cont C/B - open
	Verify ED Master Arm sw - off
	Verify ED stage sw - safe
CDR	Verify Eng Arm sw - off
	Verify PGNS sw - off

POST EVA CABIN CONFIGURATION

LMP	Stw HBLAD mag(2), waist tether & lwr PLSS STRPS(4)RHSSC
CDR	Stow CSC Cassette in ISA
BTH	Transfer OPS to cabin floor
CDR	XFER to aft cabin area (move SRC's as req'd)
LMP	Secure OPS thermal covers and stow OPS on cabin floor
CDR	Stow SRC's in SRC rack
	Remove CSRC from PGA and stow in lower lunar overshoe compartment
	Stow LM EVA antenna
	Snap RCU stowage flaps
	XFER helmet stowage bags to engine cover
	Transfer to CDR's station
LMP	Remove 16mm camera from crash bar and stow bracket on AOT guard
	Remove film magazine from camera and stow in 16mm magazine container in RHSSC
	Instll new magaz & adj setings to (TBD)
	Install camera on bracket over RH window
CDR	Stow purge valves, EV gloves, and EV visors in helmet bags
	Snap helmet stowage bags to engine cover
	Att util lt to clamp & brkt on AOT guard and position as req'd
	Stow EVA onbrd data in Flite Data File Cont

3.0 LUNAR SURFACE CONTINGENCY EVA PROCEDURES

SECTION 3.1 LM PREP FOR EVA - ONE MAN EVA

CREW STATUS- Perform Planned
SYSTEMS PREP FOR EGRESS- Perform Planned
PREP FOR EGRESS- Perform Planned
PLSS/OPS DONNING-

VERIFY/PERFORM-	EGRESSING CREWMAN	OTHER
1 Crew Stations	At CDR's	At LMP's
2 EVA Hook	Don	LHSSC
3 OPS(Perform Checkout)		
OPS NO GO FOR EVT	N/A	Engine
Other	Cabin Floor	SRC Rack
4 Armrests (3)	In OPS Brackets,SRC Rack	
5 OPS Brackets	SRC Rack	
6 PGA Connect Plugs	Flight Data File	LH PGA
7 LM EVA Antanna	Deploy	
8 RCU-RCU NO GO FOR EVT	N/A	ON LHSSC
Other	ON LHSSC	RCU Comp
9 Lunar Boots	Don	LHSSC
10 Purge Valves	ISA Mid Pkt	HSB
11 ECS Cannister and Bkt		Cabin Flr
12 LEVVA	Engine Cover	HSB
13 EV Gloves	Engine Cover	HSB
14 Anti-Fog	Temp Stow	
15 HSB	Top Lunar Boot Compt	Engine
16 CSRC	PGA Leg Pkt	N/A
17 PLSS Straps-PLSS NO GO For EVT	N/A	ISA Mid
Other	On PLSS-Exchange If Req'd	On PLSS
18 Helmets	Over RCU Stowage	

19 PLSS/OPS PREP For DONNING - OPS ANT Lead - UNSTOWED
OPS Attached to PLSS - LOCKED
OPS ANT Lead to PLSS - LOCKED
Sub Exhaust - CLEAR
Donning Straps, ELEC, O2 and H2O
UMB - UNSTOWED
Battery - CONNECTED
RCU Connec Cover - In LHSSC
OPS Checkout Gage <2.5 psig
OPS O2 Hose Nozzle - UNSTOWED

20 PLSS/OPS DONNING - PLSS/OPS Donned - Straps Connected (4)
PLSS O2 to PGA LH connect - LOCKED
RCU (All Elec CNTLS-OFF) to PLSS,
PGA and PLSS Straps
Diverter VLV - MIN (up)
O2 Shutoff VLV - OFF (up)
Feedwater - OFF (up)
Pump - OFF
Fan - OFF
MODE SEL sw - 0 (OFF)

PLSS/EVCS ELECTRICAL CHECKOUT

Set LMP Audio panel -
- S-band - T/R
- S-band tw-as desired
- ICS - T/R
- Relay - off
- Mode - VOX
- VOX sens - max increase
- VHF A - RCV
- VHF B - T/R

Set CDR audio panel -
- S-band - off
- ICS - T/R
- Relay - on
- Mode - VOX
- VHF A - off
- VHF B - T/R

Set VHF ANT SEL sw - EVA

Set comm panel (12) -
- VHF A XMTR - off
- VHF A RCVR - on
- VHF B XMTR - voice
- VHF B RCVR - off
- Squelch A - noise threshold + 1/2 div
- Squelch B - noise threshold + 1/2 div

Biomed sw - right
CDR Audio C/B - open
Disconnect LM comm - connect plss comm to PGA
CDR Audio C/B - close
PLSS mode sel sw - B

Verify -
- PLSS warning tone - on (10 sec)
- RCU press window - 0 (OPS act - abort)
- RCU vent window - P (PURGE - ABORT)
- Read PLSS 02 bottle press
- Voice comm with other crewman and MSFN

Set LMP Audio panel -
   VHF A - T/R
   VHF B - RCV

Set CDR Audio panel -
   VHF A - T/R
   VHF B - off

Set comm panel (12) -
   VHF A XMTR - on
   VHF A RCVR - off
   VHF B XMTR - off
   VHF B RCVR - on

PLSS mode sel sw - A

Verify -
   PLSS warning tone - on (10 sec)
   Voice and TM comm with MSFN
   Voice with other crewman

FINAL EVA EQUIPMENT PREP FOR EGRESS

Unstow OPS O2 Hose and Actuator
Attach O2 Actuator to RCU
Snap OPS O2 Hose to PLSS side

FINAL SYSTEMS PREP FOR EGRESS

NOTE
Do not proceed until
(TBD) min from schedule
cabin depress

Confirm "GO" for cabin depress with MSFN
Cabin fan 1 C/B - open
Cabin fan cont C/B - open
Verify - cabin repress C/B - close
Des H2O vlv - close
Verify - suit ckt relief vlv - auto
Suit gas div vlv - egress (pull)
Cabin gas return vlv - egress

PREP FOR CABIN DEPRESS

EGRESSING CREWMAN (Other Crewmen Assist)-
Suit isol vlv - suit disc
Disconnect LM O2 hoses
Connect OPS O2 hose to RH PGA blue conn
Get purge vlv from ISA mid pkt - verify closed-
Install in RH PGA red conn - verify locked-
PGA flow diverter vlvs - vertical
Verify helmet feed port cover installed and locked-
Apply anti-fog to helmet
Position mikes
Verify PLSS mode sel sw - A
PLSS fan - on
Don helmet and "lock"
Verify - RCU vent window - Clears
Attach EVVA to helmet
Don EV gloves and "lock"

OTHER CREWMEN-
Verify helmet feed port cover installed and locked-
Apply anti-fog
Position mikes
Don Helmet and "lock"
Stow soft/suit checklist - unstow hardsuit checklist and EVA card NO. 1 (AOT GUARD)

LCG PUMP C/B - OPEN
FOR EGRESSING CREWMEN-
DISCONNECT LM H2O HOSE
STOW LM HOSES
CONNECT PLSS H2O HOSE
LCG PUMP C/B - CLOSE
DON IV GLOVES AND "LOCK"
BOTH-INSPECT EMU- CHECK ALL CONNECTIONS AND LOCK - LOCKS

PRESSURE INTEGRITY CHECK

ARS/PGA-

CAUTION
TO PREVENT OVERHEATING SUIT CKT FAN AND/OR BREAKTHRU OF HTS PRIM SUBLIMATOR, THE ARS/PGA SHALL NOT BE MAINTAIN AT ELEVATED PRESS >5 MIN

SUIT CIRCUIT RELIEF VLV - CLOSE
PRESS REG A - CLOSE
PRESS REG B - DIRECT O2
MONITOR LM SUIT CKT PRESS IND UNTIL
SUIT CKT PRESS ~8.85 PSIA & IMMED SET
PRESS REG B-CLOSED

READ PGA CUFF GAGE/MONITOR PRESS DECAY
FOR 1 min-EXERCISE SUIT JOINTS DURING
DECAY PERIOD. LM SUIT CIRCUIT DECAY NOT
TO EXCEED 0.3 PSIG
SUIT CIRCUIT RELIEF VALVE - AUTO
PRESS REG B - CABIN
PRESS REG A - CABIN

PLSS/OPS/PGA-

PLSS O2 SHUTOFF VLV - ON (DOWN)

VERIFY -
PLSS WARNING TONE - ON (10 sec)
RCU O2 WINDOW - O (OPS ACT - ABORT)

VERIFY -
RCU PRESS WINDOW - CLEARS
RCU O2 WINDOW - CLEARS
3.85 $\pm$ 0.15 psig on PGA gage

PLSS O2 SHUTOFF VLV - OFF (up)
READ PGA GAGE & MONITOR PRESS DECAY 1 min
EXERCISE SUIT JOINTS DURING DECAY PERIOD
EMU CIRCUIT DECAY NOT TO EXCEED 0.3 PSID
PLSS O2 SHUTOFF VALVE - ON (DOWN)
(PLSS Hi O2 FLOW WARN MAY COME ON)
VERIFY - STABLE PRESS OF 3.85 ± 0.15 psig
- PLSS DIVERTER VLV - MIN (up)
PLSS PUMP - ON
VERIFY - AUDIBLE NOTICE OF PUMP OPERATION

PRESS REG A - EGRESS
PRESS REG B - EGRESS

CABIN DEPRESS

CABIN REPRESS VLV - CLOSE
EGRESSING CREWMAN - MONITOR PGA CUFF GAGE DURING CABIN DEPRESS AND VERIFY PGA PRESS >4.5 psig

WARNING
IF PGA PRESS DROPS BELOW 4.5 PSID,RETURN DUMP VALVE TO AUTO
IF PGA PRESS IS BELOW 4.5 psid and DECAYING,ACTIVATE CABIN REPRESS VALVE WHEN PGA PRESS DROPS TO 3.7 psid

FWD HATCH RELIEF/DUMP VLV- DUMP
MONITOR CABIN PRESS TO 3.5 PSIA
AT 3.5 PSIA, FWD HATCH RELIEF AND DUMP VALVE - AUTO
VERIFY - CABIN PRESS - 3.5 psia
- LM SUIT CKT PRESS -3.6-4.3 psia, DECAYING SLOWLY
- PLSS/OPS/PGA >4.5 psig, DECAYING SLOWLY

FWD HATCH RELIEF/DUMP VLV - DUMP
VERIFY - PLSS WARNING TONE - ON (10 sec)
RCU H2O WINDOW -A(ABORT)
MONITOR CABIN PRESS DECREASE TO 0 PSIA
VERIFY - LM SUIT CKT PRESS- 3.6-4.3 psia
- PLSS/OPS/PGA >4.5 psig, DECAYING SLOWLY

HATCH OPENING

ROTATE HANDLE ON FWD HATCH TO UNLOCK
PARTIALLY OPEN FWD HATCH
FWD HATCH RELIEF/DUMP VLV - AUTO
PLSS FEEDWATER SHUTOFF VLV - OPEN (Down)
PULL FWD HATCH FULL OPEN
AFTER RCU H2O WINDOW CLEARS (~4 min), PLACE
PLSS DIVERTER VLV - MAX COOLING (Down)
REST UNTIL COOLING SUFFICIENT
VERIFY - PLSS/OPS/PGA PRESS -3.85 $\pm$ 0.15 PSIA, STABLE
- ALL RCU WINDOWS - CLEAR
VERIFY - LM SUIT CKT MAINTAINING PRESS- 3.6-4.3 psia
- STATUS OF LM CAUT AND FAIL LTS
RELEASE PLSS ANTENNA
FACE AFT - ATTACH LEC TO PGA
ATTACH PULLEY TO OVERHEAD HANDHOLD
LOWER EV VISOR AS REQUIRED

SECTION 3.2 ONE MAN EVA

ONE MAN EVA

REFERENCE LUNAR SURFACE OPERATIONS PLAN - CONTINGENT EVA 1 AND 2

SECTION 3.3 LM POST EVA AND EQUIPMENT JETTISON - ONE MAN EVA

LM POST EVA AND EQUIPMENT JET

EXISTING CONDITIONS-

(1) SRC'S STACKED IN SRC RACK IF PREPARED
(2) 60MM HBLAD MAG & 80MM HBLAD IN SRC RACK
(3) ECS CANSTR & BRACKET, OPS BRACKETS, LEC, 60MM HBLAD, ARMRESTS (3), PLSS,OPS,OR RCU, WHICH IS "NO GO" FOR EVT JETTISONED DURING EVA

HATCH CLOSING

PLSS FEEDWATER VALVE - CLOSED (up)
STOW PLSS ANTENNA
CLOSE FORWARD HATCH

CABIN REPRESS

VERIFY FWD HATCH RELIEF/DUMP VALVE - AUTO
VERIFY OVRHD HATCH RELIEF/DUMP VALVE - AUTO

NOTE

PLSS HI O2 FLOW & LOW PGA PRESS WARN MAY COME ON DURING REPRESS. IF PLSS O2 LESS THAN 150 PSI, MANUALLY CONTROL CABIN REPRESS TO MAINTAIN POSITIVE PGA PRESSURE

CABIN REPRESS VALVE - AUTO
PRESS REG A - CABIN
VERIFY MASTER ALARM - ON
CABIN WARN LT - ON
VERIFY CABIN REPRESS VLV - OPENS
MASTER ALARM PB/LT - RESET
PRESS REG B - CABIN
VERIFY CAB PRESS INCRSNG NORMAL
VERIFY CABIN REPRESS VLV - CLOSES
VERIFY CABIN WARN LT - OFF
MONITOR CABIN PRESSURE UNTIL
  IT STABILIZES AT 4.8 + 0.2 PSIA
PLSS O2 SHUTOFF VALVE - OFF (up)

POST EVA SYSTEMS CONFIGURATION

OPEN PURGE VLV IF REQ'D & EQUAL
  PGA & CAB PRESS CLOSE PURGE VLV
DOFF GLOVES AS DESIRED
DISC RCU FM PLSS STRAPS & PGA
DISCONNECT OPS O2 HOSE FROM PGA
DISCONNECT PURGE VALVE FROM PGA
STOW PURGE VLV IN ISA MID PKT
UNSTOW LM O2 HOSES AND CONNECT
  TO RIGHT SIDE PGA CONNECTORS
  AND VERIFY LOCKED (RED TO RED,
  BLUE/TO BLUE)
CDR SUIT ISOL VLV - SUIT FLOW
PLSS PUMP - OFF
PLSS FAN - OFF
LCG PUMP C/B - OPEN
DISCONNECT PLSS H2O HOSE AND
  CONNECT LM H2O HOSE
LCG PUMP C/B - CLOSE
CDR AUDIO C/B - OPEN
PLSS MODE SEL SW - 0 (OFF)
DISCT PLSS ELEC UMB FM PGA
CONNECT LM COMM CABLE TO PGA
CDR AUDIO C/B - CLOSE
BIOMED SW - LEFT
COMM SWS - AS DESIRED

PLSS/OPS DOFFING

DISC OPS O2 ACTUATOR FM RCU

WARNING
B4 DISC RCU FM PLSS ALL ELEC PLSS CONT MUST BE IN OFF POSITION

PUMP - OFF
FAN - OFF
MODE SEL SW - O (OFF)

DISCONNECT RCU FROM PLSS
AND PLACE ON ENGINE COVER
DISC PLSS O2 HOSES FROM PGA
REMV LWR THEN UPR PLSS STRPS
FM PGA-XFER PLSS TO ENG CVR
ROUT LM UMBILICALS IN FRONT
OF PGA
STOW OPS O2 ACTUATOR AND HOSE
STOW PLSS UMBILICALS
REMOVE LOWER PLSS STRAPS AND
STOW IN ISA MIDDLE POCKET
STOW PLSS/OPS ON CABIN FLOOR
CDR AND LMP AT CREW STATIONS (DOFF
HELMETS OR GLOVES, AS REQ'D, IF
CHANGEOVER IS REQ'D)

FINAL SYSTEMS CONFIGURATION

B VERIFY STATUS OF LM SYSTEMS FOR
CABIN DEPRESS
ECS IND PWR FAIL LTS (3) - OFF
COMP CAUT LTS (4) - OFF
GLYCOL TEMP IND - 32 DEG TO 50 DEG F
GLYCOL PRESS IND - 15 TO 30 PSIA
O2 QUANTITY IND - >20%

B READ RADIATION DOSIMETER - REPORT
TO MSFN

PREP FOR EQUIPMENT JETTISON

REMOVE OPS FROM PLSS, PERFORM OPS CHECK & PLACE OPS ON ENG COVER
PERFORM FEEDWATER COLLECTION PROCEDURES
C REMOVE CDR RH ARMREST AND STOW IN RECHARGE STATION (OR ENGINE COVER)
C REMOVE LHSSC AND PLACE ON ENGINE COVER
C STOW YOYO, EVA HOOKS (2) AND RCU'S (2) IN LHSSC
C REM MAG AND WAIST TETHER FM HBLAD & LV IN SRC RCK
C STOW HBLAD, RCU/CAM BRKT & HANDLE IN LHSSC
DOFF LUNAR OVERSHOES
C STOW LUNAR OVERSHOES IN LHSSC
B VERIFY/STOW FOLLOWING IN LHSSC
FOOD WASTE
USED DEFECATN COLLECTN DEVICES
USED EMESIS BAGS
USED SMALL URINE COLLECTION ASSY
C PLACE LHSSC ON CABIN FLOOR
REMOVE PGA PROTEC PLUGS FM FLITE DATA FILE & INST IN LH PGA CNCTRS

PRESSURE INTEGRITY CHECK

CAUTION
TO PREVENT OVRHEATG SUIT CKT FAN AND/OR BRKTHRU OF HTS PRIM SUBL, THE ARS/PGA SHALL NOT BE MAINT AT ELEV PRESS > 5 MIN

B VERIFY/PERFORM-PGA DIV VLVS - HORIZONTAL
HELMETS AND IV GLOVES DONNED
CHECK CONNECTIONS AND LOCK-LOCKS

C SUIT CIRCUIT RELIEF VLV - CLOSE

L PRESS REG A - CLOSE

L PRESS REG B - DIRECT O2

L MONIT LM SUIT CKT PRESS IND
UNTIL SUIT CKT PRESS 8.85 PSIA
& IMMED SET PRESS REG B - CLOSE

B READ PGA CUFF GAGE/MONITOR
DECAY FOR ONE MIN
XRCISE SUIT JOINTS DURING DECAY PERIOD

B LM SUIT CKT DCAY NOT TO EXCEED 0.3 PSIG

C SUIT CKT RELIEF VALVE - AUTO

L PRESS REG B - EGRESS

L PRESS REG A - EGRESS

CABIN DEPRESS

C PLACE ONE PLSS ON ENG CVR AND SECOND PLSS ON MID-SECTION STEP (STOW PLSS LOWER STRAPS (2) IN ISA MID PKT)
C PLACE LHSSC ON ENGINE COVER
L CABIN REPRESS VALVE - CLOSE
B MONITOR SUIT CIRCUIT PRESS DURING CABIN DEPRESS AND VERIFY PRESS 3.6-4.3 PSIA
L FWD HATCH RELIEF/DUMP VLV - DUMP
C MONITOR CABIN PRESS DECREASE TO 3.5 PSIA
L AT 3.5 PSIA PLACE FORWARD HATCH RELIEF AND DUMP VALVE TO AUTO
C VERIFY CABIN PRESSURE AT 3.5 PSIA AND LM SUIT CIRCUIT PRESSURE 3.6-4.3 PSIA AND DE-CAYING SLOWLY
L ROT HNDL ON FWD HTCH TO UNLCK POS
L FWD HATCH RELIEF/DUMP VLV-DUMP
C MONITOR CAB PRESS DECR TO 0 PSIA & VER LM SUIT CKT 3.6-4.3 PSIA

HATCH OPENING

L PARTIALLY OPEN FORWARD HATCH
L FWD HATCH RELIEF/DUMP VLV - AUTO
L PULL FORWARD HATCH TO FULL OPEN
B LOWER EV VISOR AS REQUIRED

EQUIPMENT JETTISON

C JETTISON THE FOLLOWING-
(VERIFY ITEMS CLEAR ASCENT STAGE)

PLSS ON MID-SECTION STEP
PLSS ON ENGINE COVER
LHSSC
ARMREST (1)

L CLOSE FORWARD HATCH AND LOCK

CABIN REPRESS

L VERIFY FWD HTCH RELIEF/DUMP VLV - AUTO
C VERIFY OVRHED HATCH RELIEF/DUMP VLV - AUTO
L CABIN REPRESS VALVE - AUTO
L PRESS REG A - CABIN
L VERIFY MASTER ALARM - ON
L CABIN WARN LT - ON
L VERIFY CABIN REPRESS VALVE - OPENS
L MASTER ALARM PB/LT - RESET
L PRESS REG B - CABIN
B VERIFY CAB PRESS INCREASG NORMAL
L VERIFY CABIN REPRESS VALVE - CLOSES
L CABIN WARN LT - OFF
B MONITOR CABIN PRESSURE UNTIL
IT STABILIZES AT 4.8 $\pm$ 0.2 PSIA

POST EVA SYSTEMS CONFIGURATION

L CABIN GAS RETURN VALVE - AUTO
L SUIT GAS DIV VLV - CABIN (PUSH)
B DOFF IV GLOVES/PLACE ON ENG COVER
B DOFF HELMETS AND EV VISORS
L STOW HELMET WITH VISOR AND
GLOVES ON MID-SECTION STEP
C STOW HELMET WITH VISOR AND GLOVES
IN RECHARGE STATION
C CABIN FAN 1 C/B - CLOSE
L CABIN FAN CONT C/B - CLOSE

FINAL SYSTEMS CONFIGURATION

B VERIFY ECS BASIC (UNSTAGED)
B VERIFY EPS BASIC (UNSTAGED)
B VERIFY COMM BASIC (UNSTAGED)
L VERIFY ATT DIR CONT C/B - OPEN
L VERIFY ED MASTER ARM SW - OFF
L VERIFY ED STAGE SW - SAFE
C VERIFY ENG ARM SW - OFF
C VERIFY PGNS SW - OFF

POST EVA CABIN CONFIGURATION

L STW HBLAD MAGS (2) WAIST TETHER
LWR PLSS STRAPS RHSSC
B TRANSFER OPS TO CABIN FLOOR
C XFER TO AFT CAB AREA (MOVE SRC
AS REQ'D)
L SECURE OPS THERMAL COVERS AND
STOW OPS ON CABIN FLOOR
C STOW SRC'S IN SRC RACK
REMOVE CSRC FROM PGA AND STOW
IN LOWER LUNAR OVERSHOE COM-
PARTMENT
C STOW LM EVA ANTENNA
C SNAP RCU STOWAGE FLAPS
C XFER HELMET STOW BAGS TO
ENG COVR
C TRANSFER TO CDR'S STATION
L REMOVE 16MM CAMERA FROM CRASH
BAR AND STOW BRACKET ON AOT
GUARD
L REMOVE FILM MAG FM CAM & STOW
IN 16MM MAG CONT IN RHSSC
L INSTL NEW MAG & ADJ SETTINGS
TO (TBD)
L INST CAM ON BRKT OVER RH WINDOW
C STOW PURGE VALVES, EV GLOVES,
AND EV VISORS IN HELMET BAGS
C SNAP HELMET STWAG BAGS TO ENG CVR
C ATT UTIL LT TO CLAMP & BRKT
ON AOT GUARD & POSITION AS REQ'D
C STOW ALL EVA ONBOARD DATA IN
FLIGHT DATA FILE CONTAINER

SECTION 3.4 PLSS RECHARGE IN LM

PLSS RECHARGE IN LM

POWER SUPPLY

If PLSS RCU is connected electrically to the PLSS, verify or perform the following before connecting or disconnecting battery cable

A. PUMP SW - OFF
B. FAN SW - OFF
C. MODE SEL SW - POS o

Rotate battery cable connector 90 degrees CCW and remove from battery connector. Remove protective cover from battery cable stowage connector and stow on battery. Stow battery cable

Depress and rotate latching device 90° CCW to unlock battery

Remove battery from PLSS and stow (TBD)

Obtain replacement battery from stowage (TBD) and align battery on battery foot and slide into place in PLSS

Depress and rotate latching device 90° CW to lock battery in PLSS

Verify replacement battery has protective cover installed on battery cable connector

LIOH CARTRIDGE

Verify PLSS 02 shutoff vlv - off(up)

Unstow PLSS 02 red hose and equalize the pressure in the PLSS 02 loop by depressing the valve in the hose nozzle

Stow PLSS 02 red hose

Remove thermal insulation from the canister cover

Depress cover lock

Rotate canister cover CCW until alignment mark on cover is aligned with the open mark on canister

Remove cover from canister

Grasp drop handle and rotate contaminant control cartride CCW until lugs on cartridge are aligned with slots in canister

Pull spent contaminant cartridge out of canister and stow (TBD)

Obtain replacement cartridge from stowage (TBD), grasp drop handle, and insert replacement cartridge into canister until it bottom

Rotate cartridge CW approx-imately 120 degrees to lock it in position

Ascertain that alignment marks on both parts of the cover are aligned

Grasp cover by its handle and depress cover lock

Align the alignment mark on canister cover with the open mark on cover

Insert cover in canister

Rotate cover CW until alignment mark on cover is aligned with closed mark on canister

Release cover lock

Replace thermal insulation over canister cover

OXYGEN

Verify the following -
A. PLSS O2 shutoff valve - off(up)
B. PLSS in recharge station
C. LM ECS O2 quantity greater than 35 per cent

Connect the vehicle oxygen supply line to the PLSS oxygen fill fitting

PLSS FILL VLV - OPEN

Partial charge - 2 min (approx. 3/4 full)
or
Full charge - 70 min

PLSS FILL VLV - CLOSE

Disconnect vehicle oxygen supply line

Replace dust caps on the PLSS oxygen fill fitting and the vehicle oxygen recharge connector, restow vehicle oxygen recharge line

Replace thermal cover

FEEDWATER RESERVOIR

Verify the following -
A. PLSS water shutoff and relief valve - close(up)
B. PLSS in recharge station
C. Gravity environment

Connect LM urine transfer hose to PLSS drain connector

DESCENT H2O VLV - CLOSE

Connect LM water supply hose to PLSS fill connector

WMS VLV - OPEN AND HOLD

DESCENT H2O VLV - OPEN (3 MIN)

DESCENT H2O VLV - CLOSE

WMS VLV - CLOSE

Disconnect LM water supply hose from drain and connect to PLSS vent connector

WMS VLV - OPEN AND HOLD

DESCENT H2O VLV - OPEN

When water is observed in vent flow indicator:
  DES H2O VLV - CLOSE
  WMS VLV - CLOSE

Disconnect and stow hoses

Replace all dust covers

Return to O2 recharge for completion, if required

Secure PLSS thermal covers

SECTION 3.5 LM REPRESS FAILURE

LM REPRESS FAILURE PROCEDURE

BTH	Verify LM suit ckt press 3.6-4.0 psia(EGRESS MODE)
	Verify OPS O2 - off
	Disc OPS O2 hose/purge vlv
	Place purge vlvs on eng cover
	Cnct to LM ECS, blu/blu red/red
LMP	Suit fan sel - 1
	Suit fan DELTA-P C/B - close
	Verify ECS caution lite and H2O sep comp caution lite goes off
BTH	Suit ISOL - Suit flow
	PLSS fan - off
	PLSS O2 shutoff - off
	Verify PGA press 3.6 - 4.0 psi
	PGA flow diverter vlvs-horizontal
	PLSS mode sel - O (off)
	Connect to LM comm
	Comm sws as desired
	PLSS feedwater - close
	PLSS pump - off
	Disconnect OPS O2 actuator
	Disc't RCU from PGA and PLSS
	Stow RCU on engine cover
	Disconnect PLSS H2O hose
	Doff PLSS/OPS - set on floor
	Stow OPS O2 hose and actuator
	As req'd-connect LM H2O hose
	LCG Pump C/B-close

SECTION 3.6 LM REPRESS FAILURE - ONE MAN EVA

LM REPRESS FAILURE PROCEDURE

VERIFY LM SUIT CKT PRESS-3.6-4.0 psia
(EGRESS MODE)
VERIFY OPS 02 - OFF
DISC OPS 02 HOSE/PURGE VLV
PLACE PURGE VLVS ON ENG CVR
CONCT TO LM ECS, BLUE/BLUE,RED/RED
SUIT ISOL - SUIT FLOW
PLSS FAN - OFF
PLSS 02 SHUTOFF - OFF (up)
VERIFY PGA PRESS 3.6 - 4.0 PSI
PGA FLOW DIVERTER VLVS - HORIZONTAL
PLSS MODE SEL - 0 (OFF)
CONNECT TO LM COMM
COMM SWS AS DESIRED
PLSS FEEDWATER - CLOSE
PLSS PUMP - OFF
DISCONNECT OPS 02 ACTUATOR
DISC'T RCU FROM PGA AND PLSS
STOW RCU ON ENGINE COVER
DISCONNECT PLSS H20 HOSE
DOFF PLSS/OPS - SET ON FLOOR
STOW OPS 02 HOSE AND ACTUATOR
AS REQ'D - LCG PUMP C/B - OPEN
CONNECT LM H20 HOSE
LCG PUMP C/B - CLOSE

4.0 ORBITAL CONTINGENCY EVA PROCEDURES

SECTION 4.1 LM PREP FOR CONTINGENCY EVA (2 OPS)

CONTINGENCY EVT (2 OPS)

CREW STATUS

1		UCTA'S Empty Helmets And Gloves Stowed, If Req'd
2		Verify PGA Flow Diverter (Both) - HORIZONTAL LM H2O Hoses Connected To PGA
3		Inspect PGA Zipper, Verify Lock-locks
4		Check Status of CMP Prep for Egress

PREPARATION FOR EGRESS

1		Stow Loose Items Stow DEDA Desk Remove EVVA and Purge Valve From LMP's Helmet Bag Attach EVVA to LMP's Helmet Install Purge Valve in LMP's LH PGA Red Connector Stow SRC Samples in LMP's Helmet Bag Attach Strap-On Pocket to PGA Leg
2	(LMP)	Unstow PLSS Straps (4) From RHSSC
3		Don PLSS Straps
4	(LMP)	Unstow Waist Tethers and Lifeline From RHSSC and Stow in ISA - Mid Pocket
5		Stow Magazines, Flt Data, Flag Kit In PGA Pockets
6	(CDR)	Remove CSC From Lower Overshoe Compartment and Stow in PGA Pocket

DON OPS

1	(LMP)	Verify OPS O2 PRESS - 5380 to 6380 psia and O2 Hose Locked OPS O2 SOV - ON Verify Reg Press - 3.4 to 4.0 psig HEATER TEST - PRESS (One or more lts - ON) OPS O2 SOV - OFF Verify Reg Press <2.5 psig Unstow O2 Hose (Nozzle end)
2		Secure OPS to LMP's PGA Remove PGA Connector Plugs, Stow in ISA Lower Pocket
3	(LMP)	Connect OPS O2 Hose to LH PGA Blue Connector
4	(CDR)	Verify OPS O2 Press - 5380 to 6380 psia and O2 Hose Locked OPS O2 SOV - ON Verify Reg Press - 3.4 to 4.0 psig HEATER TEST - PRESS (One or more lts - ON) OPS O2 SOV - OFF Verify Reg Press <2.5 psig Unstow O2 Hose (Nozzle end)
5		Secure OPS to CDR's PGA
6	(CDR)	Connect OPS O2 Hose to LH PGA Blue Connector

FINAL PREP FOR EVT

1		CB(11) ECS: CABIN FAN 1 - OPEN & CB(16) ECS: CABIN FAN CONT - OPEN : CABIN REPRESS - CLOSE
2		Unstow Waist Tethers From ISA
3	(CDR)	Attach Tether To PGA LH Attach Point
4	(LMP)	Attach Tether to PGA RH Attach Point
5		Unstow Life Line From ISA Attach To Waist Tether Hooks, Lock Bag Secured To LMP's OPS Slide Hook At LMP And Attached to HSB/ Samples

PREP FOR CABIN DEPRESS

1		PGA Flow Diverters - Vertical If Helmet And Gloves Donned, Proceed With Prep For Depress As Required
2	(CDR)	Unstow LMP Helmet Verify Feed Port Cover Installed and Locked
3	(LMP)	Position Mikes
4	(CDR)	Place Helmet on LMP, Lock
5	(CDR)	Unstow Helmet Verify Feed Port Cover Installed and Locked Position Mikes
6	(LMP)	Place Helmet on CDR, Lock

7	(CDR)	Unstow Purge Valves (2) From Helmet Bags
8		Install Purge Valves in LH PGA Red Connectors
9	(LMP)	Unstow EV Visors From Helmet Bags
10	(CDR)	Attach LMP's EV Visor - UP
11	(LMP)	Attach CDR's EV Visor - UP
12		Don EV Gloves, Lock
13	(CDR)	Give CSM "GO" For Depress
14		Inspect EMU Check Connectors and Lock-locks

PRESSURE INTEGRITY CHECK

1	(CDR)	SUIT CIRCUIT RELIEF - CLOSE SUIT GAS DIVERTER - PULL/EGRESS CABIN GAS RETURN - EGRESS
2	(LMP)	PRESS REG A - CLOSE PRESS REG B - DIRECT O2 When ECS: SUIT PRESS - 8.85 psia PRESS REG B - CLOSE
3		Exercise Suit Joints and Monitor Cuff Gage Pressure Decay for One Minute Verify Decay <.3 psig
4	(CDR)	SUIT CIRCUIT RELIEF - AUTO PRESS REG A And B - CABIN Confirm CSM Side Hatch Open And CMP "GO" For LM Depress
5	(LMP)	PRESS REG A And B - EGRESS CB(16) ECS: LCG PUMP - OPEN

6		Disconnect LM H20 Hoses
7		Inspect EMU Check Connectors and Lock-locks Disconnect and Stow LM Restraints
		CABIN DEPRESS
1	(LMP)	CABIN REPRESS - CLOSE
2		Monitor Suit Circuit Press During Depress Verify Press 3.6 to 4.3 psia
3	(LMP)	Forward Dump Valve - DUMP
4	(CDR)	ECS: CABIN PRESS - Observe decrease to 3.5 psia
5	(LMP)	When ECS: CABIN PRESS = 3.5 psia Forward Dump Valve - AUTO
6	(CDR)	Verify ECS: CABIN PRESS - 3.5 psia : SUIT PRESS - 3.6 to 4.3 psia And Decaying Slowly
7	(LMP)	Forward Hatch Handle - UNLOCK Forward Dump Valve - DUMP
8	(CDR)	ECS: CABIN PRESS - Observe decrease to 0 psia : SUIT PRESS - 3.6 to 4.3 psia
		HATCH OPENING
1	(LMP)	Open Hatch
2		Verify: CSM In Position CMP "GO" For Transfer To OPS And EVT
3		OPS 02 SOV - ON Note Time With CMP and Determine T + 20 min

4	(CDR)	SUIT ISOL VALVES (BOTH) - SUIT DISC
5		PURGE VALVES - OPEN Verify O2 Flow Verify Reg Press - 3.4 to 4.0 psig LM O2 Hoses - Disconnect Verify PGA Press - 3.4 to 4.0 psig EV Visors - Lower as Required LM Comm Umbilical - Disconnect
		EVT (DOCKED)
1		CDR Egress Feet First and Transfer To CSM LMP Tend Lifeline
2		CDR Ingress CSM Head First, Face To MDC, and Move To LEB Retrieve C O2 Hoses and Comm Umbilical
3		CMP Connect C Comm Umbilical to CDR
4		CDR Configure Audio Panel As Desired
5		CDR Secure Position In LEB And Tend Lifeline for LMP LMP Egress Feet First and Transfer to CSM
6		LMP Ingress CSM Feet First, Face Down, and Assume Position for Closing Side Hatch
		EVT (UNDOCKED, STABLE)
1		CSM Maneuver Apex to LM Forward Hatch
2		CDR, Then LMP, Egress Feet First, Move Along Handrails to CSM LMP Tend Lifeline
3		CDR Ingress CSM, Head First, Face to MDC, And Move To LEB Retrieve C O2 Hoses And Comm Umbilical

4	CMP Connect C Comm Umbilical To CDR
5	CDR Configure Audio Panel As Desired Secure Position In LEB And Tend Lifeline For LMP LMP Ingress CSM Feet First, Face Down, and Assume Position for Closing Side Hatch
	EVT (UNDOCKED, UNSTABLE)
1	CSM Maneuver to LM
2	CDR Egress Feet First, Move to EVA Handrail Clear of Hatch LMP Tend Lifeline
3	LMP Egress, Move Up EVA Handrail
4	CDR and LMP Push Away from LM at Same Time (Give Signal, Pull In, Push Off)
5	CSM Maneuver Apex to CDR and LMP
6	CDR and LMP Use CSM Handholds to Move To Side Hatch
7	CDR Ingress CSM, Head First, Face To MDC, And Move To LEB Retrieve C O2 Hoses And Comm Umbilical
8	CMP Connect C Comm Umbilical To CDR
9	CDR Configure Audio Panel As Desired Secure Position in LEB And Tend Lifeline For LMP LMP Ingress CSM Feet First, Face Down, and Assume Position for Closing Side Hatch

EV HATCH OPENING

1	Attach Restraints As Required
2	Unstow Tool B Insert Tool B Into Dump Valve Depress, Rotate CW to Stop Vent for 30 Sec
3	Insert Tool B Into Actuation Socket Rotate CCW (368°) Until Hatch Can Be Opened
4	Partially Open Hatch
5	Remove Tool B and Stow On PGA
6	Open Hatch

SECTION 4.2 LM PREP FOR CONTINGENCY EVA (OPS-PLSS)

CONTINGENCY EVT (CDR/OPS-LMP/PLSS)

CREW STATUS

1 UCTA'S Empty
Helmets And Gloves Stowed, If Req'd

2 Verify PGA Flow Diverter (Both) - HORIZONTAL
LM H20 Hoses Connected To PGA

3 Inspect PGA Zipper, Verify Lock-locks

4 Check Status of CMP Prep
for Egress

PREPARATION FOR EGRESS

1 Stow Loose Items
Stow DEDA Desk
Remove EVVA and Purge Valve From CDR'S
Helmet Bag
Attach EVVA to CDR's Helmet
Install Purge Valve in CDR's LH PGA
Red Connector
Stow Anti-Fog For Later Use
Stow SRC Samples in CDR's Helmet Bag
Attach Strap-On Pocket to PGA Leg

2 (LMP) Unstow PLSS Straps From RHSSC

3 (CDR) Don PLSS Straps

4 (LMP) Unstow Waist Tethers and Lifeline From
RHSSC and Stow in ISA - Mid Pocket

5 Stow Magazines, Flt Data, Flag Kit
In PGA Pockets

6 (CDR) Remove CSC From Lower Overshoe Compartment
and Stow in PGA Pocket

7 Remove PGA Connector Plugs, Stow in
ISA Lower Pocket

DON PLSS

1 (LMP) Unstow Upper and Lower PLSS Donning Straps
Unstow 02 and H20 Hoses, and Battery Cable
Connect Battery Cable to Battery
Don PLSS by Securing PLSS Upper and Lower Straps to PGA
Connect PLSS 02 Hoses and Verify Lock
RCU (All Elec Cnts-OFF)-Connect Elec to PLSS and Lock
Attach RCU to PLSS Straps and PGA
Verify these Switch and Valve Positions
Diverter Valve - MIN (up)
02 Shutoff Valve - OFF (up)
Feedwater Valve - CLOSED (up)
Pump - OFF
Fan - OFF
Mode SEL sw - POS 0

DON OPS

1 (CDR) Verify OPS 02 PRESS -5380 to 6380 psia and 02 Hose Locked
OPS 02 SOV - ON
Verify REG Press -3.4 to 4.0 psig
Heater Test - PRESS (One or More Lts - ON)
OPS 02 SOV - OFF
Verify REG PRESS <2.5 psig
Unstow 02 Hose (Nozzle End)
Secure OPS to PGA
Connect OPS 02 Hose to LH PGA Blue Connector

FINAL PREP FOR EVT

1 CB(11) ECS: CABIN FAN 1 - OPEN
& CB(16) ECS: CABIN FAN CONT-OPEN
: CABIN REPRESS -CLOSE

2 (CDR) Verify Suit CKT Relief VLV - AUTO
Suit Gas Div VLV - EGRESS (PULL)
Cabin Gas Return VLV-EGRESS

3		Unstow Waist Tethers From ISA
4	(CDR)	Attach Tether To PGA LH Attach Point
5	(LMP)	Attach Tether To PGA RH Attach Point
6		Unstow Lifeline From ISA Attach To Waist Tether Hooks, Lock Bag Secured To LMP Slide Hook At LMP And Attached to HSB/ Samples
		PREP FOR CABIN DEPRESS
1		PGA Flow Diverters - Vertical If Helmet And Gloves Donned, Proceed With Prep For Depress As Required
2	(CDR)	Unstow LMP Helmet Verify Feed Port Cover Installed and Locked Apply Anti-Fog
3	(LMP)	Position Mikes
4	(CDR)	Place Helmet on LMP, Lock
5	(CDR)	Unstow Helmet Verify Feed Port Cover Installed and Locked Position Mikes
6	(LMP)	Place Helmet on CDR, Lock
7	(CDR)	Unstow Purge Valves (1) From Helmet Bag
8		Install Purge Valve in LH PGA Red Connector
9	(CDR)	Unstow EV Visors From Helmet Bags
10	(CDR)	Attach LMP's EV Visor - UP

11	(LMP)	Attach CDR's EV Visor - UP PLSS Mode SEL sw - POS A (Min PWR) PLSS WARNING TONE - ON (10 sec) RCU PRESS Window - 0 (OPS ACT-ABORT) Verify PLSS 02 Bottle Press Confirm CSM Side Hatch Open and CMP "GO" for LM Depress PLSS Fan - ON Suit ISOL vlv - Suit Disc Verify -RCU vent window - CLEAR LCG PUMP C/B - OPEN Disconnect LM 02 and H20 Hoses, Secure Connect PLSS H20 hose
12	(CDR)	Disconnect LM H20 Hose, Secure
13		Don EV Gloves, Lock
14		Inspect EMU Check Connectors and Lock-locks Disconnect and Stow LM Restraints

PRESSURE INTEGRITY CHECK

1	(CDR)	SUIT CIRCUIT RELIEF - CLOSE PRESS REG A - CLOSE PRESS REG B - DIRECT 02 When ECS: SUIT PRESS - 8.85 psia PRESS REG B - CLOSE Exercise Suit Joints and Monitor Cuff Gage Pressure Decay for One Minute Verify Decay <.3 psig SUIT CIRCUIT RELIEF - AUTO PRESS REG A and B - CABIN

2 (LMP) PLSS 02 Shutoff VLV - ON (Down)
Verify -PLSS Warning Tone - ON (10 sec)
-RCU 02 Window -)(OPS ACT-ABORT)
-RCU PRESS Window - CLEARS
-RCU 02 Window - CLEARS
-PGA GAGE READS 3.85 ± 0.15 psig
PLSS 02 Shutoff VLV-OFF (up)
Read PGA Gage and Monitor Press Decay
1 min.
Exercise Suit Joints During Decay Period
EMU CKT Decay Not to Exceed 0.3 psid
PLSS 02 Shutoff Valve - ON(Down)(PLSS Hi
02 Flow Warn May Come ON)
Verify -PGA Gage Reads 3.85 + 0.15 psig
-PLSS Diverter Vlv - Min (UP)
PLSS Pump -ON
Verify Audible Notice of Pump Operation

3 (CDR) PRESS REG A AND B -EGRESS

CABIN DEPRESS

1 (CDR) CABIN REPRESS - CLOSE
Monitor Suit Circuit Press
During Depress
Verify Press 3.6 to 4.3 psia

2 (LMP) Monitor PGA Gage During Depress-
Verify PGA PRESS >4.5 psig

3 (LMP) Forward Dump Valve - DUMP

4 (CDR) ECS: CABIN PRESS - Observe decrease
to 3.5 psia

5 (LMP) When ECS: CABIN PRESS = 3.5 psia
Forward Dump Valve - AUTO

6 (CDR) Verify ECS: CABIN PRESS - 3.5 psia
: SUIT PRESS - 3.6 to 4.3 psia
And Decaying Slowly

7 (LMP) Verify: PGA PRESS >4.5 psig, decaying slowly

8 (LMP) Forward Hatch Handle - UNLOCK
Forward Dump Valve - DUMP
Verify: PLSS Warning Tone-ON (10 sec)
RCU H20 Window -A (ABORT)

9 (CDR) ECS: CABIN PRESS - Observe decrease to 0 psia
: SUIT PRESS - 3.6 to 4.3 psia

10 (LMP) Verify: PGA Press >4.5 psig, decaying slowly

HATCH OPENING

1 (LMP) Open Hatch
PLSS Feedwater Shutoff Vlv-OPEN (Down)
After RCU H20 Window Clears(∿4 min), PLSS Diverter Vlv - Max Cooling (Down)

2 Verify: CSM In Position
CMP "GO" For Transfer To
OPS And EVT

3 (CDR) OPS 02 SOV - ON
Note Time With CMP and Determine T + 20 min
SUIT ISOL VALVE - SUIT DISC

PURGE VALVE - OPEN
Verify 02 Flow
Verify Reg Press - 3.4 to 4.0 psig
LM 02 Hoses - Disconnect
Verify PGA Press - 3.4 to 4.0 psig

4 EV Visors - Lower as Required
LM Comm Umbilical - Disconnect

EVT (DOCKED)

1	CDR Egress Feet First and Transfer To CSM LMP Tend Lifeline
2	CDR Ingress CSM Head First, Face To MDC, and Move To LEB Retrieve C O2 Hoses and Comm Umbilical
3	CMP Connect C Comm Umbilical to CDR
4	CDR Configure Audio Panel As Desired
5	CDR Secure Position In LEB And Tend Lifeline for LMP LMP Egress Feet First and Transfer to CSM
6	LMP Ingress CSM Feet First, Face Down, and Assume Position for Closing Side Hatch

EVT (UNDOCKED, STABLE)

1	CSM Maneuver Apex to LM Forward Hatch
2	CDR, Then LMP, Egress Feet First, Move Along Handrails to CSM LMP Tend Lifeline
3	CDR Ingress CSM, Head First, Face to MDC, And Move to LEB Retrieve C O2 Hoses And Comm Umbilical
4	CMP Connect C Comm Umbilical To CDR
5	CDR Configure Audio Panel As Desired Secure Position In LEB And Tend Lifeline For LMP LMP Ingress CSM Feet First, Face Down, and Assume Position for Closing Side Hatch

EVT (UNDOCKED, UNSTABLE)

1	CSM Maneuver to LM
2	CDR Egress Feet First, Move to EVA Handrail Clear of Hatch LMP Tend Lifeline
3	LMP Egress, Move Up EVA Handrail
4	CDR and LMP Push Away from LM at Same Time (Give Signal, Pull In, Push Off)
5	CSM Maneuver Apex to CDR and LMP
6	CDR and LMP Use CSM Handholds to Move To Side Hatch
7	CDR Ingress CSM, Head First, Face To MDC, And Move to LEB Retrieve C 02 Hoses And Comm Umbilical
8	CMP Connect C Comm Umbilical To CDR
9	CDR Configure Audio Panel As Desired Secure Position in LEB And Tend Lifeline For LMP LMP Ingress CSM Feet First, Face Down, and Assume Position for Closing Side Hatch

EV HATCH OPENING

1	Attach Restraints As Required
2	Unstow Tool B Insert Tool B Into Dump Valve Depress, Rotate CW to Stop Vent for 30 Sec
3	Insert Tool B Into Actuation Socket Rotate CCW (368°) Until Hatch Can Be Opened
4	Partially Open Hatch
5	Remove Tool B and Stow On PGA
6	Open Hatch

SECTION 4.3 LM PREP FOR CONTINGENCY EVA (2 PLSS/OPS)

CONTINGENCY EVT (2 PLSS/OPS)

1 Use Planned EVA Procedures

2 Perform the following sections as applicable and with changes as noted.

CREW STATUS

SYSTEMS PREP FOR EGRESS

PREPARATION FOR EGRESS

(1) Stow SRC Samples in HSB

PLSS/EVCS ELECTRICAL CHECKOUT- OMIT

(1) Both Connect PLSS COMM to PGA (LMP First)

(2) Both - PLSS Mode SEL - AR

(3) Both - Verify COMM With CMP and each other

FINAL EVA EQUIPMENT PREP FOR DEPRESS

FINAL SYSTEMS PREP FOR EGRESS

PREP FOR CABIN DEPRESS

(1) Connect Waist Tethers and Lifeline and HSB

(2) Before Leaving LM Cooling - LCG Pump C/B - OPEN - Verify CMP "GO" For LM Depress

PRESSURE INTEGRITY CHECK

CABIN DEPRESS

HATCH OPENING

(1) Do Not Deploy PLSS Antenna

SECTION 4.4 CM PREP FOR CONTINGENCY EVA

CM PREP FOR CONTINGENCY EVA

1 C and R SUIT FLOW - OFF
2 L SUIT FLOW - CAB FLOW
3 C and R 02 hoses interconnected with A-1 interconnects
4 C hoses routed through handhold under Panel 10 for EVT
5 R hoses secured around RH Couch headrest for EVT
6 TSB's installed on R&L girth ring & LEB
7 Seat, leg, and foot pans folded against back pan with seat pan locked
8 PGA bag disconnected from center couch
9 Couch straps unstowed
10 Center couch removed and stowed under LH couch
11 L and R couch - 270°
12 Marmon clamps closed and locked
13 PGA bag secured to aft bulkhead
14 Jack screws (A1) fully opened and taped near hatch
15 Tool B (A1) taped near hatch
16 Hatch counterbalance piston chamber vented
17 Counter balance disengaged (Pull pip pin, stow in R-10)
18 MDC INGRESS BAR STOWED
19 CABIN FAN (Both) - OFF
20 REPRESS PKG v1v - FILL

CREW STATUS

UCTA Donned and empty
Helmet stowed in helmet bag
Comm carrier donned
Gloves stowed
L 02 PGA LOCK - LOCK
L elec umb connected to PGA
SUIT FLOW v1v - CAB FLOW
SUIT RET v1v - open (pull)
EMER CAB PRESS sel - BOTH
Chronometer on left PGA sleeve
Verify PGA zipper lock - lock

SYSTEM PREPARATION FOR DEPRESS

Verify REPRESS 02 press 865-935 psi
EMERG 02 v1v - closed

Verify REPRESS O2 vlv - closed
Verify surge tank vlv - on
O2 PRESS IND sw - SURGE TK
Verify surge tank pressure 865-935 psi
Select attitude control mode and maneuver spacecraft
  to EVT attitude (TBD)
AUTO RCS SELECT - undocked transfer
  A/C ROLL - A1,A2 - OFF
  PITCH - A3 - OFF
  YAW - B3 - OFF
AUTO RCS SELECT - Docked transfer
  A11 - OFF
Check status of LM prep for egress

Stow loose items
      NOTE: Perform PLSS Comm check if required
            On request by LM,
              VHF A - Duplex
              VHF B - OFF (verify)
              VHF RANGING - OFF (verify)
            Verify Comm with,
              2 PLSS - CDR (EVCS #1) and then
                LMP (EVCS #2)
               or
              1 PLSS - EVCS #1 or #2

FINAL SYSTEMS PREP FOR DEPRESS
Verify surge tank pressure 865-935 psi
EXT LTS - RUN/EVA - on (up) (IF REQ'D)
EXT LTS - RNDZ/SPOT - off (ctr)

PREP FOR CABIN DEPRESS
Verify L O2 hoses connected Red/Red, Blue/Blue
Verify PGA flow diverter valve horizontal
Unstow helmet
Verify feed port cover installed and locked, wipe
  helmet with anti-fog
Verify PGA comm lead inside PGA and
  clear of suit neck ring
Place helmet attaching neck ring in
  the "ENGAGE" position
Position mike, don helmet (with shield) and lock

Secure helmet stowage bag
Place suit wrist disconnects to "ENGAGE" position
Don gloves and lock
SUIT RET vlv - close (push)
EMERG CAB PRESS sel - off
Check all PGA connections and
  verify locked.
Ingress LH couch

PRESSURE INTEGRITY CHECK
DIRECT O2 - closed (CW)
Verify suit press - 4.7-5.3 psia
Verify O2 flow ind - 0.2-0.4 lb/hr

CAUTION
Suit test vlv should remain in press position until suit circuit pressure is stabilized to preclude seal scarring.
If repositioning of suit test vlv from press is required prior to suit pressure & O2 stabilization, perform the following:
a Demand reg sel - off
b Allow 15 sec (min) stabilization time
c Reposition suit test vlv - depress or off as applicable
d When suit pressure stabilized, demand reg sel - both

SUIT TEST vlv - press
O2 FLOW ind - 1.0 lb/hr (pegged)
Verify O2 FLOW HI lt - on
Verify MA pb/lt(3) and tone - on, push, verify tone and lts off after push
Cycle Suit Circuit Ret vlv open and closed at suit pressure of 1.5 to 2.0 psig
SUIT PRESS ind - 8.8-9.8 psia
PGA PRESS gage - 4.1-4.5 psig
Verify O2 FLOW HI lt - out

Allow 02 flow to stabilize 15 sec
02 flow will remain below 0.8 lbs/hr
  for 30 sec after stabilization
SUIT TEST v1v - depress
02 FLOW ind - 0.2-0.4 lb/hr
SUIT PRESS ind - slightly > CAB PRESS
SUIT TEST v1v - OFF
Verify DEMAND REG SEL - BOTH

CABIN DEPRESS
Confirm GO for cabin depress with MSFN and CDR
Verify CABIN FAN (Both) - OFF
Verify REPRESS PKG v1v - FILL
Verify CAB PRESS REL v1v (2) -
  NORMAL (safety latch on)
Egress LH couch and transfer to hatch
Adjust RH strut mirror to read cabin pressure
SIDE HATCH DUMP v1v - open (CCW)

  NOTE - 02 FLOW HI warning light
         may come on prior to cabin
         press reg lock-up

Monitor cabin pressure to 3.25 psia
At 3.25 psia, SIDE HATCH DUMP v1v - CLOSE
Verify 02 FLOW ind - <0.5 lb/hr
Verify cabin pressure at 3.25 psia
  and CM suit circuit pressure stable at 3.5-4.0 psia
SIDE HATCH DUMP v1v - open
Cabin Press ind - 0.0 psia

HATCH OPENING
Verify hatch counterbalance vented
Lock pin release knob - unlock (Down)
Verify lock pin indicator released
Gear box sel - unlatch
BPC JETT - 180° from BPC JETT (verify)
ACTR handle sel - U
Unstow ACTR handle
Unlock hatch
Verify hatch unlocked
ACTR handle sel - L

SECTION 4.5 CM POST CONTINGENCY EVA (2 OPS)

Stow ACTR handle
Gear box sel - latch
Open hatch to the full open position

EVT (DOCKED)
Give GO for TRANSFER TO OPS & EVT
RECORD OPS start time

EVT (UNDOCKED, STABLE)
Maneuver CSM APEX to LM forward hatch
Give GO for transfer to OPS & EVT
Record OPS start time

EVT (UNDOCKED, UNSTABLE)
Maneuver CSM to LM
Give GO for transfer to OPS & EVT
Record OPS start time
After CDR & LMP push away from LM, maneuver
APEX to CDR and LMP

4.5 INGRESS (2 OPS)
CDR Ingress CM, head first, face to MDC,
and move to LEB
Retrieve C O2 hoses and ELEC UMB
CMP Connect C electrical umbilical to CDR
CDR Audio panel sws - as desired
Secure position in LEB and manage
lifeline for LMP
LMP Ingress CM, feet first, face down,
and assume position for closing side hatch

INGRESS (CDR - OPS, LMP - PLSS or 2 PLSS/OPS), pg 4-28

VAC TRANSFER TO CM ECS
(If 20 minutes elapsed from
OPS start time, perform the following)

CDR Verify C and R SUIT FLOW vlv - OFF
Remove interconnect and hand C O2
hoses to CMP
CMP Connect C O2 hoses to CDR PGA (RED/RED, BLUE/BLUE)
CDR Close purge valve
C SUIT FLOW vlv - adjust for comfort
OPS O2 shutoff vlv - close

LMP Verify R SUIT FLOW vlv - OFF
Remove interconnect and hand R O2 hoses to CDR
CDR Connect R O2 hoses to LMP PGA (RED/RED, BLUE/BLUE)
Close purge valve
SUIT FLOW vlv (3) - FULL FLOW
Verify flow and close OPS O2 shutoff valve
Connect R electrical umbilical
Audio panel sws - as desired

HATCH CLOSING

LMP Verify hatch seals are clear
Pull hatch to the ajar position
Verify ACTR handle sel - L
Verify gear box sel - latch
Verify latch strikers inboard of hatch sill
Unstow ACTR handle
Lock hatch
Verify lock pin has automatically
engaged and that lock pin indicator in not extended
Stow ACTR handle
ACTR handle sel - N
Verify gear box sel - LATCH
CDR Stow lifeline in temporary stowage bag
Secure transfer TSB

CABIN REPRESS

LMP SIDE HATCH DUMP vlv - close
CMP Verify CAB PRESS REL vlv (2) -
NORMAL (safety latch on)
Verify O2 PRESS IND sw - SURGE TK
Verify REPRESS PKG vlv - FILL
LMP REPRESS O2 vlv - open/10 seconds/close
Cabin press approx. 1.0 psia
Adjust RH strut mirror
CABIN PRESS IND - monitor for gross leakage (30 sec)
REPRESS O2 vlv - open
CRYO O2 PRESS 1 ind - maintain 150 psi min
CMP REPRESS PKG vlv - OFF
LMP CAB PRESS ind ∿3.0 psia
REPRESS O2 PRESS ind - 0.0 psig
REPRESS O2 vlv - CLOSE

CDR CAB REPRESS vlv - OPEN (CW)
CRYO O2 PRESS 1 ind - maintain 150 psi min
Verify cabin pressure above 3.0 psia
Verify C and R SUIT FLOW vlv - OFF
OPS O2 shutoff vlv - close
As PGA press equalizes with cabin, remove interconnect from C O2 hoses and connect hoses to PGA (red to red, blue to blue)
C SUIT FLOW vlv - adjust for comfort
L SUIT FLOW vlv - increase for comfort
Close purge valve
LMP OPS O2 shutoff vlv - close
As PGA press equalizes with cabin, remove interconnect from R O2 hoses and connect hoses to PGA connectors (red to red, blue to blue)
CDR SUIT FLOW vlv (3) - FULL FLOW
LMP Close purge valve
Verify SUIT PWR - OFF
Verify PWR sw - OFF
Verify AUDIO CONT - NORM
Connect R electrical umbilical to PGA
AUDIO PANEL sws - as desired
NOTE - If CDR and LMP desire to doff OPS at this point, refer to doffing procedures. CMP continue monitoring cabin repress

POST EVA SYSTEMS CONFIGURATION

CMP CAB PRESS ind - 4.7-5.3 psia
CAB FAN (Both) - on (up)
O2 PRESS IND sw - TK 1
CDR CAB REPRESS vlv - OFF (CCW)
Doff gloves, helmets, and EVVA's, if req'd
If helmets and gloves doffed:
EMERG CAB PRESS sel - BOTH
SUIT RET vlv - open (pull)

OPS DOFFING

Remove waist tethers and stow in TSB
Remove purge valves and stow in TSB

Verify PLSS antenna stowed
Verify OPS 02 shutoff vlv - close
Verify OPS 02 actuator stowed
Disconnect OPS 02 hose and stow
Secure thermal cover
Doff OPS and PLSS straps
Secure OPS with PLSS straps
Stow interconnects in A-1

FINAL SYSTEM CONFIGURATION
02 PRESS IND sw - SURGE TK
CRYO 02 PRESS 1 ind - 500 psia
Verify CAB REPRESS vlv - OFF (CCW)
Verify REPRESS 02 - CLOSE
REPRESS PKG VLV - FILL
Verify repress 02 press increasing
CRYO 02 PRESS 1 ind - 865-935 psia
02 PRESS IND sw - TK 1
REPRESS PKG VLV - OFF

POST EVA CABIN CONFIGURATION
Remove CSC from PGA pocket and stow in A-5
EXT LTS - RUN/EVA - OFF (down)
Perform as desired
  (a) change crew stations
  (b) Restow tool B & jack screws
  (c) Unstow & install PGA bag
  (d) Reinstall center couch
  (e) Connect counterbalance (Pip pin in R-10)

EVT EQUIPMENT STOWAGE FOR ENTRY

I. CM reentry without suits:

ITEM	STOWAGE LOCATION FOR REENTRY
a. OPS (2)	In PGA
b. Purge Valve (2)	In PGA
c. Life Line	In PGA Bag

d. EV Gloves	On PGA
e. EV Visor (2)	2 on Helmet attached to Suits, in RH & LH sleep restraints
f. Waist tether (2)	In PGA Bag
g. CSC	Vol A5
h. HSB/Samples	In PGA bag toward LEB
i. Suits	1 Suit with OPS's in PGA Bag w/tie down rope.
	2 Suits in Sleep Restraint under LH & RH Couch w/tie down rope.
j. Helmets	2 On suits with EV visor 1 in B1

II. CM reentry with suits:

ITEM	STOWAGE LOCATION FOR REENTRY
a. OPS (2)	LH & RH Sleep Restraint in PGA Bag w/tie down rope.
b. HSB/Samples	In sleep restraint with OPS's
c. Purge Valve (2)	LH & RH Sleep Restraint in PGA Bag w/tie down rope.
d. Life Line	In PGA Bag
e. EV Gloves	On PGA
f. EV Visor (2)	1 in Vol B1, 1 in Vol L3.
g. Waist Tether (2)	In PGA Bag

h. CSC Vol A5

III. The following equipment may be transferred in PGA pockets during the EV transfer:

ITEM	STOWAGE LOCATION
a. Film Magazines	Vol R13
b. Log Books	Vol R1, R2 and R3
c. Flag Kit	Food Box - L3

4.6 INGRESS (CDR-OPS, LMP-PLSS or 2 PLSS/OPS)

CDR Ingress CM, head first, face to MDC,
and move to LEB (WITH PLSS/OPS -FEET FIRST, FACE DOWN)
Retrieve C 02 Hoses and Elec Umb
CMP Connect C electrical umbilical to CDR (WITH PLSS/OPS DISCONNECT PLSS COMM IF REQ'D-PLSS MODE SEL-POS 0)
CDR Audio panel sws - as desired
Secure Position in LEB and Manage Lifeline for LMP
LMP Ingress CM, feet first, face down,
and assume position for closing side hatch

VAC TRANSFER TO CM ECS

(If 20 Minutes Elapsed from OPS Start Time, Perform the following)

CDR Verify C and R SUIT FLOW vlv - OFF
Remove interconnect and hand C 02 hoses to CMP
CMP Connect C 02 hoses to CDR PGA (red to red, blue to blue) (WITH PLSS/OPS-REMOVE OPS 02 HOSE AND PURGE VLV)
CDR Close purge valve
C SUIT FLOW vlv - adjust for comfort
OPS 02 shutoff vlv - close (WITH PLSS/OPS-PLSS 02 vlv-CLOSE - PLSS FAN - OFF)
LMP Verify R SUIT FLOW vlv - OFF
Remove interconnect and hand R 02 hoses to CDR
CDR Remove LMPS OPS 02 hose and purge vlv if connected
CDR Connect R 02 hoses to LMP PGA (red to red, blue to blue)

LMP Close purge valve
CDR SUIT FLOW vlv (3) - FULL FLOW
LMP Verify flow
PLSS 02 vlv - CLOSE
PLSS FAN - OFF
Connect R electrical umbilical (WITH PLSS/OPS-
DISCONNECT PLSS COMM IF REQ'D - PLSS MODE
SEL - POS 0)
Audio panel sws - as desired

HATCH CLOSING
PLSS FEEDWATER VLV - CLOSE
LMP Verify hatch seals are clear
Pull hatch to the ajar position
Verify ACTR handle sel - L
Verify gear box sel - latch
Verify latch strikers inboard of hatch sill
Unstow ACTR handle
Lock hatch
Verify lock pin has automatically
engaged and that lock pin indicator is
not extended
Stow ACTR handle
ACTR handle sel - N
Verify Gear box sel - Latch
CDR Stow lifeline in temporary stowage bag
Secure transfer TSB

CABIN REPRESS
LMP SIDE HATCH DUMP vlv - close
CMP Verify CAB PRESS REL vlv (2) -
NORMAL (safety latch on)
Verify 02 PRESS IND sw - SURGE TK
Verify Repress PKG vlv - FILL
LMP REPRESS 02 vlv - open/10 SEC/close
Cabin PRESS APPROX 1.0 PSIA
Adjust RH strut mirror
CABIN PRESS IND-monitor for gross leakage (30sec)
REPRESS 02 vlv - open
CYRO 02 PRESS 1 ind - maintain 150 psi min
CMP REPRESS PKG vlv - OFF

LMP CAB PRESS ind ∿3.0 psia
REPRESS 02 PRESS ind - 0.0 psig
REPRESS 02 vlv - CLOSE
CDR CAB REPRESS vlv - OPEN (CW)(CMP PERFORM IF REQ'D)
CRYO 02 PRESS 1 IND - maintain 150 psi min
Verify cabin pressure above 3.0 psia
Verify C and R SUIT FLOW vlv - OFF
OPS 02 shutoff vlv - close(WITH PLSS/OPS-PLSS
02 VLV - CLOSE)
(OPEN PURGE VLV IF ATTACH TO EQUALIZE PRESS)
As PGA press equalizes with
cabin, remove interconnect
from C 02 hoses and connect
hoses to PGA (red to red, blue to blue)
(WITH PLSS/OPS - REMOVE OPS 02 AND PURGE VLV)
C SUIT FLOW vlv - adjust for comfort
L SUIT FLOW vlv - increase for comfort
Close purge valve (WITH PLSS/OPS - PLSS FAN-OFF)
LMP PLSS 02 vlv-CLOSE
(OPEN PURGE VLV IF ATTACH TO EQUALIZE PRESS)
As PGA press equalizes with cabin,
remove interconnect from R 02 hoses
and connect hoses to PGA connectors (WITH
PLSS/OPS-REMOVE OPS 02 HOSE AND PURGE VLV)
(red to red, blue to blue)
CDR SUIT FLOW vlv (3) - FULL FLOW
LMP Close purge valve if attach
PLSS FAN - OFF
Verify SUIT PWR - OFF
Verify PWR sw - OFF
Verify AUDIO CONT - NORM
Connect R electrical umbilical to PGA
(WITH PLSS/OPS-DISCONNECT PLSS COMM-
PLSS MODE SEL - POS 0)
AUDIO PANEL sws - as desired
NOTE - If CDR and LMP desire to doff
PLSS/OPS at this point, refer
to doffing procedures. CMP
continue monitoring cabin repress

POST EVA SYSTEMS CONFIGURATION
CMP CAB PRESS ind - 4.7-5.3 psia
CAB FAN (Both) - on (up)
02 PRESS IND sw - TK 1
CDR CAB REPRESS vlv - OFF (CCW)
Doff gloves, helmets, and EVVA's, if req'd
If helmets and gloves doffed - EMERG CAB PRESS
SEL - BOTH
SUIT RET VLV - OPEN (PULL)

OPS DOFFING
Remove waist tethers and stow in TSB
Remove purge valves and stow in TSB
Verify PLSS antenna stowed
Verify OPS 02 shutoff vlv - close
Verify OPS 02 actuator stowed
Disconnect OPS 02 hose and stow
Secure thermal cover
Doff OPS and PLSS straps
Secure OPS with PLSS straps
Stow interconnects in A-1

PLSS/OPS DOFFING
Remove waist tethers and stow in TSB
All RCU ELEC CNTLS-OFF
Disconnect RCU stow in TSB
Disconnect PLSS 02 and H20 Hoses
Disconnect Lower then Upper PLSS straps-DOFF-PLSS
Stow PLSS-02,H20,and COMM Umbilicals
Stow OPS-02 Actuator and 02 hose
Temp stow PLSS/OPS

FINAL SYSTEM CONFIGURATION
02 PRESS IND sw - SURGE TK
CRYO 02 PRESS 1 ind - 500 psia
Verify CAB REPRESS vlv - OFF (CCW)
Verify REPRESS 02 - CLOSE
REPRESS PKG VLV - FILL
Verify repress 02 press increasing
CRYO 02 PRESS 1 ind - 865-935 psia
02 PRESS IND sw - TK 1
REPRESS PKG vlv - OFF

SECTION 4.7 CM EQUIPMENT JETTISON

CM EQUIPMENT JETTISON

CREW STATUS
At crew stations
UCTA donned and empty
Helmets stowed in helmet stowage bag
Gloves stowed
Comm carrier donned
02 hoses connect red/red, blue/blue
SUIT FLOW vlv - SUIT FULL FLOW
SUIT RETURN vlv - OPEN (PULL)
EMER CAB PRESS sel - BOTH
Chronometers on left PGA sleeve
Inspect PGA zipper-verify lock-lock

SYSTEMS PREPARATION FOR DEPRESS
Verify repress 02 pressure
  865-935 psi
EMERGENCY 02 valve - CLOSED
REPRESS 02 valve - CLOSE
Verify surge tank vlv - ON
02 Press ind sw - SURGE TANK
Verify surge tank pressure
  865-935 PSIA

EQUIPMENT PREPARATION FOR DEPRESS
Stow loose items
Prepare all equipment to be
  jettisoned and secure
    PLSS (1-2)
    RCU (1-2)
    OPS (1-2)
    PURGE VALVE (1-2)
    LIFELINE (1)
    EV VISORS (2)
    WAIST TETHERS (2)

PREP FOR CABIN DEPRESS
Verify PGA diverter valves -
  horizontal

Unstow helmet
Verify feed port cover installed
and locked, wipe helmet with
anti-fog
Position mikes, don helmet and "lock"
Secure helmet stowage bags
Don gloves and lock
SUIT RETURN vlv - CLOSE (PUSH)
EMER CAB PRESS sel - OFF
Check all PGA connections and verify
lock-lock

PRESSURE INTEGRITY CHECK
DIRECT O2 - closed (CW)
Verify suit press - 4.7-5.3 psia
Verify O2 flow ind - 0.2-0.4 lb/hr

CAUTION
Suit test vlv should remain in
press position until suit cir-
cuit pressure is stabilized to
preclude seal carring.
If repositioning of suit test
vlv from press is required prior
to suit pressure & O2 stabiliza-
tion, perform the following:
a Demand reg sel - off
b Allow 15 sec (min) stabliza-
tion time
c Reposition suit test vlv -
depress or off as applicable
d When suit pressure stabilized,
demand reg sel - both

SUIT TEST vlv - press
O2 FLOW ind - 1.0 lb/hr (pegged)
Verify O2 FLOW HI lt - on
Verify MA pb/lt (3) and tone - on,
push, verify tone and lts off
after push
Cycle Suit Circuit Ret vlv open
and closed at suit pressure of
1.5 to 2.0 psig

SUIT PRESS ind - 8.8-9.8 psia
PGA PRESS gage - 4.1-4.5 psig
Verify 02 FLOW HI lt - out
All 02 flow to stabilize 15 sec
02 flow will remain below 0.8 lbs/hr
for 30 sec after stabilization
SUIT TEST vlv - depress
02 FLOW ind - 0.2-0.4 lb/hr
SUIT PRESS ind - slightly > CAB PRESS
SUIT TEST vlv - OFF
Verify DEMAND REG SEL - BOTH

CABIN DEPRESS
Confirm GO for cabin depress
with MSFN
CABIN FAN (BOTH) - OFF
REPRESS PKG vlv - OFF
Verify CABIN PRESS REL vlv (BOTH)-
NORMAL (safety latch - ON)
SIDE HATCH DUMP vlv - OPEN (CCW)

NOTE - 02 FLOW HI WARNING LIGHT MAY
COME ON PRIOR TO CABIN PRESS
REG LOCK-UP

Monitor cabin pressure to 3.25 psia
At 3.25 psia, SIDE HATCH DUMP vlv - CLOSE
Verify 02 FLOW ind - Less Than 0.5 lb/hr
Verify cabin pressure at 3.25 psia
and CM suit circuit pressure stable
at 3.5-4.0 psia
SIDE HATCH DUMP vlv - OPEN
CABIN PRESS ind - 0.0 PSIA

HATCH OPENING
Verify hatch counterbalance - VENTED
Lock pin release knob - UNLOCK (DOWN)
Verify lock pin indicator released
Gear box sel - UNLATCH
BPC JETT -180° from BPC JETT (VERIFY)
ACTR handle sel - U
Unstow ACTR handle

Unlock hatch
Verify hatch unlocked
ACTR handle sel - L
Stow ACTR handle
Gear box sel - LATCH
Open hatch to full open

EQUIPMENT JETTISON

JETTISON EQUIPMENT -
PLSS (1-2)
RCU (1-2)
OPS (1-2)
PURGE VALVE (1-2)
LIFELINE (1)
EV VISORS (2)
WAIST TETHERS (2)

HATCH CLOSING
Verify hatch seals are clear
Pull hatch to the ajar position
Verify ACTR handle sel - L
Verify gear box sel - LATCH
Verify latch strikers inboard of hatch sill
Unstow ACTR handle
Lock hatch
Verify lock pin had automatically engaged and that lock pin indicator in not extended
Stow ACTR handle
ACTR handle sel - N
Verify gear box sel - LATCH

CABIN REPRESS
SIDE HATCH DUMP vlv - CLOSE
Verify CABIN PRESS REL vlv (BOTH) - NORMAL (safety latch on)
Verify 02 PRESS IND sw - SURGE TANK
REPRESS PKG vlv - FILL
REPRESS 02 vlv - OPEN/10sec/CLOSE
Cabin press approx 1.0 psia

CABIN PRESS ind - monitor for gross
leakage (30 sec)
REPRESS 02 vlv - OPEN
CRYO 02 PRESS 1 IND - maintain 150
psi min
PLSS 02 vlv - OFF
CABIN PRESS ind~3.0 PSIA
REPRESS 02 PRESS ind - 0.0 PSIG
REPRESS 02 vlv - CLOSE
CABIN REPRESS vlv - OPEN (CW)
CRYO 02 PRESS 1 ind - maintain 150
psi min

SYSTEM CONFIGURATION

CAB PRESS ind - 4.7 - 5.3 PSIA
CAB FAN (BOTH) - ON (UP)
02 PRESS IND sw - TANK 1
CAB REPRESS vlv - OFF (CCW)
DOFF GLOVES AND HELMETS, IF REQ'D
If helmets and gloves doffed - EMERG CAB PRESS sel - BOTH
SUIT RET vlv - OPEN (PULL)

POST EVA CABIN CONFIGURATION

Remove CSC from PGA pocket and stow in A-5
EXT LTS - RUN/EVA - OFF (down)
Perform as desired
(a) Recharge Repress PKG
(b) Change crew stations
(c) Restow tool B & jack screws
(d) Unstow & install PGA bag
(e) Reinstall center couch
(f) Connect counterbalance (Pip pin in R-10)