It is requested that any organization having comments, questions, or suggestions concerning this document contact C. E. Wilkins, TRW Task 81, Building 4, room 265, telephone 483-3953.

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes should be submitted to the Apollo Flight Data File Manager, T. W. Holloway, CG5, Building 4, room 230, telephone 483-4271.

Distribution of this document is controlled by Flight Data File Manager, T. W. Holloway, Flight Planning Branch, Crew Procedures Division.
# LIST OF EFFECTIVE PAGES

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B12

HOOH KELIRD
1/8 SHIM

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INS R/RDOT 163/-471

9/14/72

9/19/72

HOOK VELCRO

HOOK VELCRO

B2
F11

Vi 433
HDOT 367(360)
H 337(223)
Ha 315
Hp 403
Y 211(+S,100FT)
YDOT 270,263(+S)
R 317(316)
RDOT 440(503)
R VS RDOT 606±0
574(+)NOT STAGED
604(-)ON SURFACE
ACCEL CAL LIM-0.4
634+77777(MAX ACCEL THRES 1.2)361+00029
534,535,536+0 (ACCEL FACTOR) 362-00139
540,541,542+0 (ACCEL BIAS) 260-0946.5
AGS,AUTO,ABORT,400+1,ΔV,ULL

MAX EMER L.O.
CB'S (11-3,5)-CLOSED
AGS STATUS - OPERATE
400+4E (30 SEC)
342+0
400+1/AGS-AUTO
ASC He REG/BATS

SURF S.V. INS S.V. +1 MIN
340+56905 240+56602
341+0 241+00003
342+0 242+10156
360+0 260-0946.5
361+00029 261+0000.1
362-00139 262+5457.8
254+0490.5
414+2

9/14/72

B11

APS LEAK (AGS L/O)
IF TIME PERMITS
V37E47E
(WAIT FOR DISPLAY)
V25N07E
104E
200E, E
V82E

9/19/72
## S-BANDANTENNA ANGLES

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<td></td>
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</tr>
<tr>
<td>MODE = ICS/PTT</td>
<td></td>
<td>VOX</td>
<td></td>
</tr>
<tr>
<td>AUDIO CONT = NORM</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>VHF A = T/R</td>
<td></td>
<td>RCV</td>
<td></td>
</tr>
<tr>
<td>VHF B = RCV</td>
<td></td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>VOX SENS = MAX INCR</td>
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</table>

#### PNL 14 UPSQU - AS DES

<table>
<thead>
<tr>
<th></th>
<th>ENABLE</th>
<th>OFF</th>
<th>OFF*</th>
<th>ENABLE</th>
<th>OFF</th>
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#### PNL 16 TV - OPEN

<p>| | | | | | |</p>
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#### PNL 12 AUDIO SWITCHES

<table>
<thead>
<tr>
<th></th>
<th>RCV</th>
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<tbody>
<tr>
<td>S-BD T/R</td>
<td></td>
<td></td>
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<tr>
<td>ICS T/R</td>
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<td></td>
</tr>
<tr>
<td>RELAY ON/OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>MODE = ICS/PTT</td>
<td>VOX</td>
<td>VOX</td>
</tr>
<tr>
<td>AUDIO CONT = NORM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VHF A = T/R</td>
<td>RCV</td>
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</tr>
<tr>
<td>VHF B = RCV</td>
<td>OFF</td>
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<tr>
<td>VOX SENS = MAX INCR</td>
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#### PNL 12 COMM SWITCHES

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>3-BD MODULATE = PN</td>
<td></td>
</tr>
<tr>
<td>3-BD XMT/RCV = SEC</td>
<td></td>
</tr>
<tr>
<td>3-BD PWR AMPL = PRIM</td>
<td>OFF</td>
</tr>
<tr>
<td>3-BD VOICE = VOICE</td>
<td></td>
</tr>
<tr>
<td>3-BD PCM = PCM</td>
<td></td>
</tr>
<tr>
<td>3-BD RND = OFF/RESET</td>
<td>RANGE</td>
</tr>
<tr>
<td>VHF A XMTR = VOICE</td>
<td>VOICE OR VOICE RND</td>
</tr>
<tr>
<td>VHF A RCV = ON</td>
<td>OFF</td>
</tr>
<tr>
<td>VHF B XMTR = OFF</td>
<td>DATA</td>
</tr>
<tr>
<td>VHF B RCV = ON</td>
<td>OFF</td>
</tr>
<tr>
<td>SQUELCH VHF A = NORM</td>
<td>OFF</td>
</tr>
<tr>
<td>SQUELCH VHF B = NORM</td>
<td>OFF</td>
</tr>
<tr>
<td>TLM BIOMED = AS REQ</td>
<td>OFF</td>
</tr>
<tr>
<td>TLM PCM = HI</td>
<td>LO</td>
</tr>
<tr>
<td>RECORDER = OFF</td>
<td>ON</td>
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</table>

#### PNL 12 COMM ANTENNAS

<table>
<thead>
<tr>
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<th>SLEW</th>
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<tbody>
<tr>
<td>TRACK MODE = AUTO</td>
<td>SLEW</td>
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<tr>
<td>PITCH CONT = COMP</td>
<td>SLEW</td>
</tr>
<tr>
<td>YAW CONT = COMP</td>
<td>SLEW</td>
</tr>
<tr>
<td>3-BD SEL = SLEW</td>
<td>AFT</td>
</tr>
<tr>
<td>VHF SEL = AFT OR PWD</td>
<td>PWD</td>
</tr>
</tbody>
</table>

* DURING EVA = ENABLE.
LOSS OF COMM (PDI) 9/19/72

1 VERIFY STANDARD COMM CONFIG
2 S-BD SIG STR LOW (<3.0)-REACQ WITH STEERABLE
3 STILL NO COMM (SIG STR LOW<3.0)-SELECT BEST OMNI
4 STILL NO COMM
   DN VOICE BU, BIOMED - OFF (HOT MIKE)
5 STILL NO COMM
   S-BD: XMTR/RCVR-PRIM, PWR AMPL-SEC
6 60 SEC, STILL NO COMM
   VOICE and FM
7 60 SEC, STILL NO COMM
   CSM RELAY
PM
   S-BD AUDIO (BOTH) - OFF
   NOTIFY CSM TO CONFIG FOR RELAY

(EVA)

LOSS OF COMM VIA LM

1 CK COMM CBs
2 SELECT ALT S-BD XMTR/RCVR
3 IF SIG STR <3.9,
   REALIGN STEERABLE ANT
4 IF SIG STR <3.9, SELECT FWD OMNI, TRACK MODE-OFF,
   PWR AMPL-PRIM
5 CONFIG FOR CDR RELAY:
   AUDIO (LMP) AUDIO (CDR)
   RELAY-OFF RELAY-ON
   VHF A-OFF VHF A-T/R
   VHF B-OFF VHF B-RCV
   IF COMM OK, PLSS MODE-AR
6 CONFIG LM TO B/U EVA MODE
   XMTR A-OFF, XMTR B-VOICE,
   AUDIO (CDR),
   VHF A-RCV, VHF B-T/R
   PLSS MODE-A(CDR), B(LMP)
7 S-BD - DN VOICE BU
8 UPDATA LINK-VOICE BU
9 VHF ANT-AFT

LOSS OF CSM-LM VHF COMM

<table>
<thead>
<tr>
<th>LM COORD</th>
<th>STER ANT</th>
<th>PITCH</th>
<th>YAW</th>
</tr>
</thead>
<tbody>
<tr>
<td>+X</td>
<td>90</td>
<td>-45</td>
<td></td>
</tr>
<tr>
<td>-X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+Y</td>
<td>90</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>-Y</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>+Z</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>-Z</td>
<td>180</td>
<td>0</td>
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</tr>
</tbody>
</table>

1 ✓CB'S/SWITCHES
2 ✓SQUELCH A
   VHF A XMTR-VOICE
   VHF B XMTR-VOICE
   VHF B-T/R (BOTH)
3 ✓SQUELCH A/B
   VHF B XMTR-OFF
   VHF A-RCV (BOTH)
4 VOX MODE
   ✓VOX SETTINGS
   ✓HEADSETS/UMBILICALS
5 YAW 180°
   CHANGE ANTENNA
### F9

**T-0 LAUNCH**

- **DPS PRE PRESS RNG**
- **FUEL**
- **OXID**

<table>
<thead>
<tr>
<th>TEMP</th>
<th>50-75</th>
<th>50-75</th>
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</thead>
<tbody>
<tr>
<td>PRESS</td>
<td>48-140</td>
<td>36-200</td>
</tr>
</tbody>
</table>

- **HOOK VELCRO**

- **She PRESS RNG**
- **TIME PRESS**

<table>
<thead>
<tr>
<th>LOI</th>
<th>1110-1310</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABORT</td>
<td></td>
</tr>
<tr>
<td>DPS PRESS</td>
<td>1220-1420</td>
</tr>
</tbody>
</table>

- **11/8/72**

### B9

**T+24 LAUNCH**

- **DPS PRE PRESS RNG**
- **FUEL**
- **OXID**

<table>
<thead>
<tr>
<th>TEMP</th>
<th>50-75</th>
<th>50-75</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRESS</td>
<td>48-140</td>
<td>36-200</td>
</tr>
</tbody>
</table>

- **HOOK VELCRO**

- **She PRESS RNG**
- **TIME PRESS**

<table>
<thead>
<tr>
<th>LOI</th>
<th>1130-1336</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABORT</td>
<td></td>
</tr>
<tr>
<td>DPS PRESS</td>
<td>1316-1506</td>
</tr>
</tbody>
</table>

- **11/8/72**
DPS BURN
CB(11) DECA GMBL AC - CLOSED
CB(16) DISP/ENG OV RD LOGIC - CLOSED
CB(11&16) STAB/CONT (ALL) - CLOSED
EXCEPT CB(11) AEA - OPEN

RATE SCALE [PDI] - 25°/SEC
THR CONT - MAN/CDR
- [PDI] AUTO/CDR
ATT/TRANSL - 4 JETS
BAL CPL - ON
ENG GMBL - ENABLE
DES ENG CMD OV RD - OFF
ABORT/ABORT STAGE - RESET
DEADBAND - MIN
ATT CONT(3) - MODE CONT

MODE CONT [PDI] PGNS - AUTO
AGS - AUTO
STOP PB (2) - RESET
TTCA (2) - THROT/Min [PDI] LMP TTCA - SOFT STOP

[FOR PDI GO TO TIMELINE BOOK]
-2:00 400+1
MASTER ARM - ON (1st BURN)
- :30 ENG ARM - DES
FOR AGS BURN ABORT PB - PUSH (T=0 FOR AGS)
- :07.5 ULLAGE (MANUAL FOR AGS)
- :05 PRO
+ :01 DES He REG (1) - OPEN (if previously closed)
TFC-10 DES He REG (2) - CLOSE (<86%)
\[\Delta V=0\] STOP PB - PUSH
ENG ARM - OFF
ABORT PB - RESET

9/14/72
APS BURN

CB(16)
DISP/ENG OVRD LOGIC - CLOSED
CB(11&16)
STAB/CONT (ALL) - CLOSED
EXCEPT
CB(11) AEA AND DECA PWR AND
CB(16) DES ENG OVRD - OPEN
RATE SCALE - 25°/SEC
ATT/TRANSL - 4 JETS
BAL CPL - ON
DEAD BAND - MIN
ABORT/ABORT STAGE - RESET
ATT CONT(3) - MODE CONT

ASCENT
MODE CONT - PGNS - AUTO
AGS - ATT HOLD

STOP PB (2) - RESET
TTCA (2) JETS

-2:00 400+1
AGS/PGNS
MASTER ARM - ON

RCS STAGE
-:14 MANUAL ULLAGE
-:10 STAGE-FIRE
-:10 ABORT STAGE PB - PUSH(T=O FOR AGS)
ENG ARM - ASC

-:05 PRO

:00 ENG ON
+:01 ENG START - PUSH

ASCENT
MODE CONT - AGS - AUTO

200 fps ENG ARM - OFF
0 fps ABORT STAGE - RESET
STOP PB - PUSH

(10/27/72)
## AGS Discrete Malfunction Procedures

<table>
<thead>
<tr>
<th>DISCRETE (533R)</th>
<th>FAILURE</th>
<th>EFFECTS</th>
<th>DESCENT/ABORT PROCEDURES</th>
<th>ASCENT/ABORT STAGE PROCEDURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPS ON B=2,3,6,7</td>
<td>OFF</td>
<td>.LOSS OF FOLLOW-UP DPS ENG ON .FOLLOW-UP ENG OFF ALWAYS ISSUED</td>
<td>.MASTER ARM - ON .START PB - PUSH .MASTER ARM - OFF</td>
<td>————</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>.FOLLOW-UP ENG ON ALWAYS ISSUED</td>
<td>.DELAY ARMING WITH ENG ARM SW UNTIL TIG</td>
<td>.DELAY ARMING WITH ENG ARM SW UNTIL TIG</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>.LOSS OF FOLLOW-UP APS ENG ON .FOLLOW-UP ENG OFF ALWAYS ISSUED</td>
<td>————</td>
<td>Δ 604+00000E AT TIG .UNABLE TO UPDATE H/HDOT, PERFORM MANUAL ASCENT</td>
</tr>
<tr>
<td>APS ON B=1,3,5,7</td>
<td>ON</td>
<td>.LUNAR SURFACE FLAG IS RESET AT TIME OF FAILURE .FOLLOW-UP ENG ON ALWAYS ISSUED</td>
<td>.DELAY ARMING WITH ENG ARM SW UNTIL TIG</td>
<td>IF ON SURFACE: Δ 604-00000E Δ CHECK STATE VECTORS Δ 604+00000E AT TIG .DELAY ARMING WITH ENG ARM SW UNTIL TIG</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>.LOSS OF AUTO ATT CONT .LOSS OF AUTO ENG CONT .LOSS OF AUTO ATT ERR NEEDLES</td>
<td>.PERFORM MANUAL ASCENT .MANUAL STOP REQUIRED</td>
<td>.PERFORM MANUAL ASCENT .MANUAL START/STOP REQUIRED</td>
</tr>
<tr>
<td>AUTO B=4,5,6,7</td>
<td>ON</td>
<td>.LOSS OF ATT HOLD CONT (UNLESS 400→0)</td>
<td>.TO LAND: 400+00000E .IF FAILURE DUE TO MODE CONT SW - MAY POSSIBLY HAVE TO OVERRIDE AEA WITH ACA, THEN 575+00000E IN ORDER TO ESTABLISH NEW ATT .TO ABORT: 400+10000E</td>
<td>————</td>
</tr>
</tbody>
</table>

Δ TO BE PERFORMED IN PGNS GUIDANCE AS WELL AS IN AGS, OTHER PROCEDURES TO BE USED ONLY IF IN AGS GUIDANCE.
**AGS DISCRETE MALFUNCTION PROCEDURES (CONT)**

<table>
<thead>
<tr>
<th>DISCRETE (533R)</th>
<th>FAILURE</th>
<th>EFFECTS</th>
<th>DESCENT/ABORT PROCEDURES</th>
<th>ASCENT/ABORT STAGE PROCEDURES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OFF</td>
<td>.LOSS OF AUTO ENG CONT</td>
<td>--------------------------</td>
<td>.MANUAL START REQUIRED</td>
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<tr>
<td></td>
<td></td>
<td>WITH ABORT STAGE PB</td>
<td></td>
<td>.SET ABORT PB AFTER TIG</td>
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<tr>
<td></td>
<td></td>
<td>.ABORT PB PROVIDES</td>
<td></td>
<td>FOR AUTO OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AUTO OFF AND SELECTS</td>
<td></td>
<td>.IF FAILURE DUE TO ABORT</td>
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<tr>
<td></td>
<td></td>
<td>ABORT TARGETING</td>
<td></td>
<td>STAGE PB TOTAL FAILURE,</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MUST USE ENG ARM SW IN</td>
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<td></td>
<td></td>
<td></td>
<td>ADDITION TO ABORT PB</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>.ABORT TARGETING IS</td>
<td>.IF FAILURE OCCURS BEFORE</td>
<td>.ARM APS AT TIG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SELECTED EARLY</td>
<td>PDI+10:20 AND ABORT OCCURS</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>AFTER PDI+10:20 STAND BY</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>FOR TWEAK</td>
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<tr>
<td></td>
<td>OFF</td>
<td>.LOSS OF AUTO DES ENG</td>
<td>.IN CASE OF AN ABORT,</td>
<td>.MANUAL STOP REQUIRED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CONT</td>
<td>START PB - PUSH</td>
<td>CONFRM 224 &amp; 662 WITH</td>
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<td></td>
<td></td>
<td>.ABORT TARGETING DOES</td>
<td></td>
<td>MSFN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOT GET SELECTED UNTIL</td>
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<tr>
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<td></td>
<td>ABORT STAGE PB IS SET,</td>
<td></td>
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<td></td>
<td></td>
<td>POSSIBLE OFF-NOMINAL</td>
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<td>INSERTIONS FOR LATE ABORTS</td>
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<td>ON</td>
<td>.ABORT TARGETING IS</td>
<td>.IF FAILURE OCCURS BEFORE</td>
<td>.ARM APS AT TIG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SELECTED EARLY</td>
<td>PDI+10:20 AND ABORT OCCURS</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>AFTER PDI+10:20 STAND BY</td>
<td></td>
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<td></td>
<td></td>
<td>FOR TWEAK</td>
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<tr>
<td></td>
<td>OFF</td>
<td>.**LOSS OF NORMAL ATT</td>
<td>.TO LAND: MODE CONT-ATT</td>
<td>.MANUAL START/STOP REQUIRED</td>
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<tr>
<td></td>
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<td>HOLD CONT MODE</td>
<td>HOLD</td>
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<td></td>
<td>.AUTO ATT ENG CONT</td>
<td>.**OVERRIDE AEA WITH ACA</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>NORMAL</td>
<td>575+00000E TO ESTABLISH</td>
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<td></td>
<td>NEW ATT</td>
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<td>.TO ABORT: MODE CONT-AUTO</td>
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<td>ON</td>
<td>.LOSS OF NORMAL ATT</td>
<td>.TO LAND: MODE CONT-ATT</td>
<td>.MANUAL STOP REQUIRED</td>
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<tr>
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<td>HOLD CONT MODE</td>
<td>HOLD (NO ATT ERR ISSUED)</td>
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<td>.RATE COMMAND ONLY</td>
<td>.TO ABORT: MODE CONT-AUTO</td>
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<td>AUTO ATT CONT-NORMAL</td>
<td>.MANUAL START/STOP REQUIRED</td>
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<tr>
<td></td>
<td></td>
<td>.LOSS OF AUTO ENG CONT</td>
<td></td>
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</tr>
</tbody>
</table>

**NOTES:**
- MANUAL START/STOP REQUIRED
- SET ABORT PB AFTER TIG FOR AUTO OFF
- IF FAILURE DUE TO ABORT STAGE PB TOTAL FAILURE, MUST USE ENG ARM SW IN ADDITION TO ABORT PB
- ARM APS AT TIG
- MANUAL START/STOP REQUIRED
- CONFIRM 224 & 662 WITH MSFN
DPS ABORT/INSERTION
✓GUID SW
ABORT PB - PUSH
PGNS - ATT HOLD
THROTTLE - UP
V22N46EE (NO P70, V37E 70E)
MODE CONT(2)-AUTO
MODE SEL-AGS
✓ABORT TIME
✓INS DATA
YAW RT 30°
623+1

200fps DES ENG CMD OVRD-OFF
(UNLESS CDR BUS LOSS)
TFC-10 DES He REG (2) - Close (<86%)
STANDBY TO COPY GET
0fps STOP PB - PUSH
410+5 TRIM
GET

MODE CONT-ATT HOLD
ENG ARM-OFF
ABORT-RESET
STOP PB-RESET

ΔV 404,5,6=0 470R

ABORT RULES

1. ATT & RATE LIMITS
   DPS >5° SEC
   APS >10° SEC
2. DPS SHUTDOWN
   <30 fps - STAGE & RCS
   >30 fps - ABORT STAGE
3. APS UNDER BURN
   PGNS
   <400 NULL RESIDUALS
   >400 A/H BURN
   Ha, Hp, HDOT
   AGS
   ΔV
   AUTO, A/H 15 FPS

4. INSERTION
   WITH VOICE-GROUND RECOMMENDS TRIM SOURCE AT TGO ~ 1 MIN
   TRIM X AXIS ONLY TO <2fps AND STANDBY FOR TWEAK
   AT INSERTION +3 MINUTES (10° OHW OR 257° FDA!
5. NO VOICE
   AGS & PGNS <10fps TRIM ACTIVE SYSTEM
   AGS & PGNS >10fps TRIM SYSTEM THAT AGREES WITH RR

9/21/72
STAGING
ASC BAT (2)-ON (PRECONDITION)
DES BATTS-OFF
MODE CONT (2)-ATT HOLD
CB (16) ASC ECA CONT-CLOSE
DEADFACE
CB (16) ASC ECA CONT-OPEN
/GUID SW (IF PGNS: DAP 11002, V77)
ATT CONT (3)-MODE CONT
BAL CPL-ON
DEAD BAND-MIN
P47, 404,5,6=0 470R
HELIUM MON-> ASC PRESS
MASTER ARM-ON
ASC He SEL-BOTH
/CB ED LOGIC PWR (2)-CLOSED
He PRESS ASC-FIRE
STOP PB-PUSH
-X TRANS 2 fps
STAGE-FIRE
+X TRANS 2 fps
CB(11&16) ED LOGIC PWR (2)-OPEN
CABIN REPRESS-CLOSE
DES 02-CLOSE, #1 ASC 02-OPEN
H2O SEL-ASC
DES H2O-CLOSE, ASC H2O-OPEN
PRESS REG A&B-EGRESS
SUIT GAS DIV-EGRESS
CABIN GAS RETURN-EGRESS
ATT/TRANS-2 JETS
P00
STOP PB-RESET
/GUID SW

DPS ABORT/APS INSERTION
/GUID SW
ABORT PB - PUSH
PGNS - ATT HOLD
THROTTLE - UP
V22N46EE [NO P70, V37E 70E]
MODE CONT(2)-AUTO
MODE SEL-AGS
/ABORT TIME
/INS DATA
YAW RT 30°
623+1
BURN DPS TO DEPLETION
ABORT STAGE PB-PUSH
ENG ARM-ASC
START PB-PUSH
ASC FEED(2)-OPEN (UNLESS
MAIN SOV-CLOSE BUS LOSS)
CABIN REPRESS-CLOSE
DES 02-CLOSE, #1 ASC 02-OPEN
H2O SEL-ASC
DES H2O-CLOSE, ASC H2O-OPEN
PRESS REGS A&B-EGRESS
SUIT GAS DIVERTER-EGRESS
CABIN GAS RETURN-EGRESS
PROP TEMP/PRESS-ASC
He MON-ASC
THROTTLE/JET-JETS
CB(11) RR(2)-CLOSED
500fps MAIN SOV-OPEN
ASC FEED (2)-CLOSE
200fps ENG ARM-OFF (UNLESS BUS LOSS)
STANDBY TO COPY GET
0fps ABORT STAGE-RESET
STOP PB-PUSH
410+5 TRIM
GET
MODE CONT-ATT HOLD
ΔV 404,5,6=0 470R
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*ESTABLISH POSITIVE HDOT, THEN ABORT STAGE TO USE MANUAL ASCENT ANGLES

9/27/72
## APS

**ALL PITCH RATES 5°/SEC**

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*ESTABLISH POSITIVE HDF, THEN ABORT STAGE TO USE MANUAL ASCENT ANGLES

9/27/72
NO PDI +12 DPS ABORT

ENG ARM-OFF, CMD OVRD-OFF, LR-OFF, MASTER ARM-OFF, ASC BATT-OFF, POO, STOP PB-RESET
MODE CONT (BOTH)-ATT HOLD MNVR TO FDAI (0,272,0)
VHF ANT-AFT, AFT OMNI
P3O, LOAD PAD, RESET DET, POO

V47 414+1
V83 317R 440R 277R
400 + 3

616 + 00004
410 + 5, 373 + TIG
LOAD 450, 451, 452
370R, 310R, 400 + 1, 500R

P40
N18 R, P, Y (0,272,0)
/GUID SW
MODE CONT (BOTH) - AUTO, PRO
THR CONT-MAN/CDR/MIN
/DPS BURN CARD
ENTR (ENTR ON 203)

-2:00 MASTER ARM-ON
-0:30 ENG ARM-DES
-0:10 ABORT PB-PUSH
-0:07.5 ULLAGE (MANUAL FOR AGS)
-0:05 PRO
0:00 AIM
+0:05 MASTER ARM-OFF
+0:26 THROTTLE UP (MAN)-40%

V6X=0 STOP PB-PUSH, THR/JETS-THR
PRO, NULL RESIDUALS
PRO, POO
ENG ARM-OFF,
PRPLNT QTY MON-OFF
ABORT PB-RESET,
ENG STOP PB-RESET
V82, 403R, 315R

MINI FOOTBALL

RR

BORESIGHT
(LM/CSM ALWAYS AT 0° ROLL)
MANUAL RR LOCK ON
V83 SET ORDEAL (35NM)
RR MODE - AUTO TRACK
V63 N25 (R1 = 201)
RR MODE - LGC
PRO
RR MODE - AUTO TRACK
XPTR SCALE - LO MULT
(2 MRD/SEC, + TOP)
SET DET COUNTING DOWN TO
DESIRED RNDZ TIME

WITHOUT RR

BORESIGHT
(LM/CSM ALWAYS AT 0° ROLL)
SET UP VHF RANGING
V48, 1(2)2002 (ONLY IF ACTIVE)
TIME DRIFT FOR 2 MIN IN COAS
(+ = TGT DRIFTING UP)
V83 SET ORDEAL (35NM)
SET DET COUNTING DOWN TO
DESIRED RNDZ TIME

LM ACTIVE VEHICLE
P47
BURN UP/DOWN
(UNTIL HORIZ XPTR = nDOTI REQ)
BURN LEFT/RIGHT
(CSM BURN OPPOSITE
FOR VERT XPTR)
BURN FORE/AFT
(UNTIL RDOT = RDOT REQ)

9/14/72
NO PDI + 12 APS ABORT
✓ ENG ARM - OFF, CMD OVRD - OFF, LR - OFF
MASTER ARM - OFF, ASC BATT - ON, PRPLNT QTY MON - OFF
POO, STOP PB - RESET, TTCA (BOTH) - JETS
MODE CONT (BOTH) - ATT HOLD, MNVR TO FDAI (0,272,0)

VHF ANT - AFT, [AFT OMNI]
P30, LOAD PAD, RESET DET, POO

V47 414+1 400+3 V83 317R 440R 277R

616+00007
410+5, 373+TIG
LOAD 450, 451, 452
370R, 310R, 400+1, 500R

P42 (PRO ON 1706)
N18 R, P, Y (0,272,0)
✓ GUID SW, MODE CONT (BOTH) - AUTO, PRO

HEL IUM MON - ASC, PRPLNT TEMP/PRESS MON - ASC
ASC HE SEL - BOTH, MASTER ARM - ON
ASC HE PRESS - FIRE, ASC HE REGS 1, 2 - OPEN

BATT 1, 3 - OFF, BATT 2, 4 - OFF
CB(16) EPS: ASC ECA CONT - CLOSE, DES BAT - DEADFACE
SELECT ASC H20 TANK
DES 02-CLOSE, ASC 1 02-OPEN, DES H20-CLOSE, ASC H20-OPEN
✓ APS BURN CARD
ENTR, N40

-0:14 MANUAL ULLAGE
-0:10 STAGE FIRE, ABORT STAGE - PUSH, ENG ARM - ASC
-0:05 PRO
0:00 AIM
VGX=0 ABORT STAGE - RESET, STOP PB - PUSH
PRO, NULL RESIDUALS
PRO, POO
ENG ARM - OFF, ENG STOP - RESET, V82, 403R, 315R

9/14/72
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<td>ALL POODOO'S (EXCEPT 21406)</td>
<td>GUID CONT - AGS</td>
</tr>
<tr>
<td>21406</td>
<td>BAD RETURN FROM TIME TO TGT RTN (P63)</td>
<td>MSFN UPLINK NEW S.V. &amp; RECALL P63</td>
</tr>
<tr>
<td>RECURRING 3XXXX</td>
<td>ALL SOFTWARE RESTARTS (BAILOUT)</td>
<td>CONTINUE-INSURE NO UNSAFE CONDITION DEVELOPS</td>
</tr>
<tr>
<td>N49</td>
<td>RMAX VMAX &gt;.3nm; 2.0fps</td>
<td>A) PRE STEADY STATE LIMITS &gt;2.0mm OR 12.0fps PRIOR TO DIR ASC TPI/CSI OR &gt;.8mm OR 5.0fps AFTER DIR ASC TPI/CSI IF LIMITS-PRO, IF LIMITS-REJECT, IF IT REPEATS-PRO B) IF AFTER STEADY STATE (OCCURS AFTER 5 MARKS) 1) REJECT, 2) IF IT REPEATS-PRO</td>
</tr>
<tr>
<td>F97N63</td>
<td>LGC THINKS ENG FAILED</td>
<td>PRO TO SET ΔV MON. DO NOT ENTER BECAUSE IT WILL SLIP TIG IF RECURRING, NO GUIDANCE 10/5/72</td>
</tr>
<tr>
<td>Pre PDI</td>
<td>PDI to PDI +6+10</td>
<td>PDI +6+10 to Hi Gate</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------</td>
<td>---------------------</td>
</tr>
<tr>
<td><strong>EPS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>one dc bus</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>one descent feeder shorted</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>one ascent feeder shorted</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>4 descent bats</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>one ascent bat</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>both inverters</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>ac bus a and b</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td><strong>ED</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>one pyro system armed</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>one pyro system unable to arm</td>
<td>abort</td>
<td>go</td>
</tr>
<tr>
<td>one staging relay closed</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>one pyro system battery</td>
<td>abort</td>
<td>go</td>
</tr>
<tr>
<td><strong>ECS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cabin press &lt;4.0</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>suit leak</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>both suit fans</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>both demand regs</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>both h2o seps</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>both descent o2 tanks</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>both asc o2 tanks</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>pri coolant loop</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>pri and sec h2o feed</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>both descent h2o tanks</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>both asc h2o tanks</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td><strong>G&amp;C</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pgns guid steer</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>3 axis att cont</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>pgns rate cmd &amp; pgns auto</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>ags rate cmd</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>2 aca</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>auto +X &amp; auto DPS ignition</td>
<td>go</td>
<td>go</td>
</tr>
<tr>
<td>2 Fdai-Att/rate/err</td>
<td>option</td>
<td>option</td>
</tr>
<tr>
<td>lr</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>rednt APS on</td>
<td>abort</td>
<td>go</td>
</tr>
<tr>
<td>p &amp; r GDA trim (imping const viol)</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>manual throttle (2 TTCA) &amp; auto throttle</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td><strong>DPS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>prop leak (ΔQ Fu/Ox&gt;10%)</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>fu or ox inlet/ullage&lt;160</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>bingo/2%</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td><strong>APS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>prop leak</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>fu/ox inlet press&lt;62,&gt;220</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>APS HE 1 or 2 decreasing</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td><strong>RCS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE/prop leak</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>prop leak (downstream of main)</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>fu/ox MNFLD A or B press&lt;100</td>
<td>abort</td>
<td>abort</td>
</tr>
<tr>
<td>LIGHT</td>
<td>MEANING</td>
<td>IMMEDIATE ACTION (POSSIBLE OPERATIONAL IMPLICATIONS)</td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>DC BUS BATTERY ~11 C&amp;W LIGHTS</td>
<td>CDR BUS FAILURE</td>
<td>(DPS TO 100% AND GDA LOCKED) GUID CONT - AGS, SUIT FAN-2, CDR AUDIO CONT-BU, S-BD-XMTR/RCVR &amp; PWR AMP - PRIM, INV 2, ACT SEC GLYCOL. TO START DPS: ENG ARM-DES; DES ENG CMD OVRD-ON (2ND BURN ONLY); (M8-3) TO STOP DPS: DES ENG CMD OVRD-OFF, ENG ARM-OFF. RECONFIG IF TIME PERMITS: CB16(11) ASC ECA CONT-CL; CDR(LMP) BAT (5)-OFF/RESET; CB11(16) BAT FEED TIE (2)-OPN; [BAT 6(5) BACKUP FEED-ON]. IF FEED FAULT LT OFF-BUS SHORT; CB16(11) ASC ECA CONT-OPN; IF ON-DES BATS-DEADFACE; IF FEED FAULT LT OFF-ALL DES BATS-OFF; CB11(16)-BAT FEED TIE (2)-CL; BAT 6(5) BACKUP FEED-OF; BAT 6(5) NORMAL FEED-ON; IF FEED FAULT LT ON-DES BATS-CONNECT; RESTORE BUS.</td>
</tr>
<tr>
<td>DC BUS BATTERY ~6 C&amp;W LIGHTS</td>
<td>LMP BUS FAILURE</td>
<td>(DPS TO 100% AND GDA LOCKED) GUID CONT - PGNS, SUIT FAN - 1, LMP AUDIO CONT - BU, S-BD-XMTR/RCVR &amp; PWR AMP - SEC, INV 1; TO START DPS: ENG ARM-DES; ENG START - PUSH; TO STOP DPS: ENG STOP - PUSH; ENG ARM-OFF (M8-3)</td>
</tr>
<tr>
<td>BATTERY</td>
<td>BAT OVERTEMP REV CURRENT &gt;10A OVERCURRENT</td>
<td>CHECK ALL BATS VOLTS, AMPS &amp; TB's. IF VOLTS, AMPS OK: FAULTY BAT-OFF THEN ON; IF VOLTS, AMPS NOT OK; FAULTY BAT-OFF. LOSS OF ASC BAT 5(6) (REVERSE CURRENT ONLY) CB(11) DES ECA-OPEN. IF STAGING REQD OR IF PAST HI GATE, CB(16) BUS CROSSTIE-CLOSE. IF ABT STG REQD, CB(16) DES ECA-OPEN. IF TIME PERMITS, BAT 6(5) BU FEED-ON, DES</td>
</tr>
<tr>
<td>INVERTER</td>
<td>AC VOLTS &lt;112 398&gt;FREQ&gt;402</td>
<td>CHECK AC VOLTS &amp; FREQ. SWITCH TO INV-2. BUS A&amp;B BUS TIE INV 1 (2)-OPEN (INV 1 FEED SHORT). BUS B: BUS TIE INV 2 - OPEN (BUS B SHORT). BUS A&amp;;&amp; BUS TIE INV 1 (2) - CLOSE; SELECT INV 1. BUS A; BUS TIE INV 2 - OPEN (INV 2 FEEDER SHORT). BUS A: BUS TIE INV 1 - OPEN (BUS A SHORT, LT STAYS ON; CLOSE BUS B: BUS TIE INV 2 BEFORE SELECTING INV 2). CYCLE DECA GMBL CB FOR LOSS OF INV 1/AC ENGINE START-PUSH MASTER ARM-OFF.</td>
</tr>
<tr>
<td>ED RELAY &amp; (ONE/BTH) STG SEQ RELAY LIGHTS ON</td>
<td>ED RELAYS K1 TO K6 CLOSE WITH MASTER ARM OFF</td>
<td>BEFORE PDI: DO NOT SET MASTER ARM-ON, STAGE RELAY-RESET; IF LT STILL ON, ASC He SEL-TANK 1, ASC He PRESS-FIRE. IF APS PRESS, ABORT; IF NOT (NEXT STEP MAY STAGE VEHICLE) MASTER ARM-ON; IF NO STAGE, GO NORMAL PROCEDURES. AFTER PDI: DO NOT SET MASTER ARM-ON; STAGE RELAY-RESET; IF STAGE SEQ RELAY LT STILL ON: ASC He PRESS - FIRE, IF APS PRESSURIZES, ABORT (M11-3) AFTER LANDING-BAD SYSTEM/LOGIC PWR CB-OPEN.</td>
</tr>
<tr>
<td>STAGE SEQ RELAY LT OFF AT PDI</td>
<td>POSSIBLE RELAY FAIL</td>
<td>LAMP TEST. AT PDI: MASTER ARM-OFF; OPEN LOGIC PWR CB ON SYSTEM WHICH HAD SEQ LT-ON, MASTER ARM-ON. AT IGNITION MONITOR DPS She AND FUEL/OXID PRESS. She TANK INOPERATIVE: STOP PB - PUSH, ENG ARM-OFF. She TANK OK: MASTER ARM-OFF, LOGIC PWR CB-CLOSE, ASC He PRESS - FIRE, IF APS PRESSURIZES, ABORT (M11-4)</td>
</tr>
<tr>
<td>DES REG</td>
<td>220&gt;He PRESS&gt;260</td>
<td>DES He REG 1 - CLOSE, DES He REG 2 - OPEN, MONITOR TEMP/PRESS, MAINTAIN FUEL/OXID&gt;160. (M5-3)</td>
</tr>
<tr>
<td>ENG GMBL</td>
<td>GMBL CMD/RESP FAIL</td>
<td>ENG GMBL - OFF. IF LIGHT STILL ON: CWEA FAIL. IF LT OFF: WAIT FOR MSFN TEST. (M4-7)</td>
</tr>
<tr>
<td>CES DC</td>
<td>ATCA DC OUT OF TOLERANCE</td>
<td>CMD THRUST 10%: DECA GMBL-OPN: SEL MAN THROT, IF THROT NORM CLOSE DECA CB UNTIL THROT DOWN. IF COMMANDED THRUST NORM: GYRO TEST POS RT; IF LT ON-CWEA FAIL; IF LT OFF-CYCLE CWEA CB. IF LT STAYS OFF-TRANSIENT. LT ON-EVAL AGS CONT; IF FAIL CDR BUS CRIT</td>
</tr>
<tr>
<td>NO AUTO START</td>
<td>RELAY DRIVER FAILURE</td>
<td>ENG START - PUSH. AFTER THROTTLE UP: MODE CONT (AGS)-ATT HOLD. GUID CONT-AGS. MSFN WILL DETERMINE AGS APS Redundancy. FOR LOSS OF AUTO-CDR BUS CRITICAL FOR APS BURNS.</td>
</tr>
</tbody>
</table>
### LIGHT MEANING

#### DC BUS

<table>
<thead>
<tr>
<th>LIGHT</th>
<th>MEANING</th>
<th>IMMEDIATE ACTION (POSSIBLE OPERATIONAL IMPLICATIONS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BATTERY</td>
<td>CDR BUS FAILURE</td>
<td>GUID CONT - AGS; SUIT FAN - 2; CDR AUDIO CONT - BU; S-BD XMTR/RXVR &amp; PWR AMPL - PRIM; INV - 2; ACTIVATE SEC GLYCOL LOOP. RECONFIGURE IF TIME PERMITS: CB 16 (11) ASC ECA CONT - CLOSE, CB 11 (16) BAT FEED TIE (2) - OPEN; IF FEEDER FAULT LT ON, BAT 6(5) BU FEED - ON. RESTORE BUS, IF FEEDER FAULT LT OFF-BAT 6 (5) NORM FEED - OFF/ON. IF TB GRAY - BUS SHORT. IF TB BP - BAT 5 &amp; 6 BU FEED-ON; BAT 8 &amp; 6 NORM FEED - OFF; CCB11(16) BAT FEED TIE (2) - CLOSE. IF NO SWITCH ACTION - RESTORE BUS.</td>
</tr>
<tr>
<td>BATTERY</td>
<td>LMP BUS FAILURE</td>
<td>GUID CONT - PGNS; SUIT FAN - 1; LMP AUDIO CONT - BU; PWR AMPL - SEC; INV - 1. (M8-7)</td>
</tr>
<tr>
<td>BATTERY</td>
<td>BAT OVERTEMP</td>
<td>CHECK BAT 5,6 VOLT, AMP &amp; TB'S IF VOLTS, AMP NOT OK: CB (11 &amp; 16) CROSS TIE BUS - CLOSE. FAULTY BAT: NORMAL FEED - OFF, GOOD BAT: BACKUP FEED - ON. (M8-8)</td>
</tr>
<tr>
<td>BATTERY</td>
<td>REV CURRENT &gt;10A</td>
<td>CHECK AC VOLTS &amp; FREQ. VERIFY CB (11) INV 1 - CLOSE, SWITCH TO INV 1. BUS A&amp;B BUS TIE INV 2 (2) - OPEN (INV 2 FEED SHORT). BUS B: BUS TIE INV 1 - OPEN (BUS B SHORT) BUS A&amp;B: BUS TIE INV 2 (2) - CLOSE. SELECT INV 2. BUS A: BUS TIE INV 1 - OPEN (INV 1 FEEDER SHORT). BUS A: BUS TIE INV 2 - OPEN (BUS A SHORT, LT STAYS ON; CLOSE BUS B: BUS TIE INV 1 BEFORE SELECTING INV 1). (M8-9)</td>
</tr>
<tr>
<td>ONE STAGE SEQ RELAY FAILURE OR ED LT. OFF AT ASCENT</td>
<td>MASTER ARM SW</td>
<td>LAMP TEST. MASTER ARM-OFF, THEN ON. CB(11 &amp; 16) ABORT STAGE-OPEN. ABORT STAGE-PUSH. IF BOTH LIGHTS ON: ABORT STAGE - RESET, CB (11 &amp; 16) ABORT STAGE - CLOSE. CONTINUE NORMAL L/O. IF ONE LIGHT STILL OFF: STAGE - FIRE, ABORT STAGE - RESET, CB (11 &amp; 16) ABORT STAGE - CLOSE, GROUND CONFIRM STAGING. (M1-3)</td>
</tr>
<tr>
<td>ASC PRESS</td>
<td>EITHER He PRESS &lt;2775psi (Before Staging)</td>
<td>IF APS NOT PRESSURIZED - CONSULT MSFN, GO TO MAL PROC APS - 1 (M6-3) IF He LEAK, LMP BUS IF APS PRESSURIZED - CLOSE ASC He REG 1 &amp; 2: MONITOR ASC He PRESS; CRITICAL (SOV'S) IF BOTH &lt;2775psi AND DECREASING - IMMEDIATE LIFTOFF. MONITOR FUEL/OXID PRESS; IF EITHER DECREASING - IMMEDIATE LIFTOFF.</td>
</tr>
<tr>
<td>ASC HI REG</td>
<td>MANF PRESS&gt;220psi</td>
<td>ASC He REG 1 &amp; 2 CLOSE, WHEN &lt;220psi, OPEN EACH REG SEPARATELY TO VERIFY GOOD REG. (M6-4)</td>
</tr>
<tr>
<td>CES DC</td>
<td>ATCA DC OUT OF TOLERANCE</td>
<td>GUID CONT-PGNS, GYRO TEST-POS RT. IF LT STAYS ON; CWEA FAIL, IF LT OFF-CYCLE CWEA CB; IF LIGHT REAPPEARS: POSSIBLE NO AGS ATTITUDE CONTROL, NO APS AUTO ON/OFF. CDR BUS CRITICAL.</td>
</tr>
<tr>
<td>NO AUTO OR MAN START</td>
<td>RELAY DRIVER FAILURE</td>
<td>NO AUTO START: CDR BUS CRITICAL. NO MANUAL START (NO LIGHT): LMP BUS CRITICAL.</td>
</tr>
<tr>
<td>LIGHT</td>
<td>MEANING</td>
<td>IMMEDIATE ACTION (POSSIBLE OPERATIONAL IMPLICATIONS)</td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
<td>----------------------------------------------------</td>
</tr>
<tr>
<td>RCS TCA WITH QUAD FLAG</td>
<td>ONE OR MORE THRUSTERS FAIL OFF; CO-LINEAR THRUSTERS FIRING SIMULTANEOUSLY</td>
<td>ULLAGE: Disable 1st Flag. If 2nd Flag (V-UP), OPEN CB; Disable Flag. Enable 1st Flag. POWERED FLIGHT: If JET ON; CB QUAD TCA - OPEN DETERMINE CRITICAL QUAD (DO NOT DISABLE CRITICAL QUAD UNLESS V-JET AVAILABLE*). BUS WITH GOOD SYSTEM CRITICAL. (M7-4) *H-JET ON: ENABLE FOR CRITICAL V-JET FAIL AND DISABLE CRITICAL JET V-JET ON: ENABLE FOR CRITICAL V-JET FAIL OFF V-JET OFF: SELECT DIRECT (P, R) FOR CRITICAL V-JET FAIL OFF</td>
</tr>
<tr>
<td>ABNORMAL THRUSTERS FAILURE ON W/O RCS SECONDARY COILS, TCA, QD FL</td>
<td>POSSIBLE SWITCH ACA 4-JET (2) - DISABLE (FOR PDI: ISOLATE BY TIG + 15 SEC OR THROTTLE UP MANUALLY) ACA PROP (2) - DISABLE</td>
<td></td>
</tr>
<tr>
<td>RCS A REG RCS B REG</td>
<td>165psi&gt;REG PRESS &gt;218psi</td>
<td>Monitor MANF PRESS, When &lt;100psi: Bad System MAIN SOV - CLOSE CRSFD - OPEN (M7-4) Monitor He PRESS &amp; QTY. CB(11 or 16) QUAD TCA(4)-OPEN. Affected Sys: LGC THR CMD (4)-DISABLE, MAIN SOV-CLOSE. Monitor MANF PRESS. CDR BUS CRITICAL if Pln 16 QUAD TCA CB OPEN. Go to Mal Proc RCS 1. (M7-3) LGC Power, Scaler, or Counter Fail MODE CONT (AGS)-ATT HOLD; GUID CONT-AGS. IF LT ON-CWEA FAIL. IF RESTART LT ON; LGC FAIL. CB(11).AEA-CLOSE. LMP BUS CRITICAL. IF RESTART LT OFF; EVAL PGNS. (M2-4) ISS IMU, ICDU or PIPA (Thrusting) FAIL MODE CONT (AGS) - ATT HOLD; GUID CONT - AGS. IF LT ON - CWEA FAIL. IF PROG LT NOT ON CWEA Fail. CB(11) AEA - CLOSE. LMP BUS CRITICAL. (M2-3) CES AC ATCA AC Out of Tolerance GUID CONT - PGNS, GYRO TEST - POS RT. IF Light Stays ON - CWEA Fail. IF Light OFF: Check rate needles - NO RESPONSE: Loss of AGS Control and AGS FDAI Error Needles, RR Usable in LGC Mode Only. If Rate Needles VALID-CYCLE CWEA CB: IF LIGHT REAPPEARS; Possible Loss of AGS Control, DO NOT REMOVE ATCA CB PWR. CDR BUS CRITICAL FOR AGS CONTROL LOSS. (M4-9) AGS Power Supply Out of Tolerance, AGS Heater Failed ON, AGS Self Test FAILED, ASA FREQ OUT OF TOLERANCE MODE CONT (AGS) - ATT HOLD; GUID CONT - PGNS. Cycle 02/H20 Qty Mon Sw: If Light OFF - Perform 412R. If Light ON - CWEA CB OPEN: If Light Stays ON - CWEA Failure. If Light OFF: CLOSE CWEA CB; If Light Stays OFF - PWR Transient. If Light ON: Evaluate AGS Control &amp; Steering. CES Rate Cmd OK. (M3-3)</td>
</tr>
</tbody>
</table>
CONTEMPANY EVT (2 OPS)

PREP FOR EGRESS
Doff IV Gloves, Stow Under Netting
Doff Helmets, Verify Feedport Cover Installed
Apply Antifog (EMU kit, purse)
Stow Helmets On Ceiling
Verify Wristwatch Donned
FWD Hatch Handle - UNLOCK
Verify With CMP That Tunl Is Depressed
Verify - PGA Zipper Locked
Stow COAS On Fwd Window Mount
Stow DEDA & DSKY Desk, Loose Items
LM 02 hoses to inboard connectors
EQUIPMENT PREP (OPTIONAL)
Place items in PGA pockets
Snap one end of 2 bungees together
Attach end to BSLSS tiedown, route over horiz bar in recharge station and snap to lower snap on LH eng cover
Place items in transfer container
Stow behind bungee
OPS DONNING
Stow PGA Gas Connector Plugs & LCG Plugs in PGA pocket
Unstow OPS Straps & Purge Valves(LHSSC)
Purge Vlvs - Hi
Don Purge Valves (Outboard Red)
Don OPS Straps(Break Stitches 2 Places, Remove Keeper, Extend To Max Length, Route Thru PGA LH D-RING With Adjustable Strap On RH Side)
LMP 1st - Unstow OPS & Checkout
Verify OPS Reg Decays To 2.5 PSI(>3Min)
Unstow OPS 02 Gas Hose
Do not don OPS over 02 or H20 hoses
Secure OPS To OPS Straps
(Do Not Twist Strap)
Connect OPS Hose To PGA (Outboard Blue)
Fix OPS Flaps To Expose Press Gage
CDR Repeat OPS DONNING

CB(11) ECS: CABIN FAN - Open (VERIFY)
Unstow Lifeline/Tethers - RHSSC
Verify Small Hooks Attached to Lifeline
Attach Waist Tether Hooks To PGA
(Connect To LMP RH Side, Route In Front Of LMP & Behind CDR & Connect To CDR LH Side, Verify Hooks Locked)
Secure Tool B (aft RHSSC) to CDR tether if required
Verify LM 02 Hoses - R/R, B/B
PGA Diverter Valves - Vertical
Don Helmets
Don LEVA's, Verify Helmet Aligned
CK Conn - Hel, 02, Comm,Purge Vlvs
Verify LM Restraints Removed
Don EV Gloves, Verify Locked

SUITE INTEGRITY CHECK
SUIT GAS DIVERTER - PULL-EGRESS
CABIN GAS RETURN - EGRESS
SUITE CIRCUIT RELIEF - CLOSE
PRESS REG A - EGRESS
PRESS REG B - DIRECT 02
Monitor CUFF GAGE 3.7-4.0 PSIG Then
PRESS REG B - EGRESS (Cuff Gage Decay <.3 Psig in 1 Min)
Verify Purge Valves Accessible
SUITE CIRCUIT RELIEF - AUTO (SUITE CKT PRESS DECAYS TO 4.8 PSIA)
Confirm CSM Side Hatch Open And CMP Go For LM Depress
LCG - COLD, As REQ'D
CB(16) ECS: LCG Pump - Open
Disconnect LM H20 Hoses
Inspect EMU

CABIN DEPRESS
CB(16) ECS: CABIN REPRESS-OPEN
CABIN REPRESS VLV - CLOSE (VERIFY)
Fwd Dump Valve - OPEN Then AUTO At 3.5 Psia
Verify LM Suit circuit lockup at 4.3 psia And Decaying Slowly
Fwd Dump Valve - OPEN
Monitor Cabin Press To 0 Psia
Verify LM Suit Press 3.6-4.3 Psia

HATCH OPENING
Open Hatch
VERIFY/PERFORM:
CB(11) STAB/CONT: ATCA (PGNS) - OPEN
CB(16) STAB/CONT: ATCA (AGS) - OPEN

If undocked:
Verify CB(11) ATCA (PGNS) - Closed
Load LM Wt, PRO
Disable jets 1U,1D,1F,4U,4D,4F
V25N07E, 1257E, 303E, lE
V25N07E, 1260E, 6E, lE
V01N01E,1257E,Ver 00303,
ENTR,1260E,Ver 00006
V48E,PRO,PRO
TTCA/TRANSL (2) - DISABLE
ACA PROP (2) - DISABLE

Turn Card Over, Review Xfer Method
CDR Egress Feet First and Transfer To CSM, LMP Tend Lifeline

CDR Ingress CSM Head First, Face Toward MDC, and Move To LEB
Retrieve C O2 Hoses and Comm Umbilical
CMP Connect C Comm Umbilical To CDR
CDR Configure Audio Panel As Desired
(Vac transfer to ECS if necessary, CMP cue card)
CDR Secure Position In LEB & Tend Lifeline For LMP
LMP Egress Feet First and Transfer to CSM, Remove transfer bag
LMP Ingress CSM Feet First, Face Toward MDC, and Assume Position In Center Couch Area
CDR Connect R Electrical Umbilical to LMP
CMP Close Hatch
CONTINUE WITH VACUUM DISCONNECT AND EGRESS
CABINET PREP - Perform EVA 1, 2 Or 3 As Req'd

EQPT PREP - Perform EVA 1, 2 Or 3 As Req'd

PLSS DONNING - Perform EVA 1, 2 Or 3 As Req'd

Position Post EVA 1, 2 Or 3 Cue Card
For Post EVA

NON EVA CREWMAN - Connected To LM 02, Comm, & H2O
Gas Connector Plugs in PGA
PGA Diverter Valve - Horizontal

EVA CREWMAN: PGA Diverter Valve - Vertical

PLSS COMM CHECK

IVA

Verify Powerdown CB Configuration
(White Dots Out)
Verify LM EVA Antenna Deployed
Verify Voice Comm With Hou

Audio (Non EVA Crewman)

S-BAND - T/R
HICS - T/R
HRELAY - OFF
HMODE - VOA
HVOX SENS - MAX
HVHF A - RCV
BV-T/R

EVA

Audio (EVA Crewman)

S-BAND - T/R
HICS - T/R
HRELAY - ON
HMODE - VOA
HVOX SENS - MAX
HVHF A - RCV
BV-T/R

COMM:

COM:

VHF A XMTR - OFF
A RCVR - ON
B XMTR - VOICE
& B RCVR - ON
TLM BIOMED - NON EVA CREWMAN
SQUELCH VHF A&B - Noise Thres + 1/2
RECORDER - ON
VHF Antenna - EVA

AUDIO CB - Open
EVA Crewman Connect to PLSS Comm

AUDIO CB - Close
RCU PTT - MAIN (Rt), Verify

PLSS Mode-B, Blade-CCW
(Tone-On, Vent Flag-P,
Press Flag-O, 02 Mom)
PLSS 02 Press Gage >85%

Comm Check With Each Other & Hou

& NOTE: Unstow PLSS Antenna If It
Transmits Garbled And/OR Loses TM
Restow Before Egress

& Audio (CDR & LMP)

VHF A - T/R
VHF B - RCV

PLSS Mode - A, Wheel-CCW (Tone-On)

Perform Comm Check With Each Other &
Comm TM Check With Hou

SUIT FLOW CONT - Open

FINAL SYSTEMS PREP

CB(16) ECS: LCG PUMP - Close

LCG - Cold, As Req'd

CB(16) ECS: CABIN REPRESS - Close (Ver)

SUIT GAS DIVERTER - PULL-EGRESS (Verify)

CABIN GAS RETURN - EGRESS (Verify)

SUIT CIRCUIT RELIEF - AUTO (Verify)

OPS CONNECT

SUITE ISOL - ACT QVRE (SUITE DISC)

Discon LM 02 Hoses, Secure About PGA

Connect Ops 02 Hose To PGA B/B

Retrieve Purge Valve (Purse) -
Verify Closed, Lock Pin In & LO
Install Purge Valve In PGA R/R

Drink

DES H20 VLV - CLOSE

HELMET/GLOVE DONNING

Position Mikes (Both)
PLSS FAN - ON, Rt (Vent Flag - Clear)
Don Helmets, Check Drink Bag Position
Don LEVA And Lower Protective Visor

EVA CREWMAN: Stow LM 02 & Comm
Verify EVA Crewman in CDR's Station

Verify The Following (Both):
- Helmet & Visor (2) - Aligned & Adjusted
- O2 Connectors (7) - Locked
- Purge Valve (1) - Locked
- H2O Connectors (1) - Locked
- Comm Connectors (2) - Locked

Don EV Gloves & Verify:
- Wrist Locks (4) - Locked
- Glove Straps (4) - Adjusted
- Cover Wrist Rings

NOTE: If PGA Biting, PLSS 02 - ON/OFF

LCG - COLD, As Req'd
Disconnect LM H2O Hose
Connect PLSS H2O Hose, Verify Locked
PLSS DIVERTER - MIN (Verify)
PLSS PUMP - ON (Rt)

PRESSURE INTEGRITY CHECK
(Non EVA Crewman)

NOTE: LM Suit Circuit Shall Not Be Maintained At Elevated Press >5 min

SUIT GAS DIVERTER - PULL-EGRESS (Verify)
CABIN GAS RETURN - EGRESS (Verify)
SUIT CIRCUIT RELIEF - CLOSE

PRESS REG A - EGRESS
PRESS REG B - DIRECT O2
Monitor Cuff Gage To 3.7 - 4.0 Psig
Then PRESS REG B - EGRESS (Cuff Gage Decay < .3 Psig In 1 min)

SUIT CIRCUIT RELIEF - AUTO (Suit Ckt Press Decays To 4.8 Psia)

(EVA Crewman)

PLSS 02 - ON (Tone-On, O2 Flag-0)
Press Flag Clear (3.1-3.4 Psid)
Cuff Gage 3.7-4.0 Psig
O2 Flag Clear

PLSS 02 - OFF (Monitor Cuff Gage For 1 Min, Report Decay)
PLSS 02 - ON (Cuff Gage 3.7-4.0 Psig, Tone & O2 Flag May Come On)
Verify O2 Flag Clear

CABIN DEPRESS

Confirm Go For Depress From Hou CB(16)ECS: CABIN REPRESS - Open
CABIN REPRESS VLV - Close

Ovhd Or Fwd Dump Valve - OPEN Then AUTO
At 3.5 Psia (Verify EVA Crewman Cuff Gage Does Not Drop Below 4.6 Psig)
Verify:
- Cabin At 3.5 Psia
- LM Suit Circuit Lockup At 4.3 Psia & Decaying
- PLSS/OPS/PGA > 4.6 Psig & Decaying

Start Wrist Watch :00

Ovhd Or Fwd Dump Valve - OPEN
Verify:
- Tone-On & H2O Flag - A (1.2-1.7 Psia)
- LM Suit Circuit 3.6 To 4.3 Psia & Decaying
- PLSS/OPS/PGA > 4.6 Psig & Decaying

Partially Open Fwd hatch

FINAL PREP FOR EGRESS :03
PLSS FEEDWATER - OPEN (H2O Flag - Clear In About 4 Min)
Fwd Hatch - Open

Rest Until Cooling Sufficient
Verify:
- PLSS/OPS/PGA 3.7 To 4.6 Psig
CWEA Status:
Caution
PREAMPS

Lower EV Visor As Req'd
Release PLSS Antenna :10

POST ONE-MAN EVA
Perform POST EVA 1, 2 Or 3 As Applicable
115:15 EQUIPMENT PREP EVA 1 (25 Min)
Empty UCTA's (WMS Valve), Install Cap
HTR CONT: URINE LINE - OFF
CB(11) HTR: URINE LINE - OFF
Check PGA Zippers, Verify Lock - Lock
Stow PGA Gas Conn Plugs In Purse
Empty PGA Pockets Into Purse
PGA Relief Valve Cap In Pkt

CDR Move To Aft Cabin Area
Unstow CDR Boots, Purge Valve And
Donning Lanyard To Purse
CDR Don Boots
Unstow CDR OPS

Remove Pallet, Stow In Jett Bag
Perform OPS Check, Restow OPS

LMP Move To Aft Cabin Area
Unstow LMP Boots, Purge Valve To Purse
Stow IV Gloves In Bot Boot Comp
LMP Don Boots

Unstow LMP OPS
Remove Pallet, Stow In Jett Bag
Perform OPS Check

Stow LMP OPS On Eng Cover
Install ISS
Apply Antifog (LEVA Bags), Wipe Dry
With Tissue (LHSSC)
Stow EMU Maintenance Kits In Purse
Stow LEVA's, Helmets & EV Gloves
(Attach Watch & Mirror) On ISS
Stow LEVA Bags Under SRC Compt
Stow BRA

Move CDR's OPS To Front Of Eng Cover
Stow ETB On Aft Eng Cover
Tie Jett Bag, Stow On Aft Engine Cover
Fwd Hatch Handle - UNLOCK

115:40 PLSS DONNING (26 Min)
* * * * LMP 1st: * * * *
Set PLSS On Mid-Step
Verify OPS Reg Decay
Unstow O2 Nozzle & Antenna Lead
Secure Flaps

Attach OPS To PLSS
Connect OPS Antenna Lead To PLSS
Verify Sublimator Exhausts Clear

Unstow PLSS Straps & Hoses
Remove Elect Dust Cap, Stow In Purse
Verify AUX H2O, DIVERTER, O2 & PRIM H2O-OFF
Connect Battery Cable

Verify The Following Locked:
PLSS Battery Connection
OPS Antenna Lead To PLSS
OPS To PLSS

Don PLSS/OPS, Lift PLSS Hoses Above
Lower Straps

Connect PLSS O2 Hoses To PGA
Verify AUX H2O, DIVERTER, O2 & PRIM H2O-OFF
Connect RCU To PGA & Upper Straps
Verify RCU Controls:
PUMP, FAN - OFF (Left) MODE SEL-O
Connect RCU To PLSS

Unstow OPS O2 Hose & Actuator, Route
Hose Behind PGA
Connect Actuator To RCU

CDR Repeat PLSS DONNING * * * *

116:06 PLSS COMM CHECK (8 Min)
Verify Powerdown CB Configuration
(White Dots Out)
Verify Voice Comm With Hou

Audio (LMP)
S-BAND - T/R
ICS - T/R
RELAY - ON
MODE - VOX
VOX SENS-MAX
VHF A - T/R
B - RCV

Audio (CDR)
S-BAND - T/R
ICS - T/R
RELAY - OFF
MODE - VOX
VOX SENS-MAX
VHF A - T/R
B - RCV

CB(16) COMM: SE AUDIO - Open
LMP Connect To PLSS Comm
116:14 FINAL SYSTEMS # (1 Min)

CB(16) ECS: LCG PUMP - Close
LCG - Cold, As Req'd
CB(16) ECS: CABIN REPRESS - Close (Ver)
SUIT FAN ΔP - Open
SUIT FAN 2 - Open
SUIT FAN Sel - 2

Verify ECS Caution & H2O SEP Comp Lts - On (~ 1 Min)

SUIT GAS DIVERTER - PULL-EGRESS (Verify)
CABIN GAS RETURN - EGRESS (Verify)
SUIT CIRCUIT RELIEF - AUTO (Verify)

116:15 OPS CONNECT (6 Min)

# # # LMP 1st: # # # #
SUIT ISOL - ACT OVRD (SUIT DISC)
Discon LM 02 Hoses, Secure About PGA

Connect OPS 02 Hose To PGA B/B
Retrieve Purge Valve (Purse)- Verify Closed, Lock Pin In & LO
Install Purge Valve In PGA R/R
PGA Diverter Valve - Vertical

CDR Repeat OPS CONNECT # # #

Drink
DES H2O Vlv - CLOSE

116:21 HELMET/GLOVE DONNING (1 Min)

Position Mikes (Both)
PLSS FAN - ON, Rt (Vent Flag - Clear)
Don Helmets, Check Drink Bag Position
Don LEVA's And Lower Protective Visor
Secure Tool Harness Self Doff Straps To LEVA's

Stow LM 02 & Comm(CDRs To ECS Handhold)

Verify The Following:
Helmet & Visor (1) - Aligned & Adjusted
O2 Connectors (3) - Locked
Purge Valves (1) - Locked

Comm Connectors (1) - Locked
PGA Diverter Vlv (1) - Vertical

Verify EVA CB Configuration
(White Dots Out + EVA Decals)
11/7/72

Don EV Gloves & Verify:
Wrist Locks (4) - Locked
Glove Straps (4) - Adjusted
Cover Wrist Rings

NOTE: If PGA Biting, PLSS 02 - ON/OFF

LCG-Cold, As Req'd
CB(16) ECS: LCG PUMP - Open
Disconnect LM H2O Hose
Connect PLSS H2O Hose, Verify Locked

PLSS DIVERTER - MIN (Verify)
PLSS PUMP - ON (Rt)

PRESS REG A & B - EGRESS

116:37 CABIN DEPRESS (3 Min)
Confirm Go For Depress From Hou
CB(16) ECS: CABIN DEPRESS - Open
CABIN DEPRESS VALV - CLOSE

Ovhd Or Fwd Dump Valve - OPEN Then AUTO @ 3.5 Psia (Verify Cuff Gage Does Not Drop Below 4.6 Psig)
Verify:
Cabin At 3.5 Psia
LM Suit Circuit Lockup At 4.3 Psia
PGA > 4.6 Psig & Decaying

116:40 Start Wrist Watch :00

Ovhd Or Fwd Dump Valve - OPEN
Verify:
Tone-On & H2O Flag - A (1.2-1.7 Psia)
PZA > 4.6 Psig & Decaying

Partially Open Fwd Hatch

FINAL PREP FOR EGRESS :03

PLSS PRIM H2O - OPEN (H2O Flag - Clear In About 4 Min)
Fwd Hatch - Open
Rest Until Cooling Sufficient
Verify:
PZA 3.7 To 4.6 Psig
CWEA Status:
Caution
PREAMPS
ECS

H2O SEP Comp Lt - On
Lower EV Visor As Req'd :10

POST EVA 1

PLSS PRIM H2O - CLOSE
Fwd Hatch - Close & Lock
Dump Valves (Both) - AUTO

NOTE: PLSS 02 & PRESS Flags May Come On During Repress. If PLSS 02 <10% Manually Control Cabin Repress To Maintain Positive PGA Pressure. (Leave Cabin Repress CB Open For Manual Repress)

CABIN DEPRESS - AUTO
CB(16) ECS: CABIN DEPRESS - Close
MASTER ALARM & CABIN Warning Lt - On
Verify Cabin Press Increasing
PRESS REG A & B - CABIN

PLSS 02 - OFF @ Cabin > 2.5 Psia

CABIN Warning Lt - Off
Verify Cabin Press Stable At 4.6-5 Psia
Use Purge Valve To Depress PGA As Req'd

123:40 POST EVA SYSTEMS CONFIG (15 Min)
Verify EVA CB Configuration
(White Dots Out + EVA Decals)
CB(16) ECS: SUIT FAN 2 - Close
SUIT FAN ΔP - Close
ECS Caution & H2O SEP Comp Lts - Out
Doff Gloves, Stow On Comm Panel
Doff Helmets With Visors, Lower Shades, Stow In BRA
Verify Sat On Dump Valve
DES H20 Vlv - OPEN
Remove Purge Valve, Stow In Purse
Disconnect OPS 02 Hose
Connect LM 02 Hoses R/B & B/R
PGA Divertor Vlv - Horizontal
SUIT ISOL (Both) - SUIT FLOW
PLSS PUMP - OFF (Left)
PLSS FAN - OFF (Left)
Disconnect PLSS H2O From PGA
Connect LM H2O
PLSS Mode (Both) - 0
AUDIO CB - Open
Connect To LM Comm
AUDIO CB - Close
AUDIO (CDR & LMP)
VHF A - RCV
B - OFF
MODE - ICS/PTT
RELAY - OFF
COMM:
VHF A XMTR - OFF
A RCVR - ON
B XMTR & RCVR - OFF
TLM BIOMED - LEFT
VHF ANTENNA - AFT
UPLINK SQUELCH - OFF

123:55 PLSS 02 RECHARGE (15 Min)
Verify DES 2 02 >56%
* * * * LMP 1st: * * * *
Connect LM 02 To PLSS
HI PLSS 02 FILL - OPEN Then CLOSE
After 4 Min
PLSS Mode - AR (02 QTY ~85%)
PLSS Mode - 0
Disconnect LM 02
CDR Repeat 02 RECHARGE * * * *
Stow LM 02 Supply Hose
124:10 PLSS/OPS DOFFING (30 Min)
Disconnect OPS Actuator From RCU
Disconnect RCU From PGA
PLSS PUMP, FAN - OFF (Left) MODE SEL-O
Disconnect RCU From PLSS, Stow In LCG Bag (LHMS, CDR's 1st)
Disconnect PLSS 02 Hoses
Doff PLSS/OPS (LMP 1st)
Stow LMP PLSS On Floor
Stow CDR PLSS On Mid-Step
Report OPS Press To Hou
Stow OPS 02 Hose & Actuator
Install Gas Conn Plugs (Purse) In PGA
Install PLSS Elect Dust Cap (Purse)

# # # # CDR 1st: # # # #
Change PLSS Batt, Stow In Jett Bag
Connect Cable to Battery
Stow PLSS Hoses & Straps
Disconnect PLSS Tool Harness
Change LiOH Cart, Temp<130°, Read Cart Decal
Stow Used LiOH Carts Inside Canisters
Stow Canisters In Jett Bag
Install PLSS Tool Harness
Disconnect OPS Antenna Lead
Remove OPS & Stow Antenna Lead
Stow CDR OPS On Eng Cover
Stow CDR PLSS In Recharge Station
LMP PLSS To Mid-Step, Repeat Above ####
Stow LMP OPS On Floor Under Dump Vlv
Stow PLSS On Floor Against Hatch
124:40 POST EVA CABIN CONFIG (20 Min)
Unstow Lunar Surface Checklist, 3-3
Stow EVA 1 Prep & Post Card
137:50 CABIN PREP EVA 2 (10 Min)

- Stow All Loose Items Not Req'd For EVA
- Report PRD Readings to Hou
- Stow Lunar Surface Checklist

138:00 EQUIPMENT PREP EVA 2 (16 Min)

- Stow PGA Gas Conn Plugs In Purse
- Empty PGA Pockets Into Purse
- PGA Relief Valve Cap In Pkt
- Verify Watch & Mirror Donned
- Unstow CDR OPS
- Perform OPS Check (Both)
- Stow Both OPS On Floor
- Apply Antifog (Purse), Wipe Dry With Tissue (LHSSC)
- Stow EMU Maintenance Kit In Purse
- Stow LEVA's & Helmets On ISS
- Stow BRA
- Stow ETB On RH Eng Cover
- Tie Jett Bag, Stow On LH Eng Cover
- Fwd Hatch Handle - UNLOCK

138:16 PLSS DONNING (20 Min)

- ** ** ** LMP 1st: ** ** **
  - Set PLSS On Mid-Step
  - Verify OPS Reg Decay
  - Unstow O2 Nozzle & Antenna Lead
  - Secure Flaps
- Attach OPS To PLSS
- Connect OPS Antenna Lead To PLSS
- Verify Sublimator Exhausts Clear
- Unstow PLSS Straps & Hoses
- Remove Elect Dust Cap, Stow In Purse
- Verify AUX H20, DIVERTER, O2 & PRIM H20 - OFF
- Verify The Following Locked:
  - PLSS Battery Connection
  - OPS Antenna Lead To PLSS
  - OPS To PLSS
- Don PLSS/OPS, Lift PLSS Hoses Above Lower Straps
- Connect PLSS O2 Hoses To PGA
- Verify AUX H20, DIVERTER, O2 & PRIM H20 - OFF
- Connect RCU To PGA & Upper Straps
- Verify RCU Controls:
  - PUMP, FAN - OFF (Left) MODE SEL-O
  - Connect RCU To PLSS
- Unstow OPS O2 Hose & Actuator, Route Hose Behind PGA
- Connect Actuator To RCU
- CDR Repeat PLSS DONNING ** ** **

138:36 PLSS COMM CHECK (8 Min)

- Verify Powerdown CB Configuration (White Dots Out)
- Verify Voice Comm With Hou & Audio (LMP)
  - S-BAND - T/R
  - ICS - T/R
  - RELAY - ON
  - MODE - VOX
  - VOX SENS MAX
  - VHF A - T/R
  - B - RCV
- H COMM:
  - VHF A XMTR - VOICE
  - A RCVR - ON
  - B XMTR - OFF
  - B RCVR - ON
  - TLM BIOMED - OFF
  - SQUELCH VHF A&B - Noise Thres + 1 1/2
  - RECORDER - ON
  - VHF Antenna - EVA
  - UPLINK SQUELCH - ENABLE
- Audio (CDR)
  - S-BAND - T/R
  - ICS - T/R
  - RELAY - OFF
  - MODE - VOX
  - VOX SENS - MAX
  - VHF A - T/R
  - B - RCV
- CB(16) COMM: SE AUDIO - Open
- LMP Connect To PLSS Comm
HCB(l6) ECS: LCG PUMP - Close
LCG - Cold, As Req'd
PLSS FAN - ON, Rt (Vent Flag - Clear)
PLSS PTT (LMP) - MAIN (Rt), Verify
PLSS Mode (LMP) - A, Wheel-CCW (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)
PLSS PTT (LMP) - MAIN (Rt), Verify
PLSS Mode (LMP) - A, Wheel-CCW (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)
PLSS Mode (LMP) - B, Blade-CCW (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)
PLSS Mode (CDR) - B, Blade-CCW (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)
PLSS Mode (LMP) - B, Blade-CCW (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)
PLSS Mode (CDR) - A, Wheel-CCW (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)
PLSS Mode (LMP) - B, Blade-CCW (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)
PLSS Mode (CDR) - A, Wheel-CCW (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)
PLSS Mode (LMP) - AR (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)
PLSS Mode (CDR) - B, Blade-CCW (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)
PLSS Mode (Both) - AR (Tone-On, Vent Flag - P, Press Flag - 0, 02 Mom)

NOTE: (AR) Wheel-Hou, Blade-EVA
Perform Comm & TM Check With Hou & L Comm Check With Each Other
Read PLSS 02 Qty to Hou

SQUELCH VHF B (LMP) - Full Decrease

138:45 OPS CONNECT (6 Min)

NOTE: Unstow PLSS Antenna If It Transmits Garbled And/OR Loses TM
& Restow Before Egress

SQUELCH VHF B (LMP) - Full Decrease

138:51 HELMET/GLOVE DONNING (Min)

CDR Repeat OPS CONNECT # # # #

Drink
DES H2O VLV - CLOSE
Don EV Gloves & Verify:
Wrist Locks (4) - Locked
Glove Straps (4) - Adjusted
Cover Wrist Rings

NOTE: If PGA Biting, PLSS 02 - ON/OFF

LCG-Cold, As Req'd
CB(16) ECS: LCG PUMP - Open
Disconnect LM H2O Hose
Connect PLSS H2O Hose, Verify Locked
PLSS DIVERTER - MIN (Verify)
PLSS PUMP - ON (Rt)
PRESS REG A & B - EGRESS

139:03 PRESSURE INTEGRITY CHECK (4 Min)
PLSS 02 - ON (Tone-On, 02 Flag-0)
Press Flag Clear (3.1-3.4 Psid)
Cuff Gage 3.7-4.0 Psig
02 Flag Clear
PLSS 02 - OFF (Monitor Cuff Gage For 1 Min, Report Decay)
PLSS 02 - ON (Cuff Gage 3.7-4.0 Psig, Tone & 02 Flag May Come On)
Verify 02 Flag Clear

139:07 CABIN DEPRESS (3 Min)
Confirm Go For Depress From Hou
CB(16) ECS: CABIN REPRESS - Open
CABIN REPRESS Vlv - CLOSE
Ovhd Or Fwd Dump Vlv - OPEN Then AUTO @ 3.5 Psia (Verify Cuff Gage Does Not Drop Below 4.6 Psig)
Verify:
Cabin At 3.5 Psia
LM Suit Circuit Lockup At 4.3 Psia
PGA > 4.6 Psig & Decaying

139:10 Start Wrist Watch :00
Ovhd Or Fwd Dump Valve - OPEN
Verify:
Tone-On & H2O Flag - A (1.2-1.7 Psia)
PGA > 4.6 Psig & Decaying
Partially Open Fwd Hatch

FINAL PREP FOR EGRESS :03
PLSS PRIM H2O - OPEN (H2O Flag - Clear In 2-4 Min)
Fwd Hatch - Open
Rest Until Cooling Sufficient
Verify:
PGA 3.7 To 4.6 Psig
CWEA Status:
Caution
PREAMPS
ECS
H2O SEP Comp Lt - On
Lower EV Visor As Req'd :10

POST EVA 2
PLSS PRIM H2O - CLOSE
Fwd Hatch - Close & Lock
Dump Valves (Both) - AUTO

NOTE: PLSS 02 & PRESS Flags May Come On During Repress. If PLSS 02 <10% Manually Control Cabin Repress To Maintain Positive PGA Pressure.
(Leave Cabin Repress CB Open For Manual Repress)

CABIN REPRESS - AUTO
CB(16) ECS: CABIN REPRESS - Close
MASTER ALARM & CABIN Warning Lt - On
Verify Cabin Press Increasing
PRESS REG A & B - CABIN
PLSS 02 - OFF @ Cabin > 2.5 Psia

CABIN Warning Lt - Off
Verify Cabin Press Stable At 4.6-5 Psia
Use Purge Valve To Depress PGA As Req'd

146:10 POST EVA SYSTEMS CONFIG (15 Min)
Verify EVA CB Configuration
(White Dots Out + EVA Decals)
CB(16) ECS: SUIT FAN 2 - Close
SUIT FAN ΔP - Close
HTRS: MESA - Open
ECS Caution & H2O SEP Comp Lts - Out
Doff Gloves, Stow On Comm Panel
Doff Helmets With Visors, Lower Shades, Stow In BRA
Verify Safety On Dump Valve
DES H2O Vlv - OPEN
Remove Purge Valve, Stow In Purse
Disconnect OPS 02 Hose

Connect LM 02 Hoses R/B & B/R
PGA Diverter Vlv - Horizontal

SUIT ISOL (Both) - SUIT FLOW
PLSS PUMP - OFF (Left)
PLSS FAN - OFF (Left)

Disconnect PLSS H2O From PGA
Connect LM H2O

PLSS Mode (Both) - 0
AUDIO CB - Open
Connect To LM Comm

AUDIO CB - Close
AUDIO (CDR & LMP)
VHF A - RCV
B - OFF
MODE - ICS/PTT
RELAY - OFF

COMM:
VHF A XMTR - OFF
A RCVR - ON
B XMTR & RCVR - OFF
TLM BIOMED - RIGHT
VHF ANTENNA - AFT
UPLINK SQUELCH - OFF

146:25 PLSS 02 RECHARGE (15 Min)
Verify DES 2 02 >56%
* * * * LMP 1st: * * * *
Connect LM 02 To PLSS
HI PLSS 02 FILL - OPEN Then CLOSE After 4 Min
PLSS Mode - AR (02 QTY ~85%)
PLSS Mode - 0
Disconnect LM 02

CDR Repeat 02 RECHARGE * * * *
Stow LM 02 Supply Hose

146:30 PLSS/OPS DOFFING (30 Min)
Disconnect OPS Actuator From RCU
Disconnect RCU From PGA
PLSS PUMP, FAN - OFF (Left) MODE SEL-0
Disconnect RCU From PLSS, Stow In LCG Bag (LHMS, CDR's 1st)

Disconnect PLSS 02 Hoses
Doff PLSS/OPS (LMP 1st)
Stow LMP PLSS On Floor
Stow CDR PLSS On Mid-Step

Report OPS Press To Hou
Stow OPS 02 Hose & Actuator

Unstow Jett Bag (LHSSC), Hang From CDR's LH Handhold
Install Gas Conn Plugs (Purse) In PGA
Install PLSS Elect Dust Cap (Purse)

CAUTION: Insure PLSS LiOH Carts & Batts Numbered 3 or 4 Replaced with 5 or 6.
161:20 CABIN PREP EVA 3 (10 Min)
Stow All Loose Items Not Req'd For EVA
Report PRD Readings To Hou
Stow Lunar Surface Checklist

161:30 EQUIPMENT PREP EVA 3 (16 Min)
Stow PGA Gas Conn Plugs In Purse
Empty PGA Pockets Into Purse
PGA Relief Valve Cap In Pkt
Verify Watch & Mirror Donned
Perform OPS Check (Both)
Apply Antifog (Purse), Wipe Dry With Tissue (LHSSC)
Stow EMU Maintenance Kit In Purse
Stow LEVA'S & Helmets On ISS
Stow BRA
Stow ETB on RH Eng Cover
Tie Jett Bag, Stow On LH Eng Cover
FWD Hatch Handle - UNLOCK

161:46 PLSS DONNING (20 Min)
* * * * LMP 1st: * * * *
Set PLSS On Mid-Step
Verify OPS Reg Decay
Unstow 02 Nozzle & Antenna Lead
Secure Flaps
Attach OPS To PLSS
Connect OPS Antenna Lead To PLSS
Verify Sublimator Exhausts Clear
Unstow PLSS Straps & Hoses
Remove Elect Dust Cap, Stow In Purse
Verify AUX H2O, DIVERTER, 02 & PRIM H2O - OFF
Verify The Following Locked:
PLSS Battery Connection
OPS Antenna Lead To PLSS
OPS To PLSS
Don PLSS/OPS, Lift PLSS Hoses Above Lower Strap
Connect PLSS 02 Hoses To PGA
Verify AUX H2O, DIVERTER, 02 & PRIM H2O - OFF
Connect RCU To PGA & Upper Straps
Verify RCU Controls:
PUMP, FAN - OFF (Left) MODE SEL - 0
Connect RCU To PLSS
Unstow OPS 02 Hose & Actuator, Route Hose Behind VGA
Connect Actuator To RCU
CDR Repeat PLSS DONNING * * * *

162:06 PLSS COMM CHECK (8 Min)
Verify Powerdown CB Configuration (White Dots Out)
Verify Voice Comm With Hou
Audio (LMP)
S-BAND - T/R
ICS - T/R
RELAY - ON
MODE - VOX
VOX SENS - MAX
VHF A - T/R
B - RCV

COMM:
H VHF A XMTR - VOICE
O A RCVR - ON
U B XMTR - OFF
& B RCVR - ON
L SQUELCH VHF A&B -
& Noise Thres + 1 1/2
P RECORDER - ON
M VHF A RCVR - ON
& TLM BIOMED - OFF
D VHF Antenna - EVA
UPLINK SQUELCH - ENABLE

Audio (CDR)
S-BAND - T/R
ICS - T/R
RELAY - OFF
MODE - VOX
VOX SENS - MAX
VHF A - T/R
B - RCV

CB(16) COMM: SE AUDIO - Open
LMP Connect To PLSS Comm
162:14 FINAL SYSTEMS P (1 Min)

CB(16) ECS: LCG PUMP - Close
LCG - Cold, As Req'd
CB(16) ECS: CABIN REPRESS - Close (Ver)
SUIT FAN 1P - Open
SUIT FAN 2 - Open
Verify ECS Caution & H2O SEP Comp Lts - On (~1 Min)
SUIT GAS DIVERTER - PULL-EGRESS (Verify)
CABIN GAS RETURN - EGRESS (Verify)
SUIT CIRCUIT RELIEF - AUTO (Verify)

162:15 OPS CONNECT (6 Min)

# # # LMP 1st: # # #
SUIT ISOL - ACT OVRD (SUIT DISC)
Disconnect LM 02 Hoses, Secure About PGA

Connect OPS 02 Hose To PGA B/B
Retrieve Purge Valve (Purse) - Verify Closed, Lock PIN In & LO
Install Purge Valve In PGA R/R
PGA Diverter Valve - Vertical

CDR Repeat OPS CONNECT # # #
Drink
DES H2O VLV - CLOSE

162:21 HELMET/GLOVE DONNING (12 Min)

Position Mikes (Both)
PLSS FAN - ON, Rt (Vent Flag - Clear)
Don Helmets With LEVA's, Check Drink Bag Position
Lower LEVA Protective Visor
Secure Tool Harness Self Doff Straps To LEVA's

Stow LM 02 & Comm(CDRs To ECS Hold
Verify The Following:
Helmet & Visor (1) - Aligned & Adjusted
02 Connectors (3) - Locked
Purge Valves (1) - Locked
Comm Connectors (1) - Locked
PGA Diverter Valve (1) - Vertical

Verify EVA CB Configuration
(White Dots Out + EVA Decals)
Don EV Gloves & Verify:
Wrist Locks (4) - Locked
Glove Straps (4) - Adjusted
Cover Wrist Rings

NOTE: If PGA Biting, PLSS 02 - ON/OFF
LCG-Cold, As Req'd
CB(16) ECS: LCG PUMP - Open
Disconnect LM H2O Hose
Connect PLSS H2O Hose, Verify Locked

PLSS DIVERTER - MIN (Verify)
PLSS PUMP - ON, Rt

PRESSURE INTEGRITY CHECK (4 Min)

PLSS 02 - ON (Tone-On, 02 Flag - 0)
Press Flag Clear (3.1-3.4 Psid)
Cuff Gage 3.7-4.0 Psig
02 Flag Clear

PLSS 02 - OFF (Monitor Cuff Gage For 1 Min, Report Decay)
PLSS 02 - ON (Cuff Gage 3.7-4.0 Psig,
Tone & 02 Flag May Come On)
Verify 02 Flag Clear
162:37 CABIN DEPRESS (3 Min)

Confirm Go For Depress From Hou
CB(16) ECS: CABIN REPRESS - Open
CABIN REPRESS Vlv - CLOSE
Ovhd Or Fwd Dump Vlv - OPEN Then AUTO @
3.5 Psia (Verify Cuff Gage Does
Not Drop Below 4.6 Psig)
Verify:
Cabin At 3.5 Psia
LM Suit Circuit Lockup At 4.3 Psia
PGA > 4.6 Psig & Decaying

162:40 Start Wrist Watch :00
Ovhd Or Fwd Dump Valve - OPEN
Verify:
Tone-On & H2O Flag - A (1.2-1.7 Psia)
PGA > 4.6 Psig & Decaying

Partially Open Fwd Hatch

FINAL PREP FOR EGRESS :03
PLSS PRIM H2O - OPEN (H2O Flag -
Clear In 2-4 Min)
Fwd Hatch - Close & Lock

Rest Until Cooling Sufficient
Verify:
PAG 3.7 To 4.6 Psig
CWEA Status:
Caution
PREAMPS
ECS
H2O SEP Comp Lt - On
Lower EV Visor As Reqd :10

PLSS PRIM H2O - CLOSE
Fwd Hatch - Close & Lock
Dump Valves (Both) - AUTO

NOTE: PLSS 02 & PRESS Flags May Come
On During Repress. If PLSS 02 <10%
Manually Control Cabin Repress To
Maintain Positive PGA Pressure.
(Leave Cabin Repress CB Open For
Manual Repress)
CABIN REPRESS - AUTO
CB(16) ECS: CABIN REPRESS - Close
MASTER ALARM & CABIN Warning Lt - On
Verify Cabin Press Increasing
PRESS REG A & B - CABIN
PLSS 02 - OFF @ Cabin > 2.5 Psia
CABIN Warning Lt - Off
Verify Cabin Press Stable At 4.6-5 Psia
Use Purge Valve To Depress PGA As Reqd

169:40 POST EVA SYSTEMS CONFIG (15 Min)
Verify EVA CB Configuration
(White Dots Out + EVA Decals)
CB(16) ECS: SUIT FAN 2 - Close
SUIT FAN ΔP - Close
ECS Caution & H2O SEP Comp Lts - Out
Doff Gloves, Stow On Comm Panel
Verify Safety On Dump Valve
DES H2O VLV - OPEN
Remove Purge Valves, Stow In Purse
Disconnect OPS 02 Hose
Connect LM 02 Hoses R/R & B/B

169:55 PLSS/OPS DOFFING (20 Min)
Disconnect OPS Actuator From RCU's
Disconnect RCU's From PGA
Verify Pump,Fan - OFF (Left) MODE SEL-0
Disconnect RCU From PLSS, Stow On
Eng Cover
Disconnect PLSS 02 Hoses
Doff PLSS/OPS (LMP 1st)
Stow LMP PLSS On Floor
Stow CDR PLSS On Mid-Step
Stow OPS 02 Hose & Actuator
Install Gas Conn Plugs (Purse) In PGA
**CDR 1st: ****

Disconnect OPS Antenna Lead
Remove OPS & Stow Antenna Lead
Perform OPS Checkout
Report OPS Press To Hou
Stow OPS On Eng Cover

Stow PLSS Hoses & Upper Straps
Remove Lower PLSS Straps, Clip Straps Together, D-Ring (Name-To-Name)
Remove Yo-Yo, Stow On Eng Cover

Stow Straps In Aft LHSSC
Stow PLSS On Floor

LMP PLSS To Mid-Step, Repeat Above ****

Verify Powerdown CB Configuration (White Dots Out)

170:15 PREP FOR EQUIP JETT 1 (24 Min)

Stow Return Items In ISA Big Pkt
Unstow Scale (Bot RHSSC)

Weigh BSLSS/Rock Bag (30# Max) & Collection Bags
Record On 2-2 & Report To Hou

Weigh ISA (19# Max)
Stow Scale In RHSSC
Stow Collection Bags & BSLSS/Rock Bag
Aft Eng Cover

Verify Total DES 02 QTY (Tank 1+2) >31%
Fwd Hatch Handle - UNLOCK

Remove ISS, Wrap & Tie The Following:
Lunar Boots (4)
RCU's (2)
Armrest (1)
Yo-Yo's (2)

170:39 PRESS INTEGRITY CHECK (4 Min)

NOTE: LM Suit Circuit Shall Not Be Maintained At Elevated Press >5 Min

SUIT GAS DIVERTER - PULL-EGRESS (Verify)
CABIN GAS RETURN - EGRESS (Verify)
SUIT CIRCUIT RELIEF - CLOSE

PRESS REG A - EGRESS
PRESS REG B - DIRECT 02
Monitor Cuff Gage To 3.7 - 4.0 Psig
Then PRESS REG B - EGRESS (Cuff Gage Decay <.3 Psig In 1 Min)

SUIT CIRCUIT RELIEF - AUTO (Suit Ckt Press Decays To 4.8 Psia)

170:43 CABIN DEPRESS FOR JETT (4 Min)

Confirm Go For DEPRESS From Hou
CB(16)ECS: CABIN DEPRESS - Open
Ovhd Or Fwd Dump Valve - OPEN Then AUTO
At 3.5 Psia
(Verify Cabin Press 3.5 Psia & LM Suit Circuit Lockup At 4.3 Psia & Decaying)

Ovhd Or Fwd Dump Vlv - OPEN (Verify LM Suit Circuit 3.6 To 4.3 Psia)

170:47 HATCH OPENING (4 Min)

Partially Open Fwd Hatch
Ovhd Or Fwd Dump Valve - AUTO
Fwd Hatch - Full Open

Jettison The Following:
PLSS On Mid-Step
PLSS On Eng Cover
ISS

Verify Items Clear Of Ascent Stage
Fwd Hatch - Close & Lock

170:51 CABIN REPRESS (7 Min)

Dump Valves(Both) - AUTO (Verify)
CABIN REPRESS - AUTO (Verify)

CB(16)ECS: CABIN REPRESS - Close
MASTER ALARM & CABIN Warning Lt - On
Verify Cabin Press Increasing
PRESS REG A & B - CABIN

CABIN Warning Lt - Off
Verify Cabin Press Stable At 4.6-5 Psia

Doff Gloves, Stow On Comm Panel
Doff Helmets With Visors, Lower Shades, Stow In BRA

Verify Safety On Dump Valve

Audio (CDR & LMP):
Mode - ICS/PTT
COMM: UPLINK SQUELCH - OFF RECORDER - OFF

Unstow Lunar Surface Checklist, 7-5
Stow EVA 3 Prep & Post Card