APOLLO 15

LUNAR SURFACE EVA 1
CUFF CHECKLIST

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CDR, Apollo 15

PLSS TO LM H2O TRANSFER
PLSS Pump - OFF
Disconnect PLSS H2O
Connect LM H2O
CB(16) ECS: LCG Pump - CLOSE

LM TO PLSS H2O TRANSFER
CB(16) ECS: LCG Pump - OPEN
Disconnect LM H2O
Connect PLSS H2O
PLSS Pump - ON
**CDR - EVA 1**

- **0+10**
  - Move Through Hatch - Comm Ck
  - PLSS Antenna - Deploy
  - MESA - Deploy
  - Jett Bag - Discard
  - LEC - Deploy to LRV Side

- **0+20**
  - ETB - Transfer Down
  - ETB - To Ladder Hook
  - MESA Height - Adjust
  - Blankets - Open

- **0+29**
  - **LRV** Thermal Blanket - Remove
  - Ck - Walking hinges - Locked
  - Chassis - Parallel
  - Outrigger Cables - Taut
  - LRV Left Tape - over Strut
  - LRV Right Tape - Deploy

- **0+37**
  - **LRV** Set Up
  - LRM PLSS Ant. - Unstow
  - Chassis Hinge Pins - Check
  - Ind. Lock Pins - Pull
0+42 Mount LRV
LRV Post Deployment Checks
Test Drive LRV
[LMP: Photo CDR on LRV]
Park LRV - Quad IV - Face MESA
Power Down & Dismount LRV

0+46 LCRU Post Locks - Lift
Velcro Tab - Release
TCU Cable - To Batt Cover

LCRU - To LRV
Cable - Connect

TCU - To LRV
Cable - Connect
[LMP: EVA 1 Pallet to MESA]
Rake - To MESA Side
LGA - To Handhold
LGA Cable - Connect To LCRU

0+53 HGA - Unstow at MESA
Yellow Bracket - Discard
Antenna - Rotate onto staff
HGA - to LRV
Velcro strap - Discard
Cable - Route behind TCU
- Connect to LCRU

[LMP: Unstow tools]
0+56 TV/Tripod to +Z Strut
TV PWR SW - OFF
TV Cable - Disconnect & Stow
TV Camera - To TCU
TV Cable - Connect

LCRU CB - CLOSE
LCRU PWR SW - INT
1+00 "CTV PWR SW - ON
1+01 Whip Antenna - Deploy
LCRU Sel - PM1/NB
Check - AGC, TEMP, & PWR
LCRU Sel - TV RMT
LCRU Blankets - 100% open
Conn. Cover (LCRU) - Closed
HGA Dish - Deploy
HGA - Point To Earth
ETB Contents - To LRV
ETB (Empty) - To Ladder Hook
LMP PLSS Ant. - Stow
[LMP: Ingress]
1+09 LEC - To Pallet #1
Pallet #1 - Transfer
LEC Hooks - To Ladder Hook
HGA - Stow
1+12 LCRU Sel - PM1/WB

1+13
Tidy up LRV

Drive to Nav. Init. Site
NAV CB - CLOSE
LRV Systems - Readout
NAV ALIGN

STOP

1+18 Attach To LMP EMU:
- Hammer
- Core rammer
- Core Tube Caps (Bag #1 pkt.)
- C-Bag #4
[LMP: C-Bag #1 - To CDR]
Tongs - Tether
70mm Cam - To RCU
START Gyro - To Hou Update

1+25 TRAVEL (0:17)
- Possible Ray
- Lineaments, fillets, mounds
- Raised rille rim (levee)
- Block distribution
- 16mm - (f4; 1/260; 12 FPS)

1+42 CP1 (0:02) Canyon Crater
(023°/2.0 To LM)

1+44 TRAVEL (0:07)
- Elbow Ejecta distribution
- Drive close to rim

1+51 Geology Station #1 (0:15)
- Pan from rim
- Sample radially(rim/blanket)
2+06 TRAVEL (0:08)
- Elbow ejecta distribution
- Change in slope toward front
- Change in rock type
- Change in ground texture
- St. George ejecta dist.

2+14 Geology Station #2 (0:45)
- Sample radially
- Comprehensive sample
- Documented sample
- Double core
  (Trench - SESC and soil)
  (SESC - to CDR C-Bag)
  (Stereo pan-100m along front)
  (500mm)
  (Penetrometer)
\[ \begin{align*}
2+59 & \text{ TRAVEL (0:09)} \\
& \bullet \text{ Lateral/Vertical changes along front} \\
& \bullet \text{ Block distribution} \\
& \bullet \text{ Possible rock flows} \\
& \bullet \text{ Patterned ground} \\
& \bullet \text{ Compare crater frequency/state} \\
& \bullet \text{ Observe EVA II route}
\end{align*} \]

\[ \begin{align*}
3+08 & \text{ Geology Station \#3 (0:14)} \\
& \bullet \text{ Describe "Flow" Mtrl/source} \\
& \bullet \text{ Vertical/lateral changes} \\
& \bullet \text{ Documented samples-"Flow"/Front} \\
& \bullet \text{ Compare to earlier mare} \\
& \bullet \text{ Extent of "slide" boundary}
\end{align*} \]
3+50 Park LRV
- Heading SE; facing SEQ Bay
  Nav CB - Open
  [STOP]
  LCRU Sel - TV RMT
  HGA - Point To Earth

70mm Cam - To Under Seat
Tongs - To HTC

LMP Geo Equip:
- Core Tube Caps - Discard
- Core rammer - To HTC
- Hammer - To HTC
C-Bag #4 - Remove from LMP
Tidy Velcro Covers
  [LMP: Remove C-Bag #1]
C-Bag #4 - Under LMP Seat
C-Bag #2 - To HTC (R)

3+57
EXPTS Pkg - Offload
UHT - Tether
Carry Bar - To EXPTS Pkg

Drill - To LRV
LRRR - To LRV

HGA - Stow
LCRU Sel - PM1/WB

START

Drive to ALSEP SITE

CAUTION

Do Not Point HGA or LGA within ±20° of ALSEP Antenna
SITE REQUIREMENTS:
- General - Smooth flat
  - All thermal rad have clear view
- HFE Probes -
  - 200 ft from fresh craters
  - 5 diameters from boulders over 2 ft
  - Avoid Topo high
    (Scale 100's of ft.)
  - Avoid features over 2 ft dia. with slope greater 10°

EMU MALF

ALSEP ARRAY A-2H LAYOUT FOR A NORTHEAST LANDING SITE
4+18
LCRU Sel - TV RMT
HGA - Point To Earth
Plan ALSEP Deployment
LRRR - To Surface
- cubes facing sunlight
Drill - To Surface
- Drill facing sunlight

4+21
HFE Pallet - Remove (2 bolts)
- To 15 ft N.
HFE Cable - Connect To C/S
HFE Pallet - To 30 ft N C/S
16 ft of Probes - Keep Clean
[ LMP: Remove SIDE from Subp ]

4+28
Probes Box - Remove (4 bolts)
Probes - Position
- With Rod - To W, 12°S S/L
- W/O Rod - To E, 42°N S/L

4+34
Elect Box - Remove (4 bolts)
Pallet - Kick Clear
Dust Cover - Remove
Elect Box - Level & Align
Pallet - Discard 16 ft North
[ LMP: PSE deploy ]

4+37
Drill - To LMP Seat
[ DECAL ]
Drill & Rack - To West Probe
[ LMP: SWE & LSM deploy ]
Remove RAMMER
Insert Probe Into Stem
Report Probe depth
[ LMP: Raise C/S ]
5+04 Drill, Rack & Rod - To E Probe

Implant Bore Stem Into Surface
Insert Probe Into Stem

5+20 Report Probe Depth

[LMP: ALSEP photos]

Check 16 ft Area Clean
Check Elect Box Level & Align

Drill & Rack - To Core Site
Drill Chuck - Remove & Discard
Treddle To Drill Site

16mm Cam Mag - Change To "D"
16mm Photo - Drill Site

(f8, 12 fps, 1/250)

[LMP: Activate C/S]

5+26 Implant Core Stem - 1 inch/sec
Break Drill from stem

5+37

70mm Cam - Retrieve From LRV
70mm Photo Pan - 7ft S. Stem
70mm Cam - To LRV
[LMP: LRRR deploy]
Core Stem Caps - To C-Bag #1
C-Bag #2 - To LMP Seat
C-Bag #4 - To HTC
Core Tubes - To C-Bag #4

5+42

Check Stem Free In Surface
Drill - Remove From Stem
[LMP: ALSEP photos]
Cap Drill Stem (Black - #A)

Rotate Stem Clockwise &
Pull Stem From Treddle

Core Stem Top End - To Vise
Cap Stem, Bit End #B
Stems - to C-Bag #1 (2/pkt.)
If LMP has not completed ALSEP Deployment, Deploy LRRR and/or Photo ALSEP.

For ALSEP Photography
- 70mm Cam - To RCU
- 70mm Mag - To Color, "KK"

LRRR - Deploy
- LRRR - To 25 ft W. C/S
- Alignment Device - Deploy
- Reflector Array - Deploy
- Leveling leg - Deploy

LRRR - Level & Align
Dust Cover - Remove
Check Level & Alignment

ALSEP PHOTOS TAKEN AT (t: 11; 1/250)

STEREO 01'-STEREO

HFE CCGI SIDE

SUN

PAN
5+47 UHT - Discard
Top Off C-Bags #1, 3&4

5+57
HGA - Stow
LCRU Sel - PM1/WB

START

LRV Batt. Temps - Readout

6+03 Park LRV At MESA
- Heading North
- In Sunlight

STOP

LRV Battery Covers - Open
LCRU Blankets - 35% open
LCRU Sel - TV RMT
HGA - Point To Earth

6+12 Filter to 70mm Cam
Tongs & Gnomon - Retrieve
[LMP: SWC deploy]
Polarimetric Photography
Rocky Area - Select
FAR-Field Photos

3 photos
(f5.6, 1/125; 74 ft)
6+19 Gnomon Place
Near Field Photos

1 photo
(f8; 1/125; 11 ft)

Collect 4 Rock Samples
[LMP: Photo pans]
Post Sampling Photos
• 1 Down Sun
• 2 X-Sun

Samples to C-Bags
Gnomon & Tongs - Stow
70mm Cam - To LRV

6+25 Flag - Retrieve From LRV
- Mount in Staff
[LMP: Photo CDR/flag]
70mm Photo - LMP/Flag
(f-11, 11 ft, 1/250)

6+28 ETB - To CDR Footpan
Collect in ETB
• 70mm Cams (2) (OO), (KK)
• 70mm Mags (2) (NN), (LL)
• 500mm Lens Cam Mag (MM)
• 16mm Mags (3) (CC), (DD), (EE)
• Maps
[LMP: Pack SRC #1]
Reseau Cover - To 500mm Cam
500mm Cam - Under CDR Seat
16mm Cam - Point North
ETB - To MESA Table
Bag "Covers" - To ETB
6+35 Clean EMU’S
LMP PLSS Antenna - Stow

6+36 [LMP: Ingress]

LEC - To SRC #1
SRC #1 - Transfer

ETB - Transfer

6+46 LEC Hooks - To ladder hook

LCRU Pwr SW - OFF
Ck LCRU Blankets - 35% open
Clean EMU

6+50 Ascend Ladder with C-Bag #4
Stow LEC On Platform
Ingress LM

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EMU MALFUNCTIONS

EMU 1: Vent Flag-P, Tone-On
Fan-Off/On
If Flag Still On After 10 Sec:
OPS 02-On, Purge Vlv - LOW
(FAN Fail)

EMU 2: Pres Flag - D, Tone - ON
OPS -2 - ON, Pres Flag - Off
(Leak Or PLSS Reg Fail)
If Flag Still On: Ck Cuff Gage
>3.4, Ver TM, Ops 02 - OFF
(Press Sensor Fail)
EMU 3: 02 Flag-0, Tone - On

Ck Cuff Gage & PLSS 02 Qty
If Cuff Gage >4.0: OPS 02 - On, PLSS 02 - Off (PLSS Reg Fail)
If Cuff Gage <3.7 Or PLSS 02
Decr: OPS 02 - On (Leak)
If No Apparent Fail (02 Sen Fail)

If TM Does Not Ver Subl Brkthru
Or Prim H2O Depletion:
(H2O Press Sw Fail)
If Add'l Cooling Req'd, Act.
BSLSS (Subl Degr) [If No BSLSS, OPS 02 - On, Purge Vlv-Hi]
If PRIM H2O - C1sd: Diverter-MIN, Prim H2O - Open, Wait 4 Min Or H2O Flag Off, Diverter As Desrd

EMU 4: H2O Flag-A, Tone-On(Prim)

Ver Prim H2O - Open, If Open
Ver TM For Subl Restart Or Aux
H2O Act: Subl Restart: Prim H2O C1sd, Diverter-MAX, Wait 5 Min, Diverter-MIN, Prim H2O - Open, Wait 4 Min Or H2O Flag Off, Diverter As Desrd (Subl Brkthru)
Aux H2O Act: Diverter-MIN, Aux H2O - Open, Wait 4 Min Or H2O Flag Off, Diverter As Desrd (Prim H2O Depletion)

EMU 4A: H2O Flag-A, Tone-On (Aux)

Ver Prim & Aux H2O-Open, If Open & Add'l Cooling Req'd, Act.
BSLSS (Subl Degr) [If No BSLSS, OPS 02-On, Purge Vlv-Hi]
Ver TM For Subl Restart: Prim H2O-C1sd, Diverter-MAX, Wait 5 Min, Diverter-MIN, Prim H2O-Open. Wait 4 Min Or H2O Flag
Off, Diverter As Desrd  
(Subl Brkthru)  
If Prim Or Aux H20-Clsd: 
Diverter-MIN, Prim & Aux H20 
Open, Wait 4 Min Or H20 Flag 
Off, Diverter As Desrd 

EMU 5: Tone-On, No Flags  
Ck Cuff Gage  
If <3.4: OPS 02-On (Pres Flag 
Fail & Leak Or PLSS Reg Shift)  
If >3.4 & After Tone Off: Cycle 
Mode Sel Sw, No Tone, No Fail. 
If Tone On Again: Fan-Off 5 Sec, 
Ver Vent Flag-P, Then Fan-On. 
If No Flag: OPS 02-On, Purge 
Vlv-Low (Vent Flag & Fan Fail)  
If PLSS 02 Decr: OPS 02-On 
(02 Flag Fail & Leak)  

Ver Prim H20-Open, If Open & On 
Prim H20, Ver TM For Subl 
Restart Or Aux H20 Act: 
(H20 Flag Fail)  
Subl Restart: Prim H20-Clsd, 
Diverter-MAX, Wait 5 Min, 
Diverter-MIN, Prim H20-Open, 
Wait 4 Min, Diverter As Desrd 
(Subl Brkthru)  
Aux H20 Act: Diverter-MIN, Aux 
H20-Open, Wait 4 Min, Diverter 
As Desrd (Prim H20 Depletion)  
If TM Does Not Ver Subl Brkthru 
Or Prim H20 Depletion(Tone Fail)  
If Add'l Cooling Req'd, Act. 
BSLSS (Subl Degrd) [If No BSLSS, 
OPS 02-On, Purge Vlv-Hi]  
If Prim H20-Open, If Open & 
Add'l Cooling Req'd, Act. BSLSS
(Tone Or H2O Flag Fail Or Subl Degrd) [If No BSLSS, OPS 02-On, Purge Vlv-Hi]
Ver TM For Subl Restart: Prim H2O-Clsd, Diverter-MAX, Wait 5 Min, Diverter-MIN, Prim H2O Open, Wait 4 Min, Diverter As Desrd (Subl Brkthru)
If Prim Or Aux H2O-Clsd & On
Aux H2O: Diverter-MIN, Prim & Aux H2O-Open, Wait 4 Min, Diverter As Desrd (H2O Flag Fail)

EMU 6: Cuff Gage <3.7, (All Other Indicators OK)
OPS 02-On, Cuff Gage Should Rise (PLSS Reg Shift)
If No Gage Incr, Ver TM, OPS 02-Off (Gage Fail)

EMU 7: PLSS 02 Qty Ind Abnormal
Ck Cuff Gage Or 02 Flag-0
If Cuff Gage >4.0, OPS 02-On, PLSS 02-Off (PLSS Reg Fail)
If Cuff Gage <3.7 Or 02 Flag-0, OPS 02-On (Leak)
If No Apparent Failure, Ver TM (Ind Or X-ducer Fail Or Leak)
EMU 8: Cuff Gage >4.0
If O2 Flag-0 Or PLSS 02 Decr,
OP 02-On, PLSS 02-Off
(PLSS Reg Fail)
If Neither, Ver TM (Gage Fail)

EMU 9: Loss Of Pump Noise
If No Side Tone, OP 02-On,
Purge Vlv-LOW, Act. BSLSS
(Power Fail) [If No BSLSS,
OP 02-On & Purge Vlv-Hi]
If Sidetone OK, Ver Pump-On. If
Add'l Cooling Req'd, Act. BSLSS
(Pump Fail) [If No BSLSS,
OP 02-On, Purge Vlv-Hi]

EMU 10: Cooling Inadequate
Ver Diverter-MAX & Pump-On
Ver Prim & (If On Aux) Aux H20
Open: If Open, Act. Gas Trap
5 Sec, Wait 3 Min, If Add'l
Cooling Req'd, Act. BSLSS (Flow
Restr, Subl Or Pump Degr'd, Or
Heat Leak) [If No BSLSS, OP
02-On, Purge Vlv-Hi]
Ver TM For Aux H20 Act; Diverter
MIN, Aux H20-Open, Wait 4 Min,
Diverter As Desrd (Prim H20
Depletion)
If Prim Or (If On Aux) Aux H20
Clsd: Diverter-MIN, Prim & (If
On Aux) Aux H20-Open, Wait 4
Min, Diverter As Desrd
(H2O Flag Fail)
Loss Of Voice Comm (LM)
Ck Vol Controls (Wheel-A-Hou, Blade-B-EVA)
Cycle PTT Sw-MAIN & MOM
CDR Mode Sel To B, LMP To A
(Hand Signals)
If No Comm, CDR To A, LMP To B

LCRU 1: Loss Of Voice Comm (LCRU)
If no comm between crewmen,
perform EMU 11.
If no comm with MSFN:
Ck Vol Control (Wheel-A-Hou)
Repoint LCRU antenna
Select alternate mode--
MODE - PMI/WB or FM/TV
Point selected antenna
LCRU cb - close
LRV AUX cb - close
LCRU POWER Sw - EXT

BSLSS Don And Activate

1 Unstow BSLSS
2 Conn Tether Between Crewmen
BSLSS H2O Flow Divider At Good PLSS (Good PLSS on Rh side)
3 Remove Dust Cover From BSLSS
H2O Flow Divider
4 Discon Good PLSS H2O From PGA
5 Conn BSLSS H2O Flow Divider To PGA With Good PLSS
6 Failed PLSS Pump-Off
7 Discon Failed PLSS H2O From PGA & Secure
8 Discon BSLSS H2O From BSLSS H2O Flow Divider
9 Conn BSLSS H2O To PGA With Failed PLSS
10 Conn Good PLSS H2O To BSLSS H2O Flow Divider
BSLSS Doff

1 Discon BSLSS From Failed PLSS PGA
2 Discon Tether From Both PGA's
3 Discon PLSS H2O From BSLSS
4 Discon BSLSS From PGA & Discard
5 Conn Good PLSS H2O To PGA
6 Ingress LM