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APOLLO 12 VOICE TRANSCRIPT PERTAINING TO THE  
GEOLOGY OF THE LANDING SITE. VOLUME 2.

N. G. Bailey, et al

Geological Survey

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APOLLO 12 VOICE TRANSCRIPT  
PERTAINING TO THE GEOLOGY OF THE LANDING SITE

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**APOLLO 12 VOICE TRANSCRIPT**

**Pertaining to the geology of the landing site**

by

**N.G. Bailey and G.E. Ulrich**

**U.S. Geological Survey  
Branch of Astrogeology  
Flagstaff, Arizona**

1975

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## INTRODUCTION

The Apollo 12 Lunar Module Intrepid landed in the Ocean of Storms on November 18, 1969 to enable the initiation of man's second surface exploration of the Moon. This document is an edited record of the conversations between astronauts Charles "Pete" Conrad, Jr., Alan L. Bean, Richard F. Gordon, and capcom Edward Gibson at Mission Control in Houston during the approximately 7.5 hours of EVAs and 31.5 hours of lunar-stay time. It includes some comments made during their return to Earth. It is a condensation hopefully of all the verbal data having geologic significance. Retained are discussions and observations documenting the lunar landscape, its geologic characteristics, the rocks and soils collected, and the photographic record, along with supplementary remarks essential to the continuity of events during the EVAs. We have deleted the words of mechanical housekeeping and engineering data, attempting not to lose the personal and philosophical comments of interest.

The sources of this verbal transcript are the complete audio tapes recorded during the EVAs and the Technical Air-to-Ground Voice Transcription published by NASA. The voice record is chronological and given in days, hours, minutes and seconds of Apollo Elapsed Time (AET). (Time elapsed after launch from Kennedy Space Center at 11:22 a.m. E.S.T. on November 14, 1969).

## ACKNOWLEDGMENTS

The assistance of R. L. Sutton, U. S. Geological Survey, in obtaining an accurate listing of the Apollo 12 samples is appreciated. The preparation of the cover illustration and Figure 1 was by R. E. Sabala, U. S. Geological Survey. Final formatting, typographic corrections, and revisions were made by Cyndee Condit and Mary Hopper, U. S. Geological Survey, using the WYLBUR text-editing program on the National Institutes of Health computer system. This project was supported by NASA Order No. W13,672.

## GLOSSARY OF TERMS, ABBREVIATIONS, ACRONYMS, AND SYMBOLS

### APOLLO 12 CREW

CC	Capsule Communicator, Capcom (Edward Gibson during the EVAs, other astronauts during other time periods)
CDR	Commander (Charles "Pete" Conrad Jr.)
CMP	Command Module Pilot (Richard F. Gordon)
LMP	Lunar Module Pilot (Allan L. Bean)
AET	Apollo Elapsed Time - since launch from Earth (days-hrs-mins-secs)
ALSEP	Apollo Lunar Surface Experiments Package
ALSRC	Apollo Lunar Sample Return Container
BK	Block crater
BN	Bench crater
BN1	Bench crater - 1st station
BN2	Bench crater - 2nd station
CONT	Contingency sample - bag of soil and rocks collected early during the first EVA
Core	Drive tube coring device for collecting soil samples
CSC	Lunar Close-up Stereo Camera, "Gold Camera"
CSM	Command and Service Module, "Yankee Clipper"
CSRC	Contingency Sample Return Container
DOC	Documented sample - soil and/or rocks that are documented by photography before and after sampling
DPS	Descent Propulsion System

GLOSSARY CONT'D.

EMU	Extravehicular Mobility Unit - lunar surface space suit worn by the astronauts during EVAs.
ETB	Equipment Transfer Bag for transport of items between LM hatch and lunar surface
EVA	Extravehicular Activity - activities on the surface
f-3	One of the alternate landing sites in the Surveyor crater area
GASC	Gas Analysis Sample Container
HD	Head crater
HD1	Head crater - 1st station
HD2	Head crater - 2nd station
HD3	Head crater - 3rd station
HO	Halo crater
IFR	Instrument Flight Regulations
LAM	Landing Area Maps
LESC	Lunar Environment Sample Container - designed to be sealed prior to return in ALSRC
LM	Lunar Module, "Intrepid"
LRL	Lunar Receiving Laboratory
Mag/Mags	Magazine/Magazines - photographic
MC	Middle Crescent crater
MESA	Modularized Equipment Stowage Assembly - a storage area on the LM that contains science equipment



GLOSSARY CONT'D.

MQF	Mobile Quarantine Facility - trailer with living quarters used to quarantine astronauts during their return from Pacific splashdown to Houston
PAN	Panorama of 70 mm photographs
PHO	Photographic reference in transcript keywording
PLSS	Portable Life Support System - backpack on EVA space suit
PSE, PSEP	Passive Seismic Experiment, Passive Seismic Experiment Package
SAMP	Sample reference in transcript keywording
SC	Spacecraft
SEQ	Scientific Equipment Bay
SIDE	Solar Ion Detection Experiment
Solar Wind, SWC	Solar-Wind Composition experiment
SRC	Sample Return Container, "Rock Box"
SP	Sharp crater
SRV	Surveyor III
Strut	Leg on the LM
Plus-Z Strut	Forward leg on which the ladder is mounted
Minus-Z Strut	Rear leg of LM
Plus-Y Strut	Right leg of LM
Minus-Y Strut	Left leg of the LM

**GLOSSARY CONT'D.**

- \*\*\*** Garbled or clipped transmission
- - -** Deletions between statements of statements that are not geologically relevant
- Pause by speaker
- -** Interruption by another speaker, or abrupt termination of a recording
- --** Used where times were not given in Technical Air-to-Ground Voice Transcription
- (words)** Inferred words probably said that were garbled during transmission
- (words?)** Inferred words possibly said that were garbled during transmission

## EXPLANATION OF KEYWORDING

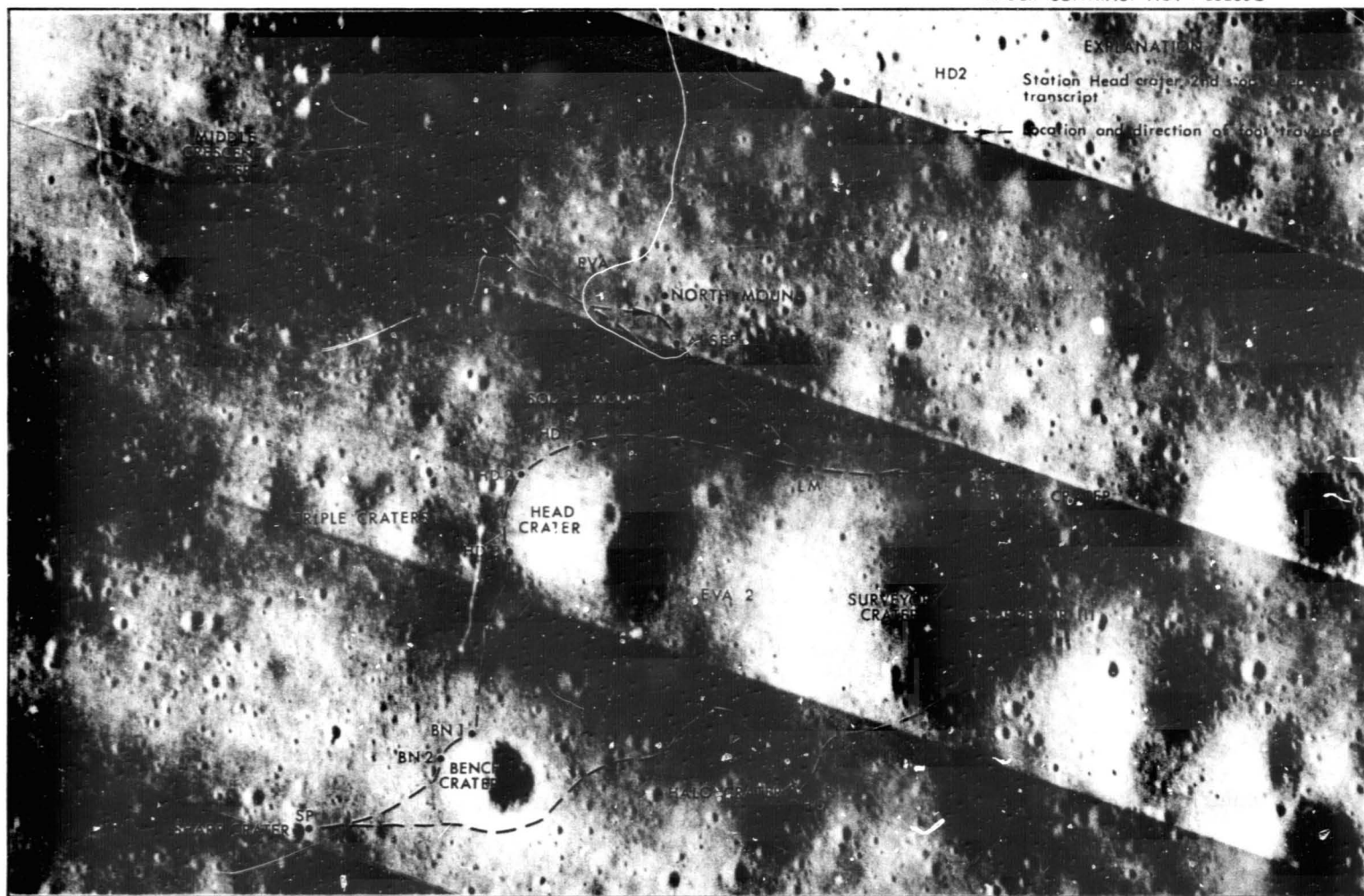
The purpose of the keywords enclosed in parantheses to the right of the transcript is to inform the reader of either the phase of the mission (DESCENT, BETWEEN EVAS, etc.) during which the statements were made, or the particular location or station (LM, ALSEP, HD1 etc.) where the speaker was, or between which locations (LM-ALSEP, HD1-HD2 etc.) the speaker was traversing. There are also separate sample (SAMP xxxxx) and photo (PHO xx xxxxx) keys to denote the particular samples and photos either being described or taken during that conversation. Normally, where both sample and photo keys occur in the same line, the photo numbers are cross-indexed to the sample numbers in that line. Where remarks in the beginning of a statement were not either specifically or generally about the sampling or photography mentioned later in the same statement; the keywording was placed in the particular line containing the first mention of the referenced activity as with PHO 47 6925-26, 29 in the statement made at 04 21 49 50.

Because the taking of specific photos was not always mentioned, we have keyed all photos known to show a sample or its location in the first line that contains sample keywording at the time the sample was collected.

Photo keys placed in the "- - -" lines that signify deletion of non-relevant statements show when those particular photos were taken even though not mentioned.

Conventions used in keyword sample and photo numbering:

- |                               |   |
|-------------------------------|---|
| SAMP CONT 12070-77            | - Sample Contingency 12070 through 12077 inclusive  |
| SAMP 12001; 03                | - Sample numbers 12001 and 12003  |
| SAMP 12010?                   | - Tentative identification of the sample mentioned  |
| SAMP?                         | - Sample possibly collected but still unidentified  |
| SAMP 12020 or 12006?          | - Probably 12020 but possibly 12006   |
| PHO 48 7022-33                | - Magazine 48, frames 7022 through 7033 inclusive   |
| PHO 48 7048, 7050; 49 7189-90 | - Frames 7048 and 7050  |
| PHO 48 7071?                  | - Tentative identification of time photo was taken or statement of interest concerning that photo |



Horizontal data for this map based on Lunar Orbiter 3 frame H154. EVA stations were located graphically by resection to features visible on H154 and on 70 mm pictures taken by Charles C. Conrad and Alan L. Bean during their stay on the Lunar surface.

Compilation performed under the supervision of R. M. Batson. Image correlations by R. M. Batson, K. B. Larson, V. S. Reed, and R. L. Tyner.

100 50 0 100 200 300 METERS

25S LATITUDE, 23.4W LONGITUDE

THE APOLLO 12 LANDING SITE



Figure 1. Apollo 12 landing site showing LM location and area traversed by astronauts during EVAs.

GEOLOGIC CONDENSATION OF THE APOLLO 12 VOICE TRANSCRIPT

\* \* \* \* DESCENT \* \* \* \*

04 14 29 18 CDR \*\*\* 6000 update. Hey, there it is! There it is! (DESCENT)  
Son-of-a-gun! Right down the middle of the road!

04 14 29 27 CDR Hey, it's starting right for the center of the (DESCENT)  
crater.

04 14 31 06 LMP Oh! Look at that crater; right where it's supposed (DESCENT)  
to be.

- - -

04 14 31 35 LMP Contact light. (DESCENT)

- - -

\* \* \* \* LM WINDOW \* \* \* \*

04 14 33 58 CDR Man, oh man, Houston. I'll tell you, I think we're (LM WINDOW)  
in a place that's a lot dustier than Neil's. It's a  
good thing we had a simulator, because that was an  
IFR landing.

- - -

04 14 34 10 LMP \*\*\* I know it. Holy cran, it's beautiful out here! (LM WINDOW)

04 14 34 15 CDR It sure is; it's something else. We flew by it - - (LM WINDOW)

- - -

04 14 35 11 CDR Hey, we flew right by the crater, Houston, but this (LM WINDOW)  
ground looks neat out here. We're not going to have  
any trouble going back there.

- - -

04 14 35 21 CC Where'd you put her down, Pete; over on site 4? (LM WINDOW)

04 14 35 27 CDR No, sir. About halfway between site 4 and site 3. (LM WINDOW)  
I flew by the right side of the crater and then had  
to fly over to the left and land. We're in good  
shape.  
- - -

04 14 35 45 CDR You guys did outstanding targeting. I'll tell you; (LM WINDOW)  
that thing was right down the middle. Beautiful!  
- - -

04 14 35 51 CC Oh, we're glad to hear that, Pete. Intrepid, (LM WINDOW)  
Houston. We got your noun 43.  
- - -

04 14 35 56 CDR I'll tell you; it's a real pleasure for me to ride (LM WINDOW)  
with a number 1 aviator.  
- - -

04 14 38 16 CDR Snowman stood out so clear I couldn't believe it. (LM WINDOW)

04 14 38 19 LMP It's beautiful out there. I even took a peek. (LM WINDOW)

04 14 38 22 CDR It's a nice place to land. (LM WINDOW)  
- - -

04 14 38 25 CDR I'm sorry I flew by, but I was just going too fast. (LM WINDOW)  
- - -

04 14 38 36 CDR It's a good thing we leveled off high - and came (LM WINDOW)  
down, because I sure couldn't see what was  
underneath us once I got into that dust. That went  
a long way. That stuff was going to the horizon.

04 14 38 50 LMP Did it really? Just like they say? Look at those boulders out there on the horizon, Pete. Gee-many! This is a pretty good place. Look right over there. (LM WINDOW)

04 14 39 09 LMP Those rocks - are we on the Copernicus ray area? (LM WINDOW)

- - - (PHO 48 7022-33)

04 15 58 49 CC Well done, Intrepid. You got a bunch of happy geologists in the back room waiting to go. (LM WINDOW)

04 15 59 04 CDR Okay. We were just working on that and - I'm very close to where I want to be, but I'm trying to pin it down exactly. (LM WINDOW)

04 16 01 44 CDR I guess, Houston, for planning purposes, we landed very close to the head of the Snowman. I'm guessing exactly on the same line as selected site 3 but a little bit further left and I - let me give you some coordinates here. This is my first offhand cut at it. (LM WINDOW)

- - -

04 16 07 07 CDR We're having a little trouble judging distance. How long is my shadow? (LM WINDOW)

04 16 07 13 CC Intrepid, your shadow length on a level surface is 250 feet. (LM WINDOW)

04 16 08 21 CDR Well, I'd say that my shadow was much shorter than that. (LM WINDOW)

- - -

04 16 14 00 CC We'll shorten that shadow length up for you a bit. If we assume a 3-1/2-degree slope all the way, then you'll come up with a 150-foot shadow. (LM WINDOW)

04 16 14 12 CDR Okay. Then I'm judging about right. How wide a diameter is the head of the Snowman? (LM WINDOW)

04 16 15 24 CC Diameter of the Head crater from one inside rim to the other inside rim is around 400 to 500 feet. (LM WINDOW)

04 16 15 41 CDR Okay. Right on the head of the Snowman, to the (LM WINDOW)  
left, let's use map 7-6 at coordinates M.5 and make  
it 10.5. I think that's a very sharp, blocky rim  
crater. Do you agree?

04 16 17 47 CC The coordinates which you gave us - are those the (LM WINDOW)  
coordinates of the crater or the coordinates of your  
present location? And also, repeat your question on  
- related to the blocky rim.

04 18 18 00 CDR I think I have that crater in sight. And it's a (LM WINDOW)  
very blocky rim crater, and I want to know if the  
crater that I gave you the coordinates of is a very  
blocky rim crater. I think I'm sitting right next  
to the head of the Snowman on the right-hand side at  
coordinates S.8 and 13.3. I think that's where I  
landed.

04 16 18 36 CC Copy S.8 and 13.3. The coordinates you gave us of (LM WINDOW)  
the crater are right next to Bench crater. Do you  
confirm? Bench crater being at 1.5 rather than M.5.

- - -

04 16 21 16 CDR Yes; it's Bench crater. That's the one I'm (LM WINDOW)  
referring to. And I think I landed at Head crater,  
almost - just a little bit past one of the traverses  
that you got laid out there.

04 16 21 37 CC Roger, Intrepid. And we're trying to decide here (LM WINDOW)  
whether your present position is really R.2 rather  
than S.8.

04 16 21 57 CDR Yes, you're right. R.2. I'm sorry. I'm reading it (LM WINDOW)  
backwards. R.2.

- - -

04 16 34 35 CDR I think it's just a matter of a few hundred feet one (LM WINDOW)  
way or another. I flew right by the side of the  
crater and grounded to a halt and parked it, but  
that's about my best guess right now where we are.



- - -

04 16 35 36 CC Intrepid, Houston. On your previous question on (LM WINDOW)  
Bench crater, from our maps here, we can't tell  
whether that is a blocky rim.

04 16 35 49 CDR This crater's about 5 degrees off to the left of the (LM WINDOW)  
sunline of my shadow, is a very blocky rim, big  
blocks, - depending on how far away it is, there's  
some blocks over there that may be 8 feet.

04 16 36 15 CC Roger. Copy. You're looking at the crater which is (LM WINDOW)  
5 degrees south of the sunline?

04 16 36 26 CDR Yes. Five degrees left of my shadow. (LM WINDOW)

- - -

04 16 38 32 CC Help us get a better visual pindown of where you (LM WINDOW)  
are. Are you able to locate a 50-foot block,  
approximately 100 foot, right in front of you, or an  
8- to 10-foot block about 50 feet in front of you?  
And that will be at R.5, 13.1.

04 16 39 23 CDR Well, I can't say that there is anything like that. (LM WINDOW)  
There is one great big block that looks to me like  
it's 1500 or 2000 feet in front of us that meets  
that description. It's really a big fellow, sitting  
out there.

04 16 39 45 CDR However, what fools you, Houston, let me say this; (LM WINDOW)  
there's another large crater right smack in front of  
us, but it's not obvious to us. There is no shadow  
length. That angle is so low that we're sitting  
here where we don't see any shadows; and unless we  
look very carefully, it's not obvious to us that  
there is a big crater out there. That may be the  
head of the Snowman that's sitting out further past  
me - I'm not sure that I'm not sitting right smack  
on the other side of the Surveyor crater, just a  
little bit past it. I think really the best thing  
for us to do is to get out and look around. The

sooner we do that, the quicker we'll figure out where we are.

- - -

04 16 46 43 CDR Houston, this is Intrepid. Al's finishing off (LM WINDOW)  
eating; and while he does that, I've been sitting here scanning with the monocular. And the first thing I should give you, according to the checklist here, as you already know, we flew right by the side of the Snowman, and landed right past him some little bit. Our yaw angle is 10 degrees, and my general impression is - that we're in country where I see mostly angular rocks, very few rocks at hand that are rounded. Everything is angular. Now, I'll let Al talk about the closeup stuff. Out on the horizon - -

- - -

04 16 48 54 CDR There are - the blocky rim crater that I previously (LM WINDOW)  
mentioned - when I look through the monocular, everything has a pure white look. These big blocky boulders look pure white. Now some of them are really big; and, when I say big, I'm talking 8, 10, maybe 20 feet up on the horizon. They have got to be 20 feet across.

- - -

04 16 51 15 CDR Okay, Houston, I'm back on the air again. And just (LM WINDOW)  
a general comment about all these blocks in the surrounding terrain; at first glance out of the spacecraft, I could distinguish absolutely no color difference in anything. About the only difference is looking cross-sun versus down-sun. I'm sure that some of these rocks have different colors and different textures; but, from here, viewing from the spacecraft, they don't appear that way. Looking at all the materials on the horizon and the blocks on the horizon, they all appear to be of the same material, and they all appear to be pure white. Now, we've got a pretty low sun-angle, and I'm

looking at them at a low angle, so they have varying other colors; but in this monocular, they all appear white. They are all very blocky. As I said, the size goes all the way up to, I'm guessing, 20 feet. A couple of big ones on the horizon.

- - -

04 15 57 32 CC Intrepid, in order to pin down your location a little bit better, would you try to give us the location with respect to the LM. That is, distance and angle, from your Z-axis, of the large block that you have on the horizon? And also the large craters, craters that are roughly 20 feet in diameter or larger that is, slightly larger than the LM shadow width? Also, we ought to press on here fairly quickly, as we are getting a little bit behind our timeline. (LM WINDOW)

04 16 58 08 LMP That's what we think, too. I'll tell you what we're going to do. I'll give you a good description here; and we're going to get ready; and when we get out, we'll take the TV and show you the craters; and I think you'll have a pretty good handle on it. Generally, right now, we're sitting on a, not a level surface, but we don't see any particularly high hills, either. It's just sort of an undulating plain. You can see quite far in all directions. There doesn't seem to be any particularly high objects, such as mountains or high hills or anything like that that interferes with the view. The only features that are obvious, besides the just general rolling country that we're on, are blocky rim craters that are visible in almost every direction. Some of them are quite close, and some of them are far away. We got one of them, for example, at 12 o'clock, Pete described about 2000 or 3000 feet away, that if it didn't have these large boulders on it and had a pretty nice raised rim, perhaps maybe even up to 10 feet high raised rim, we wouldn't be able to see it. I guess the diameter of that crater must be on the order of 600 to 700 feet; that's at 12 o'clock. We've got a number of more weathered (LM WINDOW)

craters around us of every size, from one that's just outside the window here at 2 o'clock, 15 feet, that's about 6 feet in diameter and about 3 feet deep, all the way up to one that I see over at the 1 o'clock position. It doesn't have a particularly raised rim, but it looks like it could have a diameter on the order of 400 feet, 500 feet. There are many rocks that are scattered around on the surface. Most of them are partially buried, and as they are buried there, you can see that there are little fillets of dirt that have built up around almost all of them. And I can't tell, of course, if it's only from this direction or not, but all these rocks seem to have the same characteristics, whether they are small or large. One interesting feature that is directly at our 12 o'clock, about 20 feet, is a whole surface area that's a bit different from the rest in the fact that it's got sort of parallel lines or parallel trenches or skin trenches perhaps an eighth of an inch deep and running what would be north to south to us; and you can see it from about my 2 or 3 o'clock position, all the way over to Pete's window. Some sort of force apparently caused these traces to be made in the surface. I don't think it was our engine, because, as I say, they are perpendicular to the lines that our engine would have made. We'll be able to get a better look at that when we get out, of course; and we'll also be able to use that close-up stereocamera on it and get some good pictures of it.

04 17 01 58 LMP Pete also pointed out that there doesn't seem to be (LM WINDOW) any possibility here of seeing anything like a contact between different colored surfaces. There may be - a chance to notice the contacts or different materials by looking at the texture. For example, that area that I described as directly in front of the LM that has those north-south lines on them, but other than that, it just looks like one uniform surface with many, many craters in it. There is no immediately apparent white rim craters near us. Most of the ones that I can see out my window don't have a raised rim at all. They don't

have any particular elongations. They seem to be, just from glancing at them, about the same texture as the areas surrounding them. I think you're going to like this place, though, Houston, because we can see, in the not-too-far distance, some pretty nice-size rocks that are on the edge of the craters that we suspect could be bedrock from below the regolith here. And, well, I guess, we'll have to get outside and find how far we can move and how fast, so that we know which ones of these we can visit. It looks - there are going to be some good places out here to the west with the ALSEP. And I think, in general, that we're going to be able to gather a lot of good information from where we are. This is a lot better surface, I think, than Pete or I had imagined before we got here. It looks like we're going to be able to move around pretty well, and it looks like there's going to be a lot of different types of samples lying about. So I think probably with that, we'll go ahead and start rigging out.

- 04 17 04 21 CC Roger, Al. That was an excellent description. (IM WINDOW)  
Before we hustle on here, could you give us one quick answer? What is the distance of the 400-foot crater which you see at 1 o'clock?
- 04 17 04 33 LMP I'd say it's about 500 feet, and it runs from about (IM WINDOW)  
my 12:30 to my 2 o'clock position. It doesn't look like it has any particular blocks on the rim. I think we'll be able to pinpoint ourselves pretty well when we get out and look behind us a little, and maybe walk over to one of these craters.
- 04 17 04 57 CDR Also, Houston, I landed - not 20 feet behind me - if (IM WINDOW)  
I peer around the corner of the window here, I'm right on the edge of another great big crater. It falls away at a - oh, I'm going to say 10-degree slope at least, right behind us. We're right on the edge, we landed right past a fairly large crater. I'd say 300 to 400 feet in diameter. Generally, it's very strange - it rolled, \*\*\* very apparent to me to look for when I came in for a landing but

\*\*\* down \*\*\* clear around the back. And I was going to \*\*\* to keep them close to my \*\*\* back about 50 feet.

- - -

04 18 22 28 CMP Houston, I have Snowman. And I believe I have the Surveyor from the northwest side of the Surveyor crater. (IM WINDOW)

04 18 22 56 CMP And, Houston, it's cast a shadow; it looks like it is about - oh, it's hard to distinguish; it looks like about a third of a crater in diameter. (IM WINDOW)

04 18 23 15 CMP I have Intrepid. (IM WINDOW)

04 18 23 33 CMP I have him. He's on the Surveyor crater; he's about a fourth of a Surveyor crater diameter to the northwest. (IM WINDOW)

04 18 23 49 CMP I'll tell you, he's the only thing that casts a shadow down there. (IM WINDOW)

04 18 24 04 CMP He's got a fairly good sized crater just to the north and slightly east of him; out directly behind him; he is on the Surveyor crater. (IM WINDOW)

04 18 24 37 CMP All right, Ed. Now I'm directly overhead. He's a third of the way between the Surveyor crater and the Head. (IM WINDOW)

04 18 24 59 CMP The Intrepid is just on the left shoulder of the Snowman. He is looking at me. He is about a third of the way from the Surveyor crater to the head. I see the Surveyor! I see the Surveyor! (IM WINDOW)

- - -

04 18 30 10 CC Intrepid, for your info, Clipper got a visual on you, and he also picked up Surveyor. (IM WINDOW)

- - -

04 18 30 45 CDR Okay. Did he tell you how far - did he have the LM (IM WINDOW)  
and the Surveyor - -  
- - -

04 18 31 21 CMP Roger. Intrepid's coordinates on LAM 7, 13.6, K.9. (IM WINDOW)  
- - -

04 18 31 32 CC 13.6 and K.9. Copy. Thank you, Clipper. (IM WINDOW)

04 18 32 41 CDR Roger. Did Yankee Clipper have us both in the (IM WINDOW)  
sextant at the same time?

04 18 32 52 CC Roger. That's affirmative. He got you between Head (IM WINDOW)  
crater and Surveyor crater slightly north.

04 18 33 05 CDR That's where I figured we landed. (IM WINDOW)  
- - -

04 19 04 15 LMP Those rocks have been waiting 4-1/2 billion years (IM WINDOW)  
for us to come grab them.

04 19 04 20 CDR Think so, huh? (IM WINDOW)

04 19 04 21 LMP Let's go grab a few. Yes. Heck, yes. (IM WINDOW)

04 19 04 25 CDR Get an ALSEP out first. (IM WINDOW)  
- - -

04 19 05 19 CC Intrepid. You're go for EVA. (IM WINDOW)  
- - -

04 19 10 35 CDR Okay. The hatch is open now. (IM WINDOW)  
- - -

\* \* \* \* EVA 1 \* \* \* \*

04 19 17 39 CDR Okay. I'm out on the porch. Just a second gang, (LM)  
let me pull a pip pin. Deploy the MESA.

- - -

04 19 18 37 CDR Hey, I'll tell you what we're parked next to. (LM)

04 19 18 40 CDR We're about 25 feet in front of the Surveyor crater. (LM)

04 19 18 45 CDR I bet you when I get down to the bottom of the (LM)  
ladder, I can see the Surveyor.

- - -

04 19 19 11 CDR Do you have any TV, Houston? (LM)

04 19 19 14 CC Roger. We've got a TV. No Pete Conrad as yet. (LM)

04 19 19 24 CDR No, I'm at the top of the ladder. (LM)

- - -

04 19 21 20 CDR I got it right now. Man, they aren't kidding when (LM)  
they say things get dusty. Whew! I'm headed down  
the ladder.

04 19 21 26 LMP Okay; wait. Let me get the old camera on you, babe. (LM) (PHO 46 6715-18)

- - -

04 19 21 58 CC You're coming into the picture now, Pete. (LM)

04 19 22 06 LMP Okay. Got the old camera running. (LM) (PHO 16MM)

04 19 22 09 CDR Okay. Down to the - the pad. (LM)

04 19 22 16 CDR Whoopie! Man, that may have been a small one for (LM)  
Neil, but that's a long one for me. I'm going to  
step off the pad.



04 19 22 24 CDR Mark. (LM)

04 19 22 25 CDR Off the - ooo, is that soft and queasy. Hey, that's neat. I don't sink in too far. I'll try a little - boy, that Sun's bright. That's just like somebody - shining a spotlight on your hand. (LM)

04 19 23 12 CDR Well, I can walk pretty well, Al, but I've got to take it easy and watch what I'm doing. Boy, you'll never believe it. Guess what I see sitting on the side of the crater. (LM)

04 19 23 21 LMP The old Surveyor huh? (LM)

04 19 23 23 CDR The old Surveyor; yes, sir. Does that look neat? It can't be any further than 600 feet from here. How about that? (LM)

- - -

04 19 23 55 CDR The Surveyor really is sitting on the side of a steep slope, I'll tell you that. Okay. Now I'll work on my Contingency Sample. Got to walk real careful, Al. (LM)

- - -

04 19 25 03 CDR As you might suspect from some of the pictures Neil brought back, gang, I have several small rocks sitting out in front of me that have a neat amount of dirt built up around them. I'm not sure that my descent engine didn't blow them there. But then again, it may not have. (LM)

04 19 25 36 CC Roger, Pete. Copy that. Is the dirt built up on the side closest to the LM? (LM)

04 19 25 43 CDR Well, let me - I'm going over to get my Contingency Sample, and I'll get one of the rocks in the sample. And yes, as a matter of fact, it is built up on the side that the LM landed on, let me get it. Well, there's one scoop. There's another with some more rocks in it. Wheel! This dirt's just like the (LM) (SAMP CONT 12070-77)

one-sixth g airplane, Al. Flies up in the air, and you can just chase it around. Here's another good looking rock. Whoops! In the sample. There's another rock I want to get in it.

04 19 27 06 CDR I think that's about enough, don't you? Except (IM) (SAMP CONT 12070-77)  
there's one big rock that's too pretty to pass up.  
No, I may not be a hog. It won't fit. I'll go over  
here and get this other one, though.

- - -

04 19 27 27 CDR Say, Houston, one of the first things that I can (IM) (SAMP CONT 12070-77)  
see, by golly, is little glass beads. I got a piece  
about a quarter of an inch in sight, and I'm going  
to put it in the Contingency Sample bag, if I can  
get it. I got it.

- - -

04 19 28 06 LMP I'll tell you, your boots are digging in the soil (IM)  
quite a bit. If you don't pick up your feet, you  
really kick a load of dirt ahead of you. Your left  
foot's got a big mound ahead of it right now that  
it's just pushing along.

04 19 28 45 CDR Boy, do I sink in, wow! (IM)

04 19 29 53 CDR That descent engine! It's just like Neil's. I (IM)  
didn't dig any crater at all. Al, you've really got  
to watch your step down here.

- - -

04 19 38 47 CDR Getting ready to do it in a second, Al, just as soon (IM)  
as I get the bag. I got the Contingency Sample in  
the bag.

- - -

04 19 42 37 CC Pete, you're 34 minutes into the EVA, and you're (IM)  
right on the nominal timeline.

- - -

04 19 40 47 CDR - - I'm about to fall down this little crater hole. (IM)  
Oops. Wait, it really does get -

04 19 40 53 LMP You'd better get over here in the shadow. (IM)

04 19 40 56 CDR I'm in a - oops, another crater hole. (IM)

04 19 41 01 LMP It's a regular obstacle course over there. (IM)

- - -

04 19 43 13 LMP Boy that Contingency Sample is black. (IM) (SAMP CONT 12070-77)

04 19 43 24 CDR I may have filled the bag too full. (IM) (SAMP CONT 12070-77)

- - -

04 19 45 59 LMP Okay, be out in a minute. Got to set the camera, (IM)  
and I'll be right out.

- - -

04 19 46 12 CDR Okay, Contingency Sample f:8, that's f:8. Eight, (IM) (PHO 46 6719-23)  
five. It's done.

04 19 46 59 CDR We sampled in quite a few places, Houston, so I'm (IM) (PHO 46 6719-23)  
taking a bunch of pictures.

04 19 47 04 CC Pete, for your information for those photos, your (IM)  
shadow length right now is about 45 feet on a level  
plane.

- - -

04 19 49 10 LMP Okay, Pete, here I come. (IM)

04 19 49 14 CDR No, no, no, no. Let me come (humming). Got to run (IM) (PHO 46 6724-29)  
through this crater. Here I come. Now, wait a  
minute, LM egress 5 - oops - at 15. I just shambled  
that color chart. I tried to throw it in the ground;  
and naturally it went in sideways, and it got itself

so covered with dirt, you wouldn't know what color it was. Okay, I'm ready for you.

- - -

04 19 50 36 CDR Hey, if I'd landed 20 feet behind where I landed, (IM)  
we'd have landed right smack in that crater.

- - -

04 19 51 59 CDR Okay. That a boy. You look great. Welcome aboard. (IM)  
Okay, place - wait a minute - the chart I didn't  
get, deploy color chart on undisturbed surface.  
Didn't make it. Contingency sample area I got, and  
LMP egress I got. I'm off for S-band antenna.

- - -

04 19 53 08 CDR Look at the descent engine. It didn't even dig a (IM)  
hole.

- - -

04 19 53 32 CDR Okay. My comments are exactly the same as Neil's, (IM)  
in fact, everytime I get down in one of these little  
craters, I sink in a lot further. I'd say our  
footsteps are sinking in -

- - -

04 19 54 00 CDR Oh, I tell you. I think it's pretty much the same (IM)  
as Neil and Buzz found, don't you, Al?

04 19 54 05 LMP I do. One thing I've noticed; it seems to compact (IM)  
into a very shiny surface. I guess the particles  
are very small and very cohesive, so every boot  
print, as you look at it, it looks almost like  
hitting a piece of rubber itself. It's so well  
defined, you can't see any grains in it or anything.

- - -

04 19 55 05 LMP Hey, you can see some little shiny - (IM)

04 19 55 11 CDR Glass. (IM)

04 19 55 12 LMP Right - glass, in these rocks. (IM)

04 19 55 18 LMP You can also see some pure glass, if you look around. You can jump up in the air. (IM)

04 19 55 26 CDR Hustle, boy, hustle. We got a lot of work to do. I've got to do my pans in 15 - 5 minutes here. (IM)

04 19 55 31 LMP Okay. I'm doing some useful work, like getting that TV camera going. (IM)

- - -

04 20 12 25 LMP Looks like a good place for the Solar Wind collector, Pete. I think I'll stick it right here. (IM)

- - -

04 20 17 12 CC Al, we're still not getting a good picture. Why don't you press on, and we'll try to get back to it later, if we have time. (IM)

- - -

04 20 19 33 CDR Okay, the flag is up. (IM) (PHO 47 6896-97)

- - -

04 20 21 22 CDR Okay, get back working, while I go get my camera. I got some pan shots and next the ALSEP. (IM)

- - -

04 20 21 58 CDR I'm heading out to do the pan photographs right now; and, with any luck at all, we'll get back on the timeline and complete what we need. Al's taking shots of the Solar Wind, and I'm hopping out here to the number 1 slot. (IM) (PHO 47 6898-99)

- - -

04 20 22 29 CDR Okay, go f:11; f:11 it is. Two, 3, now f:8, 4, 5, (IM) (PHO 46 6730-63)  
6, 7, 6, 7 -

04 20 24 07 CMP Houston, Yankee Clipper. I marked off Snowman with (IM)  
the telescope, and we're going to get some good  
pictures from that one.

- - -

04 20 24 47 CDR One, 2, 3, 4, 5, 6 - (IM) (PHO 46 6730-63)

04 20 25 44 CDR Okay, Houston, two of the pans are done. (IM) (PHO 46 6730-63)

- - -

04 20 25 49 CC Roger, Pete. Al, how was the LM inspection? (IM)

04 20 25 56 LMP I'm working on it right now. (IM)

04 20 26 05 CDR Taking a look at that Surveyor, Al; I should suspect (IM) (PHO 47 6900-11)  
we ought to be able to get there quite readily. I'm  
going to head down there by the crater a little bit.

- - -

04 20 28 05 CC Al, do you have any comments on the footpad (IM)  
interaction with the surface?

04 20 28 11 LMP Yes, I do. Actually Pete's pads went in a little (IM)  
bit further than did Neil's; I'd say most of the  
pads are in about an inch-and-a-half to two, and it  
sort of looked like we were moving slightly forward,  
and that pretty well killed off our right velocity  
when we touched down. The right-hand footpad seems (PHO 47 6905-07)  
to have bounced; that'd be the plus Y. The others  
don't seem to have. They must have - maybe hit  
there first, and rocked back and forth or something.

04 20 28 48 CC Roger, Al. Do you see anything on the surface from (IM)  
the DPS?

04 20 28 56 LMP No, I don't. It's kind of interesting - the surface (IM)  
under there is clean. It doesn't have the loose  
dust particles as does the rest of the lunar surface  
about here. It also has a number of small round  
dirt clods, if you want, that seem to be strolling  
off in a radial direction from underneath the skirt  
of the engine. I'll take a couple of pictures -  
good shots just about 8 inches or so off the ground.

- - -

04 20 30 10 LMP I'm ready to start the ALSEP offload when you are. (IM)

- - -

04 20 31 34 LMP Okay, and we're off to load the ALSEP. (IM)

- - -

04 20 33 36 LMP Look at me, Pete. It's a good shot, babe. The LM (IM) (PHO 47 6912-14)  
and everything's reflected in your visor.

- - - (PHO 47 6915; 46 6783-6792)

04 20 53 08 LMP I'm going to go right up to the Head crater, I (IM-ALSEP)  
guess.

- - -

04 20 53 26 CDR Well, it looks to me like either the direction (IM-ALSEP)  
you're headed is good, or the one a little bit more  
to the right. You're going to have to go far enough  
so we don't end up in one of the craters when we  
start to deploy.

- - -

04 20 54 13 CC Pete and Al, your LM shadow should be about 110 (IM-ALSEP)  
feet.

04 20 54 20 CDR Okay, I'm looking for it. I'm dying to find out (LM-ALSEP) (PHO 46 6793)  
what this mound is over here anyhow, Al. We got a  
very peculiar mound sticking up out of the ground,  
Houston. I want to go look at it. As a matter of  
fact, I think I'll go take a picture of it.

04 20 54 39 CC Roger, Pete. Could you give us your position and (LM-ALSEP)  
distance with respect to the LM?

04 20 54 48 LMP Go ahead, Pete. Do what you're doing. Pete's about (LM-ALSEP)  
- I'd guess, about 300 feet at 12 o'clock in the  
bottom of a shallow crater that you're bound to see  
on your map. It's sort of a doublet. Okay?

04 20 55 01 CDR I'm headed to the right-hand edge of the Head crater. (LM-ALSEP)

04 20 55 14 CDR Hey, Al. Here's a neat spot to put it out up here. (LM-ALSEP)

04 20 55 17 LMP Is it flat for a good piece? (LM-ALSEP)

04 20 55 19 CDR Oh, you'd better believe it. (LM-ALSEP)

04 20 55 20 LMP Okay, we'll put that - it's a good long ways away (LM-ALSEP)  
too; it must be at least - what - 500 feet from the  
LM?

04 20 55 27 CDR I don't know. (LM-ALSEP)

04 20 55 28 LMP 600? (LM-ALSEP)

04 20 55 31 CDR It's a world's most peculiar - I got to photograph (SOUTH MOUND) (PHO 46 6794-95)  
this thing. I can't imagine what it is. The mound  
is sticking up; and I can't imagine how it got there  
or what would make it.

- - -

04 20 55 53 CDR I got to get them a stereo of this thing. It's (SOUTH MOUND) (PHO 46 6794-95)  
really fantastic.

- - -



04 20 56 08 CC Pete, at 1 plus 48 into the EVA, you're looking good. Looks as though you're right on there, if you've just about completed your traverse. (LM-ALSEP)

- - -

04 20 56 28 CDR See where I'm headed? This great big flat area. (LM-ALSEP)

04 20 56 29 LMP That's a good - hey, there's another one of those mounds over there. (LM-ALSEP)

04 20 56 31 CDR Where? Hey, you're right. What do you suppose they are? (LM-ALSEP)

04 20 56 35 LMP I don't know, Houston, what they are; they're just sort of mounds. Looks like - don't take this the wrong way. It looks like a small volcano, only it's just about 4 feet high; and at the top, it's about 5 feet across; and it then slopes from the top on down to the - level with the terrain, and that diameter, that circle - where it finally becomes level with the terrain, is about 15 or 20 feet. So, it looks sort of like a small volcano. There's a couple of them out here. They look like they're formerly made out of mud or something. (LM-ALSEP)

04 20 57 15 CC Al, roger. We copy. Is there any hole or central vent? (LM-ALSEP)

- - -

04 20 57 24 CDR We'll go over after we get the ALSEP out. There's a couple of them here. We couldn't ask for a better spot to put this ALSEP down. (ALSEP)

04 20 57 33 LMP No. This is nice. Hey, lot more rocks up here. (ALSEP)

04 20 57 42 CDR Listen Edward, we could play geologist for 2 days and never get any further than we are right now. Seeing all different kinds of things. (ALSEP)

04 20 57 51 LMP Hey, here's a different one. (ALSEP)

04 20 57 52 CDR Yes. It's really neat. Better than any geologist (ALSEP)  
in Houston.

04 20 58 02 LMP Let's get a quick pan of the area here that - \*\*\* (ALSEP) (PHO 46 6796-6811)  
the ALSEP before the - there you go.

- - -

04 20 59 15 LMP That's pretty good, Pete. I'm going to move just a (ALSEP)  
little bit further to the east - correction, to the  
north, so that I won't end up over in that hole to  
the side. Okay?

04 20 59 25 CDR All right. Yes, I think it would be a real good (ALSEP)  
spot.

04 20 59 52 LMP Awfully frustrating. Okay, I think this is the (ALSEP)  
spot, Pete, right here.

04 20 59 57 CDR You look and make sure now that we're going to have (ALSEP)  
a good place for everything.

04 21 00 02 LMP Yes, we will. Magnetometer can sit over there and (ALSEP)  
the seismometer will sit on a good flat place;  
although the trouble with the seismometer, we don't  
have any good solid bedrock or anything to set it  
on. All we've got is this dirt. And I don't see  
any area around that has any rock.

- - -

04 21 08 15 LMP Houston, I'm not kidding, we are really getting (ALSEP)  
dirty out here. There's no way to handle all this  
equipment with all the dust on it. Every time you  
move something, the dust flies; and, in this low  
gravity, it really takes off, goes way up in the air  
and then comes down and lands on you.

04 21 08 32 CDR How far do you estimate we're from the LM? 600 (ALSEP)  
feet? 700 feet?

04 21 08 36 LMP At least. (ALSEP)

04 21 08 37 CDR I think you're right. 600, 700 feet. (ALSEP)  
- - -

04 21 15 06 CC Pete and Al, at 2 hours and 7 minutes into the EVA, (ALSEP)  
you're about 5 minutes behind.  
- - -

04 21 18 16 CDR Okay. I've got the Solar Wind deployed here. (ALSEP) (PHO 46 6812)  
- - -

04 21 30 32 LMP Okay. That's complete. Let me take a couple of (ALSEP) (PHO 47 6916-17)  
pictures of it. Okay, Houston. The Passive Seismic  
is down; the alignment is exactly 90 degrees, and  
I'm going to take a couple of pictures of it here.  
- - -

04 21 34 09 LMP I'm down in a little crater now, Houston. (ALSEP)

04 21 34 13 CDR Sure enough, right in the bottom of the crater. (ALSEP)

04 21 34 15 LMP It is a lot softer dust than up on the rim. Not (ALSEP)  
much; but it's noticeable. I don't think the sides  
are slippery, though. I don't think it's going to  
bother us going over to get our Surveyor.  
- - -

04 21 39 42 LMP Okay, Houston. The magnetometer's deployed; it's (ALSEP)  
level, and it's pointed exactly east. And the  
little black dot is right in the middle.  
- - -

04 21 40 50 LMP Okay, Pete, let me take a couple of pictures of (ALSEP) (PHO 47 6920-21)  
this \*\*\*  
- - -

04 21 42 18 LMP Okay. I've deployed the SIDE now, Pete. (ALSEP) (PHO 47 6922-24)  
- - -

04 21 49 50 CC And, Pete and Al, a comment on picture taking. If (ALSEP)  
you would, try to document some of the dirt which  
has gotten all over the equipment. If you would,  
try to get closeups which will show the dirt we  
might have on thermally sensitive areas. And, also,  
when you get done, if you would, take one or two (PHO 47 6925-26, 29)  
extra pictures showing the ALSEP with the mounds  
that you described previously in the background.  
That'll give us a good geometric reference.  
- - -

04 21 50 25 CDR I did a pan out here at the - (ALSEP) (PHO 46 6796-6811)  
- - -

04 21 54 18 CDR Hey, if this SIDE falls over, then I'm really going (ALSEP)  
to be mad. I got that thing firmly planted.  
- - -

04 21 55 54 CDR That's a shame. What time is it, anyhow? Let me (ALSEP) (PHO 46 6812?)  
get over here and get a big picture of this.

04 21 56 08 CC Pete, you're 2 plus 48 into the EVA. (ALSEP)  
- - -

04 21 56 47 CDR Back off; I got the picture. (ALSEP) (PHO 46 6813)

04 21 56 52 CDR No. Let me get - I'm just getting one from a (ALSEP) (PHO 46 6814-17)  
distance here, up a way.

04 21 57 00 CC Al, copy you have the SIDE deployed. (ALSEP)

04 21 57 05 CDR Yes. Everything's deployed. I'm going to go get (ALSEP) (PHO 46 6818-21)  
the shorting plug now, Houston.  
- - -

04 21 57 12 CDR Boy, do I like to run up here. This is neat. The (ALSEP)  
 first thing we've got to do is run over to that  
 volcano-looking - or whatever that little jabber-do  
 is. That's interesting.  
 - - -

04 21 59 26 CDR Check that antenna; make sure it's level. (ALSEP)

04 21 59 33 CDR You do that. I'll give you the tongs. I'm going to (ALSEP)  
 run over and photograph this ding-a-ling looking -  
 - - -

04 22 00 02 CDR All right, I'm going over to this mound. (ALSEP-NORTH MOUND)  
 - - -

04 22 00 33 CDR I don't know what this thing is. It's really weird. (NORTH MOUND)  
 - - -

04 22 00 46 CDR I don't know what this is. Let me get the - \*\*\* (NORTH MOUND) (PHO 46 6822-26)  
 feet at f:8.  
 - - -

04 22 01 29 CDR Well, I think that rock - I think it's a little (NORTH MOUND)  
 secondary impact crater. Very funny boy, is that a  
 funny rock - it looks -  
 - - -

04 22 01 47 LMP Hey, here's a rock they'll be glad to see in (ALSEP) (SAMP 12017)  
 Houston.

04 22 01 51 LMP It's an interesting one. It looks like a solid (ALSEP) (SAMP 12017)  
 glass chunk. It's really shiny black. Did you ever  
 see anything like it before?  
 - - -

04 22 03 39 LMP Hey, Pete, let me put this rock in your pack \*\*\* - - (ALSEP) (SAMP 12017)

04 22 03 46 CDR - - look at that, got all that glass spatter on it. (ALSEP) (SAMP 12017)  
That's fantastic.

04 22 03 50 LMP Never seen anything like that rock. (ALSEP) (SAMP 12017)

04 22 03 52 CDR No, I haven't. (ALSEP) (SAMP 12017)  
- - -

04 22 04 03 LMP Yes. I got some pictures to take and that's it. (ALSEP) (PHO 47 6925-31)

04 22 04 07 CDR Well, you take some pictures, and I'll meet you over (ALSEP-SOUTH MOUND)  
at that big mound. All right?

04 22 04 10 LMP All right. Sounds good. (ALSEP-SOUTH MOUND)  
- - -

04 22 05 54 CDR Okay. Boy, is that a big rock! (ALSEP-SOUTH MOUND)  
- - -

04 22 06 33 LMP I'm coming your way. Let's start sampling. (ALSEP-SOUTH MOUND)  
- - -

04 22 07 49 CDR Okay. We're standing over at the Head crater. (SOUTH MOUND)

04 22 07 55 LMP Why don't we start picking up some rocks, Pete, (SOUTH MOUND) (SAMP?)  
while we wait?

04 22 08 01 LMP Want to get a picture of that? (SOUTH MOUND) (SAMP 12021) (PHO 47 6932)

04 22 08 03 CDR Sure do. (SOUTH MOUND) (SAMP 12021) (PHO 47 6932)

04 22 08 05 LMP Let me get it set up. (SOUTH MOUND) (SAMP 12021) (PHO 47 6932)

04 22 08 07 CDR Right. (SOUTH MOUND) (SAMP 12021) (PHO 47 6932)

04 22 08 12 LMP Try it at f:8. Okay. There you go. Okay. Grab (SOUTH MOUND) (SAMP 12021) (PHO 47 6932)  
her up, Pete.

04 22 08 31 CC Pete and Al, two things we'd like you to do on the traverse on the way back: one is to get samples and some documentation of those mounds; and, secondly, if you can, get over the thousand-foot crater, which is northwest of the ALSEP, and get samples and documentation of that sample from there. (SOUTH MOUND)

04 22 08 56 CDR Thousand-foot crater? (SOUTH MOUND)

04 22 08 57 LMP Suppose that's where we are? Is that that one over there? (SOUTH MOUND)

04 22 08 59 CDR You don't mean the Head crater, do you? Let's get some of this mound Al. (SOUTH MOUND)

04 22 09 07 CDR It's an interesting thing. There's a little vent hole. (SOUTH MOUND)

04 22 09 05 CC Negative. If you're at Head crater now, we'll give you a radar vector. Stand by. (SOUTH MOUND)

04 22 09 12 LMP \*\*\* this way. You've already got pictures of this, Pete? (SOUTH MOUND)

04 22 09 17 CDR Yes, at 15 feet. I'm just taking it close up over here. (SOUTH MOUND) (PHO 46 6827-32)

04 22 09 19 CDR Look at this black rock here. (SOUTH MOUND) (SAMP 12008?) (PHO 46 6831-32)

- - -

04 22 09 26 LMP Yes, but I didn't get a picture of it. Okay. (SOUTH MOUND) (SAMP 12008?)

04 22 09 28 CDR Of that one? Yes. Okay? (SOUTH MOUND) (SAMP 12022)

04 22 09 32 LMP (stereo?) picture in there. Let's get another one from here \*\*\* this one - (SOUTH MOUND) (SAMP 12022?) (PHO 47 6933)

04 22 09 38 CDR Let's go around to the other side and not kick any dust on it. It ruins it. (SOUTH MOUND)

04 22 09 43 CC Pete, the crater which we speak of is 300 feet northwest of Head crater. (SOUTH MOUND)

04 22 09 58 CDR The head - oh - I see it. Yes. You mean the great (SOUTH MOUND)  
big one over here?

04 22 10 01 CC That's affirmative. (SOUTH MOUND)

04 22 10 02 CDR Okay. Yes. We can go over there. Okay, but that's (SOUTH MOUND)  
the - -  
- - -

04 22 10 20 LMP Let me see if I can chip some of that off, Pete, (SOUTH MOUND) (SAMP 12007)  
- - -

04 22 10 37 LMP I'm going to knock a piece of that off. (SOUTH MOUND) (SAMP 12007)

04 22 10 41 CDR Got the feeling that when that crater was made, it (SOUTH MOUND)  
just threw out a big blob of dirt. This is where it  
landed.

04 22 10 51 CDR Ain't any that big. (SOUTH MOUND)

04 22 10 53 LMP Hey, you'd almost - I wouldn't be surprised to find (SOUTH MOUND) (SAMP 12007)  
this is that microbreccia you haven't got any - -

04 22 10 59 CDR Hey, let me get a picture. Let me get a picture of (SOUTH MOUND) (PHO 47 6934-35)  
that one.  
- - -

04 22 14 37 CDR Roger-roger. We're almost over to the thousand foot (SOUTH MOUND-MC)  
crater.

04 22 14 44 CDR Got about another 200 feet to go. You can (SOUTH MOUND-MC) (PHO 47 6936-37)  
see these linear patterns quite frequently on the  
surface, Houston. They seem to generally run from  
the north to the south, and they're just little  
lines. They're off in the dirt; sometimes you see  
a large area - we're in an area right now. It  
looks like it had a fresh impact not too long ago.

04 22 15 15 LMP Let me take a picture of this one, Pete. (SOUTH MOUND-MC) (PHO 47 6938)



04 22 15 17 CDR Hey, I got some neat ones right here. (SOUTH MOUND-MC)

04 22 15 19 LMP Okay. Looks like a secondary impact crater that occurred - recently. (SOUTH MOUND-MC) (PHO 47 6938)

04 22 15 28 CDR Yes. Some of them do, don't they? (SOUTH MOUND-MC)

04 22 15 30 LMP They do. This one looks like fresh. Doesn't have that old look like all the rest of these - - (SOUTH MOUND-MC)

04 22 15 33 CDR Come on. Let's go. \*\*\* right over there. (SOUTH MOUND-MC)

04 22 15 34 LMP There's some of that \*\*\* (SOUTH MOUND-MC)

04 22 15 37 CC Roger, Pete and Al. We copy that. We show you're 3 hours and 7 minutes into the EVA. And we'd like you back to the LM to start the closeout in 10 minutes. (SOUTH MOUND-MC)

- - -

04 22 15 56 LMP Well, we're there, now. (SOUTH MOUND-MC)

04 22 15 57 CDR Yes. We're almost to the crater. We're not getting very many rocks by going this far, but if that's what you want, that's what you want. Run, baby. (SOUTH MOUND-MC)

04 22 16 09 LMP When we start picking up, we'll try and get a larger sample - - (SOUTH MOUND-MC)

04 22 16 12 CDR Hey, this looks like a brilliant spanking fresh impact crater. Look at that little fellow, huh? (SOUTH MOUND-MC)

04 22 16 21 LMP Sure does, doesn't he? (SOUTH MOUND-MC)

04 22 16 22 CDR Yes. Let's get some rocks right here; here's some. Here, get some pictures first. Get some pictures of that crater, and I'll get some over there. I'll get this one right here. (SOUTH MOUND-MC) (PHO 47 6939)

04 22 16 32 LMP Okay. Wonder why these look so fresh? Must be just the difference in materials. (SOUTH MOUND-MC)

04 22 16 38 CDR Boy, it sure does look fresh though, doesn't it? (SOUTH MOUND-MC)

04 22 16 43 CDR There's a rock for you. (SOUTH MOUND-MC) (SAMP 12010?) (PHO 46 6835)

04 22 16 46 CDR Listen, we need to find a grapefruit, too, you know. (SOUTH MOUND-MC)

04 22 16 48 LMP Yes. There's a bunch around. (SOUTH MOUND-MC)

04 22 16 50 CDR Made a dent on this rock. Whoops, wait a minute; I dropped it. Hold it, move on a little bit; move on, move forward. (SOUTH MOUND-MC) (SAMP 12015?) (PHO 46 6833-35)

- - -

04 22 17 06 CDR Get right to the edge of this crater and photograph it. Get a pan in it, and then we won't have to come back this way. Look at there; that crater's spectacular isn't it? Wow, a monster! Look at that rock! I'd like to - (MC)

04 22 17 18 LMP Oh \*\*\* get some of this bedrock - - (MC)

04 22 17 20 CDR Well, we may want to go back there tomorrow, but we can't go any further. We'll never get back in 10 minutes. (MC)

04 22 17 27 LMP Hey, there's bedrock right down here a little ways. (MC)

04 22 17 30 LMP It's right down the hill. (MC)

04 22 17 32 LMP About 50 yards. (MC)

04 22 17 39 CDR You're right. I'll pan it first. (MC) (PHO 46 6836-44)

- - -

04 22 17 52 CDR Don't they look like something looking into zero phase? Look at those fresh little jabber-dos. Now wait a minute. I want to - - (MC)

04 22 17 59 LMP Why don't you go ahead and pan - right here? (MC)

04 22 18 00 CDR And I want to get it at 74. (MC)

- - -

04 22 18 04 CDR Seventy-four - - (MC)

04 22 18 05 LMP You ought to have two f:8. (MC)

04 22 18 06 CDR Eight, right? (MC)

04 22 18 08 LMP Fifty, and you're looking - right there, and you ought to have it. (MC)

04 22 18 11 CDR Eight over there, and 11 right there and 8 over there. (MC)

04 22 18 15 CDR One, 2, 3 - - (MC) (PHO 46 6845-52)

04 22 18 20 CDR - - 4 - - (MC) (PHO 46 6845-52)

04 22 18 23 CDR - - 5. Now let me go back to f:11. (MC) (PHO 46 6845-52)

04 22 18 37 LMP Got it. I was just looking over this rock down here. Looks like it came - - (MC)

04 22 18 41 LMP Just a minute. Okay. Now, let me go over here, and I'll get one in stereo of this baby. (MC) (PHO 47 6940)

04 22 18 50 LMP Houston, we're looking down into this big crater now, and it looks rather old \*\*\* - - (MC)

04 22 18 53 CDR Hey, there's some bedrock on the bottom, I think, here. Looks like big boulders. (MC)

04 22 18 57 LMP There's some big boulders that are resting inside the rim. None on the rim like we see on a large crater that's further to the west by another thousand feet. But you don't see any outcroppings of rocks either that - that we could look down and say, well, from the top of the rim down to about 20 feet or something, then we come to the underlying rock. But there is this rock that's very large, an arm's - spread around. We're going to try to collect some of the samples. (MC)

- - -

04 22 19 43 LMP We're picking up a couple right now, and we're on our way back. Just a minute. (MC)

04 22 19 53 LMP Boy, there's a big block over there. (MC)

04 22 19 55 CDR Why don't you get it? Got it? I can't get it with the tongs. (MC) (SAMP 12016?)

04 22 19 57 LMP Move ahead and I'll pick it up, (MC) (SAMP 12016?)

04 22 19 59 CDR Hey, wait a minute. How about this? (MC) (SAMP 12016?)

04 22 20 06 LMP Get it? (MC) (SAMP 12016?)

04 22 20 15 CDR Push it over here and I'll get it. (MC) (SAMP 12016?)

04 22 20 16 LMP Push her over here. (MC) (SAMP 12016?)

04 22 20 26 CDR Okay \*\*\* (MC) (SAMP 12016?)

04 22 20 27 LMP Drop it in my bag. (MC) (SAMP 12016?)

04 22 20 29 CDR Okay. You got anything else you want to put in your bag? Got to push another one over here. (MC)

04 22 20 34 LMP Okay, in just a minute. (MC)

04 22 20 37 LMP A couple of big ones. Oh, I wish - get this inside of that. I can't. (MC)

04 22 20 41 CDR Try that one. (MC) (SAMP?)

04 22 20 42 LMP That's a good one. (MC) (SAMP?)

04 22 20 46 LMP A couple of nice ones right here. Wait a minute. Get my hand here. (MC)

04 22 20 53 CDR There you go. Oops. (MC)

04 22 20 56 LMP Okay. Wait a minute. Yes. Let's just get this real good one. (MC) (SAMP?)

04 22 21 03 LMP Okay. We're getting you some of this rock and hope (MC) (SAMP?)  
it's a sufficient. Let's go back and pick up  
another kind. Where the heck is the LM?

04 22 21 10 CC Roger, Pete and Al. We copy. We suggest you start (MC)  
smoking on back there. You're 3:13 and I'd like you  
back there in 4 minutes.

04 22 21 21 CDR Okay. We're on our way. Let's go, Al. (MC-LM)

- - -

04 22 21 31 LMP I was looking at that rock perched right over on top (MC-LM)  
of the hill, there. \*\*\* my distance here, because  
there's nothing but -

- - -

04 22 21 48 LMP Must have been 1200 - 1300 feet, huh? (MC-LM)

04 22 21 53 LMP You could travel a lot further than that; you know (MC-LM)  
it?

- - -

04 22 22 33 CDR Listen. When I get this rock box, we've got to get (MC-LM)  
some more rocks. Turned us all around and we didn't  
get any rocks.

04 22 22 44 LMP I'm getting some up here. (MC-LM) (SAMP?)

04 22 22 46 CDR We'll fill it. Just a minute. (MC-LM)

04 22 22 53 CDR Hey, Houston. We're approaching the ALSEP, headed (MC-LM)  
back to the LM.

- - -

04 22 23 09 LMP Hey, ease over this way a little. (MC-LM)

04 22 23 11 LMP Over towards your left. (MC-LM)

04 22 23 14 LMP I thought there were a couple of good rocks over there. (MC-LM) (SAMP 12014?)

04 22 23 21 CDR Be about halfway - (MC-LM)

04 22 23 23 LMP Why don't we grab a couple of rocks here? (MC-LM)

04 22 23 26 CDR All right. Here's one right here. (MC-LM)

04 22 23 27 LMP Okay. Let me get a photograph of it. Hurry. We're on the way. (MC-LM)

04 22 23 38 LMP Okay. There's a good one. Wait a minute. Eight. Step in and get the picture. (MC-LM) (SAMP 12014?)

04 22 23 49 LMP Got it. There you go. (MC-LM) (SAMP 12014?)

04 22 24 08 LMP Get another good one. Forget the picture. (MC-LM) (SAMP?)

04 22 24 11 CDR Okay. You're in the shadow. Step back just a little. (MC-LM)

04 22 24 14 LMP I said forget the picture - - (MC-LM)

04 22 24 15 CDR Okay. (MC-LM)

04 22 24 17 LMP That's a good one. That's a heavy son-of-a-gun. (MC-LM)

04 22 24 21 CC Pete and Al, we're picking up your heavy footprints going by the seismometer. (MC-LM)

- - -

04 22 24 27 LMP Let's get one last shot of this thing. (MC-LM)

04 22 24 30 CDR You - look, I got to get going on the rock box. I can't - - (MC-LM)

04 22 24 35 CDR Go ahead and get one more. Zing. I feel like Ebenezer Scrooge or something running across the plain. (MC-LM)

04 22 24 49 LMP Boy, there's a lot of soft land here. (MC-LM)

04 22 24 53 CDR Okay. We're within about 300 feet of the LM now, Houston. (MC-LM)

- - -

04 22 25 03 CDR There's a good rock. (MC-LM) (SAMP 12020 or 12006?)

04 22 25 05 CDR Look at that! (MC-LM) (SAMP 12020 or 12006?)

04 22 25 07 CDR Never saw one like that before. Look at that! (MC-LM) (SAMP 12020 or 12006?)

04 22 25 14 CDR That green? What is it? (MC-LM) (SAMP 12020 or 12006?)

04 22 25 18 CDR No, it was grinning at me. That's why I stopped. (MC-LM) (SAMP 12020 or 12006?)

04 22 25 20 CDR The heck with it. Put it in the rock bag. (MC-LM) (SAMP 12020 or 12006?)

04 22 25 30 LMP Here, let's pick up a couple of these. (MC-LM) (SAMP?)

04 22 25 36 LMP Hey, they're good. They're a little different. They're more the gabbro type. Yes - wait a second. (MC-LM) (SAMP?)

- - -

04 22 25 59 CDR Get it in? (MC-LM) (SAMP?)

04 22 26 01 LMP Good show. (MC-LM) (SAMP?)

04 22 26 02 CDR Let's go. (MC-LM)

04 22 26 05 CDR What I'd hate to see is an LMP laying on the lunar surface. Hey, what's that glass! Look at that! Son-of-a-gun. I got to have that. Look at that, a pure bead of glass! (MC-LM) (SAMP 12001)

04 22 26 18 LMP Let's grab it. Oh, come on. Hold my hand. (MC-LM) (SAMP 12001)

04 22 26 31 LMP Oh, I'm losing it. (MC-LM) (SAMP 12001)

04 22 26 44 LMP Got it. (MC-LM) (SAMP 12001)

04 22 26 45 CDR Pure glass or something, huh? (MC-LM) (SAMP 12001)

04 22 26 46 LMP It's one of those black beads, only this one's - - (MC-LM) (SAMP 12001)  
about - - three-eighths of an inch in diameter. And  
they're all - -

04 22 26 49 CDR All look green to me. (MC-LM) (SAMP 12001)

04 22 27 14 CDR Take the pan photographs again. I took them at 15 (MC-LM) (PHO 47 6941-7006)  
feet, I think, by mistake.

04 22 27 19 CDR And I'll get the rock box out. (MC-LM)

04 22 27 22 CDR Hey, Houston. We're back at the LM. (LM)

04 22 27 26 CC Roger, Al, Pete. We copy. After you get finished (LM)  
with the core tube, Al, we'll have some  
instructions for you with the TV.

- - -

04 22 27 45 LMP Now, which pans do you want me to take? Over here? (LM)

04 22 27 47 CDR No, about - yes. Front and over on left and rear. (LM)

04 22 27 54 LMP Okay. Will do. I'll take them again. I'm going to (LM)  
take a few pans first, Houston, if that's okay.  
It'll take about an additional 3 minutes.

- - -

04 22 29 21 CDR That Surveyor sure looks neat sitting on the side of (LM)  
that crater.

04 22 29 25 LMP Pretty steep walls down there. (LM)

04 22 29 46 LMP Okay, let me just get the other two pans, Pete. Be (LM)  
finished in a minute.

- - -

04 22 30 38 LMP \*\*\* pans. Get on a higher place. (LM)

04 22 30 43 LMP Oh, I was too low for the pans. Okay this is a good (LM)  
spot, I think.



04 22 31 49 LMP Okay. That's it for the pans, Pete. (LM) (PHO 47-6941-7006)

04 22 31 51 CDR Okay. One rock box open. (LM)

04 22 31 53 LMP Okay, one more set to go. (LM)

04 22 31 59 LMP I've got this bag of rocks on me, here. Want me to bring them to you in a minute? (LM)

04 22 32 03 CDR Yes. I'm having trouble over here with the rock box holders. (LM)

04 22 32 13 CDR This rock box keeps wanting to go up in the air. Oh, the heck with it, I think I'll put them in there. (LM)

- - -

04 22 32 48 CDR Got to get this core tube, buddy. (LM)

- - -

04 22 33 10 LMP All the pans are done, Pete. Okay? (LM) (PHO 47 6941-7006)

04 22 33 14 CDR Come get the core tube. (LM) (SAMP CORE 12026)

- - -

04 22 33 54 CDR Here's your core tube right here. (LM) (SAMP CORE 12026)

- - -

04 22 34 07 CC Pete, now, you're 3 plus 26 into the EVA. And Al, we'd like you to hustle. We'd like you back there at the bottom of the ladder in 3 minutes. (LM)

- - -

04 22 34 22 CDR Let me get your rock bag before you get away. (LM)

04 22 34 24 LMP Okay, get that rock bag. I'll go get this core tube. I think I can make it in 3 minutes. (LM) (SAMP CORE 12026)

04 22 34 30 LMP If they'd give me 2 minutes, I'd go over and do (LM)  
their TV.  
- - -

04 22 34 39 LMP Adios. I'll go for the core tube. I'll go for the (LM) (SAMP CORE 12026)  
core tube over near the TV, and I'd come back by it.  
- - -

04 22 34 54 CDR I sure wish we had more rocks. (LM)  
- - -

04 22 35 02 LMP Okay, I'm core tubing it, right now. (LM) (SAMP CORE 12026)

04 22 35 12 CDR You know, I wish we had more rocks. (LM)

04 22 35 16 CC Pete, you can go ahead and fill up the remainder (LM) (SAMP 12001; 03)  
with the fines from that area.

04 22 35 24 CDR Okay. I'll have to wait for Al to come back anyhow. (LM) (SAMP 12001; 03)  
Let me see; is there something I could be doing all  
this time? Scoop material. That a boy.

04 22 35 38 LMP Houston, we're getting the core tube in real good. (LM) (SAMP CORE 12026)  
It's down almost full length now.

04 22 35 45 LMP It's a little harder to drive in; you have to auger (LM) (SAMP CORE 12026)  
it a bit and then pound it, but now it's full  
length, and let me take a picture of it and that (PHO 47 7007-08)  
will be it. Okay 250, 8.  
- - -

04 22 36 23 LMP Okay, here comes the core tube. (LM) (SAMP CORE 12026)

04 22 36 27 LMP Got the cap ready, Pete? (LM) (SAMP CORE 12026)

04 22 36 28 CDR Yes. (LM) (SAMP CORE 12026)

04 22 36 29 LMP This stuff comes right out, doesn't it? That's all right. (IM) (SAMP CORE 12026)  
- - -

04 22 38 34 LMP I'll bring you that core tube in a minute, Pete. (IM)

04 22 38 43 CDR Now, I'm just looking for things to do. I got a whole bag full of soil, and rock box 2 out. Man, does that LM look pretty! Does that Surveyor look pretty! (IM) (SAMP 12001; 03)  
- - -

04 22 41 32 LMP Let's go with the core tube. (IM) (SAMP CORE 12026)  
- - -

04 22 41 53 LMP Okay, Pete. Does it look like the dirt's in there? (IM) (SAMP CORE 12026)

04 22 41 56 CDR Yes, sir. It looks like the dirt is in there. (IM) (SAMP CORE 12026)

04 22 41 58 LMP Good. Put the cap on that tube. You got it on unlocked here. (IM) (SAMP CORE 12026)

04 22 42 05 LMP That's it. That core tube's in the bag - wait a minute. Give me my rocks off of here, will you? (IM) (SAMP CORE 12026)

04 22 42 13 LMP We've got a whole bag full of dirt there. (IM) (SAMP 12001; 03)

04 22 42 17 LMP Bigger rock? (IM)

04 22 42 18 CDR What'd we do with it? (IM)

04 22 42 19 LMP No, no, no just give me the bag, the whole bag. (IM)  
- - -

04 22 42 33 CDR All right. Hey, that's a couple of neat rocks. (IM)  
- - -

04 22 43 27 LMP I feel like the guy in the shopping center waiting (IM)  
for his wife.

04 22 43 33 LMP I'm standing here holding two bags, buddy. (IM)

04 22 43 36 CDR I'm coming. (IM)

- - -

04 22 43 46 LMP Dump some dirt in that bag. (IM)

- - -

04 22 43 54 CDR All right, let me look. All right. Boy, that's (IM) (SAMP 12001; 03)  
dirt.

04 22 43 58 LMP That's dirt, you better believe it. They're not (IM) (SAMP 12001; 03)  
going to grow many roses here.

04 22 44 02 CDR Now, that's good; that's plenty. Hold it. All (IM) (SAMP 12001; 03)  
right. Now, we shake her all down. That's a good  
bag full.

- - -

04 22 45 02 CDR And there's a rock box that's full of rocks. (IM)

- - -

04 22 57 31 CDR We got one rock box coming up. (IM)

- - -

04 22 58 32 CC Roger, Pete. Copy. One SRC in. (IM)

- - -

04 23 06 38 CDR Hatch closed.

\* \* \* \* BETWEEN EVAS \* \* \* \*

05 01 16 33 CDR As far as the geology goes - that was me that was (BETWEEN EVAS)  
beating with the hammer, not Al. As far as the  
geology goes, we really didn't have a chance to look  
too hard, but I think it's very obvious that there  
are a variety of different kinds of rocks. I would  
also like to say that I think that we're in a most  
favorable position to get to the Surveyor. I don't  
think we want to walk down the crater wall from the  
crater wall side that the Surveyor is on. I think  
what we want to do is walk down in the crater right  
from the LM across the bottom and walk up to  
Surveyor. It looks far too steep to approach from  
the other side, near the upper part. That's number  
one. Number two, I think that we're pretty well  
game for any kind of a traverse that you want us to  
make. You know what we can do here in a few minutes  
is sit down with our book and put together the best  
of spot 3 and 4. And ya'll can do the same thing.

05 01 18 14 CC Okay, Pete. We're leaning right now towards the (BETWEEN EVAS)  
traverse for site 4, although we wouldn't take it  
necessarily in the same order it's spelled out  
there. If you want, you can get out your notes on  
board for site 4, and we could give you a tentative  
of the spellout of the order in which you would hit  
those points. And in looking at it, I see it would  
take you down the western wall of the Surveyor  
crater, which is, I believe, the way you want to go.

- - -

05 01 19 17 CDR Say, that ought to work out pretty darn clever, (BETWEEN EVAS)  
actually, to start at f-3 which is essentially where  
we landed.

05 01 19 37 CC Roger. That's affirmative. We show our present (BETWEEN EVAS)  
thoughts on where you landed are R.2, 15.0. And, if  
you like, I'll go ahead and give you the order in  
which you could hit those points that are spelled  
out, like a through g.

05 01 19 56 CDR Hey, wait a minute. I'm going to improve your knowledge of where we are. It just came to me what crater I'm looking into here. I am sitting approximately 120 feet northeast from the number 3 crater, that's 3 in age, that is on the east side of the Head crater which would be Q - as a matter of fact, we're right on about Q.5 and about 14.1. (BETWEEN EVAS)

- - -

05 01 22 59 CC Pete, can we go ahead with the debriefing? What I'd like to do is give you the recommended order for the points in traverse 4. (BETWEEN EVAS)

- - -

05 01 25 29 CDR Okay. Go ahead; give me your recommended sites now. (BETWEEN EVAS)

05 01 25 33 CC Roger. Okay. Number 1 would be f, and that's Head crater; number 2, b. Bench crater; number 3, a, Sharp crater; and we might possibly delete this depending on how you are doing on the timeline at that point. Number 4 is c, Halo crater; number 5, d, Surveyor crater; 6 is e, Block crater; and we'll omit g. (BETWEEN EVAS)

05 01 26 32 CDR Okay. Now where is a? Oh, it's Sharp crater, is that right? (BETWEEN EVAS)

05 01 26 40 CC That's affirm. A is Sharp crater. And we may just cut across that corner depending upon how you are doing with the timeline. (BETWEEN EVAS)

05 01 26 51 CDR Yes. But don't we also want to get out here on this possible Copernican ray stuff? Oops, excuse me, \*\*\* material. (BETWEEN EVAS)

05 01 27 09 CC Roger. We do want to get off after that Copernican ray material. Two points: one is it's further out than you might be able to hack in a normal traverse just for the documented samples; and, two, we're not too sure exactly where that line really lies. If (BETWEEN EVAS)

you can go, on over into that area without taking a lot of time away from the other documented sampling; press on.

- 05 01 27 45 CDR Okay. In looking at the general map, map 5 - (BETWEEN EVAS)  
whatever you want to call them - we got over in that shelf crater, that's where you sent us, and we got to that fellow, so some of that stuff we picked up might be of that Copernican ray material. We also had photographs down there of that shelf, which everybody thought was interesting. I took a set of stereos in that thing, all the way around that big crater. Now, we made it over there with no strain. Matter of fact, we ran over and ran back in nothing flat. So, I think it's reasonable to go as you have indicated. Which would be one, starting at f, which is right in front of the spacecraft, then going to Sharp, then going to Bench, then to Halo, then to the Surveyor crater, then to Block, and back to the spacecraft. How's that sound?
- 05 01 29 03 CC Roger, Pete. That sounds real good. Understand (BETWEEN EVAS)  
you'd like to go Sharp and then Bench.
- 05 01 29 13 CDR Yes. We can try that. (BETWEEN EVAS)
- 05 01 29 28 CC Okay, Pete, if you would, take a look at the (BETWEEN EVAS)  
information you have there on those sites, and we'll be getting back to you in the pre-EVA briefing and talk a little bit more about the location of the sampling, the core tubes, and the trench site sampling.
- 05 01 29 49 CC You may have some pretty good ideas on that now (BETWEEN EVAS)  
after being able to look at it first hand. And, Pete, we have several questions for you related to the EVA. We'd like to move through these pretty quickly, as we know we ought to get you off to bed pretty quickly.

- - -

05 01 32 32 CC Pete - or Al, second question. When you put the core tubes in, do you now think it's feasible to join two core tubes together and perhaps get at least one and a half core tube lengths in? Something on that order? (BETWEEN EVAS)

05 01 32 55 LMP Yes. It was getting harder as I drove it in just like it does back on Earth. But I think if you wanted to stand there and pound, maybe three times as long as you would have to to drive in one, you could do it. And I don't know if we could do that now, though, with those pins in, but maybe we could take those pins out and put two of them together. I'd sure be willing to give it a try if you'd want to do it. (BETWEEN EVAS)

- - -

05 01 40 45 CC Okay. Two questions related to the mounds which you saw out there. Is the object at R.5, 13.1 a mound or a rock? And, secondly, confirm that you did get a sample of the mound material. (BETWEEN EVAS) (SAMP 12007, 12008?, 12022)

05 01 41 04 CDR Yes. We got a sample of the mound material; we got lots of them. And would you say again the coordinates? (BETWEEN EVAS) (SAMP 12007, 12008?, 12022)

05 01 41 12 CC Coordinates are R.5, 13.1. (BETWEEN EVAS)

05 01 41 56 CDR No. I don't think so, Houston. This mound is too small to show up like that. I believe I'll look at it a little bit more here for a minute and think about it. I'll tell you where the mound is - the mound is not seen on the map. What you gave me was a crater. (BETWEEN EVAS)

05 04 42 23 CC Roger. We copy that. And on that mound sample, you got material from the mound as well as material around the mound itself? (BETWEEN EVAS) (SAMP 12007, 12008?, 12022)

05 01 42 34 CDR That's right. We can get tomorrow a Documented Sample if you want. (BETWEEN EVAS) (SAMP)



05 01 42 40 CC We will talk to you about that in the briefing (BETWEEN EVAS) (SAMP)  
before the EVA, Pete. And a question on the number  
and sizes of rocks - what was the ratio of fines to  
rocks that you finally ended up with?

05 01 43 03 CDR I put two of the large scoops worth of fill in one (BETWEEN EVAS) (SAMP 12001-03)  
bag that had three rather large rocks in it; I think  
it is three. And the other bag of rocks fills half  
of the rock box, and I guess there were - what would  
you say, Al - 10, 12 rocks in there, and the rock box  
is full to the top. I couldn't get anything more in  
there, I'll tell you that, and get the core tube in  
there. That's it.

- - -

05 01 45 18 CC And, Pete, could you give us an estimate of the (BETWEEN EVAS) (SAMP)  
number of rocks that you have on board?

05 01 45 31 CDR I really didn't get a count, Houston. Well, let me (BETWEEN EVAS) (SAMP)  
see - I guess it would be about, would you say -  
about 15 to 20 rocks is all.

05 01 45 44 CC Okay. We are looking for really the quantity of (BETWEEN EVAS) (SAMP)  
rocks - pounds of rocks.

05 01 45 51 CDR That rock box is heavy, I'll tell you that. I think (BETWEEN EVAS) (SAMP)  
it is right up to max.

- - - (PHO 46 6853-68; 47 7011-20)

05 09 10 32 CC Intrepid, Houston. I have got a late change for you (BETWEEN EVAS) (SAMP)  
that came in a couple of hours ago. On the rocks  
you are bringing back in the jettison bag. Grumman  
has come through and - several people have decided  
that the weight, the allowable weight, to be stowed  
in the bags on the deck there should be reduced from  
35 pounds to 20 pounds. That's 14 pounds of rock  
and one 6-pound bag.

05 09 -- -- CDR Okay, Houston. How about giving me the word on (BETWEEN EVAS)  
geology now?

- - -

05 09 -- -- CC Okay. First of all, the two prime sites we consider (BETWEEN EVAS) (PHO) around here are Bench and Sharp craters. We could pretty much follow the traverse which we discussed before. What I'd like to do is give you the additional information that you don't have on your sheet and also, perhaps, to discuss how we'll fit the ALSEP revisit into this. Your first point along the traverse is Head crater which we called out f. What we would like to do in view of the fact that you are going out towards the ALSEP is to move that side over to the northwest rim of Head crater and coordinates there are R.0 11.0, and then you will carry out which we already have outlined for Head crater. That's the two partial pans across Head crater and document the slope, slumps, and ledges. In addition to that, seeing as we have the PSE so closely located to that, we would like to see if we can get a null signal for the PSE; so, if possible, could you roll a large crater - a large boulder - - roll a large rock into the crater and take a stereopair of the rock prior to rolling and a stereopair of the track made by the rock after rolling. Okay, that's point 1. Do you copy?

05 09 -- -- SC Yes, sir. We'll rock and roll. We've had a lot of (BETWEEN EVAS) training for that sort of thing on the geology trips we had. We're with you all the way. Let's press on from the Head.

- - -

05 09 -- -- SC Look, we are going to go the other way around, I (BETWEEN EVAS) think. Let's go to ALSEP and then to 1.

- - -

05 09 -- -- CDR Another thing, while you are standing there - - I (BETWEEN EVAS) want to tell you, I do have Bench crater in view from the window; Sharp crater, I do not. So it looks to me like it would be relatively easy to go to ALSEP - to the coordinates you gave me on Head

crater, and I am looking at it right now, and I see several rocks which might do what you want to do - which we might be able to roll down the side of that crater and followed by one astronaut, probably; but anyhow, we will give it a whirl and then in the next plane, you want us to go Sharp, and if so \*\*\*

05 09 -- -- CC No Pete. The next one is Bench crater and then we will be moving on to Sharp. (BETWEEN EVAS)

- - -

05 09 -- -- CC Okay. What we wanted to do was to move your point b on Bench crater on over the northwest edge of it as opposed to on the southwestern edge. (BETWEEN EVAS)

05 09 -- -- SC Okay. I am with you. Give me the coordinates and we will do it your way. (BETWEEN EVAS)

05 09 -- -- CC Okay. Coordinates on that would be M.0 and 10.0, so you would be up on the north side. (BETWEEN EVAS)

05 09 -- -- SC Great minds think alike. That is where I was pointing. (BETWEEN EVAS)

05 09 -- -- CC Roger. Okay, three things we would like you to do which are in addition to what we already discussed on your plan. Take stereopairs of features of interest in Bench crater, especially of the Bench; determine whether the Bench is bedrock or breccia near the base of regolith. And, if the Bench is bedrock, sample ejecta representative of the Bench, or sample the Bench itself, if possible. And lastly, look northwest and - - (BETWEEN EVAS)

- - -

05 09 -- -- CC And lastly, in Bench crater, look northwest and southwest from the rim of Bench crater to see if Copernicus ray material is obviously different from other units. (BETWEEN EVAS)

- 05 09 -- -- CC Okay. Moving out to Sharp crater which is (BETWEEN EVAS)  
coordinate a. First, we call for a full trench site  
in the crest of Sharp crater, and we want to make  
sure you also add to that the gas analysis sample.  
That looks as though it will be pretty much your  
furthest point out. We would like a whole pan from  
the rim of Sharp crater, that also is because that  
is your furthest point out. And crew option at this  
point - extend your traverse west into what appears  
to be Copernicus ray material and also - sample.
- --
- 05 09 45 35 CC Okay. Last points on Sharp crater is sample and (BETWEEN EVAS)  
describe differences across the contact of m1, m2,  
if it is apparent when you reach that region. On  
your map, that shows up as a dotted line running  
northwest-southeast.
- 05 09 45 59 CDR Yes. We have got it. I can tell you right now, it (BETWEEN EVAS)  
is going to be pretty darn hard to do that. You  
look across on the material looks all the same.  
Looking down-sun, it looks all the same, except it  
is a different color.
- 05 09 46 18 CDR It's really weird. I'm sure that you can see the (BETWEEN EVAS)  
stuff from far out; but down here, it might as well  
all be the same until you get right up on top of  
the individual rocks.
- 05 09 46 28 CC Roger. Understand. Probably, you might not see any (BETWEEN EVAS)  
color differences. But if you could, keep your eye  
open for differences in rock types. Moving on to  
the fourth point - -
- 05 09 46 40 CC - - which is Halo crater. Now, as we have it called (BETWEEN EVAS)  
out there, at this point, you can try to join the  
two core tubes together and core through the thin  
ejecta of crater 6, or Halo crater. When you do  
that, you'll have to pull the pip pin off the one  
core tube which you make the bottom tube. We'd like  
you to avoid the rockiest parts of the crater; and,  
if the tubes can't be joined, just take one on the

rim and then one about 100 feet west of that location. If you could, give us a pan at that location, and here is a comment which is really applicable to all of the traverse. Document patterned ground and fillets on different slopes and blocks, especially any asymmetric fillets you may run into. We would expect - well, we would find it most interesting to get this type of information on the youngest material so that's why we call for it here, especially in Halo crater. The best way to document patterned ground is to photo into the Sun, near-field, and that way the pattern should show up in an optimum way.

05 09 48 04 CC And the last one is you go on down the Surveyor (BETWEEN EVAS)  
crater, and in there we have a Block crater. We'd like there to collect the samples of major rock types and a partial pan across the Surveyor crater. And I think that covers it from our end.

05 09 48 28 CDR Okay. We may have a little trouble getting to Block (BETWEEN EVAS)  
crater. I'm not sure whether it is an optical illusion or what, but that face, that wall that the Surveyor is on looks one whale of a lot steeper than 14 degrees. Now, it just may be that we are standing on the other side of the crater ourselves and it just looks a little funny. And we've been discussing the Surveyor a little bit here during the evening, and it does - that crater gets pretty rugged over on that side, especially in the block area, as I remember it from yesterday. We'll give her a go. Now, when we get in each one of these points, you can remind us of it again. But I think we have it fairly well in mind what you want.

- - -

05 09 54 31 LMP Houston, quickly. Do you want a core tube at Head (BETWEEN EVAS)  
crater, or do you want us to skip that one?

05 09 55 45 CC Okay, Al, lets look for that third core tube over at (BETWEEN EVAS)  
Sharp crater. Take that in the - in doing your trench site sampling. That will allow you to get that biological core tube sample at that point.

\* \* \* \* EVA 2 \* \* \* \*

05 11 27 42 CC Stand by, Intrepid. You are go for EVA, Pete. (IM)  
- - -

05 11 38 26 CDR There you go. I'm headed down the ladder. (IM)  
- - -

05 11 38 58 CDR Mark. (IM)

05 11 38 59 CDR I'm on the lunar surface. (IM)  
- - -

05 11 46 22 LMP Here I come, Pete. (IM)  
- - -

05 11 47 34 CDR Right now, this stuff, this - material around the (IM)  
spacecraft reminds me - in this sun-angle, looking  
into the Sun - a very rich brown color - it reminds  
me of a good plowed field.

05 11 48 00 CDR Looking down-sun, it's still the same old ash gray, (IM)  
very light white ash gray.

05 11 48 40 LMP Okay. LMP's off the footpad. (IM)  
- - -

05 11 50 30 LMP You know, other than the large-size rocks - very, (IM)  
very difficult to determine a contact around here.  
- - -

05 11 52 04 CDR Hey, look at that Surveyor, Al. That's not (IM)  
anywheres near as bad a slope - - now that it's out  
of the shade.

05 11 52 11 LMP Hey, Houston, that Surveyor looks a lot better (LM)  
today. Yes, now that the Sun's up on it, shone on  
it.  
- - -

05 11 53 01 CDR Say, Houston, while he's putting the tool on, it's a (LM) (PHO 48 7034-35)  
very interesting thing. There is a angular rock  
that's literally 6 inches from the engine exhaust  
skirt. It's just sitting on the lunar surface, and  
I really find it hard to believe that the engine  
exhaust couldn't blow that rock away. It's only  
about 3-1/2 inches by 3-1/2 inches, and it's not  
stuck in the ground; it's just sitting there loosely  
about 6 inches from the engine bell; and, of course,  
the ground is glassy clean all the way around it and  
yet the engine exhaust blast didn't blow that rock  
away.

05 11 53 40 CC Roger, Pete. We copied that comment. Were you able (LM)  
to get a photo of that in the first EVA?

05 11 53 47 CDR No, we'll get that right now. (LM) (PHO 48 7034-35)  
- - -

05 11 54 01 CC And, Pete, now for your reference on the photos. (LM)  
Your shadow length now is 18 feet.  
- - -

05 11 54 14 CC Al, also if you would, before you start that (LM) (PHO 48 7041-42)  
traverse, would you get a good photo of the Solar  
Wind to show us how that foil is wrapped around?

05 11 54 26 CDR Will do. (LM) (PHO 48 7041-42)  
- - -

05 11 58 12 CDR Okay. If you get your camera, I'll put that TV (LM)  
camera in the ETB.

05 11 58 25 CDR Okay, from the local terrain, Houston, as you know (IM)  
it right now, and with the polarizing filter. Have  
you got any particular place enroute to the ALSEP or  
to Head crater that you'd like polarizing pictures  
taken?  
- - -

05 11 59 06 CC Pete, we have no preference on that. Go ahead and (IM)  
take it as called out for in the cuff checklist.  
- - -

05 11 59 19 CDR Drop her. Okay, Houston, one TV camera in the bag (IM)  
and -

05 11 59 33 CDR Our plan of attack is one picture of that rock under (IM) (PHO 48 7034-35)  
the descent stage - -

05 11 59 36 LMP Will do. (IM) (PHO 48 7034-35)

05 11 59 37 CDR - - grab the handtool carrier and head for the Solar (IM) (PHO 48 7041-42)  
Wind and grab a picture of that; in the meantime,  
I'll lope off to the ALSEP and check the SIDE; I'll  
meet you at point 1 at Head crater.

05 11 59 49 CC Roger; we copy. And, Al, have you gotten the (IM) (PHO 48 7036-40)  
readings on the contrast charts?

05 11 59 57 LMP Not yet and I plan to do that real quick. (IM) (PHO 48 7036-40)  
- - -

05 12 00 01 LMP Houston, Pete's on his way to the ALSEP. (IM-ALSEP)

05 12 00 08 CC Roger, Al; we copy. And at 30 minutes into the EVA, (IM-ALSEP)  
you're pretty close to the nominal timeline.  
- - -

05 12 00 30 CDR Can the guy with the seismometer hear me running? (IM-ALSEP)  
- - -



05 12 01 11 CC Pete, we're watching you down here on the seismic data - looks as though you're really thundering right by it. (LM-ALSEP)

- - -

05 12 01 41 CC And we're able to copy your rest and now that you're moving again. (LM-ALSEP)

- - -

05 12 02 57 CDR Oh, boy, is \*\*\* like I want that rock. Here's a dandy extra grapefruit-size-type goody. (ALSEP-HD) (SAMP?)

05 12 03 04 LMP Find a crater with a shadow in it first; there's one. (LM)

05 12 03 24 LMP Okay, Houston, I'm approaching a crater now and I'm going to put the contrast chart in it - one on each side; one on the sunny side, one on the shadow side. I'll give you a report. (LM)

05 12 03 44 LMP There's the one on the sunny side. (LM)

05 12 03 46 CDR Man, have I got the grapefruit rock of all grapefruit rocks. It's got to come home in the spacecraft; it'll never fit in the rock box. Okay, Houston, I'll tell you what I'm going to do. I'm going to wind up at the right place at Head crater; and, while I'm waiting for Al, I'll roll a boulder for you. Okay, Houston? (ALSEP-HD) (SAMP?)

- - -

05 12 04 18 CC Pete, Houston. Can you give us a mark when you roll - - (ALSEP-HD)

05 12 04 20 CDR That crater is - yes, I sure will. That crater is, by golly, a rather steep crater - a lot steeper than it looks from out the LM. (HD1)

- - -

05 12 04 43 LMP I'm looking at the contrast chart in the Sun and I (IM)  
can see all the different shades. And I've taken a  
photo of it; now, look at the one in the shadow. In  
the shadow, I can see - well, depends on how close I  
am. If I'm within about 3 feet of it or 4 feet of  
it, I can see all six shades. I'll take a picture  
here, then I'll back up.

- - -

05 12 05 10 CDR Let me ask you a question, Houston. How big a rock? (HD1)

- - -

05 12 05 27 CDR How about a grapefruit-size rock? That's what I'm (HD1)  
holding in my hand and these other rocks that I was  
talking to you about are pretty well buried, and  
they're pretty large. I don't think I could get one  
of them going.

05 12 05 40 CC Roger. We copy. Grapefruit-size or any size is (HD1)  
fine.

05 12 05 49 CDR Okay. Al, are you standing still? (HD1)

05 12 05 53 LMP Yes, I'll stand still; go ahead. (LM)

05 12 05 54 CDR Okay. I'm standing still Houston, on my mark, (HD1)  
they're rolling -

05 12 06 00 CDR Mark. (HD1)

05 12 06 01 CDR It's starting down - hit, hit, hit, hit. Now it's (HD1)  
just rolling. Roll, roll, roll, still rolling.

05 12 06 13 CC Roger, Pete. We've got some jiggles - - (HD1)

05 12 06 14 CDR Roll, roll, roll, (HD1)

05 12 06 15 CC - - that I can see here. We'll get a reading on it (HD1)  
for you.

05 12 06 22 CDR Still rolling - still rolling. Very slowly, still (HD1)  
rolling. And it's stopped -

05 12 06 31 CDR Mark. (HD1)

05 12 06 32 CDR Stop. (HD1)

05 12 06 37 LMP Okay, Houston, I'm looking at the contrast chart in (IM) (PHO 4836-40)  
the shadow and, as I mentioned, at 3 feet, I can see  
all six. If I back up maybe to 10 feet, as long as  
I stand here a moment and adapt my eyes, I can see  
all six, also. Now, the thing that seems to have  
the biggest effect on it is how low the Sun is. The  
Sun is high now and so I don't have to squint my  
eyes particularly looking in that direction.  
Yesterday, looking into the same crater, even though  
it wouldn't be any darker in there because the Sun  
was there, I - would never be able to adapt. Right  
now, I can see all six marks, and I've taken the  
photographs. Going to go out and do Solar Wind now.

05 12 07 24 LMP I can't see a lot of difference in visibility here (IM)  
as on Earth, really. You adapt just as well - the  
only major difference I've noticed is the fact that  
when you're out here on this area, if you look  
cross-sun, the Moon appears one color; if you look  
down-sun, it's another; if you look up-sun, it's  
another. But looking into shadows or anything else  
like that, it's pretty much the same as on Earth.

- - -

05 12 07 59 LMP Okay, I'll take some pictures here of the Solar Wind (IM) (PHO 48 7041-42)  
for you.

- - -

05 12 08 37 CC Roger, Al. And, Pete, if it's convenient, and you (HD1)  
can find another rock there and give her a heave,  
"Experiments" sure would like to see another one.

05 12 08 50 CDR Okay, I was setting up my rock hole and all that - (HD1)  
good things for the polarizing light. And - say, I  
was looking at a rock that has small crystals in it.  
One of them is shining very, very bright green, like  
ginger-ale-bottle green.

05 12 09 28 CDR Okay. Al, are you on your way? (HD1)

05 12 09 30 LMP That's affirm; I'm now making sure that everything (LM)  
is in the toolbox - handtool carrier here.

- - -

05 12 10 38 LMP I'm just leaving the LM. (LM-HD)

05 12 10 41 LMP Boy, this handtool carrier is light and nice. (LM-HD)

05 12 10 47 LMP Compared to carrying it around on Earth I think it's (LM-HD)  
going to be - we might be able to just slip it right  
down inside the Surveyor crater with us. Piece of  
cake. Okay. I see you over there; I'm on the way.

05 12 11 16 CDR Oh don't tell me, you ding-a-ling camera. Man! (HD1)

05 12 11 20 LMP I can see everything from fine-grain basalt as I (LM-HD)  
come running across the area here, to coarse-grain  
ones; I see some sort of light reddish-grey colored  
rock that I would call - I don't know really what I  
would call it - it looks almost like a granite, but  
of course it probably isn't, but it has the same  
sort of texture. The individual components -  
constituents, so to speak are crystals but it still  
has that same appearance.

- - -

05 12 12 17 CDR I'm taking the polarized pictures right now - but, (HD1)  
Al, when you get up to me, if you'll just stop  
up-sun at 15 feet and take that shot of what I'm  
shooting at, f:11 15, two pictures; one before, one  
after.

- 05 12 12 36 LMP Okay, let me take something out of this crater hole, (IM-HD) (SAMP 12030) (PHO 48 7043-45)  
Pete. It's sort of unusual; it's got a lot of those  
little droplets on it, those blips. But the  
fragments in this crater look different from the  
others. Take a couple of quick pictures, then I'll  
be right with you.
- - -
- 05 12 13 01 LMP Get me a stereopair of this. Good. We'll use the (IM-HD) (SAMP 12030) (PHO 48 7043-44)  
tongs here, and I'll pick it up.
- 05 12 13 16 LMP It's right exactly - this is a very small crater, (IM-HD) (SAMP 12030)  
Houston, probably about 3 feet in diameter and looks  
like it was made at - not very fast moving or  
energetic or heavy projectile. Yet, right in the  
middle of the hole is some of these glass-covered  
rock fragments. And, on some of the other rocks  
that seemed to be rested in the hole, I'm putting  
them all in sample bag 1 here. I mean - some of the  
others don't have any coating on them at all. I'm  
picking them up with the tongs, but I can't tell how  
strong they are. They don't seem to hold together  
too well; they seem kind of weak. There you go.  
Now, I'll head on over and work with you.
- 05 12 14 07 CC Roger, Al. We copy that. If you're going to (IM-HD) (SAMP 12030)  
document that, try to get some of the material  
around the glass as well as the glass itself.
- 05 12 14 16 LMP Okay. I'll just get this as a bonus. I want to get (IM-HD) (SAMP 12030) (PHO 48 7045)  
over here and start working with Pete as a team,  
here.
- 05 12 14 22 LMP Just didn't want to have to try to remember where (IM-HD)  
that was.
- 05 12 04 25 CDR You're going to get a big surprise when you look (HD1)  
into this Head crater, Al. It's a heck of a lot  
deeper than it looks.
- 05 12 14 39 CDR Here's a nice white, small crater - a white rim on (HD1)  
it, about a 5-foot diameter one.

05 12 14 48 LMP I've been concentrating, Houston, as I came walking (HD1)  
over here to Head crater, to see if there were any  
possible changes in either texture, slope, color,  
anything you can think of or anything that I could  
think of, that would say to me that I was walking on  
a different surface than when I started. And I  
can't - haven't seen a thing yet; it all looks the  
same - it all looks like it's covered with this -  
black rock.

05 12 15 19 CDR Slow up. Don't kick dust in the middle of my (HD1) (PHO 49 7172-88)  
polarized picture area here.

05 12 15 23 LMP Okay. I'll stop right here. (HD1)

05 12 15 25 CDR Okay. Put the tool carrier down and get your up-sun (HD1) (PHO 48 7046-47)  
pictures. You see where my footsteps are, that rock  
that's half buried and the two rocks that I've  
turned over in my footsteps?

05 12 15 36 CDR Okay, it's 15 feet, full, two shots - now, you're (HD1) (PHO 48 7046-47)  
not going to get the before, unfortunately.

05 12 15 46 LMP Okay. How about right - better have my shadow here (HD1)  
or over there?

05 12 15 50 CDR No, that's the pile, right there. See where I (HD1) (PHO 48 7046-47)  
turned over the two rocks alongside the great big  
rock, where my foot tracks are?

05 12 15 58 LMP Oh yes, way down there at the end. (HD1) (PHO 48 7046-47)

05 12 16 00 CDR No, right here. I'll walk over to it. (HD1) (PHO 48 7046-47)

05 12 16 06 CDR Right straight in front of me. This rock pile, (HD1) (PHO 48 7046-47)  
right here.

05 12 16 09 LMP Oh, okay. Want me to shoot it from right here? (HD1) (PHO 48 7046-47)

05 12 16 11 CDR Yes, and you aren't 15 feet; back up; you're in \*\*\* (HD1) (PHO 48 7046-47)

05 12 16 13 LMP All right. I sure will. Fifteen feet - okay, it (HD1) (PHO 48 7046-47)  
ought to be about full.

05 12 16 37 LMP Okay, got those two. Got a couple of pictures (HD1) (PHO 48 7046-47)  
there, Houston. Let me tell you what my camera  
reading is now and then we can try to keep up with  
it from time to time. Next time, I'll come over  
here by Pete and we'll - -

05 12 16 50 CDR Yes, Houston, I've shot three - six - nine - 12, 15 (HD1) (PHO 49 7172-88)  
- 15 pictures.

05 12 17 01 CC Copy 15, Pete. (HD1)

05 12 17 05 CDR Okay, and on my mark, I'm going to send a slightly (HD1)  
smaller rock into the crater. Are you ready?

05 12 17 12 CC Roger. We're watching. (HD1)

05 12 17 14 CDR Mark. (HD1)

05 12 17 18 CDR I didn't quite kick it hard enough; wait one and (HD1)  
I'll do it again.

05 12 17 25 LMP And, Houston, that sample bag that I put the (HD1) (SAMP 12030)  
fragments in that I mentioned earlier, that I found  
in the bottom of that small crater?

05 12 17 31 CDR Mark. (HD1)

05 12 17 32 LMP That's sample bag 1D. (HD1) (SAMP 12030)

05 12 17 37 CC Copy your mark, Al, or Pete, and 1D on that sample (HD1) (SAMP 12030)  
bag.

05 12 17 46 CDR You know, it's a funny thing, Houston, in one-sixth (HD1)  
g, even though slopes are steep and everything,  
these rocks just don't want to go anywhere.

05 12 17 58 CC Roger, Pete. We haven't been able to pick it up on (HD1)  
the PSE here.

05 12 18 04 CDR Okay, that was too small a rock. Take the filter (HD1)  
off the front of my camera, would you?

- - -

05 12 18 17 LMP Okay. Here's your camera. Filter's off. (HD1)  
- - -

05 12 18 30 CDR Okay, I've got a rock over here. (HD1) (SAMP?)  
- - -

05 12 18 41 LMP We probably ought to come over here to the other (HD1)  
side; it looks the best, and do a little trench, and  
compare some of the soil profiles.

05 12 18 49 CDR Okay, they wanted it - look, I've got an area right (HD1)  
over here that looks like a good area to work in.  
Okay?

05 12 18 56 CDR Little white spatter-like craters; it looks like (HD1)  
they're very fresh impact, like that little one  
right there.

05 12 19 04 CDR Let me go over here; there's three in a row, and (HD1) (SAMP 12031) (PHO 48 7048, 7050; 49 7189-90)  
let's work this area a little bit, which is the  
corner of Head crater they wanted us to work.

05 12 19 13 CDR And we can work right here and up to the top of it. (HD1)

05 12 19 16 LMP What corner is this? (HD1)

05 12 19 18 CDR We're in the northwest corner. (HD1)

05 12 19 22 CDR Right as I indicated on the map. (HD1)

05 12 19 25 CDR Okay. Now I don't want to get any dirt in this (HD1) (PHO 48 7048)  
thing; it's pretty interesting.

05 12 19 29 CDR A little secondary impact crater, huh? (HD1) (PHO 48 7048)  
- - -

05 12 19 36 CDR No, I'll get the cross-sun. (HD1)  
- - -



05 12 19 40 LMP Well, you've also got to be careful with this tool carrier, Houston. Did you want to put the gnomon in, Pete? (HD1)

05 12 19 45 CDR Oh, yes, let me have my tool. (HD1)

05 12 19 49 LMP Here's your - grabber. (HD1)

05 12 19 52 CC Roger, Al. We copy that comment and on the northwest rim, we're looking for two partial pans. (HD1)

05 12 20 01 LMP All right, we'll get them. (HD1)

05 12 20 06 LMP Okay, wait, let me get my pictures, Pete. (HD1) (PHO 48 7048-50)

05 12 20 11 LMP Let me get over here and get the gnomon and - a sample of this rock right here; this rock is very - typical of all the fragments around here. (HD1) (SAMP 12031) (PHO 48 7048, 7050; 49 7189-90)

05 12 20 28 LMP Hey, that's interesting; look where you kicked. Got some lighter material there. (HD1) (PHO 48 7048-50)

05 12 20 32 CDR Boy, sure did, didn't I! (HD1)

05 12 20 34 LMP Yes, that's interesting; that's the first time we've seen that. (HD1)

05 12 20 36 CDR In fact, you know what it looks like here, it looks like it may be this darker material - well, I don't know - - (HD1)

05 12 20 42 LMP I'm going to photograph that, too. (HD1) (PHO 48 7048)

05 12 20 45 LMP - - let me get this. Houston, kind of interesting here. Pete walked across one edge of the rim here. We're about - oh, 50 feet inside the upper rim and he happened to scrape an area there with his foot. It's a much lighter colored soil - - (HD1) (PHO 48 7048)

05 12 21 04 CDR Like cement. (HD1)

05 12 21 06 LMP Yes. Let me take - (HD1) (PHO 48 7048)

05 12 21 08 CDR Get your picture? (HD1) (PHO 48 7048)

05 12 21 09 LMP I got it. (HD1) (PHO 48 7048)

05 12 21 14 LMP Here, let me get my bag, Pete. You got to be careful with that handtool carrier; it'll fall over. (HD1)

- - -

05 12 21 26 CDR Sample bag number 13, okay? (HD1) (SAMP 12031)

05 12 21 32 CDR Okay. Al, let me photograph this thing, and let's trench this whole area. (HD1) (PHO 49 7189-90)

05 12 21 38 CDR I dropped the gnomon in right here over my footsteps and the light soil versus the dark, and we can trench there. (HD1) (PHO 49 7189-90)

05 12 21 45 LMP Okay, I just put it into 3D. (HD1) (SAMP 12031)

- - -

05 12 21 54 CDR Let's see. Five feet, f:8, 1/250th. Okay. (HD1) (PHO 49 7189-90)

05 12 22 06 LMP Okay, and let me get a picture of what you're doing. (HD1) (PHO 48 7049-50)

05 12 22 07 CDR Get the stereopair on, I think. (HD1) (PHO 48 7049-50)

05 12 22 10 LMP Okay. You're going to trench right there, huh? (HD1) (SAMP TRENCH 12033) (PHO 48 7051-52; 49 7191-96)

05 12 22 13 CDR Yes, let me get my shovel. (HD1) (SAMP TRENCH 12033)

- - -

05 12 22 27 LMP Okay. That's going to make an interesting shot. What can I give you, Pete? (HD1) (PHO 48 7049-50)

05 12 22 33 CDR I need the shovel. (HD1)

05 12 22 34 LMP All right. I'll hold the tool carrier while you grab at it. Got her? (HD1)

- - -

05 12 22 45 LMP Okay. Move over here where I can bag it better for you. (HD1) (SAMP TRENCH 12033)

05 12 22 59 LMP Very interesting things about this side of the mountain - I mean, this side of the crater - is that these boulders aren't uniformly distributed around. They all seem to be over here on the western side. If you look over the eastern side or the north or south, you can see some; but there's quite a bit more over here on the west, for some reason - - (HD1)

05 12 23 21 CDR Here you go, Al - quit baloneying and help me. (HD1)  
- - -

05 12 23 32 LMP Stick it right in there - - (HD1)

05 12 23 33 CDR In that white soil with the brown, huh? (HD1)

05 12 23 34 LMP Yes. (HD1)

05 12 23 35 CDR There you go. Now, let me trench it. (HD1) (SAMP TRENCH 12033)

05 12 23 40 CDR We get some photos of that. (HD1) (SAMP TRENCH 12033) (PHO 48 7051-52)

05 12 23 41 LMP Okay, look, you can see where you dug in that; there's still some under you; why don't you give me another scoop right in there? (HD1) (SAMP TRENCH 12033)

05 12 23 46 CDR Okay. A good idea. (HD1) (SAMP TRENCH 12033)

05 12 23 48 LMP There's not much in here. Okay. Where Pete digs up - sure enough, right underneath the surface, you find some much lighter gray - boy, I don't exactly know what at this point, and you can look around now and see several places where we've walked. If the same thing's occurred, we never have seen this at all - boy, that's going to make a good picture, Pete. Never seen this at all on the area we were before. Hey, that looks nice. (HD1) (SAMP TRENCH 12033) (PHO 48 7051-52)

05 12 24 22 CC Roger, Al. We copy that; you think it could be the sun-angle? (HD1) (SAMP TRENCH 12033)

05 12 24 25 LMP Listen. No, not at all. This is definitely a change to a light gray as you go down, and the deeper Pete goes - he's down about 4 inches now - it still remains this light gray. This soil must be of a different makeup than that we were on outside the crater, because we have to - - (HD1) (SAMP TRENCH 12033) (PHO 48 7051-52)

05 12 24 45 CDR Say, this is different than around the spacecraft, because we've kicked up all kinds of stuff around the spacecraft and it's all the same color - - (HD1) (SAMP TRENCH 12033) (PHO 49 7193-94)

05 12 24 52 LMP Top and bottom, this is quite a bit different. (HD1) (SAMP TRENCH 12033) (PHO 49 7193-94)  
- - -

05 12 25 03 LMP Yes, dig as deep as you can, then give me a sample right out of the bottom, because this will be something new. I'll put it in sample bag number 5D. (HD1) (SAMP TRENCH 12033) (PHO 49 7193-94)

05 12 25 13 CC Al, we copy 5D. And would you give your location relative to the center of Head crater. Specifically, are you just on the west side of it where we have the Triple crater? (HD1) (SAMP TRENCH 12033)

05 12 25 24 LMP We aren't; we're on the northwest corner of it - - (HD1)

05 12 25 27 CDR Right where you told us to go, Houston. (HD1)

05 12 25 30 CC Roger. You should be very close to that Triple crater. (HD1)

05 12 25 31 LMP Give me another shovelful there, Pete. (HD1) (SAMP TRENCH 12033)

05 12 25 35 CDR Triple crater. Well, there's one crater right here - - (HD1)

05 12 25 39 LMP There's a couple of craters right over the rim here; we're sort of in the rim - Pete's down now about - - (HD1)

05 12 25 46 CDR That's not a good one, Al, let me get another one - - (HD1)

05 12 25 49 LMP - - down about 6 inches and - looks just light gray (HD1) (SAMP TRENCH 12033)  
down there. Now, in the bag, you'll find there's  
some darker gray material that fell in off the side.

05 12 26 01 CDR There you go. (HD1) (SAMP TRENCH 12033)

05 12 26 03 CDR Let's throw this little rock in that I dug up from (HD1) (SAMP TRENCH 12034)  
down deep.

05 12 26 06 LMP Is that a rock? (HD1) (SAMP TRENCH 12034)

05 12 26 07 CDR Yes, sir. (HD1) (SAMP TRENCH 12034)

05 12 26 09 CDR Get another sample bag. (HD1) (SAMP TRENCH 12034)

05 12 26 11 LMP All right. (HD1) (SAMP TRENCH 12034)

05 12 26 12 CDR That's a good one, because I don't want - - (HD1) (SAMP TRENCH 12034)

05 12 26 13 LMP Well, wait a minute; let me get a picture of it (HD1) (SAMP TRENCH 12034) (PHO 48 7051?)  
first.

05 12 26 16 CDR I dug it up out of a hole. It's hard to keep this (HD1) (SAMP TRENCH 12034) (PHO 49 7195-96)  
soil in the bag. Stereopair. Okay, in bag D.

05 12 26 32 LMP There's, of course, a little of the top soil mixed (HD1)  
in because the sides collapsed. Angle of repose is  
about 85 degrees, but - -

05 12 26 40 CDR The minute you touch the side, it falls in. (HD1)

05 12 26 42 LMP - - it's not cohesive at all, even though it seems (HD1) (SAMP TRENCH 12033-34) (PHO 48 7052?)  
to remain nearly vertical; I guess it's the low  
gravity. Hey, that's a nice rock. Pete just handed  
me a rock from the bottom of the hole, and it's  
covered with gray; I can't see - anything in it  
other than just the gray dirt covering, soil  
covering. Let me get a final shot, Pete.

05 12 27 17 LMP Okay. As you move off, Pete, every once in a while, (HD1-HD2) (SAMP 12055) (PHO 49 7197-7200; 48 7053-55)  
I can see some white; but, most of the time - hey,  
you kicked over a rock that had a white bottom -  
quite a bit different than the top. Right behind  
you; you might want to take a picture of that. It's  
quite a bit different than those others.

05 12 27 49 CDR Houston. You're going to have to budget our time (HD1-HD2)  
now. How long do you want us to spend in Head  
crater?

05 12 27 55 LMP Because it looks like we could just spend all our (HD1-HD2)  
time here if we wanted to - -

05 12 27 57 CDR That's what's bothering me; we could do that any (HD1-HD2)  
place here on the Moon.

05 12 28 02 CC Pete, we show that you're 58 minutes into the EVA, (HD1-HD2)  
and we'd like to get you over to Bench crater, and  
leaving there something on the order of 1 plus 12;  
we can slip that a bit. So we suggest you finish up  
where you are - what you're doing there at Head and  
move on.

05 12 28 21 CDR Okay. Al, where's the map? (HD1-HD2)

05 12 28 23 LMP Got the map right here, Pete. Let you take a look (HD1-HD2)  
at this.

05 12 28 27 CDR By the way, this is the smartest idea we came up (HD1-HD2)  
with, Houston; this map just works great out here.

05 12 28 31 LMP Okay, let me take a picture of this rock. I'm (HD2) (SAMP 12055) (PHO 48 7053-55)  
going - -

05 12 28 37 CDR This isn't going to show much. (HD2) (PHO 49 7197-98)

05 12 28 38 LMP Let me use your shovel. (HD2)

05 12 28 40 CDR All right. Now I'm trying to find the Triple (HD2)  
craters they're referring to.

05 12 28 43 LMP Kick it around - here. (HD2)

05 12 28 54 CC Pete, that Triple crater is just south of your present position, and why don't you just go ahead and move on? (HD2)

05 12 29 02 CDR Okay. I got you. (HD2)

05 12 29 15 LMP Okay. Now, there's a good picture, Pete, let me get that one. (HD2) (PHO 48 7053-55)

05 12 29 18 CDR Okay, now, let me see which side is which. (HD2) (SAMP 12055?)

05 12 29 20 LMP Well, we've got it; turn over one of the rocks of the rim. The bottom part of the rock is gray, about a half of it; this rock happens to be about a 6-inch diameter rock. That'll give you stereo on it. And the top is the same color as the - - (HD2) (SAMP 12055?) (PHO 48 7053-55; 49 7199-200)

05 12 29 35 CDR Wait a minute. You got it in your shadow. (HD2) (SAMP 12055?) (PHO 48 7054)

05 12 29 37 LMP Yes. I do. I'll take another one. Pete, maybe you want it. (HD2) (SAMP 12055?) (PHO 48 7055)

05 12 29 45 LMP Even these rocks out in here - even the ones that are almost completely covered with the soil, if I look at them I can see glints of crystals or something. (HD2)

05 12 29 53 CDR Yes, every one of them. (HD2)

05 12 29 55 CDR All right, let me have that. (HD2) (SAMP 12055?)

05 12 29 56 LMP There's your tube. (HD2)

05 12 29 57 CDR All right, we're going to head for Bench crater. (HD2-HD3)

05 12 30 00 LMP Okay. Now we didn't get a pan view, did we? (HD2-HD3) (PHO 49 7201-16)

05 12 30 03 CDR No, and I'm going to get it when I get to the Triple craters, which is right over here. (HD2-HD3) (PHO 49 7201-16)

05 12 30 08 CDR They think they're right over here; I can't see them; I've got to look over the hill. (HD2-HD3)

05 12 30 11 CDR All right. Yes, here they are. Ho, ho, ho. (HD2-HD3)

05 12 30 15 LMP Hey, things are quite a bit lighter gray up here on top of the hill. (HD2-HD3)

05 12 30 26 CDR Yes. (HD2-HD3)

05 12 30 27 LMP The \*\*\* we're approaching - - (HD2-HD3)

05 12 30 28 CDR Oh, look at these craters, Al. (HD2-HD3)

05 12 30 33 LMP Boy! (HD2-HD3)

05 12 30 36 CDR Now, Houston, do you want Head crater - from Triple craters? Is that what you want or do you want the Triple craters? (HD2-HD3)

05 12 30 49 CC Pete, we suggest you just move on to Bench - and comment on that double core tube; if you find a spot that looks soft, go ahead and sink the double core tube. (HD2-HD3)

05 12 31 00 CDR We'll do it at Bench. (HD2-HD3)

05 12 31 05 CDR It's really a shame, Houston; we could work out here for 8 or 9 hours. The work is no strain at all. (HD2-HD3)

05 12 31 20 LMP I took three quick pictures of Triple craters, Houston. (HD2-HD3) (PHO 48 7056-58)

05 12 31 27 CDR We're not going to get to that other one - Bench, is it; but that looks like a real interesting area on the far corner of Bench, Al. See all those big rocks? Some of them look as if they could be bedrock out of somewhere. (HD2-HD3)

05 12 31 40 LMP I'm kind of wondering, we're passing up these here - and they got to be bedrock from somewhere; we need to get a pretty large-sized one here, before we leave this area, Pete. (HD2-HD3)

05 12 31 47 CDR I'll tell you what we'll do is, I'll stop right here and take a pan. (HD3) (PHO 49 7201-16)



- - -

05 12 31 55 LMP Because these rocks obviously came out of the (HD3)  
crater, because they're scattered more uniformly  
around it. There's a bunch of them on the rim and  
there's not many far away. We probably ought to  
grab a big one of them.

05 12 32 07 LMP We're moving - straight south now. (HD3)

05 12 32 17 LMP There's an interesting rock; let's - hey, that's all (HD3) (SAMP 12052?)  
right; let's get it.

05 12 32 29 LMP Let me read your camera and you can read mine, if (HD3)  
you would. Help them out a bit down there.

05 12 32 34 CDR Just a minute. Okay, your camera right now is on (HD3)  
36. How about mine?

05 12 32 41 LMP That's 36 also. (HD3)

05 12 32 43 CDR Okay, move. (HD3)

- - -

05 12 32 51 LMP Every crater you come to and look in, you see the (HD3)  
glass beads. Move out of your way, Pete.

05 12 33 12 CDR Okay, now. Back to rock-taking settings, 5 feet, (HD3) (SAMP 12052) (PHG 48 7059; 49 7217-18)  
f:8, 1/250th. Okay. All right, Al, where do you  
want to grab the sample here?

05 12 33 20 LMP Right here, I'd like to grab that rock right there, (HD3) (SAMP 12052)  
because it's got kind of a sharp edge on it and all  
the rest of them are - I don't know, it's got kind  
of an oblique edge on it, and you don't see many  
like that around here.

05 12 33 32 CDR Which one you mean? (HD3) (SAMP 12052)

05 12 33 33 LMP This one right here, this gray one. It looks a (HD3) (SAMP 12052)  
little bit different than the rest.

05 12 33 35 CDR This one? (HD3) (SAMP 12052)

05 12 33 36 LMP No, right there, a little bit further - that one right there. I'll just grab it and put it in the box, if we can pick it up. (HD3) (SAMP 12052)

05 12 33 40 CDR This one, the big one? (HD3) (SAMP 12052)

05 12 33 42 LMP The big one. (HD3) (SAMP 12052)

05 12 33 43 CDR No, ho, ho, wait until I get the pictures. (HD3) (SAMP 12052) (PHO 49 7217-18)

05 12 33 44 LMP Okay. If we can do that, we can just put it in the bag. I think that's kind of a different - looking rock. This rock is different, Houston - just in the way it's shaped, and it's partly rounded and got some oblique angles on it. Maybe under all that dirt is something a little bit different. (HD3) (SAMP 12052)

05 12 34 05 CDR Okay. I got it. (HD3) (SAMP 12052)

- - -

05 12 34 17 LMP Sorry. (HD3) (SAMP 12052)

05 12 34 18 CDR That's all right. All right. Picking it up; no sweat. (HD3) (SAMP 12052)

05 12 34 23 CDR That a boy. We know you got the rock; that's what counts. (HD3) (SAMP 12052)

05 12 34 28 CDR Okay, I got the bag. (HD3) (SAMP 12052)

05 12 34 30 LMP The thing that was giving it that unusual shape was the dirt that was adhering to it. That's okay; we'll take it back with us. (HD3) (SAMP 12052)

05 12 34 36 CDR Good rock. (HD3) (SAMP 12052)

05 12 34 38 LMP And this is probably typical of the rocks around this crater, Houston. So, - I think it will be a good sample for us. (HD3) (SAMP 12052)

05 12 34 53 LMP I'd say in the area we're moving along now as we head south - is, what you say, Pete, there's about 5 percent rocks? (HD-BN)

05 12 35 02 CDR Yes, something like that; they go anywhere from 2-1/2, 3 feet all the way down to small fragments. (HD-BN)

05 12 35 06 LMP That's right. There's even one by you there that's 3 feet that's not \*\*\* - look at the fillets around that rock. (HD-BN)

05 12 35 12 CDR Look, that's deep fillets \*\*\* - - (HD-BN)

05 12 35 13 LMP That's a beauty. Wait a minute; I'd better stop and get that. Hold the tongs. (HD-BN)

05 12 35 15 CDR Okay, let's do; let's - - (HD-BN) (PHO 49 7219-20)

05 12 35 17 LMP In fact, maybe we can take it on two or three sides. Have to watch - the trouble is - there you go; that's a good rock. Hey, look at the pits in it, too. That's obviously been struck a lot by - meteoroids; this is going to be a good rock, Houston. It's about 3 feet in diameter - about 2 feet thick - - (HD-BN) (PHO 48 7060-61)

05 12 35 34 CDR Got to back around it. (HD-BN)

05 12 35 35 LMP - - well-rounded, got a - lot of surface pits in it. I can see the glitter - (HD-BN)

05 12 35 42 CDR I got to back off to 15 feet on this one. (HD-BN) (PHO 49 7221-22)

05 12 35 45 CDR Get a stereopair. (HD-BN)

- - -

05 12 35 48 CC Roger, Al. We copy that. Are you able to find any chips from that rock in the near vicinity? (HD-BN)

05 12 35 57 LMP This is not unlike all the other rocks around here, Houston. All the rocks are just about - (HD-BN)

05 12 36 01 CDR Al, did you get some off the far side - of that? (HD-BN)

05 12 36 06 LMP Yes, lets get that. That's a good idea. All the rocks we've been looking at, Houston, in this area seem to be the same. They seem to have a - the rock has got dirt built up on all sides of it, all directions. (HD-BN) (PHO 48 7062)

05 12 36 18 CDR Sure does; looks about equal too, doesn't it? (HD-BN)

05 12 36 20 LMP It looks about equal; that's right. Very interesting. I don't know what the means of transport but it's just built up around it. (HD-BN)

05 12 36 28 CDR Here's some here. (HD-BN)

05 12 36 31 CDR Go ahead. I want to look here for a second. (HD-BN)

05 12 36 36 LMP If you look real closely at the rock, the surface of it is coarse pitted and there's some pits that are maybe even up to three-eighths of an inch in diameter on it; however, most of them are small. It doesn't look like a basalt, although the grains are too small for me to see anything - identify any specific one. Some of the pits have glass in it, which is not too surprising; and many of them don't. That's about all we can say about that rock, Houston, and that's typical of the ones in this area. (HD-BN)

05 12 37 14 CC Roger, Al. Could you give us a sample bag number and then press on? (HD-BN)

05 12 37 20 LMP Okay. Well, we didn't take a sample there. The couple that we did take a sample of previously are the same types, so the last couple of samples have been of the same type rocks that we're discussing. (HD-BN)

05 12 37 32 CDR Okay, Houston, I'm coming up on Bench crater right now. I loped off and left Al. And I took you a pan in Bench crater. This looks like a very interesting crater; it's different. Oh, and I see some really different rocks - a big one. Hey, that looks like bedrock. Gee, what a crater. Oh, boy. (BN1) (PHO 49 7223-28)

05 12 38 01 CDR Hey, Al, look at - come on over here. (BN1)

05 12 38 03 LMP I'm coming. (BN1)

05 12 38 05 CDR We got to get some of this. Let me get some pan's in there. (BN1) (PHO 49 7223-33)

05 12 38 08 CC Sounds interesting, Al. And, Pete, sounds as though you're getting down to bedrock. Is that affirm? (BN1)

05 12 38 15 CDR Yes. They got to be bedrock. And this one in the bottom is - as a matter of fact - - (BN1)

05 12 38 21 LMP Boy, there's some big fragments around here. (BN1)

05 12 38 22 CDR - - get the pictures. It looks like to me that stuff is melted in the bottom of it. I - can't swear to that, but I'll get you some pictures. Starting right now. F:8 - \*\*\* - fix. Okay. Let me go over on the other - little bit here. Get you a good pan. (BN1) (PHO 49 7229-33)

05 12 38 55 LMP Yes. This rock looks pretty much the same from a distance, Houston. (BN1)

- - -

05 12 39 08 CDR What a fantastic sight. Al, look in the bottom of that crater. (BN1)

05 12 39 12 LMP Hey, look at that! (BN1)

05 12 39 13 CDR Do you think that stuff melted or what? What's that look like to you? (BN1)

05 12 39 20 LMP Well, it looks to me - those rocks look - what it looks to me like is we've got one of those central - little bitty central peaks, you know - little rebound there, like the - - (BN1)

05 12 39 28 CDR Yes. But don't they look melted on the top? Don't they look like they've been - they were molten? They're not completely jagged. (BN1)

05 12 39 34 LMP No, they're not. It's hard to tell. I noticed when (BN1) (SAMP?)  
I was looking at that rock back there up real close  
that it had been hit by meteorites so much, I guess,  
it had given it a rounded appearance something like  
those in the hole, except there's a couple over  
there, like you say, that don't look that way. Hey  
we ought to grab one of these pieces of rock.

05 12 39 50 CDR Hey, hey, hey. Here's some good rock samples right (BN1) (SAMP?)  
here. Come on.

05 12 39 54 CDR Let's get with it. (BN1)

05 12 39 55 LMP I'm right here. (BN1)

05 12 39 56 CDR I know you know me, I want to cover the ground. (BN1)

05 12 40 06 CDR They'll baloney about it all day long in the LRL. (BN1)  
The name of the game is to get the business done.

05 12 40 12 CDR One potato. (BN1)

05 12 40 14 CDR \*\*\* potatoes. There's another one. (BN1) (SAMP 12053)

05 12 40 17 CDR Look at that baby; that rock looks a little (BN1) (SAMP 12053)  
different.

05 12 40 21 LMP Okay. I don't think - it's going to fit. Let's put (BN1) (SAMP 12053)  
it in one of these bags. It'll fit in there, Pete.

05 12 40 31 LMP It's going to go in sample bag 64 (4D). I think (BN1) (SAMP 12053)  
it's \*\*\* oops - -

05 12 40 37 CDR Come here, you pesky booger. 64. It might fit in (BN1) (SAMP 12053)  
there.

05 12 40 43 LMP No. It won't fit in there, Pete. The rock's too (BN1) (SAMP 12053)  
big.

05 12 40 46 CDR Let's just put it in here, and we've got a nice (BN1) (SAMP 12053) (PHO 48 7063-64; 49 7234-35)  
picture of it, so we can tell where it's from - -

05 12 40 49 LMP That's a super rock. (BN1) (SAMP 12053)

05 12 40 50 CDR - - let's just pick up two or three others - little (BN1) (SAMP 12032)  
ones and put them in 64 (4D) here, from that same  
area. Here, all this - all this stuff is from - -

05 12 40 57 CC Copy. Sample 64 (4D). (BN1) (SAMP 12032)

05 12 40 59 CDR - - Head crater, I mean - from - - (BN1)

05 12 41 04 LMP Nice rock. Get some of the other we took the (BN1) (SAMP 12053?) (PHO 48 7063; 49 7234-35)  
picture of.

05 12 41 06 CDR Yes. Wait a minute. (BN1)

05 12 41 09 LMP Okay. Yes. I don't think I got that in the (BN1) (SAMP 12032?)  
picture.

05 12 41 14 CDR Okay. May not have. (BN1) (SAMP 12032?)

05 12 41 16 LMP Hey, you notice that underneath this soil on the (BN1)  
rim, too, it's the light gray.

05 12 41 21 CDR Look. See that stuff over - let's go over to that (BN1)  
corner and try to break off a piece of that big  
rock, huh? - -

05 12 41 26 LMP That's a good idea. (BN1)

05 12 41 27 CDR - - looks like bedrock to me. (BN1)

05 12 41 30 CDR And go on and put 64 in there. Houston, there are a (BN1) (SAMP 12032?)  
couple of small rocks that we just picked up from  
the area we have been discussing. It doesn't - I  
don't think they appeared in the photo, but that  
won't make any difference. It's just typical of the  
other rocks around here. Holy Christmas! What's  
this? Look at this, Al. We're kicking up the same  
sort of light gray. Apparently, on the rims here,  
you get that light gray, out in the - -  
- - -

05 12 41 59 CDR - - look at this stuff. (BN1)

05 12 42 01 LMP Hey, that's interesting. (BN1)

05 12 42 02 CDR What do you suppose that is? (BN1)

05 12 41 04 LMP Hey, we can't - here's something interesting, (BN1) (SAMP 12035) (PHO 48 7064; 49 7236-39)  
Houston. Hey, it looks like a surface - what we got  
is what looks like kind of a semiburied rock. Hey,  
there's a small piece of it over there to the left.  
See it, Pete? We'll be able to catch it and put it  
in the bag.

05 12 42 16 LMP See that over there? (BN1) (SAMP 12035?)

05 12 42 18 LMP What it looks like is a buried rock, not unlike the (BN1) (SAMP 12035?)  
others around here, except it appears to have some  
sort of coating on it that's very iridescent. Lot  
of crystals shining in it.

05 12 42 29 CDR I'll tell you what's happened is it's been laying in (BN1) (SAMP 12035?)  
the ground and it's been hit by another fragment.

05 12 42 34 LMP Think so? (BN1) (SAMP 12035?)

05 12 42 35 CDR Yes. Look at the glass beads, too. (BN1) (SAMP 12035?)

05 12 42 37 LMP Yes, they're all over the place. (BN1) (SAMP 12035?)

05 12 42 40 LMP Okay, you want to catch that - - piece over there (BN1) (SAMP 12035?)  
and I'll put it -

05 12 42 43 CDR Wait - let me get the sample of it. (BN1) (SAMP 12035?)

05 12 42 46 CDR All right. Sample in sample bag 7D. (BN1) (SAMP 12035?)

05 12 42 51 CC Copy 7. And would you go ahead and give us some (BN1) (SAMP 12035?) (PHO 48 7064; 49 7236-39)  
picture numbers, also?

05 12 42 58 LMP Okay. We'll give you some in just a minute. Pete's (BN1) (SAMP 12036-37) (PHO 48 7064; 49 7236-39)  
picking up a small piece of this rock. Maybe you  
could get a piece that's fractured right off the  
middle.

05 12 43 06 CDR That's what I wanted to do. (BN1) (SAMP 12036-37)



- - -

05 12 43 13 CDR On the edge of the scoop. (BN1)

05 12 43 15 CDR There it is right there. (BN1)

05 12 43 16 LMP Okay. Got kind of an interesting coating on it. (BN1) (SAMP 12036-37)  
That's different from what we've seen.

05 12 43 23 LMP Maybe this is more newly exposed than the \*\*\* is (BN1) (SAMP 12036-37)  
that all you want to put in that bag?

05 12 43 28 CDR Listen. Hand me the scoop - - let me get some of (BN1) (SAMP 12036-37)  
those glass beads and stuff there - -

05 12 43 32 LMP All right. Let me get you the scoop. (BN1)

05 12 43 43 LMP Got it, Pete. (BN1)

05 12 43 45 CC Pete, we show you're 1 plus 14 into the EVA and we'd (BN1)  
like you to move on from this crater at about 1 plus  
27. If you could, then, go on down and take a look  
at the bedrock on the Bench.

05 12 44 01 LMP Hey, I better not put that in there, that's what we (BN1) (SAMP 12036-37)  
wanted to show was the - -

05 12 44 04 LMP Let me get you another sample bag. (BN1) (SAMP 12036-37)

05 12 44 05 CDR I hate to try and get down to the bottom of this (BN1)  
fellow. It's awful steep.

- - -

05 12 44 14 CDR But we're going to get you some of the bedrock. It (BN1)  
looks like it's up in the lip here. All of it looks  
the same - on the edge.

- - -

05 12 44 25 CDR That's 8D. (BN1) (SAMP 12036-37)

- - -

05 12 44 38 LMP What we're putting in here now, Houston, is some soil that's right next to the rock that we previously described. In fact, Pete's got a nice fragment of that rock that's going to end up in this bag, too. Oh, catch that one. (BN1) (SAMP 12036-37)

05 12 44 50 LMP That's a beauty. That thing is barely - weak - it fractures right off - - (BN1) (SAMP 12036-37)

- - -

05 12 45 22 LMP Okay. Put that in the bag. There you go. (BN1) (SAMP 12036-37)

05 12 45 26 CDR We need to put more, samples per - in the bag. (BN1)

05 12 45 30 LMP And they are saying they can't hardly use those little ones. (BN1)

05 12 45 32 CDR They won't fit in there any bigger. (BN1)

05 12 45 35 LMP Here, I'll get it. (BN1)

- - -

05 12 45 59 CDR Okay. Let's go over here and get some of this good rock. Like bedrock to me. (BN1-BN2)

05 12 46 05 CDR Looks a lot like the fragments we've been seeing laying all over the place, but this stuff obviously - I'll bet you we have a total of about 3 pounds of rocks right now. (BN1-BN2)

05 12 46 14 CDR Okay. We're going to have to grab some bigger \*\*\* (BN1-BN2)

05 12 46 22 CDR Got to dip down in the side of the crater there; see how it is going up and down - - (BN1-BN2)

05 12 46 27 CDR Boy this is interesting. I want to get this area right here and see if I can't sample it - - if I don't fall down in the crater. Go. That's a boy. Well, this is different; look at this, Al? This is different, we'll get some of this. (BN1-BN2)

- - -  
 05 12 47 16 LMP Look at the glass all over those rocks. (BN2) (SAMP 12038?) (PHO 49 7240-41)  
 - - -  
 05 12 47 28 LMP I want to bring this back; look at it. (BN2)  
 05 12 47 37 LMP Here, let me put this - put that in there. (BN2)  
 - - -  
 05 12 47 56 CDR Okay. Now you're going to help me get a bunch of (BN2)  
 these.  
 05 12 47 59 LMP Let's do; let's get a bunch of them and then they'll (BN2)  
 - have any rocks to bring back. Doing the best I  
 can. There you go; there's a good one. Put that  
 thing in there.  
 05 12 48 23 CDR I could take that big piece right there. Look at (BN2) (SAMP 12063?)  
 it; it's got spattered glass or something all over  
 it.  
 05 12 48 29 LMP Let's take it. Why don't we take a big piece of it? (BN2) (SAMP 12063?)  
 And - sample bag.  
 05 12 48 39 CDR I'm \*\*\* these sample bags, whether they're the - lit (BN2) (SAMP 12063?)  
 - the round ones, or the square ones - or the flat  
 ones, they're all the same type. What you need are  
 sample bags - little ones for these and some big  
 ones for the bigger rocks. Okay; 9D is the sample  
 we just picked up and described, Houston.  
 05 12 48 57 LMP Okay. Put this right in here, Pete. (BN2)  
 05 12 48 58 CDR No. Wait a minute; here's a better one. (BN2)  
 05 12 49 00 LMP Okay. Now we are working on a sample bag 10D. (BN2) (SAMP 12039-40) (PHO 49 7240-43?)  
 05 12 49 09 CC Roger. Copy 10D; and, on your way out, would you (BN2)  
 get that partial pan with a 75-foot baseline?

05 12 49 18 CDR I already got the pan. (BN2) (PHO 49 7223-33)

05 12 49 21 CDR Got a stereo partial pan. Okay? (BN2) (PHO 49 7223-33)

05 12 49 27 LMP Okay. That's a good rock, and that one fills that one up. (BN2) (SAMP 12039-40)

- - -

05 12 49 51 CC You're looking in good shape. You can press on along the traverse over to Sharp crater. (BN2)

05 12 50 02 LMP Why don't you take your - oh, you already got a snapshot of this didn't you, Pete? (BN2) (PHO 49 7242-43?)

05 12 50 06 CDR Wait, wait, wait. Sharp crater, that's funny, I can't seem to locate it. (BN2)

05 12 50 11 CC Pete, from your present position that's about 400 feet southwest. (BN2-SP)

05 12 50 19 LMP Nice one 400 feet south - - (BN2-SP)

05 12 50 21 CDR - - Al, it's got to be over that hill right there. (BN2-SP)

05 12 50 23 LMP About right there. (BN2-SP)

05 12 50 24 CDR Right here. (BN2-SP)

05 12 50 26 LMP Okay. Let's try it. (BN2-SP)

05 12 50 37 LMP 400 feet southwest. (BN2-SP)

05 12 50 39 CDR All right. Now we want to get the core tube and that gas sample and a bunch of good things, right, Houston? (BN2-SP)

05 12 50 46 CC That's affirmative, Pete. All those good things at Sharp crater. (BN2-SP)

05 12 50 56 CDR Got to find it first. (BN2-SP)

- - -

05 12 51 11 CDR Sharp crater, where are you? (BN2-SP)

05 12 51 15 LMP Got it pinpointed, Pete? (BN2-SP)

05 12 51 16 CDR No. I can't find it. (BN2-SP)

05 12 51 19 LMP Well, we're going in about the right direction. (BN2-SP)

05 12 51 20 CDR There's one right over here to - kind of more to your right. Trouble is, I'm looking down zero phase, you know, and that's - there it is. That's got to be it right there. (BN2-SP)

05 12 51 34 LMP Hey, I see it. (BN2-SP)

05 12 51 37 CDR Boy, there's big fragments out here. (BN2-SP)

05 12 51 41 LMP You can say that again. (BN2-SP)

- - -

05 12 51 52 LMP Why don't we stop here and look at the chart a little bit more closely? (BN2-SP)

05 12 52 00 CDR Man, does that LM look small back there. I'll tell you what. I'd better get a tie anyhow. Look at the chart. (BN2-SP)

05 12 52 13 CC Roger. Are you going to give us a backside survey at that point, Pete? (BN2-SP)

05 12 52 18 CDR Yes. I'll make it a full pan. So darn far out. I might as well. (BN2-SP)

05 12 52 27 CC Okay. A full pan over when you get to Sharp. We show you are 1 plus 23 into the EVA and we're looking to leave Sharp crater on 1 plus 51, so you got lots of time. (BN2-SP)

05 12 52 41 CDR We got to find Sharp crater first. (BN2-SP)

05 12 52 44 CDR We should be right here. How big is Sharp crater? (BN2-SP)

05 12 52 55 LMP Looks pretty small. It looks to me to be about 30 meters. (BN2-SP)

05 12 53 00 CDR Okay. I've got it. It's right here in front of me. (BN2-SP)

05 12 53 03 CDR Yes. That's it. (BN2-SP)

05 12 53 22 CDR Okay. That little box. Five pictures. Eight. (BN2-SP) (PHO 49 7244-75)

05 12 53 35 LMP This has got to be Sharp crater right here. We'll drive that double core tube in there. (BN2-SP) (SAMP CORE 12027)

05 12 53 42 LMP Yes. This has a nice white rim on it. In fact, the rim of this looks pretty much like the area we kicked over on the previous craters. I'm not sure this is Sharp crater, but let's use it anyway, because it's the only one out here. (BN2-SP)

05 12 53 55 CDR I know. I can see - there is nothing out here. It's the darndest thing I've ever seen. (BN2-SP)

05 12 54 01 CC We're estimating a diameter of Sharp crater, Pete, for about 40 feet. (BN2-SP)

05 12 54 09 CDR Hey, Al, this may be it. (BN2-SP)

05 12 54 10 LMP This is it. It's got to be it. It's got a nice raised rim on it. (SP)

05 12 54 14 LMP It's raised up about - what do you say, 2 feet? (SP)

05 12 54 17 CDR Yes. The trouble is that I'm running zero phase. It's like you never - (SP)

05 12 54 22 LMP Hey, this is the same color as all that subsurface material. (SP)

05 12 54 27 CDR It's awful soft in here; watch it. (SP)

05 12 54 30 CDR Holy Christmas! Look at the bottom of that. (SP) (PHO 48 7065-66)

05 12 54 36 CDR It looks like blast effect coming out of it. Looks (SP) (PHO 48 7065-66)  
like it's got blast effects radial all the way  
around. This has got to be fairly fresh to the -  
look at that, Al. Isn't that neat? We might get  
some pictures of that.

05 12 54 52 LMP Okay. (SP) (PHO 48 7065-66)

05 12 54 53 CDR I don't know what to set it on - 74, I guess. We're (SP)  
not that far away.

05 12 54 56 LMP Boy, the rim is soft here, isn't it? (SP)

05 12 54 59 CDR Sure is. (SP)

05 12 55 00 LMP Quite a bit softer than the others we - - (SP)

05 12 55 01 CDR But look at the radial spray pattern. (SP)

05 12 55 05 CDR Look at that. (SP)

05 12 55 07 LMP I guess I'm supposed to drive the what - double core (SP)  
tube here or something?

05 12 55 12 CDR We got to dig a trench? (SP)

05 12 55 14 CC Al, we'd like to get the trench site sample there, (SP)  
and you can hold off on that double core tube until  
you get over to Halo crater.

05 12 55 23 LMP Okay. All right, we're supposed to look west for (SP)  
Copernican rays here too.

05 12 55 40 CDR Houston, there's no way to tell the difference - (SP)  
contactwise. You agree, Al?

05 12 55 45 LMP There's no way. Now this one is fresh enough so (SP)  
that you can see - like you say - some of the  
rays, but any crater older than this there doesn't  
appear to be any way to tell the materials from  
inside the crater from that that was there when - I  
mean, right on the surface before the crater was

formed. There's no differentiation at all. Let's see. Which sample do you want now?

05 12 56 13 CC Al, we're looking for the trench site sample. That (SP)  
includes your environmental sample of trench and the  
gas analysis you can put in there, too.

05 12 56 26 CDR You want it right in the crater rim? (SP)

05 12 56 28 CC That's affirmative. That would be perhaps the (SP)  
easiest and best place to do it, and you can get  
that one core tube down in the bottom of the trench.

05 12 56 39 LMP Okay, Pete. Before you do that \*\*\* you're going to (SP)  
have to lift this up so that I can take the sample  
out.

05 12 56 44 CDR Wait one. Okay, I'll be right with you. (SP)

05 12 56 48 CDR You going to do it right there? (SP)

05 12 56 50 LMP Yes. Lift it up and I'll reach in there and grab (SP)  
the - put the - this will be the one for the soil  
here.

- - -

05 12 57 41 CDR Did you take a picture before, Al? (SP)

05 12 57 43 LMP No. (SP)

05 12 57 49 LMP I'll take one right now, Pete. (SP) (PHO 48 7067)

05 12 57 52 CDR That'd be a good spot right there, I believe. (SP)

05 12 58 06 CDR Dig in that stuff. (SP) (SAMP TRENCH LESC 12023)

05 12 58 09 CDR You could drive three core tubes down there. (SP) (SAMP TRENCH LESC 12023)

05 12 58 12 LMP You sure could. It's soft. (SP) (SAMP TRENCH LESC 12023)

05 12 58 13 CDR Yes. Got down about 8 inches. (SP) (SAMP TRENCH LESC 12023)



05 12 58 15 LMP Yes. Pete, you're digging a nice clean trench. (SP) (SAMP TRENCH LESC 12023)

05 12 58 18 CDR Wait, wait, wait, wait. Let me get the trench pictures. (SP) (SAMP TRENCH LESC 12023) (PHO 49 7276-77)

05 12 58 23 CC Okay, Al. Could we have some numbers along with those pictures? (SP) (PHO 49 7276-77)

05 12 58 28 LMP Okay. We'll have to give them to you, Houston. We've been delinquent there. Fine gray. Very fine soil here. (SP) (SAMP TRENCH LESC 12023)

05 12 58 43 CDR Okay. I'm ready to - take a look at my - what's the number? (SP)

05 12 58 46 LMP Okay. You're on number 105. (SP)

05 12 58 53 LMP That's okay. Well, I'll trade cameras with you because you've been \*\*\* okay? (SP)

05 12 58 58 CDR All right. Now what do you want to do? Fill that with dirt and rocks? (SP)

05 12 59 02 LMP We sure do. (SP)

05 12 59 04 LMP Fill the big container with dirt. (SP) (SAMP TRENCH LESC 12023)

05 12 59 10 CC Pete, we copy you're on 105. (SP)

05 12 59 12 LMP Be careful now. Wait a minute, wait. The tools didn't go in. (SP) (SAMP TRENCH LESC 12023)

05 12 59 23 LMP That stuff is really funny. Now I can't see the trench and I know you can't. (SP) (SAMP TRENCH LESC 12023)

- - -

05 13 00 05 LMP Well, you still need some more, although one more scoop ought to do it though. (SP) (SAMP TRENCH LESC 12023)

05 13 00 09 CDR Ah, that's soft. (SP) (SAMP TRENCH LESC 12023)

05 13 00 12 LMP Watch yourself. You're getting close to the crater. (SP)

- - -

05 13 00 34 LMP Okay, that's it. Bag's full. And now let me put the lid on. (SP) (SAMP TRENCH LESC 12023)

- - -

05 13 01 12 LMP Right on the top. Houston, this dirt came from about 8 inches down. Wait a minute, Houston. (SP) (SAMP TRENCH LESC 12023)

05 13 01 20 CC Copied. Eight inches down, and what's the sample bag number on that? (SP) (SAMP TRENCH LESC 12023)

05 13 01 26 LMP This is the deep trench sample in the - doesn't fit right there - all right - okay, on this? Now, lower it. (SP) (SAMP TRENCH LESC 12023)

- - -

05 13 02 10 CDR Suppose you're getting some vacuum welding? Huh? (SP)

- - -

05 13 02 39 CDR Okay. Now you need a core tube in the bottom of that trench. Is that right, Houston? (SP)

05 13 02 43 CC That's affirmative. And, Al, when you get a chance can we get your photo numbers? (SP)

05 13 02 50 CDR That's right - 50. And this is core tube number 2. (SP) (SAMP CORE 12027) (PHO 49 7279-80; 48 7068-70)

05 13 02 54 LMP Core tube 2 and I'll need the - there you go. Ought to be a good place, Pete. Relatively fresh stuff here. (SP) (SAMP CORE 12027)

- - -

05 13 03 08 LMP This kind of pack you could almost drive it without a hammer; but if you'll hand it to me, I'll get - - (SP) (SAMP CORE 12027)

05 13 03 11 CDR Just a second. (SP)

05 13 03 13 LMP I want to take a couple more shots of this before we (SP) (PHO 48 7068-69)  
leave.

05 13 03 28 CDR They're all in. I'll get the pictures. (SP) (PHO 49 7279-80)

05 13 03 31 CDR It's driving in real easy, Houston. (SP) (SAMP CORE 12027)

- - -

05 13 03 36 LMP I can't lean down too far now. And we're driving it (SP) (SAMP CORE 12027)  
all the way in pretty easy.

- - -

05 13 03 47 LMP Okay. Just a second. Let's put this up. Let me (SP) (SAMP CORE 12027) (PHO 48 7070)  
take a picture of it, Pete. Make sure we got it  
documented.

05 13 03 53 CDR Two. Stereo pictures. Okay. (SP) (PHO 49 7279-80)

05 13 04 01 LMP All right. This dirt's gotten on my camera and I (SP)  
can't see the settings anymore. I'm going to have  
to do something about that.

05 13 04 23 LMP Okay. You ready to put the top on this core tube? (SP)

05 13 04 26 LMP Okay. Here we come. I hope that soil stays in (SP)  
there.

- - -

05 13 04 37 LMP Probably did because it stayed in your scoop so (SP)  
well.

05 13 04 40 CDR You'd better believe it. It's full. (SP)

- - -

05 13 05 19 CC Okay. We show you should have gotten in the trench (SP)  
site sample, the core tube samples from the bottom  
and also the gas analysis sample.

05 13 05 31 LMP Okay. We need some little rock fragments for that, (SP) (SAMP GASC 12024) (PHO 48 7070)  
Pete. You'll have to hold up the bag so I can reach  
it.

05 13 05 35 CC Roger. That's surface rock fragments. (SP) (SAMP GASC 12024)

05 13 05 38 CDR Okay. Just a second. Yes. We're going to get it; (SP) (SAMP GASC 12024)  
hold the phone.

- - -

05 13 06 14 CDR Some little rocks in here - - (SP) (SAMP GASC 12024)

05 13 06 15 LMP Okay, little rocks \*\*\* now, push it. (SP) (SAMP GASC 12024)

05 13 06 19 CC Roger. Copy. You got some rocks and the gas (SP) (SAMP GASC 12024)  
analysis and would also confirm that you have gotten  
the environmental sample?

- - -

05 13 06 28 CDR We got the environmental sample, we got the trench (SP)  
and core tube, and I'm trying to find a little rock.  
Little rock? There's a lot - -

05 13 06 45 LMP There's a neat one. There it is right there. (SP) (SAMP GASC 12024)

05 13 06 48 CDR Ho-ho, just right for that little can. (SP) (SAMP GASC 12024)

05 13 06 52 LMP Give me a few. (SP) (SAMP GASC 12024)

05 13 06 57 LMP Here's a couple of nice ones right here, Pete. (SP) (SAMP GASC 12024)

- - -

05 13 07 04 LMP Okay. Thank you very much, Houston. See those (SP) (SAMP GASC 12024)  
bright shiny ones there?

05 13 07 09 LMP Wait. Let's get a shot of them. Just move - just a (SP) (PHO 48 7070)  
second, Pete.

05 13 07 13 LMP Okay. Got a picture of them. (SP) (PHO 48 7070)

05 13 07 18 LMP Careful. These - there. How about those right - (SP) (SAMP GASC 12024)  
right there? See them shine?

05 13 07 29 CDR The little ones? (SP)

05 13 07 30 LMP No, no. Move over this way. This way. Up - you're (SP)  
near about - right there.

05 13 07 36 CDR No. Hey, that's a neat - oh, that's glass. Look at (SP) (SAMP GASC 12024)  
that.

05 13 07 40 LMP Right next to it. (SP) (SAMP GASC 12024)

05 13 07 41 CDR Yes, here. One at a time. Make a good sample for (SP) (SAMP GASC 12024)  
them.

05 13 07 46 LMP And that piece right next to it, right there. (SP) (SAMP GASC 12024)

05 13 07 49 LMP Houston, how far are we from the LM? (SP) (PHO 48 7071?)  
- - -

05 13 07 57 LMP Hey, we need some more, Pete. Give me a bigger (SP) (SAMP GASC 12024)  
rock. There's not enough to do anything with.

05 13 08 00 CDR Hey, come on, I'm getting tired of picking up those (SP)  
little things.

05 13 08 02 LMP There's nothing in there. (SP)

05 13 08 06 LMP Get a big one. There's one right there. (SP)

05 13 08 08 CDR Get a big what? Here, this one? (SP)

05 13 08 10 LMP Yes. (SP)

05 13 08 12 CDR I don't think that will fit. (SP)

05 13 08 14 LMP Let's try it. (SP)

05 13 08 15 CDR No, that won't - - (SP)

05 13 08 17 CC Pete and Al, we show you're 1200 feet from the LM. (SP) (PHO 48 7071?)

05 13 08 22 CDR Okay. Come on, Al, we're wasting time. (SP)

05 13 08 31 LMP There you go. (SP)

05 13 08 34 CC Pete, as soon as you finish up there, you can head on back toward the east, towards Halo crater. No need to go any further west. (SP)

- - -

05 13 09 06 CDR There you go. The front of my lens is clean, relatively speaking. Nothing else is. (SP)

- - -

05 13 09 24 CDR Head for Halo crater. (SP-HO)

05 13 09 26 CC Okay, Pete, we will give you a radar vector on this one. If you will go over - just directly east of Bench crater, and you can continue on east until you are just about directly opposite the LM. And then a couple of more steps ought to take you right to Halo crater. (SP-HO)

05 13 09 45 CDR Sounds like a pretty good vector. That also says we are running right into the Sun. Does that agree with you? (SP-HO)

05 13 09 51 CC That's affirmative. You will be running right into the Sun and directly at your 9 o'clock position, you will see the LM. And then a couple of more steps and you'll be right there. (SP-HO)

05 13 10 01 CDR I've got the LM in sight to my 10 o'clock. You know what I feel like, Al? (SP-HO)

05 13 10 11 LMP What? (SP-HO)

05 13 10 12 CDR Did you ever see those pictures of giraffes running in slow motion? (SP-HO)

05 13 10 17 CDR - - that's exactly what I feel like. (SP-HO)

05 13 10 21 CC Say, would you giraffes give us some comment on your (SP-HO)  
boot penetration as you move across there, what  
you're doing now, and what you had back there at  
Sharp crater?

05 13 10 32 LMP Oh, it's much firmer here. We don't sink in (SP-HO)  
anywheres near as much. Now I'm crossing some of my  
own tracks.

05 13 10 39 LMP The toes sink in a bit, Pete, as you push off. You (SP-HO)  
land flat-footed so your heels don't sink in; but,  
as you push off with your toes, they sink in down  
about 3 inches. Your heels are only sunk in perhaps  
an eighth of an inch.

05 13 10 53 LMP Also, right as you kick off on your toe. Everytime (SP-HO)  
he lands he sends little particles spraying out  
ahead of him, and beside him and everywhere else.  
They go out to distances maybe 2 feet to 3 feet  
around him.

05 13 11 12 CDR Okay. We're back at Bench crater. Now, have we (SP-HO)  
gone too close towards the LM?

05 13 11 27 CDR Going on the south side of Bench crater, Houston. (SP-HO)

05 13 11 30 CC Okay. Now, if you'll just go directly to the east (SP-HO)  
of the center of Bench crater and then continue  
directly east right into the Sun; and then at 9  
o'clock, you'll see the LM, and a couple of more  
steps and you'll be there.

- - -

05 13 12 21 CC Pete, the crater you're looking for, Halo crater, is (SP-HO)  
just about the same size as Sharp crater and should  
resemble it.

05 13 12 31 CDR I think I have it in sight, but I'm not sure. (SP-HO)  
There's a couple of them here.

- - -

05 13 12 52 CC Pete, the dimension on Halo crater is about 20 feet, (SP-HO)  
so that would make it half of what you saw at Sharp.

05 13 13 03 CDR Okay. Now, Halo. I wonder if I'm standing - you (SP-HO)  
suppose this is it, Al?

05 13 13 09 LMP Well, it doesn't have any halo around it. (SP-HO)

05 13 13 13 CDR Yes, I know. But you never can tell from here. (SP-HO)

05 13 13 17 LMP You can look at the map when you get there. (SP-HO)

05 13 13 23 LMP Let me look in the map, Pete. (SP-HO)

05 13 13 31 CC Pete and Al, one way to locate it, also, is that it (SP-HO)  
should be right on the rim of Surveyor crater, and  
you ought to see Surveyor off directly to the  
northeast.

05 13 13 48 CDR Okay. I know where we are. (SP-HO)

05 13 14 02 CDR \*\*\* beautiful. Round glass ball they got to have, (SP-HO) (SAMP 12041)  
Al. Quarter of an inch.

05 13 14 14 CDR And the sample bag. (SP-HO) (SAMP 12041)

- - -

05 13 14 35 LMP This is sample bag 11D. (SP-HO) (SAMP 12041)

05 13 14 37 CDR I didn't take a picture. I just wanted to - - (SP-HO)

05 13 14 39 LMP Okay. Watch that crater behind you. Don't step (SP-HO)  
back.

- - -

05 13 14 51 CDR This is glass beads. (SP-HO) (SAMP 12041)

05 13 14 52 LMP I know. I was thinking of this. We got a total now (SP-HO) (SAMP 12041)  
of about 5 pounds of rocks.



05 13 14 57 LMP I'd hate to have us get back to the LM and then have (SP-HO)  
to fill it up around there again.

05 13 15 02 CDR Ah, we're going to the Surveyor crater. (SP-HO)

05 13 15 06 CDR \*\*\* get to the bottom of that baby. (SP-HO)

05 13 15 08 LMP Why don't you take a rest here? (SP-HO)

05 13 15 09 CDR Yes. (SP-HO)

- - -

05 13 15 25 CDR Yes. Yes - I'll tell you what - let's see, we're (SP-HO) (PHO 49 7281)  
cross-sun, right? Look over here at me and smile.

05 13 15 32 LMP Okay. Have a picture. You're right there by a (SP-HO) (PHO 48 7071)  
crater.

05 13 15 36 LMP There's the LM. Right in the background. Looked (SP-HO) (PHO 48 7071)  
great. There you go.

05 13 15 49 CDR All right. Let's ease off at a nice - - at a slower (SP-HO)  
pace. Just like you're going now. I think this is  
Halo crater right up here in front of us.

05 13 16 11 LMP Hey, Ed, you might tell Fred Haise he ought to quit (SP-HO)  
working on running and start working on holding  
things in his hands. My legs don't get a bit tired,  
but your hands get tired carrying these tools,  
particularly the handtool carrier.

- - -

05 13 16 40 CDR Tell Jim Lovell to practice digging. (SP-HO)

05 13 16 45 LMP Boy, look at all the texturing - look here, Pete; (SP-HO)  
now we are crossing something that's got a  
completely different texture than what we have been  
on.

05 13 16 52 CDR You're right. (SP-HO)

05 13 16 53 LMP Look at all - look here. We got all sorts of - - (SP-HO)

05 13 16 54 CDR This is Halo - let's take some pictures here. (HO) (PHO 48 7072-76; 49 7282-84)

05 13 16 59 LMP We've run across a sort of a textural contact. We're suddenly on an area that's quite - not so smooth; it's got dimples and wrinkles in it. You want me to take some pictures or what, Pete? (HO) (PHO 48 7072-76; 49 7282-84)

05 13 17 11 CDR Yes. Why don't you come up here - - and we will take a couple of good dirt bag samples of this stuff. (HO) (SAMP 12042) (PHO 48 7072-76; 49 7282-84)

- - -

05 13 17 20 LMP It's interesting. You know, I think this looks like that material that we talked about the first day in front of the LM. Maybe it runs past the LM down into this area. But it's sure different than where we've been. It looks almost like it's more - the material is more cohesive and forms clumps, instead of being so nice and smooth. Maybe you can go around behind you. (HO) (SAMP 12042) (PHO 48 7072-76; 49 7282-84)

05 13 17 28 CDR I was waiting for the gnomon to damp out, but - - (HO)

05 13 17 55 LMP Okay. Right here. Good shot here, Pete. (HO)

05 13 17 58 CDR I wanted to get my footprints in it too, so they can see that. (HO) (PHO 49 7284)

- - -

05 13 18 10 LMP You know, I think I will take some a little further away. Back up a little, and shoot a 15-foot one if it's okay. (HO) (PHO 48 7074-75)

05 13 18 18 CDR Yes. I'm going to dig. (HO)

05 13 18 22 LMP All right. I will be back to collect it in just a second; let me get this 15 footer. (HO) (PHO 48 7074-75)

05 13 18 27 CDR Halo crater a, slightly big - yes. (HO)

05 13 18 33 LMP Hey, I'm shooting about four here. Okay. Real (HO) (PHO 48 7074-75)  
interesting that this - -

05 13 18 42 CDR Let's get some sample bags and we'll - - scoop this (HO) (SAMP 12042)  
stuff.

05 13 18 47 CDR Let me - boy, it sure is fine; it's kind of like (HO) (SAMP 12042)  
over at the other - at Sharp crater.

05 13 18 55 LMP Yes. Looks the same, except on the surface it just (HO)  
seems - -

05 13 18 58 CDR Except it looks almost finer. (HO) (SAMP 12042)

05 13 19 01 CDR Wait a minute and I'll get you another bag - - (HO) (SAMP 12042)

05 13 19 02 LMP It's funny though. If you saw this on Earth, you (HO) (SAMP 12042)  
would think it was a real soft dirt that had just  
been rained on recently. \*\*\* not hard rain but just  
a sprinkle, so that the droplets - -  
- - -

05 13 19 15 LMP Now, that's a good sample bag full. (HO) (SAMP 12042)

05 13 19 17 LMP That's 12D, Houston, the sample bag number - - (HO) (SAMP 12042)

05 13 19 20 CDR Is Halo crater a shallow crater, Houston? With a (HO)  
couple or three dimple craters in the south side of  
it?  
- - -

05 13 19 35 LMP We can collect the rock while we wait, Pete? (HO)

05 13 19 38 CDR Yes, well, look; I think this is Halo crater right (HO)  
here - -

05 13 19 41 LMP All right. Let's ease over there - - (HO)

05 13 19 42 CDR - - and let's go get some rocks from it and (HO)  
everything; we're seeing it right; we've actually  
got the soil sample from part of it.

05 13 20 09 CDR But this isn't 20 feet in diameter. Is it right on (HO)  
the rim of the Surveyor crater, Houston?

05 13 20 15 CC That's affirmative; and, from your comments on the (HO)  
three dimples, we show that you're there.

05 13 20 22 CDR Okay. What do you want in it? (HO)

05 13 20 26 LMP It's a 20-foot-diameter crater? (HO)

05 13 20 26 CC We'd like to get the pan and a double core tube. (HO)

05 13 20 28 CDR About 20. (HO)

05 13 20 33 LMP I can't believe we're at the right place. (HO)

05 13 20 35 CDR I'm not sure we're at the right place, either. Let (HO)  
me look at the top of this hill here. This is  
Surveyor crater. Let me look at the chart.

05 13 20 44 LMP There's a nice rock right there. (HO)

05 13 20 45 CDR Here's Surveyor. (HO)

05 13 20 49 LMP Let me look at the map. Not even hardly a crater (HO)  
worth looking at where we are.

05 13 20 59 CC Okay, Pete. It's your call there. You're the local (HO)  
experts. If you see a better location for that  
double core tube, go ahead.

05 13 21 10 CDR Yes. We're trying to find the right crater, (HO)  
Houston.

05 13 21 15 LMP Hey, Pete. I think it's that area right over there. (HO)  
Halo is this first one right here, the little one,  
and then all those others are next over according to  
the chart.

05 13 21 25 LMP So we can just go over there and - - (HO)

05 13 21 27 CDR Which one's Halo? This one right here? (HO)

05 13 21 29 LMP This - no, it's right - you see where I'm pointing? (HO)

05 13 21 32 LMP As I see it, it's that one right over there. (HO)

05 13 21 34 CDR Okay. Let's go. (HO)

05 31 21 37 CDR And I have the double core tube? (HO)

05 13 21 39 CDR And you want what, Houston, a partial pan? (HO) (PHO 49 7289-7311)

05 13 21 44 CC That's affirmative. We'd like a full pan at that point, Pete. (HO) (PHO 49 7289-7311)

05 13 21 51 CC And also, Al, if you could give us some sort of an estimate of how hard it is to get the core tube in. That is, what's the force you have to use; how many pounds and how much force. (HO)

05 13 22 02 CDR Hey, look at this little neat crater right here. It's a good place to sample. (HO)

05 13 22 16 LMP Oh, look at all the glass in the bottom of that baby. Got a lot of that though. (HO)

05 13 22 21 LMP Got a lot of glass. (HO)

05 13 22 22 CDR Out there? (HO)

05 13 22 23 LMP Yes. (HO)

05 13 22 24 CDR I think that's Halo right there. (HO)

05 13 22 25 LMP Which one? (HO)

05 13 22 26 CDR The one you're looking at. That one right there. (HO)

05 13 22 29 LMP Too big. (HO)

05 13 22 30 CDR Too big, huh? (HO)

05 13 22 31 LMP Let's take this one right here. (HO)

05 13 22 34 CDR All right. That's good. Lots of glass down in the (HO)  
bottom of this baby - -

05 13 22 42 CC Pete and Al, could we have a readout on the cameras (HO)  
at this point?

05 13 22 46 LMP Sure could. Just a second. Yes - see mine (HO)  
probably, Pete.

05 13 22 51 CDR You'd better take all these pictures. I'm running (HO)  
out.

05 13 22 53 LMP Well, I'd better change cameras because - - (HO)

05 13 22 54 CDR Sixty - 60 for Al. - - (HO)

05 13 22 56 LMP Let's see. You've got 110. You've got plenty to (HO)  
go.

05 13 22 59 CDR Hey, you know what's happened? (HO)

05 13 23 02 CDR This thing hasn't been taking every picture. (HO)

05 13 23 03 LMP Take a picture and let's see. (HO)

05 13 23 04 CDR I just caught it. I mean it's been doing it (HO)  
intermittently.

05 13 23 07 LMP Okay. Now \*\*\* get out and make the double core tube (HO) (SAMP CORE 12025; 28) (PHO 48 7077; 49 7285-88)  
here.

05 13 23 17 CC Pete, we copy 60 and 110 on the film. (HO)

05 13 23 23 CDR That's affirm. (HO)

- - -

05 13 23 55 CC Pete and Al, we'd like you to go ahead and get the (HO)  
pan's taken on the LMP's camera. You can either  
have Al do the pan's or switch cameras. Your  
choice.

05 13 24 14 LMP Okay, Pete. You'll have to unscrew - pull the pin (HO)  
and unscrew that if you can.

- - -

05 13 24 42 CDR Double core tube. You can drive it. Give it a go. (HO) (SAMP CORE 12025, 28)

05 13 24 47 LMP I'm going to hand you the hammer. I'm not sure that (HO)  
double core tube screws on as far as it should. Try  
it again.

05 13 24 57 CC Pete and Al, Houston. Be sure you give us the (HO)  
number of the lower core tube, please.

05 13 25 05 LMP Okay. The lower core tube is number 3, I think. (HO) (SAMP CORE 12025, 28) (PHO 49 7285)  
Yes.

05 13 25 10 LMP Three, and the upper one's 1. (HO) (SAMP CORE 12025, 28)

05 13 25 14 LMP Where are you going to drive it? (HO) (SAMP CORE 12025, 28)

05 13 25 16 CDR Where would you recommend? (HO) (SAMP CORE 12025, 28)

05 13 25 17 LMP Well, let's go over to this crater right here. (HO) (SAMP CORE 12025, 28)

05 13 25 23 LMP Where it's soft around those little \*\*\* craters. (HO) (SAMP CORE 12025, 28)

05 13 25 29 LMP About right here. (HO) (SAMP CORE 12025, 28)

05 13 25 33 LMP Want to take a picture? (HO) (PHO 48 7077)

05 13 25 34 CDR Yes. (HO) (PHO 49 7285)

05 13 25 36 LMP I can shove it in a little - I hope this is a good (HO) (SAMP CORE 12025, 28)  
soft place.

05 13 25 41 LMP It seems to be. Oh, I hit something solid there. (HO) (SAMP CORE 12025, 28)  
Well, I shoved it in - I used all my weight,  
Houston, and shoved it in about 11 inches. Now,  
I'll just pound on it a while and see what we can  
do. It's going in okay. Yes. It's going on down.

05 13 26 02 LMP No. We've got a good spot. I don't think - really (HO) (SAMP CORE 12025, 28)  
think this is the right place. Some of those things  
aren't so obvious.

05 13 26 11 CDR Got awful solid, didn't it? (HO) (SAMP CORE 12025, 28)

05 13 26 13 LMP Yes, it's going. Let me wiggle it a bit. It's got (HO) (SAMP CORE 12025, 28)  
one core tube completely in now. Have to hit it  
harder.

- - -

05 13 27 17 CDR Okay. He's up to the bottom of the handgrip portion (HO) (SAMP CORE 12025, 28)  
of the upper tube. He's really driving that baby.

- - -

05 13 27 37 CC We want to be sure to get the site there documented. (HO) (SAMP CORE 12025, 28)

05 13 27 47 CDR We'll document it for you. (HO) (SAMP CORE 12025, 28) (PHO 49 7285-88; 48 7077)

- - -

05 13 27 54 CDR Hit something solid there, didn't you? (HO) (SAMP CORE 12025, 28)

05 13 27 56 LMP No. It's just getting down there, Pete. (HO) (SAMP CORE 12025, 28)

05 13 28 00 LMP We've got a double. Now the question is can we pull (HO) (SAMP CORE 12025, 28)  
it out?

05 13 28 03 LMP Let me get the down-sun shot. I hope that's a good (HO) (SAMP CORE 12025, 28) (PHO 48 7077)  
spot.

- - -

05 13 28 15 LMP Ought to get some of these rocks nearby here. (HO)

05 13 28 21 LMP Come on. Let's see here. 250, 11. All right. (HO) (SAMP CORE 12025, 28) (PHO 48 7077)

05 13 28 32 LMP You give them that low pan of something, so they can (HO)  
see where this came from.

05 13 28 35 CDR You do it. I don't have that much film. (HO)



05 13 28 37 LMP Okay. Why don't I just trade you cameras? That's probably the smart way. (HO)

05 13 28 41 CDR All right. (HO)

- - -

05 13 29 22 LMP Well, I'll tell you what happened, Houston. The nut that holds the handle of the camera on broke off. And so, the handle's free, but that's okay. We'll just carry it around. (HO)

- - -

05 13 30 42 CDR Al, you got to take the Surveyor pictures, so why don't I give you the camera? (HO)

05 13 30 46 LMP Okay. That's good enough. (HO)

05 13 30 49 CDR But, we've still got 50 pictures or so. Now watch it. Make sure it takes a picture each time it turns. (HO)

- - -

05 13 31 54 LMP Let me carry part of it or something. Okay. Let me go pull out the core tube. (HO) (SAMP CORE 12025, 28)

05 13 31 58 CDR No, I tell you what. We can always take the magazine off this and put it on the other one. (HO)

- - -

05 13 32 06 CDR All right. Let's go get your core tube. I'll go get it. (HO) (SAMP CORE 12025, 28)

- - -

05 13 32 15 CDR Okay. Hey, you sure beat on it. (HO) (SAMP CORE 12025, 28)

05 13 32 23 LMP That's what it took to get it in the ground. (HO) (SAMP CORE 12025, 28)

05 13 32 26 CDR It's coming up real easy. (HO) (SAMP CORE 12025, 28)

05 13 32 35 LMP Looked for a minute like you were going down real (HO) (SAMP CORE 12025, 28)  
easy. The core tube hangs in and your feet just  
sink down. Okay, hold.

- - -

05 13 35 58 CC Pete, we copy that you finished the core tube. Is (HO) (SAMP CORE 12025, 28)  
that affirm?

05 13 36 02 CDR Yes, sir. We got a double core tube, and all put (HO) (SAMP CORE 12025, 28) (PHO 49 7285-88; 48 7077)  
together correctly.

05 13 36 08 CC Very good. Well done. Have you gotten the (HO)  
panorama?

05 13 36 15 CDR No, I'm going to get Al to do that right now. He's (HO) (PHO 49 7289-7311)  
using my camera. His camera's had it. With the  
handle off it and everything, by the time we got  
done handling it, we got dirt all over the lens. We  
run out of film; we happen to have another magazine  
with us, or change that one - -

05 13 36 34 LMP Don't change that; we'll just take that one off. (HO)

05 13 36 37 LMP Of course, we don't want to, but if we have to, I (HO) (PHO 49 7289-7311)  
guess we can. Okay. Let me start this pan.

05 13 36 44 LMP Seventy-four it is, f:11, 250. Okay? (HO) (PHO 49 7289-7311)

05 13 36 55 CC Okay. Pete. You're 2 hours and 7 minutes into the (HO)  
EVA. And we show you leaving Halo at around 2:15.  
And now that's for a 4-hour EVA. We've extended you  
to 30 minutes for a total EVA of 4 hours. We'd  
like, before you go on to have a good EMU check and  
sit down and regroup and figure out a plan of attack  
on the Surveyor. One thing we would like to make  
sure is that you remain away from directly below the  
Surveyor as you move up to it. That is, move up on  
one side or the other, either north or south.

- - -

05 13 37 54 LMP That's it, Pete. Pan's complete. Probably ought to (HO) (SAMP NOT RETURNED) (PHO 49 7289-7311)  
get rocks - one of these rocks here just throw it in  
the bag - -

05 13 38 03 LMP How about - you want to get this one? (HO) (SAMP NOT RETURNED)

05 13 38 08 LMP Let's sample a couple of these laying right over (HO) (SAMP NOT RETURNED)  
here.  
- - -

05 13 38 30 CDR Okay. Here, take one quick picture so we can save (HO) (SAMP NOT RETURNED) (PHO 49 7312)  
some film.

05 13 38 35 LMP All right. Here it goes. (HO) (SAMP NOT RETURNED) (PHO 49-7312)

05 13 38 36 CDR Where it came from. (HO) (SAMP NOT RETURNED) (PHO 49-7312)  
- - -

05 13 38 53 LMP Those little holders for these sample bags are (HO) (SAMP NOT RETURNED)  
ridiculous, you know. In this light gravity up  
here, if you put anything in the holder and move,  
it flips it right out of it. Come out of there,  
sample bag. There you go. Funny how this one - go  
in there. Go in - that a boy, give me some of that  
dirt around there too, Pete. Drop it right in.  
This is going in sample bag 13D, Houston.

05 13 39 26 CDR Al, let's move up on the rim of the Surveyor crater (HO-SRV)  
and start getting some rocks; gnomon - and we'll  
figure out - there you go.

05 13 40 14 CC Al, could we have some sample bag numbers while (HO-SRV)  
you're working along there?

05 13 40 20 LMP Sure could. I thought I - didn't I call out 13D, (HO-SRV)  
Houston? I guess I didn't call it out loud enough.  
I think it was 13D. The next time we stop I will  
tell you the next one for sure and then you will  
know what it is.

05 13 40 41 CDR Al, look at these rocks; they look a little bit different. Let's grab some. (HO-SRV) (SAMP 12054) (PHO 49 7313-15)

05 13 40 50 CDR Look at that glass in the bottom of that one. They look like granites, don't they? (HO-SRV) (SAMP 12054)

05 13 41 00 LMP They do; they look just like granite. Here's a beauty over - here's a beauty. (HO-SRV) (SAMP 12054)

05 13 41 06 LMP Right here. That is a nice rock. (HO-SRV) (SAMP 12054)

05 13 41 09 LMP Right around here. Let's get this one for sure. (HO-SRV) (SAMP 12054)

05 13 41 14 LMP Won't fit in the bag, but it is sure different. It seems to have some - - (HO-SRV) (SAMP 12054)

05 13 41 18 CDR Got a big glass splotch on it. (HO-SRV) (SAMP 12054)

05 13 41 20 LMP Yes. That's a good one. That's a real good rock. Get some pictures - - (HO-SRV) (SAMP 12054) (PHO 49 7313-15)

05 13 41 23 CDR Wait. Wait. Wait. Wait. Okay. It's in. (HO-SRV) (SAMP 12054)

05 13 41 31 LMP That's a beauty. That gnomon doesn't really damp as fast as it should you know, Pete. I think it does great in one g, but one-sixth g, it doesn't seem to damp right. Let me get the cross-suns too. Oops, got to get over where you are. (HO-SRV) (SAMP 12054) (PHO 49 7313-15)

05 13 41 51 LMP Okay. We will just put that in; that's a beautiful rock. (HO-SRV) (SAMP 12054)

05 13 41 59 CDR Okay. You able to scoop it up? You know you need some tongs that will get bigger samples than we have got. (HO-SRV) (SAMP 12054)

05 13 42 12 LMP All right. Watch that. (HO-SRV) (SAMP 12054)

05 13 42 19 LMP Hey, that's beautiful. It's got a lot of - (HO-SRV) (SAMP 12054)

- - -

05 13 42 27 CDR Okay. Now I want some of these granites over here - (HO-SRV) (SAMP 12051) (PHO 49 7318-20)  
or what looks like granite.

05 13 42 36 CDR Doesn't that LM look neat, sitting on the other side (HO-SRV)  
of that crater?

05 13 42 39 LMP Yes. It does; we ought to get a shot of that. (HO-SRV) (PHO 49 7316-17)

05 13 42 42 CDR Yes. Get a shot of home. (HO-SRV) (PHO 49 7316-17)

05 13 42 47 LMP Okay. Let me see, how many pictures have I got now, (HO-SRV)  
Pete?

05 13 42 50 CDR 143. (HO-SRV)

05 13 42 56 CDR You're getting close to the end - we ought to - - (HO-SRV)

05 13 42 57 CDR Okay. That's 14D, Houston, in the next sample bag (HO-SRV) (SAMP 12043-44) (PHO 48 7082-83)  
so the last one was 13D.

05 13 43 00 LMP Let me take a picture quick here. (HO-SRV) (PHO 48 7082-83)

- - -

05 13 43 20 CDR Step across over there; photograph that rock right (HO-SRV) (SAMP 12051) (PHO 49 7318-20)  
there - - wait until I drop the gnomon in - - and do  
it in such a manner as to get this crater that it  
came out of.

05 13 43 28 LMP That's a good idea. Let me see if I can; I'll have (HO-SRV) (SAMP 12051) (PHO 49 7318-20)  
to back - let me get a 15-foot shot.

05 13 43 34 CC Pete, could we have your present position? (HO-SRV)

05 13 43 39 CDR Roger. If you were looking at the Surveyor crater (HO-SRV)  
and west with 12 o'clock, we're at 9 o'clock  
position on the Surveyor crater.

05 13 43 55 CC Roger. You're right on the rim - understand - we'd (HO-SRV)  
like to get a good EMU check and a rest here before  
you proceed.

05 13 44 12 LMP This rock might be good for 13. Pete, let me reach (HO-SRV) (SAMP 12051)  
back here and grab this strap.

05 13 44 19 LMP Okay, now go. (HO-SRV) (SAMP 12051)

05 13 44 29 CDR Okay. Let me roll a little bit over. (HO-SRV) (SAMP 12051)

05 13 44 28 LMP That a boy. Back up. Now, if they had a strap like (HO-SRV) (SAMP 12051)  
that, they could just hold the other guy while he  
leaned over and picked up a rock.

05 13 44 35 CDR It works pretty good. It sure saves time. Look at (HO-SRV) (SAMP 12051)  
the sheer face on that rock, something whistled by  
it or something.

05 13 44 43 LMP It's fractured a bit; it's got some pretty (HO-SRV) (SAMP 12051)  
interesting fracture marks on it. It also has got  
some - what look like abrasion marks on it. Maybe  
that's just hard packed dirt. Boy, there is a lot  
of flashing crystals in that rock - crystal faces.  
It's a good rock.

- - -

05 13 45 05 LMP Okay. Let me take the picture of that where the (HO-SRV) (SAMP 12051) (PHO 49 7320)  
rock was. Right there.

05 13 45 11 CDR Okay. What I recommend we do is change film packs. (HO-SRV)

05 13 45 15 LMP All right. That's a good idea. (HO-SRV)

05 13 45 29 CDR Shoot a pan, and get the Surveyor. Use up that (HO-SRV) (PHO 49 7321-24)  
film.

05 13 45 36 LMP Ah, it's a bad place to shoot, but I'll try it (HO-SRV) (PHO 49 7321-24)  
though.

05 13 46 01 CDR Al, what I think we can do is walk down here about (HO-SRV)  
300 feet and walk straight down that slope to it.

05 13 46 06 LMP I do, too. It doesn't look so bad from here, does (HO-SRV)  
it Pete?

05 13 46 14 CC Pete, will that direction of your travel be to the (HG-SRV)  
northeast direction?

05 13 46 21 CDR No, what we do is go directly east and then walk (HO-SRV)  
directly short of north, you know, curving right  
around and down to it.

- - -

05 13 46 38 CDR Yes. You get kind of an optical illusion depending (HO-SRV)  
on where you're standing.

05 13 46 44 LMP Trade me one. Trade me magazines. (HO-SRV)

05 13 46 46 CDR Okay. Wait a minute. (HO-SRV)

- - -

05 13 47 22 CC Pete, a reminder on that film pack, cycle one frame (HO-SRV)  
before you start.

05 13 47 31 LMP Roger. We cycled one before we took it off, too. I (HO-SRV)  
think we're in good shape, Houston.

- - -

05 13 49 36 CDR We're moving on, Houston. (HO-SRV)

05 13 49 48 LMP Yes. A few minutes ago, Pete wanted to pick up a (HO-SRV) (SAMP 12051)  
rock, so I held onto that strap of the Surveyor bag  
and he leaned right over and picked it up and I  
helped him get back up. It's not that you're heavy  
or anything, it's the fact that you have such poor  
balance.

05 13 50 02 CDR Look at that glass - - (HO-SRV) (SAMP 12044) (PHO 48 7082-83)

- - -

05 13 50 16 CDR Yes. We are just going to move to the area, where (HO-SRV) (SAMP 12044) (PHO 48 7082-83)  
we could stop and case the joint. Al, grab a shot  
of that beaded glass there and we'll bag it.

- - -

05 13 50 39 LMP Okay. Set her up. (HO-SRV) (SAMP 12044) (PHO 48 7082-83)

05 13 50 42 CDR Better take that. (HO-SRV) (SAMP 12044) (PHO 48 7082-83)

05 13 50 46 LMP There you are in here. (HO-SRV) (SAMP 12044)

05 13 50 50 LMP Okay. I got it, Pete. (HO-SRV) (SAMP 12044)

05 13 50 52 CDR Got her? (HO-SRV) (SAMP 12044)

05 13 50 53 LMP Yes. Got a lot of those; we've - got too many of (HO-SRV) (SAMP 12044)  
them.

05 13 50 58 CDR Oh, you did get a lot of these? (HO-SRV)

05 13 50 59 LMP Yes. Why don't you get that? Pick it up - - (HO-SRV)

05 13 51 02 CDR Could get the rock with it. Look. (HO-SRV) (SAMP 12043)

05 13 51 03 LMP Okay. Get some rocks with it. That's a good idea. (HO-SRV) (SAMP 12043)  
Hey, here's some rocks right here. There's a good  
rock. You know, we keep collecting a lot of the  
same type of rocks, because there just doesn't seem  
to be any other kinds around. I haven't seen any  
microbreccia the whole day; I've looked around for  
it. All I have seen is some basalt; I've seen  
nothing that looked vesicular at all, except on the  
surface.

05 13 51 27 CDR I haven't either. (HO-SRV)

05 13 51 31 LMP You know, that's real strange; it's not at all like (HO-SRV) (SAMP 12043)  
Neil's rocks. Close as it comes is that gabbro - -



05 13 51 35 CC Roger. We copy those comments. Pete, now we show. (HO-SRV)  
you are 2 plus 23 into the EVA and, based on a  
4-hour EVA, you would be leaving the Surveyor at 2  
plus 50. But don't rush; we'd like to make sure you  
get a good rest before you go into it.

05 13 51 52 LMP Why don't you give me a rock or two, Pete? And I (HO-SRV) (SAMP 12043)  
will stick in there. Got any spares? There you go.  
Good rock.

- - -

05 13 52 15 LMP We just made a sample of - glass bead and some local (HO-SRV) (SAMP 12043-44) (PHO 48 7082-83)  
rock on the south edge of the Surveyor crater,  
Houston. And they are going into bag 14D.

05 13 52 30 CDR I'm remembering back to all of our training. I'm (HO-SRV)  
trying to remember who the guy was that kept saying,  
"Whatever you do, don't get dust on the gnomon."

05 13 52 44 CDR Okay. We are going to jog on here for a little bit, (HO-SRV)  
Houston, and get a little bit closer to the Surveyor  
and look her over.

- - -

05 13 53 18 CC Pete and Al, could you give us a comment on how far (HO-SRV)  
you're sinking in?

05 13 53 24 CDR Not sinking in very far at all. This is fairly firm (HO-SRV)  
stuff and I'm down in the crater about the same  
distance down that Surveyor is. I'm just going  
around it radially. Wouldn't you say so, Al?

- - -

05 13 53 47 CDR Okay. Don't worry about it, Houston, because (HO-SRV)  
really, it's no strain; I'm 200 feet away from it;  
I'm at the same level; the ground is firm, and I can  
go right back up the way I came down with no strain  
at all.

- - -

05 13 54 09 CDR Al, I'll tell you what let's do. Let's go right (SRV)  
over here, and we will park all of our gear, take  
ourselves a little rest, go over your photo plan,  
and then we'll have at it.

- - -

05 13 54 22 CDR I'll tell you what, why don't you get a photograph (SRV) (PHO 48 7084)  
of it right now.

- - -

05 13 54 29 CDR I'm trying to see which way it landed. (SRV)

- - -

05 13 55 35 CDR Look, I'll tell you what. Let's leave the whole - (SRV)  
let's take the tool carrier with us - - I think - can  
go right up the other rim and around to that big  
blocky baby there and - - \*\*\* right over there at  
that - - neat crater. Where all that rock is just -  
- back of the LM.

05 13 55 56 CDR You know, I could have landed the LM in the bottom (SRV)  
of that crater. It would have scared me to death,  
but -

05 13 56 15 LMP Let's see. Okay, Pete. Would you carry the (SRV)  
hand-tool carrier down there?

05 13 56 20 LMP And let me take some pictures up here around it? (SRV)

05 13 56 23 LMP Now look. You can see which way it came in. See (SRV)  
the way these gear pads dug in over there - - dug up  
dirt? They're still setting there.

05 13 56 31 LMP This is going to make a good shot. We're not (SRV) (PHO 48 7085)  
supposed to take pictures with that mag. We'll have  
to do it, though.

05 13 56 45 LMP Beautiful. Beautiful sight. You know, this one's (SRV)  
brown and I don't remember ours being brown there  
at the Cape. Kind of a light tan or maybe that's  
the way it's changed color. What was this one,  
Houston? White? When it started out?  
- - -

05 13 57 21 LMP I'll stop here, and this will be my last picture. (SRV) (PHO 48 7086-93)

05 13 57 30 CC Al, the equipment bays were white on the side, and (SRV)  
the scoop itself was a light blue.  
- - -

05 13 57 59 LMP \*\*\* it turned tan or something. We'll have to look (SRV)  
at it more closely.

05 13 58 01 CDR Yes. That's what happened. It just changed color, (SRV)  
huh?

05 13 58 04 LMP It sure has. Something has cooked that paint brown. (SRV)  
Can't imagine what. You know, it's funny. On the  
slopes here, it's just a little bit softer. But  
there's no tendency to slip down or anything like  
that.

05 13 58 20 LMP I don't think it's any deeper. A little softer (SRV)  
maybe. Maybe a little deeper. Why don't I move  
this down here just a little bit closer, Pete?

05 13 58 28 LMP Then we'll take the rest down here where we can see (SRV)  
it better.

05 13 58 36 CDR Hey, you can see - look at there where it dug those (SRV)  
scoops. You can still see the - -  
- - -

05 13 58 40 LMP Boy, that's going to make some beautiful pictures on (SRV)  
the way that's weathered since - -  
- - -

05 13 59 00 LMP Oh, no. I don't think so. As you notice, there's a (SRV)  
 general trend of lines along here from the north -  
 that would be the northeast or the southwest - see  
 those little lines running along through the crater  
 here?

05 13 59 16 LMP I think I'll take a picture of that. Boy, this (SRV) (PHO 48 7034)  
 thing is dusty. \*\*\* 8. Just do this.

05 13 59 33 CDR Yes, this has those lineal patterns here, Houston. (SRV)  
 Right down inside the crater; and they're not laying  
 at all in the same direction - I mean, it's not from  
 us - not from the LM.

05 13 59 50 CDR Hey, Al, did you get a picture right across there? (SRV) (PHO)

05 13 59 53 LMP Yes, I did, Pete. (SRV) (PHO)

- - -

05 14 04 46 CDR I'll tell you what, why don't you mosey down there (SRV) (PHO)  
 and start taking some photographs?

- - -

05 14 04 56 CDR The first thing is photo bay A, 11, 15 feet, one (SRV) (PHO 48 7095)  
 picture.

05 14 05 03 LMP Eleven, 15; let me get a check. Eleven, 15, boy (SRV)  
 that's turned just kind of a light tan hasn't it,  
 Pete?

05 14 05 12 LMP And some of the things are even a dark brown. (SRV)

05 14 05 14 CDR Now, you're closer than 15. Don't go any closer. (SRV)

05 14 05 16 LMP Yes. Maybe I'd better back up a little. (SRV)

- - -

05 14 05 28 LMP Boy! It sure dug in the ground, didn't it? Oh, (SRV)  
 look at those pad marks. They're still there.  
 Still the waffle imprints on it. Okay. What's  
 next?

05 14 05 36 CDR Photo TV sector f:8, 15, three pictures. (SRV) (PHO 48 7096-97)

05 14 05 41 LMP Okay. Let me move down. (SRV)  
 - - -

05 14 05 50 CDR Cadet Gibson checklist. Okay, Al - - (SRV)

05 14 05 53 LMP Hey look at that dirt's still on the footpad. It's (SRV)  
 going to make a great - -  
 - - -

05 14 05 59 LMP Hey, we got a nice brown Surveyor here, Houston. (SRV)  
 Even the tanks which were - -  
 - - -

05 14 06 09 CDR The glass is still on the top. (SRV)

05 14 06 11 LMP Not a bit of it is fractured. (SRV)  
 - - -

05 14 06 14 CDR Okay. Shovel is a gray. Take the Surveyor scene (SRV) (PHO 48 7099-100)  
 here.

05 14 06 20 LMP I don't want to kick any of this dirt up because I'd (SRV)  
 like to get a picture of the compacting of the dirt  
 there.  
 - - -

05 14 06 27 CDR That's photo TV sector f:8, 15, and three. Now I (SRV) (PHO 48 7101-05)  
 have photo scoop imprints, f:8, 5, two in stereo.  
 - - -

05 14 06 45 LMP Boy that color chart has sure changed colors these days. (SRV)

05 14 06 50 LMP Let me get a quick shot here. About 15 feet and I'll shoot. (SRV) (PHO 48 7004-05)

05 14 06 55 CDR Okay. Now I want the footpad photo scoop imprints f:8, 5 feet, two in stereo. (SRV) (PHO 48 7106-09)

05 14 07 04 LMP Okay. Those scoop imprints look different than I imagined. (SRV) (PHO 48 7106-09)

- - -

05 14 07 21 LMP Shooting right there where the scoops made the scoops. (SRV) (PHO 48 7106-09)

05 14 07 22 CDR Oh, I'm sorry. Yes. The next one is photo the footpads: two prints, f:8, 5, two in stereo. (SRV) (PHO 48 7106-09)

05 14 07 32 LMP Wait just a second; I'll get it. I know what I'm going to do. Okay. I'll get the footpads now. And I'll also get the dirt that's on them. That looks good. Okay. What's next, Pete? (SRV) (PHO 48 7110-13)

05 14 07 53 CDR Disturbed surface by the footpad 2 area. FP-2 area f:8, 5, in stereo. (SRV) (PHO 48 7110-13)

05 14 08 03 LMP Okay. Will do. Did it - yes, that disturbed it all right. Well, we'll be able to get the rocks that the Surveyor's found - no strain. Get a bunch. There's one. Okay. Next one, Pete. (SRV) (PHO 48 7110-13)

05 14 08 26 CDR Photo vernier engine bay A, f:11, 5 feet, one picture. (SRV) (PHO 48 7114)

05 14 08 33 LMP Okay. A little bit to the east of - - looks pretty good. The engine is still green. In fact that green seems to have had less change than most of the rest. Okay, Pete. That's complete. (SRV) (PHO 7115-16)

05 14 08 49 CDR Photo large box A, f:8, 5 feet, one picture. (SRV) (PHO 7115-16)

---  
05 14 09 09 LMP Okay. Will do. (SRV) (PHO 7115-16)  
---  
05 14 09 26 LMP Now be careful. Let me look and see what it looks like. Houston, not a bit of this glass is cracked. (SRV)  
One little piece down here looks like it no longer reflects, but other than that, it's in perfect condition. A little warped - segment's warped, but other than that, it looks pretty much the same. The thing that's the most amazing to me is how it's turned so brown.  
05 14 09 52 LMP I want to wipe it a little bit, Pete. I'm going to wipe it with this little cloth that protects my wrist ring. It doesn't have anything structurally associated with it. (SRV)  
05 14 10 06 CDR It wipes off just like you'd expect us to wipe off glass. (SRV)  
05 14 10 11 LMP Let me wipe a couple of spots though - it might - it's going to be tough to show this, Pete. It's in a shadow. Give it a go, though. I don't think the pictures are going to show you much, Houston. (SRV) (PHO 48 7117-18)  
05 14 10 25 CDR They're better than no pictures at all. (SRV)  
05 14 10 26 LMP That's right. That's exactly right. Okay. Got it there, Pete. Ready for the next one. (SRV) (PHO 48 7117-18)  
05 14 10 34 CDR Okay. Photo small box f:8, 5, one. (SRV)  
05 14 10 38 LMP Okay. Now that's pretty much in the shadow. I'm going to open it up a little bit. (SRV)  
05 14 10 43 LMP No, no, no. It's in the shadow of the landing radar or the - instrument box. (SRV)  
05 14 10 47 CDR I think you ought to photo that scoop there, the way it's dug in. (SRV) (PHO 48 7119-23)

05 14 10 50 LMP I did. (SRV)

05 14 10 52 CDR There's no way that thing can slide down the hill on (SRV)  
us the way it's dug in.

05 14 10 57 LMP Okay, now let me get that footpad. That's a (SRV) (PHO 48 7124)  
beautiful shot there. We're going to do footpad 3,  
I guess it is, or is that 1?

05 14 11 05 CDR That's 3. (SRV)

05 14 11 06 LMP Okay. And that's going to be in f:8, probably. (SRV)  
It's pretty low; let me try 5.6.

05 14 11 14 CDR That aft honeycomb shock absorber struck the dirt (SRV)  
and looks like it took some of the shock. Other  
than that, the front one didn't appear to do that.

05 14 11 26 LMP Sure isn't going to slide down the hill though, (SRV)  
that's for sure. Okay, Pete. What's next? Back up  
15 feet and take it.

05 14 11 32 CDR Photo bay B - - (SRV)

05 14 11 34 LMP Okay. Let me get over here. (SRV)

05 14 11 35 CDR F:11, 15, 1 - - (SRV)

05 14 11 37 LMP That'll be a tough shot, because it's in the Sun, (SRV) (PHO 48 7124)  
but I'll get over here; that might help it.

05 14 11 53 LMP Back up a little bit more. How's that for 15 feet, (SRV)  
Pete.

05 14 12 04 CDR You're more than 15. (SRV)

- - -

05 14 12 22 CDR Okay. Photo solar array; got photo footpad 3. (SRV)  
Those solar arrays are not blue anymore; they're  
black.

- - -



05 14 12 41 CDR F:5.6, 15 feet, one photo. (SRV) (PHO 48 7124)

05 14 12 42 LMP Right on track. Okay, shot. (SRV) (PHO 48 7124)

05 14 12 52 CDR Okay, move around to the front. (SRV)

05 14 13 01 CDR Photo footpad 3. F:11, 5 feet, one photo. (SRV) (PHO 48 7124)

05 14 13 06 LMP All right, got it in sight, it dug in real well, (SRV)  
too. It's probably - it's right, in fact, it's  
right - dug in right to the top of the - -

05 14 13 15 CDR And another thing we're going to photo is the scoop (SRV) (PHO 48 7126-29)  
trenches f:8, 5 feet, at 2.

- - -

05 14 13 27 LMP Hey, let me get the top of this little instrument (SRV) (PHO 48 7125?)  
box, where the glass is fractured there. They're  
interested in that, if I can get it.

05 14 13 37 CDR See up the hill here. Oh, look! There's where it (SRV)  
hit. See?

- - -

05 14 13 52 LMP Okay. Now I photograph the trenches, right? (SRV) (PHO 48 7126-29)

05 14 13 57 CDR Yes. (SRV)

- - -

05 14 14 18 CDR What are you photoing, Al? (SRV)

05 14 14 19 LMP The trenches. (SRV)

05 14 14 21 CDR Photo the scoop trenches at 5 feet, f:8, in stereo. (SRV) (PHO 48 7126-29)  
Watch it now; you're going to get dust on us.

- - -

05 14 14 49 CDR Okay. Photo the TV mirror. (SRV) (PHO 48 7130-32)

- - -  
05 14 14 59 CDR The TV mirror is brown. (SRV)

05 14 15 03 LMP It's no longer a mirror. (SRV)

05 14 15 05 CDR No, it's brown because it's looking at brown, isn't it? (SRV)

05 14 15 07 LMP No, it looks like - - (SRV)

05 14 15 08 CDR Maybe it's got some coating on it. Yes. It does. (SRV)

05 14 15 11 CDR Why don't you stay right there, and I'll come in and wipe it? (SRV)

- - -  
05 14 15 29 CDR It's just got a fine dust on it. (SRV)

05 14 15 30 LMP Fine dust on it. I'll be darned! Let me get a shot that; that will be a good - let me see if I'm set right. No, I'm not set right! Did you tell me 5.6? (SRV)

05 14 15 42 CDR No. Photo TV mirror: f:8, 5 feet. Photo. (SRV) (PHO 48 7130)

05 14 15 49 LMP Okay, I goofed it. I'll take it again. Hey, get over here, Pete. Get one more shot. (SRV) (PHO 48 7131)

05 14 15 59 LMP You don't get a chance like this every day, now. Shoot up the extras; we've got lots of film. (SRV)

05 14 16 05 CDR There you go. Okay? Why didn't you get yourself in the photo, too? (SRV) (PHO 48 7132)

05 14 16 14 LMP Okay. Just a second. Back up just a little, Pete. Try for 15 feet. Okay. That ought to be good. How's that look to you? (SRV) (PHO 48 7133-36)

05 14 16 54 CDR Okay, Houston. I'm jigglng it. The Surveyor is (SRV)  
 firmly planted here. That's no problem. Okay, Al.  
 We're ready to start getting the TV camera.

- - -

04 14 29 10 LMP One scoop. (SRV)

05 14 29 15 CDR That's dandy! It's even got dirt in it. (SRV) (SAMP 12029, 12060-61)

05 14 29 17 LMP Bring back some of the original dirt. Okay. Got an (SRV) (SAMP 12029, 12060-61)  
 extra sample for you, Houston. The scoop's got dirt  
 in it.

05 14 29 21 CC Well done, troops. Say, when you move out from (SRV)  
 here, right? - well, first of all, we show you're 3  
 hours into the EVA; and you're about 10 minutes  
 behind nominal traverse we had figured out for a  
 4-hour EVA. However, your PLSS consumables are  
 holding out real well, so we suggest you go on with  
 the nominal traverse. We may want you to cut down  
 to perhaps just one sample at Block crater.

05 14 29 49 CDR Okay, that's what I wanted to do is go to Blocky (SRV)  
 crater if you agree - -

- - -

05 14 29 54 LMP We thought this thing had changed color, but I think (SRV) (PHO 48 7138)  
 it's just dust. Look, we rubbed into that battery,  
 and it's getting shiny again. Let me get a shot on  
 it.

05 14 30 01 LMP I think that's what - maybe this thing's just (SRV)  
 collecting all this red dust.

- - -

05 14 30 06 CC Okay, Pete. Now, before you leave there, also, (SRV)  
 would you get some of those geosamples which we've  
 discussed, as well as some of the loose soil from  
 that area?

05 14 30 16 CDR Will do. We'll do it right now. (SRV)

05 14 30 23 CDR Here's this rock right here. Let me give the  
Surveyor tool a heave. (SRV)

- - -

05 14 30 53 CDR I've got your full measure of rock right here. (SRV)

05 14 30 56 LMP Okay. Let me go get the sample bags. (SRV)

05 14 31 02 LMP Hey, that's a good one. (SRV)

05 14 31 04 CDR I don't think the TV could see that one, though, I  
figure it was too close. How about this one? (SRV)

05 14 31 15 CDR Okay. All right, now. Trying to remember where  
that - they got a \*\*\* one. (SRV)

05 14 31 25 LMP Here's a square one. I see one up there, right now. (SRV) (SAMP 12064)

05 14 31 28 CDR Where's the one that had the lines in it? (SRV) (SAMP 12056?)

05 14 31 31 LMP I think it's right up here on the - there's a  
crater, right up - I'll show you. Looks like a  
brick over there. (SRV) (SAMP 12056?)

05 14 31 36 CDR Come on, I've got these two rocks over here. Let me  
dump them - - (SRV)

05 14 31 36 CC Pete and Al, Houston. Before you leave the area of  
the Surveyor, would you take a look back at the  
Surveyor and see whether the direction of the  
sunlight has any effect on the colors which you see? (SRV) (SAMP?)

05 14 31 52 CDR Wait, wait! Let me get this in the bag, too. (SRV) (SAMP 12056?)

- - -

05 14 31 57 CDR Okay. No, it's light brown wherever you look at it,  
up-sun, down-sun, or cross-sun. (SRV)

05 14 32 05 LMP But, strangely enough, that light brown rubs off. (SRV)  
That's the funny part.

05 14 32 08 LMP That's funny, because the dirt here is not brown. (SRV)

05 14 32 11 CDR Look, is that the rock right there? You know, these (SRV)  
rocks, as they showed in the Surveyor pictures, all  
have this soil built up around them.

05 14 32 25 LMP Yes, they all have fillets around them. (SRV) (PHO 48 7139)

05 14 32 30 CDR I'm trying to remember where - I can't orient myself (SRV)  
to the pictures, can you?

05 14 32 35 LMP No, there's - I think it's about - - (SRV)

05 14 32 37 CDR Should we grab this one right here? (SRV) (SAMP 12062?)

05 14 32 39 LMP That's a good rock right there. (SRV) (SAMP 12062?)

05 14 32 41 CDR I don't know whether I can get that or not. Let me (SRV) (SAMP 12062?)  
see.

05 14 32 51 LMP We'll get it. That a boy. There you go. (SRV) (SAMP 12062?)

05 14 33 06 CDR Okay, let's head for Block crater; pick up a couple (SRV)  
of more of these en route.

05 14 33 12 CDR Let's get that brick-looking one over there. I (SRV) (SAMP 12064)  
think that's one of them they saw there. Up the  
hill a little bit - ways. That was one they saw.

- - -

05 14 33 41 LMP Right here's the one, the square one, Pete. (SRV) (SAMP 12064)

05 14 33 48 CDR Okay. That's about enough rocks, pal. (SRV)

05 14 33 55 LMP I think it is, that is, for here. Let me get it. (SRV) (SAMP 12064)  
Okay, you got it. Good show.

05 14 34 07 CDR Okay, let's head for Blocky crater. (SRV-BK)

05 14 34 12 CC Al, do you have a sample bag number on that last one? (SRV-BK)

05 14 34 16 CDR All those rocks are too big for sample bags - - (SRV-BK) (SAMP 12056?, 12062?, 12064?)

05 14 34 19 LMP They are big rocks, Houston. They're all at least 6 inches in diameter, and I think these are some of the ones you wanted. It's kind of hard to tell without having a photograph on hand or something that's standing there and studying it for a lot longer than I think we care to do it, just which rocks are which. (SRV-BK) (SAMP 12056?, 12062?, 12064?)

05 14 34 45 LMP It's pretty easy to move along this slope. It's just a little bit deeper and it's a little bit softer. (SRV-BK)

- - -

05 14 35 05 LMP You don't have a chance to go from side to side, like on level ground. Look at that huge boulder out there at - boy, I wish we could go over there. Look at that boulder. (SRV-BK)

05 14 35 13 CDR Where? (SRV-BK)

05 14 35 15 LMP Straight ahead. See it there? (SRV-BK)

05 14 35 19 CDR That one? (SRV-BK)

05 14 35 20 LMP No, there? Over the top of the hill. (SRV-BK)

05 14 35 25 CDR Don't see where you are looking. (SRV-BK)

05 14 35 27 LMP Right on the other side of the - about 200 yards that way. See that big boulder sitting up there; the biggest one we've seen since we've been here. (SRV-BK)

05 14 35 37 CDR I don't see which one you're referring to - that one right there? (SRV-BK)

05 14 35 40 LMP Yes. (SRV-BK)

05 14 35 43 CDR Yes. Oh, these down in here are bigger than that. (SRV-BK)  
 Look at that right there on your left. Look.

05 14 35 50 LMP Let me turn around and look. (SRV-BK)

05 14 35 52 CDR Gigantic right there. There's a big one. (SRV-BK)

05 14 35 55 LMP Come further left. That's a pretty good sized one. (SRV-BK)

05 14 36 00 CDR I've got it. Let's get up out of the crater where (BK)  
 we can get up on the level ground. Okay.

- - -

05 14 36 34 CDR There you go. Okay, let's document a sample here, (BK)  
 and I think you ought to photo that whole Blocky  
 crater right there. That thing's spectacular.

05 14 36 53 LMP It is. What is it? (BK)

05 14 36 56 CDR That's got to be bedrock there, babe. Yes. Let's (BK)  
 get some samples of that.

05 14 37 03 CDR Hey, Houston - is the dimple crater right behind the (BK)  
 LM? It's a big blocky impact crater.

05 14 37 32 LMP It's funny. I don't have any - I kind of thought it (BK)  
 would be tough down in the crater, losing your  
 balance, but it doesn't seem to be; it's just harder  
 walking, that's all.

05 14 37 47 LMP We're right at the top of the rim, we can get a good (BK)  
 place to rest.

05 14 37 56 CDR We're going to sample - I'll tell you what we're (BK)  
 going to do, Houston. We're going to get an EMU  
 check here; we're going to pick up one sample out of  
 this Block crater; give you a partial pan of it  
 because it's a pretty fantastically interesting  
 crater with a lot of bedrock. Big chunky rocks  
 blown up out of it - -

05 14 38 11 LMP Very angular. Very sharp. (BK)

05 14 38 13 CDR - - and get a sample of the double craters on the side of the Surveyor crater, and then my recommendation is, we've got so much gear and so many rocks, that we head for the LM and start packing it all up. (BK)

- - -

05 14 38 40 CC And how are you doing on that film? (BK)

05 14 38 42 LMP Let me ask Pete. That's a good question. Boy, my camera is completely dust-covered, Houston. I just hope that the lens is open - - (BK)

05 14 38 47 CDR \*\*\* 121. (BK)

05 14 38 48 LMP How's the lens? - - (BK)

05 14 38 52 CDR Your lens is in good shape. Now, why don't you stand right here and get a partial pan while you're resting on this crater? Either side. (BK) (PHO 48 7140-47)

- - -

05 14 39 10 LMP I'm beginning to think that these rocks that look red, if we'd just crack them open, we'd find they're plain old basalt rock on the inside. We just don't ever have any cracked. We ought to pound one of those things with a hammer in a minute. (BK)

05 14 39 22 LMP Okay, you want me to do a pan of this little part or the whole crater, Pete? (BK) (PHO 48 7140-47)

05 14 39 25 CDR No, get the whole crater. Get about four shots across it and then move over and get another four. (BK) (PHO 48 7140-47)

05 14 39 30 LMP Okey-doke. 74. (BK)

- - -



05 14 39 45 CDR Oh, it feels okay; sure, the way to carry gear; it (BK)  
sure beats that thing. That's a pain. Now, wait a  
minute; where are you shooting, Al? I want you to  
shoot down in that crater right there.

05 14 39 55 LMP Sorry, that's what I - okay, read you. (BK) (PHO 48 7140-47)

05 14 39 59 CDR Shoot way down into it; get a stereo of that thing (BK) (PHO 48 7140-47)  
with those big blocks down there.

05 14 40 03 LMP Okey-doke. It's kind of dark, but I think we can (BK) (PHO 48 7140-47)  
get something good. Okay, move over here. This is  
probably the most spectacular crater we've come to,  
I think. The original craters took it down to  
bedrock and then, I guess, more recently then, this  
one, came in here and really banged it out. These  
blocks are a lot more sharp cornered than any we've  
seen anywhere else. I guess this must be the most  
recent one we've been around.

05 14 40 40 CDR No. I got the idea that the bedrock's not too deep, (BK)  
and that this was a big crater but it's very, very,  
very, very old. And then this thing came along and  
hit it - - and broke into the side of the bedrock  
that's been sticking out into this \*\*\* - -

05 14 40 55 LMP Yes, and then threw it all out again. (BK)

05 14 40 59 CDR I think - let's get a sample of that rock. (BK) (SAMP 12045-47) (PHO 48 7148-50)

05 14 41 04 LMP Yes. Let's do. I think it's going to be the same - (BK)  
- - -

05 14 41 06 LMP Okay. Want to get a docu - we get a documented and (BK) (SAMP 12045-47)  
a couple of the big pieces. How's that?

05 14 41 12 CDR Yes. (BK)

05 14 41 13 LMP That's a good idea. (BK)

05 14 41 14 CDR Let's see. What looks like all the same. Right (BK)  
here?

05 14 41 16 LMP Yes. Let me get a shot at it, Pete, cross-sun. (BK) (PHO 48 7143)

05 14 41 19 CDR Okay. Get a stereopair right here. We don't need the gnomon; I'll put the - - (BK) (PHO 48 7143-50)

05 14 41 22 LMP By the way, when I shot that crater down there, I had my distance set on 30 feet. I thought that would be right, but that's the only one we haven't shot on the numbers. (BK) (PHO 48 7143-47)

05 14 41 38 LMP Okay. Let me get some rocks. Okay. This is going to be sample bag number 15D. (BK) (SAMP 12045-47) (PHO 48 7148-50)

05 14 41 53 CC 15D, Al. (BK) (SAMP 12045-47)

05 14 41 56 LMP Okay. Pete, you ought to put two or three rocks in here, just generally; and I'll photograph them, and we can see what you took. Couple of more. Those are good. You know, most of the rock we've seen today is exactly like this. Going to pound one of these with a hammer in a minute. (BK) (SAMP 12045-47) (PHO 48 7148-50)

05 14 42 16 LMP Hey, there's some of that light-colored under-soil. (BK)

05 14 42 20 CDR You're right. (BK)

05 14 42 26 LMP Okay. You want me to get another sample bag? (BK)

05 14 42 30 CDR No. I want to start moving out. (BK)

05 14 42 33 LMP Okay. Go. (BK-LM)

05 14 42 35 CDR All right. (BK-LM)

05 14 42 43 LMP I'll just pick up this one big rock here, Pete and stick it in the bag. (BK-LM) (SAMP?)

05 14 42 48 LMP Good. That's a good rock. (BK-LM) (SAMP?)

05 14 42 50 CDR Okay, Houston. Now, I'm going to go pack up the DOC sample box, and I'll understand you're going to allow me 20 pounds of other rocks. Is that right? (BK-LM)

- - -

05 14 43 05 CC Pete, what we'd like to do is to get an estimate (BK-LM)  
from you of how much you think you've got in the  
first SRC in terms of volume or weight.

05 14 43 16 CDR Well, in comparison to the zero-g airplane, let's (BK-LM)  
see, the maximum load is 80 total pounds, right?  
I'm going to guess that the mass that I sent up was  
about a 60-pounder. Just the box.

05 14 43 37 CC Roger, Pete. From what you said in the first EVA (BK-LM)  
and basic calculations on Apollo 11 data, we come up  
with about 54 pounds.

05 14 43 48 CDR Very good. I think that we're fairly close. (BK-LM)

05 14 43 57 LMP I just bet you everything we got here is really (BK-LM)  
black basalt. All been colored just like that  
Surveyor. Hey, that bag is bouncing a little bit  
too much back there, Pete.

- - -

05 14 44 36 CDR Al, you've got to get that closeup stereocamera (BK-LM) (PHO CSC)  
going.

05 14 44 39 LMP Okay. (BK-LM)

05 14 45 02 CDR Okay, Houston. CDR is back at the LM. (LM) (PHO 48 7151-52)

05 14 45 13 CC Roger, Pete. You're 3 plus 16 into EVA, and for a (LM)  
4-hour EVA, you're right on.

- - -

05 14 46 41 LMP Hey, I think all this stuff is just fine-grained (BK-LM)  
basalt, Pete. We haven't seen anything else but  
that. We haven't seen anything at any of the places  
that we've gone except the same type of fine-grained  
basalt. It's been different colors because of how  
long it's been out on the surface or where it's  
been. It'll be interesting when we get them to  
Houston and they crack them open.

05 14 47 05 CDR Hopefully. (BK-LM)

05 14 47 12 LMP Take a rest here a moment. I used to have to push the legs down in that lunar handtool carrier, but I don't have to anymore. He just pushes his own legs; got enough rocks in there. (BK-LM)

05 14 47 34 LMP Hey, Houston. Here's where that engine moved some dirt. You can see it here. (LM)

05 14 47 44 CC Where are you on that, Al? (LM)

05 14 47 49 LMP I'm right to the left rear of the - it looks like I'm between the plus Y and minus Z strut, and it looks like it really washed a lot of dirt off in this direction. If I look back behind me, - - (LM)

05 14 48 03 CDR Hey, Al? Al? Let's get the - - (LM)

05 14 48 08 LMP Need some rocks? (LM)

05 14 48 09 CDR Get the rocks over here. Come on. We can't baloney all day. We've got to get out of here. (LM)

- - -

05 14 49 22 LMP No. Okay. Now I'll go do stereo closeup photos. (LM) (PHO CSC)

05 14 49 34 CDR I'll tell you what, you go get me the Solar Wind, first. (LM)

05 14 49 37 LMP Solar Wind first? I'll go get it for you. (LM)

- - -

05 14 57 38 CDR Give me a hand getting this rock box closed. (LM)

05 14 57 40 LMP Okay. Will do. Hey, that's a nice full box. (LM)

- - -

05 14 59 04 LMP Okay. Got it, Pete. It looks good. The SRC is closed, Houston. (LM)

05 14 59 14 CDR Al, I want all the big ones. That looks like about 1 inch to me. (LM)

05 14 49 20 CDR That's it. The extra big. (LM)

05 14 59 24 LMP Okay, you got some of those bedrock ones in there, didn't you? (LM)

05 14 59 28 CDR Yes. (LM)

- - -

05 14 59 35 CC Okay. We'd like to give you a little weight summary for the rock boxes. We estimate you probably got about the same in rock box 2 as you did in rock box 1. No problem there. The Surveyor parts and TV camera will show a nominal 25 pounds in 15. What you could put in your bag that goes on the floor is about 15 pounds worth of rocks; and in the left-hand side stowage bag, you can put about 25 pounds of rock. So I guess those are the two you are working for now. Fifteen pounds worth of rocks in the bag on the floor, and 25 pounds on the left-hand side stowage bag. (LM)

05 15 00 12 CDR Okay, we don't have that many rocks, Houston. I'll tell you what we've got. We've got - SRC 2 is full and closed. It's - gosh, I hope I got it all in there, let me see: Solar Wind, core tubes, environmental gas sample, Documented Samples all made it in. And the box is full, and I closed it, and I've got about - what's 1 inch on my scale? - I've got about 1 inch worth of rocks in another bag. And that's it; that's all the rocks we've got. A bunch. (LM)

05 15 00 42 CC Roger, stand by for that number, Pete. Pete, that 1-inch displacement is about 10 to 15 pounds. No problem, pack it up. (LM)

05 15 01 01 CDR Okay. That's good. Now, let me ask you another question. I can get some more rocks. Why don't I do that? While Al is taking stereophotos. We'll see if I can get myself - - (LM) (PHO CSC)

05 15 01 21 LMP Okay, I'm going to - I don't have a camera to go along with this, so I'll just tell Houston when I'm taking a picture and then they'll know. So they can keep up with it. Okay, Houston. On this stereocamera, I'm taking a picture now, about 10 feet from the LM between the plus Y and minus Z strut, and I am hoping to show the effects of the engine exhaust on the lunar surface. That was number 800. Taking one at 801. It's moving around here \*\*\* I'm going to take another one. The little counter doesn't seem to be working. Everything is working okay but the little counter. And I am taking the fourth picture right up next to the engine, here. Okay, another one close to the engine. About 2 feet from the engine. Okay, Houston. The little counter on top of the experiment's not working, so I'll just tell you what I take next. And the light and everything seems to be working so I assume it's probably taking pictures. I'm going to go look for a crater that is undisturbed and take a picture down inside it. Here's one of the - - (LM) (PHO CSC 57 8441-45)

05 15 02 59 LMP Here's one of a rock. Take two of the rock. Now, I am taking a picture of Pete's footprint in the soil. You can take a look at the interaction of that. Take another one. (LM) (PHO CSC 57 8446-48)

05 15 03 59 CC Okay, we recommend that you pack up where you are and start trying to pack up the excess rocks you just got and think about ingress. (LM)

- - -

05 15 04 44 LMP I'll take some of these pictures until you give me a call, Pete. (LM) (PHO CSC 57 8449-55)

05 15 04 48 CDR Why don't you just start working your way over here, (LM)  
Al? And we've got an awful lot of gear, and we will  
start getting her up.

- - -

05 15 06 27 LMP Okay, Pete, I'll take this as my last one. (LM) (PHO CSC 57 3455)

- - -

05 15 19 45 CDR Okay. Houston, I guess you can mark me off the (LM)  
lunar surface; I'm on the footpad.

- - -

05 15 21 55 CDR \*\*\* let me close the hatch. (LM)

- - -

05 15 22 32 CDR One hatch closed. (LM)

\* \* \* \* POST EVA 2 \* \* \* \*

05 18 33 55 CC Okay. Thank you. Okay, and a question on the third (POST EVA 2) film pack which we used. How much of that was used on the inside, and where in the traverse did you pick it up and - and change it to one of the existing cameras?

05 18 34 19 CDR Well, I got some bad news for you and some good (POST EVA 2) news. In the first place, the third magazine was a color magazine, and all it had on it were some shots that were taken of earthrise and a few things like that coming around on descent; and, unfortunately, Al and I got our signals crossed, and it's outside on the lunar surface right now. Now, what we did was take the black-and-white magazine off of Al's camera when it failed and put it on my camera and used it up so that we have two complete black and whites of the second EVA and two complete colors of the first EVA, the only thing that's missing is the color magazine that has undocking and a couple other mundane things like that on it at the beginning of the LM operation; and, unfortunately, that's out there in that saddle bag. We didn't catch that one.

- - -

05 18 35 26 CDR Oh, yes. We have all the Surveyor pictures and (POST EVA 2) everything, but they're all black and white.

- - -

05 18 40 59 CDR We were really thirsty after the second EVA because (POST EVA 2) - I don't know as yet how far we went. I think we made a pretty good trip out there.

05 18 41 15 CC Roger, Pete. We're estimating something over a mile (POST EVA 2) for the full circuit. But that's not counting some of the side jaunts you made.



05 18 41 23 CDR We've been trying to follow our tracks out here with (POST EVA 2)  
the monocular. Have you got your map book there?  
Let me talk to you about this big block rimmed  
crater that's out here.

- - -

05 18 42 02 CDR Okay. On the great big map, it's the crater - the (POST EVA 2)  
one that has got the really big blocks on it, that's  
just outside the ellipse on map A.

05 18 42 14 CC Okay, Pete. Which is the great big map? (POST EVA 2)

05 18 42 16 CDR The smaller one is - okay, the one that shows the (POST EVA 2)  
landing ellipse. It's number 30 chart.

05 18 42 48 CDR Yes. That crater is on our horizon, and we can see (POST EVA 2)  
it from here, and I can sit here with the map and  
pick out the really great big boulders and  
everything, and - one of the problems up here is  
there's nothing to break up - or there's nothing  
between you and any object that you happen to pick  
up out there like a rock to judge distance by. And,  
when we first landed, I really thought that crater  
was like a thousand feet away, but it's obviously a  
whale of a lot further than that away. It looks  
like it's right next to us, and we can use the  
monoculars and scan those gigantic boulders over  
there. That's the only one that's visible to us on  
the horizon, but I wanted to point out that you can  
get an idea and of the fact that that really looks  
like it's about a thousand feet away from us, but  
you know how far away it is from us and how  
difficult it is to gage distance.

05 18 44 02 CC Roger, Pete. Maybe the use of that LM shadow then (POST EVA 2)  
was pretty useful. I know in the beginning, you  
doubted that the shadow was really that long, and  
apparently it was telling you the truth.

05 18 44 19 CDR Yes. I think you're probably right. The other (POST EVA 2)  
thing is from the spacecraft here looking at the  
ALSEP, it looks like it's right under the window,  
and Al and I are just guessing that it's at least  
450 feet away now.

- - -

05 18 46 22 CC Copy your question, Pete. Stand by. Also, that (POST EVA 2)  
crater which you were talking about is, we estimate,  
4-1/2 kilometers from your present position.

- 07 05 02 43 CDR Today, while the picture-taking was going on, the three of us had the opportunity to discuss what we thought the texture of the surface was, especially because we were interested in our landing area and possibly finding some Copernican ray materials, looking at the rays and everything. And they are quite readily visible from 60 nautical miles, but if you look at them carefully through the monocular or something like that, I think that the difference in texture is so slight when you get actually down on the surface that Al and I had the impression on the lunar surface at our landing site that we just could see no contact difference whatsoever anywhere we went, and I think that as you look at the Moon going away you get that idea. You can see highlights and whites and grays. You can see rays and things like that, but they're really not that much different in color from one another. (TRANSEARTH COAST)
- 07 05 03 55 CC Roger. What about the white and gray differences you saw around the west side of Head crater? Could you see those out over the regional area? (TRANSEARTH COAST)
- 07 05 04 10 CDR Well, I kind of had the feeling that - Al and I talked about this, that when we were in the right place and our foot subtracks turned up the lighter material that it was still the same material. It's just that it hadn't weathered on the surface, and we had the feeling that the ray material is probably the same thing. It's pretty much the same general material, but it came at different times and it's had different amounts of exposure to the weather. (TRANSEARTH COAST)
- - -
- 07 05 07 21 CC Hey, listen. Tell us about all those grooves and ridges you saw on the surface. Did you get any patterns out of those? Could you see those from orbit? (TRANSEARTH COAST)

- - -  
07 05 08 23 LMP Say, Don, you were asking about those lines. We (TRANSEARTH COAST)  
don't - the ones we saw on the ground were very,  
very small; maybe an eighth of an inch. But there  
are definite patterns on the Moon.

- - -  
07 05 13 51 CC Hey, listen. While we're getting that, since you're (TRANSEARTH COAST)  
the international experts on lunar rock rolling, how  
does that work? Tell us what a rock looks like when  
it rolls down a lunar crater, since you did some of  
that on Earth.

07 05 14 08 CDR Well, it goes very slowly. And I guess the (TRANSEARTH COAST)  
impression you have is the same way as if you throw  
something up there, and we had the occasion to throw  
some things away. They sort of move out, not too  
rapidly, but they just keep going, and that's  
exactly what happens when you roll a rock down the  
side of a crater. Once you get - it was hard to get  
them going; I was surprised. I think everybody had  
the idea up there that because you're in such light  
gravity, that things would roll down rather easily.  
And that really wasn't the case. Once you got it  
going, it just sort of went along in animated slow  
motion, but it kept going for a long, long time.

07 05 14 54 CC Did it bounce, or did they dig in, and did they go (TRANSEARTH COAST)  
through this bounce \*\*\*

07 05 14 59 CDR Well, they bounce and slide, a little bit of (TRANSEARTH COAST)  
everything, just like they do on Earth, but just  
stretch it out. I found that I couldn't walk;  
wherever we went, we loped, and it just didn't seem  
natural not to lope. And - but when you lope, it  
reminded me of these pictures, high-speed motion  
pictures of watching a greyhound run or something  
like that. That's just the feeling I had as I loped  
across because I'd have to step out and then just  
sort of hold what I had until I came down. And  
that's the way Al and I moved around on the whole  
traverse.

07 05 15 44 CDR Well, Al accused me of making him carry all the tools. One time he said that he had wound up with all the ones that I had, too, and I was just running there in front of him. He's probably right, now that I think about it. (TRANSEARTH COAST)

- - -

07 05 17 28 CDR Yes. I'd like to ask the doctors because I haven't any idea, but I'm sure that our heart rate stayed fairly low even when we were loping. I don't think we approached anywhere near the heart rates that we had in just our normal walk-throughs and practices in just one g back on Earth and I agree with Al. You could go for 8 or 9 hours out there and still be \*\*\* the other thing that we did was - I think was kind of interesting - everybody got worried about falling over and going down slopes and things. I fell over once up there, but I didn't have any problem getting up and we just finally - to expedite things - we would just either fall over on our face picking up the rock and give ourselves a one-hand pushup or just get down on our knees and with it get whatever it was we needed to pick up down there, because we picked up many rocks that were bigger than the tongs would pick up. (TRANSEARTH COAST)

- - -

07 23 46 13 CC And, 12; Houston. The folks down here have thought a little bit about your two EVA's, especially the geology involved, and have a few questions which were stimulated by what you said during the EVA's and after it. And, any time you would like to have a discussion of those questions, we are sitting here waiting for you. (TRANSEARTH COAST)

- - -

08 00 17 15 CC Okay, Pete. One question is could you give a little more elaborate description of the patterned ground with the ridges and grooves; that is, were there several scales of the patterning and was there a (TRANSEARTH COAST)

difference in the bearing strength of the surface on the patterned ground?

- 08 00 17 39 CDR You're referring to the things that look like streaks and that we talked about that were in different directions, also, than the LM - so that they weren't effects of the LM exhaust plume, is that what you're talking about? (TRANSEARTH COAST)
- 08 00 18 00 CC Yes, you talked - you described some which were perpendicular to the direction which you thought the exhaust plume would normally give pattern ground. (TRANSEARTH COAST)
- 08 00 18 11 CDR Yes. If I remember correctly, that was in the Surveyor crater, and I think that we noticed these radial streaks almost everywhere. Don't you agree, Al? (TRANSEARTH COAST)
- 08 00 18 25 LMP Yes. We'd see some and then we'd go through an area that wouldn't have any; then we'd see another area and then there would be an area that wouldn't have any, so we were seeing them frequently, you know; they weren't very isolated, but they were all over. The ones down in the Surveyor crater were from - looked to me like the north-northeast, running southwest, wouldn't you say, Pete? And then maybe the ones out in front of the LM, for example, they were north, running south and maybe northwest running south. I can't remember now, but I'm sure it's on the voice tape. The size as I recall - Pete may recall them differently - it's hard to remember them, some of these things- they look to me like they were about maybe an eighth of an inch to a sixteenth of an inch wide, and they maybe were - as you looked at them real close, they looked like they were about a sixteenth of an inch high or less and then, maybe then they were about three-eighths of an inch between little hills; something like that would be my guess. What do you think, Pete? (TRANSEARTH COAST)
- 08 00 19 28 CDR Yes, I agree with that. You mentioned bearing strength. I think the bearing strength of the ground, generally speaking in the Surveyor crater (TRANSEARTH COAST)

and up around as we approached it from the far side on our traverse and everything was probably some of the firmest ground we were on; the ground that we sank in the least. There was one place we got into, when we got out - way out - was it Sharp crater, Al? - where we felt that the ground was much more soft and powdery and we were, therefore, not as good bearing strength.

- 08 00 20 08 LMP Yes. I think it was Sharp; maybe that's on the (TRANSEARTH COAST)  
tape, too.
- 08 00 20 11 CDR And I can't say that I remember any radial (TRANSEARTH COAST)  
patterning out there at Sharp to speak of.
- 08 00 20 20 LMP I don't remember any either. One thing - we know we (TRANSEARTH COAST)  
did that Gold camera right at the very end, and I don't think I was able to get any of that patterned ground; I should have, but the time just ran out. Before I could get very many pictures, we came back in. I did take it with a 70-millimeter several times.
- 08 00 20 41 CC Roger, over what extent did that patterned ground (TRANSEARTH COAST)  
occur, and can you relate it to anything that you've seen back here?
- 08 00 20 59 CDR Well, I don't think we paid that much attention to (TRANSEARTH COAST)  
it, other than when we were aware of it; it was all around us like the Surveyor crater. Going down - I guess walking down to the Surveyor was when we noticed it in there, while we were resting. And to what extent it went, I really can't say; but, like Al said, we came across it in several places, and it's more an impression than anything else, but I really don't remember it out there by Sharp crater or anything, and this is where ground was sort of soft and maybe finer grained than we've been on. So that may be a very pertinent point, that the more firmer ground that we're on, the more we would see this radial or patterned streaking.

- 08 00 21 53 LMP Hey, and that's something else I haven't thought of, (TRANSEARTH COAST)  
Pete. Remember that firm ground also was the same  
ground we came up on when I said it looks like this  
ground has got kind of little blobs in it; and it  
looks like what a nice, smooth, level dirt field  
would look like if it just had some very light rain  
on it. Remember when we looked at that?
- 08 00 22 13 CDR You're right. That was when we were on firm ground, (TRANSEARTH COAST)  
right there. That's a good point; I hadn't thought  
of that.
- 08 00 22 19 LMP I do remember looking at that pattern to see where (TRANSEARTH COAST)  
it went; and usually, if I was near it and looked  
out in the distance, it looked like it went in the  
direction of the grooves, as far as I could see out  
in that direction, you know, and be able to see any  
detail that fine. In other words, I never did look  
either left or right on those groove patterns where  
it did look to me like it went all the way out to  
the limit of vision to seeing them. I never saw any  
sort of contact along the transverse direction of  
the grooves either in Surveyor crater or in front of  
the LM or the couple of other places we happened to  
walk around. Yes, now that I mention it, we saw I  
guess at least three basic types of ground. The one  
that we were on most of the time that we discussed,  
like right outside the LM, we saw the kind with the  
grooves; we saw the kind with the little like  
raindrops on it, and of course, we got pictures of  
all the different kinds, and then we saw some more  
finely powdered ground like out around Sharp crater,  
and then we saw some more finely powdered like is  
down on the inside of the small craters and to some  
extent on the inside of the Surveyor crater. Those  
are all the different types of soils that I can  
recall.
- 08 00 23 39 CDR However, they all had the same color. Boy, there (TRANSEARTH COAST)  
was, other than the fact that you're suddenly aware  
that you've sunk in further or you just have to be  
thinking about it or looking at it at the time,  
there was no distinguishing in colors or anything



like that. Now, there might be a subtle enough distinction in colors that from a far distance; that's where rays out of these craters give you that pattern. But, when you're standing right up close to it, that was not at all apparent that there was anything different in color.

- 08 00 24 18 LMP Yes, that color was so deceptive. I can recall now (TRANSEARTH COAST) looking at all of the terra around the LM the first day we were out and making some comments - I don't recall what I said, probably more gray-brown or gray-white. Then the second day I was out in the very same place, and I wasn't really aware of it at the time; I kept talking about it being light brown. All the rocks, I kept thinking, had a light tan coating; whereas, the first day I thought they had a light gray coating. My impression now is, and it could be completely wrong, is that I'm going to be anxious to see the rocks when we get home - if we picked up all the different kinds of rocks that we saw that had to do with texture and shape and anything else, we could see which wasn't much, believe me. I looked hard. But my impression is, we're going to crack those rocks open and when we do we're going to find - we should have done this on the lunar surface with a hammer - we're going to find that those things are dark gray basalts. Also, every time we came in the LM, both times, Pete's suit and my suit looked the same gray color. I never saw anything but that dark gray. I never saw any of the browns that I'd seen outside or anything like that.
- 08 00 25 23 CDR Yes, our suits looked like we'd been wallowing (TRANSEARTH COAST) around in graphite, a dull graphite.
- 08 00 25 28 LMP That's right. It was about that thin, too, and (TRANSEARTH COAST) fine, and it clung to everything.
- 08 00 25 35 CC There were some points there where you talked about (TRANSEARTH COAST) seeing large white boulders in the distance or on other occasions, seeing things which appeared white. Do you really think that was the color, white, or do

you think it was the way in which the Sun was reflecting off of those surfaces that you were looking at?

08 00 25 55 LMP Well, we discussed that again when we got back up in (TRANSEARTH COAST) orbit; and the fact that, at the high sun-angles, the ground looked white to us from orbit and everything, and I think it's purely a matter that the Sun is so bright that when it shines on those objects at a distance and you're very close to having the Sun directly behind you, that it gives the appearance - everything has the appearance of being chalk white. I think that's one of the most different things about the lunar surface, that I saw, from the Earth's surface, was the fact that where the Sun is has such a great effect on the color. Whereas, you take on Earth you have some sort of rock laying on the ground, the Sun can move a long way and the rock still pretty much looks the same; and, when you pick it up and kind of shade it with your body or something on the ground, you can usually get a good index of the color. You do that on the Moon, and you just can't hardly see the rock. When it's in the Sun it just changes colors with the sunlight. That's one of the most phenomenal differences I can see.

08 00 27 04 CDR Yes. Now, Al mentioned a very good point. There's (TRANSEARTH COAST) no doubt about it that the ground looked different the second day than the first due to the sun-angle getting higher; however, on the horizon, the horizon remained approximately the same, and again I think it's because of the greater distance and the fact that the angle between us and the Sun was still relatively small looking at a distance, and the rocks still looked white out there, chalk white. I'll bet if we stayed there and let the Sun move to 90 degrees, that what we saw in the distance would change in color.

08 00 27 48 LMP Yes, I agree with Pete. Now, one interesting thing, (TRANSEARTH COAST) when we were out at the Surveyor, that was sort of tan. My initial impression was that radiation or

something had darkened the paint, but when you look at the chrome surface - the only surfaces I saw that didn't look this way were the barer surfaces, by the way. But you look at the chrome surfaces of, for example, that battery box, and it had changed almost the same color, that light tan. Now, maybe if we had looked at it that first day and it had been in sunlight, it wouldn't have looked like tan; it would have looked like gray, but it looked like tan - you'll be able to get this, of course, because we've got the cameras with us - but when I rubbed the box, it took off the light gray coloring; but it just didn't dust off. I'm pretty sure that we didn't put it on with our LM, because it wasn't just like dust that hangs around your house that's only been there a day or two. It was like dust that's collected on there for a long time and longer to have some effects on it, long enough so that it really becomes not a thick coating but a very cohesive coating. It was almost like a skin on there. You had to rub hard to get it off that battery box. When you did, there was a nice shiny chrome beneath it. It was kind of a strange thing, like a bunch of dust had blown on the box; and it had stood there long enough to really get hard.

08 00 29 11 CDR But I think there's going to be enough parts that (TRANSEARTH COAST)  
have not been touched by either our gloves or by the  
bag that the camera is in, that you'll be able to  
get a good hack on that.

- - -

08 00 29 30 CDR Yes, the TV mirror has only my finger mark on it, (TRANSEARTH COAST)  
and I'm sure that nothing else has touched any of  
the rest of that TV mirror, and it was covered with  
this fine dust.

08 00 29 43 LMP Also, in the same place with the mirror, Pete, (TRANSEARTH COAST)  
although our mockup didn't look this way as I  
remember, there's a lot of electronics exposed in  
behind that mirror, that, of course, we never could  
possibly touch. It should have the same coating in  
there or something.

08 00 29 57 CDR The other most important thing is the Surveyor was (TRANSEARTH COAST)  
equally brown all the way round it; and had we  
covered it coming in, I think we'd have seen a  
directional pattern on the Surveyor, so I don't  
think, as a matter of fact, the way that dust flew  
when we landed, I don't think any of it landed  
within 10 miles of where we landed. It just took  
off.

08 00 30 17 LMP I kind of agree. And even if it did, it wasn't (TRANSEARTH COAST)  
going to fall in the crater; just shoot right across  
it.

08 00 30 21 CDR Yes, and the Surveyor was lower than we were. (TRANSEARTH COAST)

08 00 30 24 LMP Hey, did - I just thought of an interesting possible (TRANSEARTH COAST)  
point that somebody wants to do when they get with  
that camera - the geologists want to look at it when  
they get the camera before they give it to the  
scientists - is back in there behind that mirror  
where all the radiation could get in to - it  
couldn't get into as much as it could in, let's say,  
the top. The camera got radiation all day long,  
because it would get it the minute the Sun came up  
and it'd get it all the way around to sunset. But  
inside that little hole where the mirror rotates,  
there's going to be parts in there, easily  
calculable, that got just only a certain amount of  
sun each individual day. Like, say, some parts  
would only get 10 percent of the Sun on the  
southside; some parts or the inside would get 50  
percent, so if they're very careful with that  
mirrored surface in the back of the mirror and  
inside that little hollow place, they're liable to  
be able to get some index of how fast this stuff  
builds up and when it does.

08 00 31 42 CC Did you notice any vertical gradient in the color on (TRANSEARTH COAST)  
the Surveyor, as you might expect, if it was dust?

08 00 32 01 CDR No, it was pretty well uniform all the way over it. (TRANSEARTH COAST)

08 00 32 07 LMP Pete brought out a point. It's strange, too. It was - all the way around; it all looked the same. (TRANSEARTH COAST)

08 00 32 12 CDR You see, we approached from the opposite side than we landed, and that was our first impression coming up on the opposite side was that it was brown. It didn't look brown the day before in the shadow, either; it looked white. And, of course, it was out in the sunlight by the time we got to it on the second EVA. (TRANSEARTH COAST)

08 00 32 37 CC Okay, a question on the vesiculation of rocks. Did you really notice any or an appreciable amount of vesiculation in any of the rocks you saw? (TRANSEARTH COAST)

08 00 32 48 CDR Not a one. That's what's funny. I guess Neil and Buzz brought some back, but we didn't see one rock anywhere with any of that type structure. (TRANSEARTH COAST)

08 00 32 59 LMP I agree with Pete. One time I reported I did, and then I looked at the rock when we finally picked it up, and it didn't look like it at all. It had a bunch of pits on it, but it didn't have any vesicles in it, and we were all doing something else, and so I never really went back and corrected myself; but I've got to agree with Pete. I never saw any vesicular material at all. (TRANSEARTH COAST)

08 00 33 19 CDR I'm not convinced that we got too much different kind of rock material, to tell you the truth. Of course, I got fooled out there in the desert; and so anything that we saw that remotely resembled being different to our eye, we brought you a sample. (TRANSEARTH COAST)

08 00 33 36 LMP I think we got a sample of almost everything that was there. Everything that we saw that was different in texture, or the way it weathered, or where it was setting, or anything else that seemed unusual to us about the differences of rocks, we grabbed some of them; but, like Pete says, it's going to be interesting to see how many different things we did actually get. (TRANSEARTH COAST)

08 00 34 23 CC Pete and Al, were you able to notice any - which (TRANSEARTH COAST)  
appeared to be boulder tracks on Head crater or any  
of the other craters similar to the type of tracks  
you saw after you rolled that one rock down?

08 00 34 33 CDR None. Well, let me say this. Without walking down (TRANSEARTH COAST)  
to the crater, I couldn't tell what kind of a track  
the rock made that I rolled down there to start  
with. However, I think we have enough pan photos,  
that you can stereo in the craters that we went up  
to, that if there are any boulder tracks, you're  
going to be able to see them.

08 00 35 09 LMP Yes, I think that's the best point right there. We (TRANSEARTH COAST)  
took enough so you're going to find them. Now, I  
don't remember seeing any myself, but I think - I  
also don't remember specifically looking for them.  
Usually, when you see them, if you see anything  
special like that, you'll remember it, but maybe  
there are some around and I didn't - just even  
notice them.

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08 00 36 45 LMP Let me say something else, too, and I can't remember (TRANSEARTH COAST)  
if I said it. You know where we talked with Al  
Chidester and the guys, before we went, about the  
main objectives of the geology wasn't to go out and  
grab a few rocks and take some pictures, but to try  
to understand the morphology and the stratigraphy  
and what-have-you of the vicinity you were in. Look  
around and try to use your head along these lines.  
Well, I'll tell you, there was less than 10 times I  
stood in spots, including in the LM both times we  
were back in, and said, "Okay now, Bean, what can  
you do in that - can you fill that square? Is it  
possible to look out there and try and determine  
where this came from, which is first, which is  
second and all that?" And except for deciding which  
craters looked newer than others, which we know from  
ground observations, I was not able to see any  
special little clues like we were, for example, over  
in Hawaii. And when we were out at Meteor Crater

and other places, that gave us that kind of clues. That whole area is just - has been acted on by these meteoroids or something else so that all these features that are normally neat clues to you on Earth are not available for observation. I didn't find any way to fill those two big squares, you know; I never was able, when walking up to a crater, to determine when the normal ground stopped and the ejecta started except on the difference in slope or the fact that it got a little bit more powdery under my feet, and that's not a very good index. We never saw anything of a different color or a different amount of rocks or anything else, except the times that Pete and I kept kicking up that very light gray as opposed to the more dark cement-gray material. There's just no contrast to look at.

08 00 38 41 CDR I think even a trained geologist would have trouble (TRANSEARTH COAST) doing a whole lot of field geology that way on the Moon. I think what you're going to have to do is pick your traverses like we did and just sort of select at a regular interval as you go along and then come back and analyze the stuff to find out differences. I've kind of got the idea that a lot of it is the same and the only difference being its relative age to one another by being blasted by a meteor coming in and getting thrown out at different times. Don't you think that, Al?

08 00 39 23 LMP I think that. I think one of the things you're (TRANSEARTH COAST) going to want to up, too, is you're going to want to up the number of core tubes so you can get down in these areas you are interested in and find out what's going on under there, because it's covered with this layer, and there just ain't no way to figure it out. I know, thinking back - like I say, before the EVA, during the EVA, and afterwards, we talked about it and thought about trying to get the big picture, trying to be more than rock collectors and picture takers; and, believe me, we worked at it, and I think from our training we were pretty doggoned good at getting that sort of thing in training, not just grabbing a few rocks, but trying

to evaluate the things that we want to evaluate. But it just was difficult to do because the clues just aren't right laying there on the surface. It's got this big blanket of all-beat-up soil over every single thing. I think maybe you want to get a better trenching tool. Pete, the trenching tool we had was just that shovel and he could only go down about 8 inches without falling on his head. Now, if you don't want to get a lot of core tubes but you want to see what's going on maybe we need some sort of better trenching tool so a guy can lean over and trench down 6 or 8 inches or, at least as far as the ground is soft, and then take a look at what's underneath it.

08 00 40 47 CDR We were really hindered in the fact that we could not bend over. It wasn't as apparent in our training as it was up there because, in your training when you weigh 285 pounds there in the building, and you've got all the stuff on your back, it's fairly easy to sort of scrunch down or lean quite a bit. You can't do that up there on the Moon, and like Al just said, and I'm short and low to the ground to begin with, that somebody that's taller than I am is going to have a difficult time with the same length tools trenching as deep as I did. Because you just can't get over. We've really got a whole bunch of ideas and we're going to, in the 5 days there in MQF, we'll put all this down on paper on what we think we could do to pass on some suggestions to improve the tools that we have right now, to do a little better job. (TRANSEARTH COAST)

08 00 41 45 LMP Yes, I think those tools can really be worked over; they seemed pretty good before we left, but once we got up there and started working with them, in that one-sixth g, like Pete says, you can't always do the same things; you're leaning in a different way, and things are a little different. I think we thought about it enough and observed it enough that we can come back and give some pretty good suggestions for tool improvement and equipment improvement along those lines that'll help the next guys get more (TRANSEARTH COAST)



rocks, and better rocks, and faster, and trench deeper, and do more core tubes or whatever else they want to do. Hey, tell them they can start fixing that doggoned hammer.

08 00 42 23 CC Okay. Thanks for your comments.

(TRANSEARTH COAST)

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08 00 43 34 CDR Yes. One more thing, that we did - getting back to (TRANSEARTH COAST)

this crater morphology and all that business; when we looked at those craters, we tried to do that, too, because we could see bedrock, or what we thought was bedrock, on the outside, we said, "Great! We're going to look in those craters." This is what we said before we even got out. "We're going to look in those craters and we're going to see a deep contact between the regolith and the bedrock, and we're going down a little bit further and here's going to be something else; we really got it knocked." We looked in those craters and what it looks like is just like the surface except there is a few rocks that seem to be resting on the wall and resting in the bottom. Now, if you went down there and dusted away all that material, I don't know how much there is there, maybe you would find a contact between the regolith and the bedrock; now, you know, you really couldn't see it. Now, maybe you could infer it from the pictures we took and what we discussed. Usually, it was showing here and there, particularly on that very last crater. But that's going to take some work; it's just not like looking at a crater on Earth.

08 00 44 45 LMP I think the fact that it has this makes geology up (TRANSEARTH COAST)

there as difficult, if not more difficult, as it is on the Earth, because you have trees and grass and all kinds of things like that that hide a lot of the Earth's geology. So, I think you're in the same box up there.

03 00 45 16 CDR Another thing that has been concerning me a little bit - you know we keep talking about going to all these neat places like Hyginus Rille and all that stuff, because we were going to stand on the side right below the rille and we're going to look up on that big high side and right there is going to be the history of the Moon, sort of like the Grand Canyon gives us such a great one of the Earth. Well, I'll tell you, if the sides of that place are anything like the sides of craters, or the sides of the Surveyor, you're going to look up there and you're going to see a bunch of dust just like you see on the surface, unless - you know - I could be easily wrong, we haven't been there, but we just didn't see any places, no matter what the slope, that didn't have all this material all over it.

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08 00 50 44 CDR Hey, one last comment there, Houston. How about telling old Uehl Clanton that we both thought we were in the Kapoho, too, when we were on that Moon, and we gave him about the same type of information that we gave him at Kapoho, as far as it was visible.

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08 04 33 12 CC Pete, some time this evening, if you've got time, we've got some geology questions down here that we would like to send up to you. And, when you want to discuss them, we'll pipe them up to you, if that's all right with you.

08 04 33 30 CDR Are these different from the geology questions we got about 3 or 4 hours ago? We're glad to do it.

08 04 33 36 CC That is affirmative. It's really a continuation of the same kind of material, but we've got eight specific questions.

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08 04 44 37 CDR Roger. We're ready for your questions. (TRANSEARTH COAST)

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08 04 45 41 CC Okay, on the second one, did you get any soil samples from the Surveyor trenching area other than the material that may be with the scoop itself? (TRANSEARTH COAST)

08 04 46 00 CDR The scoop itself has some material left in it, I believe, or - it'll be in that bag, and that'll be it. (TRANSEARTH COAST)

08 04 46 09 CC Okay. Roger. Next question now goes to the geology area, and the question's - well, I'll start out here. Did you ever climb one of those mounds, and what more description can you give us of the mounds, and particularly was there any apparent orientation or elongation to the mounds? Also, anything about vent holes? (TRANSEARTH COAST)

08 04 46 33 CDR Okay. Now, the mounds weren't that big that you would climb one. You could just stand and look at it. There were two of them. One was bigger than the other; and, no they didn't have any vent holes. Their orientation - both of them, appeared to be in an east-west direction. Sort of - let's say you had a strip that was about a foot wide, that you just bent it and made a little triangular thing out of it. The mounds looked something like that, and we sampled all around one mound. Brought back stuff from it - material; excuse me, Uehl Clanton. That's about all I can say for them. I think you're hunting around for anything volcanic in nature, and they didn't appear to, to us anyhow. They appeared more like a big glob of something that had been pitched into that particular area, either by the craters that were formed nearby or something else further away. We looked around for all evidences of vent holes or anything coming out of it that might be scattered around, you know. Let's say, rocks from it itself or some ejected pyroclastics around on the ground might be near it. We couldn't find (TRANSEARTH COAST)

any of those either. I was kind of wondering at the time why you didn't ask us to give a core tube through it, but you didn't.

08 04 48 21 CC Roger. Thanks. Next if there's no more in that one, the next one is whether or not you noticed any preferential distribution of the glass beads and the glassy material? (TRANSEARTH COAST)

08 04 48 42 CDR Generally speaking, it was all over the place in the bottom of even the smallest little craters that we came across. But we found it wherever we went, and no more in one place than in another. I think that we have three or four samples of glass that looked the same that were taken from different places, and they should be documented. One of them isn't, but I remember where we got it. (TRANSEARTH COAST)

08 04 49 20 CC Roger. I'm not sure I understand. Did you mean that they - the glass beads were in the bottoms of all craters or that they were on the tops of the level surfaces as well as in the bottoms of the craters? (TRANSEARTH COAST)

08 04 49 33 LMP That's right. When we walked around on the level surface, if you just look down and look even halfway, you'd find beads here and there. Now, you didn't find a lot of big ones. You'd run across big ones every once and a while, big ones being about a quarter to three-eighths of an inch in size. If we came upon those, we would see them, but generally there were a lot of little ones around. Now, if you looked down into the small craters, I'm thinking of the craters 3 or 4 feet in diameter, maybe a foot deep, it didn't look like they were made with very big objects; you would usually find glass beads at the bottom and you would usually find glass-covered rocks, and that was surprising to us because we had always imagined that these beads just came from the larger craters, up to 8 or 9 or 10 feet, but this didn't seem to be the case. (TRANSEARTH COAST)

08 04 49 51 CDR Also, if I remember, we have a rock which is some 2 (TRANSEARTH COAST)  
inches or so in size that is spattered with glass,  
and we brought it back for that reason. They are  
not beads; it's just a big splatter - -

- - -

08 04 52 17 LMP Right. I was saying that even the craters up to as (TRANSEARTH COAST)  
little as 3 or 4 feet in diameter, 1 foot deep, the  
ones that didn't look to me like they were made by  
either very heavy particles, or very fast particles,  
you could usually look around in the bottom of them  
and see glass-covered small rocks, in a number of  
them. We took some pictures and documented them  
real well, and then I'll let Pete - let me say the  
rest. Also, one time when we were walking around  
outside a big crater, we saw a rock about 3 inches  
in diameter, I guess, somewhere in that  
neighborhood; and it was almost completely covered  
with this glass. And the glass looks the same as  
the glass you see in closeup stereopictures that  
Neil brought back, that he took pictures of, down in  
small craters. So, this will be a nice sample for  
somebody to look over.

08 04 53 14 CC Very good. Okay. Next question is - can you give (TRANSEARTH COAST)  
us some more detail on the material that appeared to  
be melted in the bottom of Bench crater? Did this  
just cover the central peak or did it appear more  
extensively located - spread around down there?

08 04 53 34 CDR It appeared to look - a little bit lava-like in (TRANSEARTH COAST)  
nature but I don't mean to imply that I thought the  
crater was volcanic in origin. It looked more to me  
like we were seeing the effects of some high-speed  
impact and - causing some melting of material down  
there. I wish that we could have gone down in that  
crater and gotten a sample, but it was too steep and  
too rugged for us to attempt it, and, therefore, we  
did take some partial pan stereo of the whole crater  
for you and we tried to get material from the top  
but nothing from the top resembled the material in  
the bottom.

- 08 04 54 27 LMP I think the reason Pete said that to begin with is (TRANSEARTH COAST)  
our experience over in Hawaii in some of those  
chains of craters or those lines of - I can't think  
of the exact word now - but where the lava comes out  
in long cracks, zones of weakness, it just sort of  
bubbles out and spatters one on top itself and ends  
up making sort of knobby-looking mounds of basalt.  
Well, from the top of the crater, all this stuff  
looked like knobby little mounds that were sort of  
like rift zones - the material you usually see  
around rift zones and that's what he is trying to  
say - neither of us think of it as a volcanic  
material, but it had that sort of melted knobby  
effect. We got a lot of pictures of it, though.
- 08 04 55 16 CC Roger. On the northwest side of Head crater, you (TRANSEARTH COAST)  
talked about a rock that you kicked over, and you  
mentioned that the bottom was different from the top  
and we are not sure just in what way it was  
different. Remember that one?
- 08 04 55 36 CDR Well, yes - I remember it and it wasn't different in (TRANSEARTH COAST)  
- I should maybe have clarified it then because it  
wasn't that big a deal - I guess it was the first  
time that when we kicked over a rock, it was two  
different colors, you know. Before you'd kick over  
a rock and it looks just like the top is the bottom.  
This one, it looked a little bit lighter gray and  
the reason was, after I thought about it, was  
because we were marching around in that same area  
where we noticed that there were two different types  
of soil. The soil that was the topsoil for just a  
thin layer on the top, of an eighth of an inch or  
something, and then below that was the thin gray  
layer and that - what was causing the rock to appear  
white, in this case, instead of gray like the top  
was the fact that it had been in this light soil  
down beneath the surface. So, I don't think it's a  
big thing.
- 08 04 56 29 CC Roger. Let me give you the last two questions so (TRANSEARTH COAST)  
you can cover them together. The first one is, are  
there any special or unusual features that you

remember, thinking back on it now, that you didn't have time to describe? And the other thing is, can you sort of recap the traverse along each leg and recall what you think was the significant feature that you saw at each of the stations where you stopped?

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- 08 04 57 32 CDR I think we pretty well talked about everything that we saw that attracted our attention. We can't think of anything right now that we saw that we didn't mention to you sometime or another, either during the EVAS or after. Al's only comment, which he already said he talked about this morning, was the fact that the color did change with the sun-angle between the first day and the second day. As far as the traverse goes, I guess that the most significant thing - there was nothing unusual at Head crater other than the fact that we found I guess, that Head crater was where we first saw the difference in soil below the ground and above the ground. The next most significant thing I think, is as we did go over to Sharp crater, - no, no, Head crater is not where we saw it; - what was the name of the crater that we saw the material we just discussed? Was it - that was Bench crater, right? (TRANSEARTH COAST)
- 08 04 59 07 CC Say again on that, 12. (TRANSEARTH COAST)
- 08 04 59 11 CDR Wasn't the name of the crater - our second stop on the traverse was Bench crater, is that correct? (TRANSEARTH COAST)
- 08 04 59 16 CC That's right. (TRANSEARTH COAST)
- 08 04 59 20 CDR Okay. I'd get our books out except they're so dirty with dust, and we've had a heck of a time getting rid of the dust in the Command Module, I don't want to do that. (TRANSEARTH COAST)
- 08 04 59 34 CDR We discussed the difference in texture of the rocks at the bottom of that crater. I guess the next most significant thing was that somewhere between Bench (TRANSEARTH COAST)

crater and Sharp crater, we obviously ran over what must be a contact in that the ground very definitely changed to a softer, finer dust. We sank in deeper out there not only right at Sharp crater but leading up to it. So Al sort of spotted it first watching me run because he was behind and he could tell that - I guess I was kicking up more dust. Is that right, Al?

08 05 00 27 LMP Yes. That's right. It was obvious that Pete had started running on a different kind of ground, or dragging his feet, one. It turned out it was different kind of ground. (TRANSEARTH COAST)

08 05 00 35 CDR And I guess that's the most significant thing over there on that part of the traverse. From there, we're not sure that we ever did get to Halo crater. There turned out, now I'm going to have to look at our photographs and I'm going to have to look at the maps again and figure out exactly where Halo crater was because there were about five little craters all of them which could have been Halo crater, all together; and it wasn't apparent in looking at the little map that we had which was colored at that spot, whether there were five craters or two craters or what. And I had a very difficult time locating it. We suspect that we were not in Halo crater but if we weren't, we were awful darn close to it. I guess the next significant thing was the fact that from Halo crater, or coming up to Halo crater, we really got on a third type ground, which was ground that we discussed around the Surveyor crater which seemed to be the firmest, especially down in the crater, both going down to the Surveyor from the one side and going up towards the LM through that Blocky crater on the other side, nearest the LM. The Blocky crater was also an interesting feature and that may be something that we - I think we did discuss, though, as we stood there - was the fact that we felt that the Surveyor crater was an old crater, as if it had been impacted - -

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- 08 05 03 27 CDR Okay. I guess we discussed that we felt the (TRANSEARTH COAST)  
Surveyor crater must have been impacted very early  
and had bedrock, and that this bedrock had weathered  
down to where the crater was very smooth and had  
weathered much there; and along came another one and  
made this small blocky crater in the side of it,  
which indicated to me that bedrock was not too far  
below the surface right where we were at the  
Surveyor crater. And, of course, we have samples of  
that. Something that Al and I just were talking  
about - he wanted me to mention that the Surveyor,  
except for the fact that it had changed color,  
looked in very good shape. This is true.
- 08 05 05 43 CDR I guess the last most significant thing is that Al (TRANSEARTH COAST)  
and I and Dick also, having watched our training,  
were impressed with the fact that we managed to get  
as far out as we did. And that it was as easy going  
in that kind of country as it turned out to be. The  
distance that we covered, I guess we covered a  
little over a mile.
- 08 05 06 05 LMP If you had lunar-weight equipment on Earth, you (TRANSEARTH COAST)  
could never make that traverse in that time. You  
would die before you got to the end, and we weren't  
even sweating; we were kind of hopping around out  
there doing the job. The only thing that kept us  
from moving faster was there was so much to see.  
Also, the only thing that kept us from studying more  
details at each site was the fact that we had to  
keep pressing on. So what's going to happen when we  
get back, we're not going to know all the details of  
each site because we just weren't able to stay there  
long enough, as long as we'd like to on any site.  
We could have spent the whole time in any of those  
craters, trenched around them and looked at -  
collected different size rock - type rocks around  
it, and tried to go back and forth on the - check  
the blanket and see if we could discover any  
difference in texture and all that sort of thing.  
But the time just wasn't available. It was one of  
those things of how much you want to cover in the  
time you've got to do it.

- 08 05 07 00 CDR Yes, what Al's saying is we did Big Bend, Hawaii, Meteor Crater, and New Mexico in one 2-hour trip around there. That's about what it amounted to. (TRANSEARTH COAST)
- 08 05 07 11 CC Yes. You did a great job of it, too. Hey, listen. When you looked into the craters, did you notice any boulder tracks that indicated there'd been many rocks rolled down besides the ones you rolled down or accumulations or boulders at the bottom of these steep slopes? (TRANSEARTH COAST)
- 08 05 07 31 CDR No, not any particular distribution. When there were rocks in the bottom, it was in these blocky craters where it looked like the material had been there. (TRANSEARTH COAST)
- 08 05 07 50 CDR I'm sorry, I just didn't observe - I wasn't really standing in a position to observe any track that the one rock made that I rolled down. The other rock that I threw down there was so small that it didn't go very far anyhow. Now, dust flew and the rocks both bounded and rolled depending on how far along it was going down the side of the crater. But it was not obvious to me that it was making any tracks. Now, had you stood back and looked at it from a different sun-angle, I feel that maybe you would for a while. Just like, it was very obvious when we looked out our window where we had been walking around. We could see for great distances where our footsteps went. (TRANSEARTH COAST)
- 08 05 08 37 CC The seismologists are trying to get some feeling for whether or not you thought there was a lot of rock rolling that might be causing the signals that they see. (TRANSEARTH COAST)
- 08 05 08 50 CDR If there was, it was not evident to us. Most of the rocks that we saw on the sides of craters all had dust around the bottom of them and they - it didn't look like they had moved for a long, long period of time and most of them looked like they were partially buried. The majority of them looked that way. (TRANSEARTH COAST)

08 05 09 13 LMP That's right. Not only that, we didn't see any that (TRANSEARTH COAST)  
looked like they thought they were going to roll  
down in the near future, either.

08 05 09 19 CC Roger. Hey, listen. When you pulled out the core (TRANSEARTH COAST)  
tube, did the holes collapse or did they stay there?

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08 05 09 40 LMP The tubes themselves stayed pretty doggoned (TRANSEARTH COAST)  
uncollapsed except for the top 1 or 2 inches. The  
minute you draw out the core tube, the top 1 inch,  
let's say not 2 - 1 inch or so would kind of crumble  
off and some parts would fall down in, but the sides  
were still relatively vertical. It's the same thing  
that happened in the trenches. When Pete would dig  
the trenches, the sides would be almost 90 degrees,  
except every time you'd tap the sides, let's say  
accidentally with his shovel, then that part would  
get knocked off, but the part that would remain,  
would still remain 90 degrees. As long as you  
didn't touch it, it seemed to be happy right there  
at 90 degrees.

08 05 10 19 CDR That reminds me of another thing. That pulsed my (TRANSEARTH COAST)  
memory. Again, this is an impression, but it seemed  
to me that there were angles greater than 90 degrees  
in the trenches, implying layering; and, although  
there wasn't any difference in color, it seems to me  
that that would sort of imply that there was some  
layering there and maybe this material is built up  
over a different time frame. If that's really true,  
you'll see that in the photographs.

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08 05 17 47 CC Hey listen, did you take any closeup stereopictures (TRANSEARTH COAST)  
outside of the disturbed area and, if so, where?

08 05 18 05 CC Yes. (TRANSEARTH COAST)

08 05 18 06 LMP Yes, we did. I took some near the engine, as I (TRANSEARTH COAST)  
talked about, then I walked out and took some of the  
bottom of some little craters that we had not walked  
in. Then, I took some of Pete's footsteps, three or  
four of those. Then, I went out into a couple of  
areas that we hadn't been and took some photographs.  
But we were not able, because of the time, to really  
do as many pictures as we wanted and do as many  
different things. Since that was the last  
experiment, that was one that's just sort of  
suffered, and so we'll just have to see what we get  
out of that one. I wasn't particularly satisfied  
with the way it was at the end, but we'll just have  
to see what happens.

08 20 00 38 CC Do you have an estimate of the number of pounds for (TRANSEARTH COAST)  
those rocks?

08 20 00 44 CDR The rocks probably weigh 15 pounds. (TRANSEARTH COAST)

08 20 00 54 CDR What they are is four large rocks. (TRANSEARTH COAST)

08 20 00 57 CC Those are the grapefruits? (TRANSEARTH COAST)

08 20 01 01 CDR Yes. They're the grapefruits, all of them, none of (TRANSEARTH COAST)  
those would fit in the - we didn't want to use up  
the room in the rock boxes for those big ones.

- - -

09 08 24 50 CC Roger, Dick, thanks. Question number 7. You (TRANSEARTH COAST)  
mentioned during the EVA finding three kinds of  
soil. Will you give a brief description of each,  
its color its texture, and so forth, and discuss  
whatever problems you had in handling all the  
different kinds of lunar material?

09 08 25 10 CDR Well, when we say three different kinds of soil (TRANSEARTH COAST)  
yesterday, that was a - I guess what I want to say  
is a subjective thing in that the colors were all  
the same. It appeared that some soil was firmer  
than other soil in the manner in which we sunk into  
it. The softer soil that we sank deeper in was of

a finer grain. This was over towards the very extreme end of our traverse, over at the Sharp crater which is about as far away as we could get from the LM. And now, we have samples - in the sample bags - some of these types of soil. When I say three different kinds of soil, the medium-textured one was where we landed on one side of the Surveyor crater; and, over on the other side when we went down to get to the Surveyor, we found the ground was - I'd say considerably more firm. It appeared to be firmer ground, - we didn't sink in quite as much as we did over working around the LM. Then, when we got over to the Sharp crater, which was the far end, that's the softest ground; we sank in the deepest there. Do you have anything to add to that Al?

09 08 26 33 LMP No, you covered it. They asked about the color. (TRANSEARTH COAST)

09 08 26 36 CDR One of the real difficult things about the whole EVA, in the geology part of it was the fact there didn't appear to be any difference in color among either the rocks or the soils. They all looked about the same. The first day, to me, they all looked sort of a dull gray. And I think I described most of the rocks that way, as a dull gray, and the soil's a dull gray, and this sort of thing's a dull gray. And if you look real close, of course, you could see maybe a - -

- - -

09 08 27 39 CDR Well, anyway, all the rocks, the soil looks sort of a gray, and if you look real close maybe you can find a white rock now and then or you could maybe disturb something and get a little darker gray; but generally, they were gray. The second day we went out, the same thing that looked gray to us the first day - at least to me - started looking a sort of a brown, a dark brown, or a tannish brown; and it was really one of the most interesting things of the EVA - of the lunar surface operations, was how much that color could change just with a 7-degree of so (TRANSEARTH COAST)

sun-angle change and how everything there changes color with it. In fact, when we came upon the Surveyor, you'll recall, it was gray, I mean it was brown. We saw it the second day; it was brown, and we asked you if it had been painted that way and you said no, it hadn't been; it had really been white. When we got up next to it, we discovered that sure enough it looked brown, and the coating on it was the same brown as the soil. Now, I wouldn't be a bit surprised when we get all those parts back to Houston, they don't turn out to be, you know, under the earth light and light of the laboratory, they turn out to be kind of a dark gray again. It's going to make geology quite a bit more difficult than we see it on Earth because the color cues just aren't going to be there; you're going to have to look for texture and fracture and luster and a lot of other things that will aid you in determining differences in rocks and minerals.

\* \* \* \* END OF TRANSCRIPT \* \* \* \*

TABLE 1. APOLLO 12 SAMPLE LISTING CROSS-REFERENCED TO 70 MM PHOTOGRAPHS AND APOLLO ELAPSED TIMES

<u>LRL SAMPLE NO.</u>	<u>SAMPLE CLASS</u>	<u>70 MM PHOTO COVERAGE</u>	<u>TRANSCRIPT REFERENCES (AET)</u>	
12001	FINES - SELECTED SAMPLE		04 22 26 05 05 01 43 03	04 22 35 16
12002	DOLERITE - SELECTED SAMPLE			
12003	FINES AND CHIPS FROM 12001 - SELECTED SAMPLE		04 22 26 05 05 01 43 03	04 22 35 16
12004	BASALT - SELECTED SAMPLE			
12005	BASALT - SELECTED SAMPLE			
12006	BASALT - SELECTED SAMPLE		04 22 25 03	
12007	BASALT - SELECTED SAMPLE		04 22 10 20	05 01 40 45
12008	CUMULATE - SELECTED SAMPLE	46 6831-32	04 22 09 19	05 01 40 45
12009	BASALT - SELECTED SAMPLE			
12010	BRECCIA - SELECTED SAMPLE	46 6835	04 22 16 43	
12011	BASALT - SELECTED SAMPLE			
12012	BASALT - SELECTED SAMPLE			
12013	BRECCIA - SELECTED SAMPLE			
12014	DOLERITE - SELECTED SAMPLE		04 22 23 14	
12015	BASALT - SELECTED SAMPLE	46 6833-35	04 22 16 50	
12016	BASALT - SELECTED SAMPLE		04 22 19 55	
12017	BASALT - SELECTED SAMPLE			
12018	DOLERITE - SELECTED SAMPLE			

TABLE 1. CONTINUED

<u>LRL SAMPLE NO.</u>	<u>SAMPLE CLASS</u>	<u>70 MM PHOTO COVERAGE</u>	<u>TRANSCRIPT REFERENCES (AET)</u>
12019	BASALT - SELECTED SAMPLE		
12020	BASALT - SELECTED SAMPLE		04 22 25 03
12021	DOLERITE - SELECTED SAMPLE	47 6932	04 22 08 01
12022	DOLERITE - SELECTED SAMPLE	47 6933	04 22 09 28      05 01 40 45
12023	FINES - LESC	49 7276-77	05 12 58 15
12024	FINES - GASC	48 7070	05 13 05 31
12025	FINES - TOP, DOUBLE CORE TUBE	48 7077; 49 7285-88	05 13 23 07
12026	FINES - CORE TUBE - N. OF LM		04 22 33 14
12027	FINES - CORE TUBE - SHARP CRATER	48 7068-70; 49 7279-80	05 12 53 35      05 13 02 50
12028	FINES - BOTTOM, DOUBLE CORE TUBE	48 7077; 49 7285-88	05 13 23 07
12029	FINES - MATERIAL IN SURVEYOR SCOOP		05 14 29 15
12030	FINES - DOC. SAMPLE	48 7043-45	05 12 12 36
12031	DOLERITE - DOC. SAMPLE	48 7048,50; 49 7189-90	05 12 19 04
12032	FINES - DOC. SAMPLE		05 12 40 50
12033	FINES - TRENCH - DOC. SAMPLE	48 7051-52; 49 7191-96	05 12 22 10
12034	BRECCIA - TRENCH - DOC. SAMPLE	48 7051?	05 12 26 03
12035	BASALT - DOC. SAMPLE	48 7064; 49 7236-39	05 12 41 04
12036	DOLERITE - DOC. SAMPLE	48 7064; 49 7236-39	05 12 42 58
12037	FINES - DOC. SAMPLE	48 7064; 49 7236-39	05 12 42 58



TABLE 1. CONTINUED

<u>LRL SAMPLE NO.</u>	<u>SAMPLE CLASS</u>	<u>70 MM PHOTO COVERAGE</u>	<u>TRANSCRIPT REFERENCES (AET)</u>	
12038	BASALT - DOC. SAMPLE	49 724C-41	05 12 47 16	
12039	DOLERITE - DOC. SAMPLE	49 7240-43	05 12 49 00	
12040	DOLERITE - DOC. SAMPLE	49 7240-43	05 12 49 00	
12041	FINES - DOC. SAMPLE		05 13 14 02	
12042	FINES - DOC. SAMPLE	48 7072-76; 49 7282-84	05 13 17 11	
12043	BASALT - DOC. SAMPLE	48 7082-83	05 13 42 57	05 13 51 02
12044	FINES (GLASS "DUMBBELL" RETURNED WITH THE SAMPLE) - DOC. SAMPLE	48 7082-83	05 13 42 57	05 13 50 02
12045	BASALT - DOC. SAMPLE	48 7148-50	05 14 40 59	
12046	BASALT - DOC. SAMPLE	48 7148-50	05 14 40 59	
12047	BASALT - DOC. SAMPLE	48 7148-50	05 14 40 59	
12048	FINES - DOC. SAMPLE			
12050	CHIP FOR ORGANIC ANALYSIS - DOC. SAMPLE			
12051	BASALT - DOC. SAMPLE	49 7318-20	05 13 42 27	
12052	BASALT - DOC. SAMPLE	48 7059; 49 7217-18	05 12 32 17	
12053	BASALT - DOC. SAMPLE	48 7063-64; 49 7234-35	05 12 40 14	
12054	DOLERITE - DOC. SAMPLE	49 7313-15	05 13 40 41	
12055	BASALT - DOC. SAMPLE	48 7053-55; 49 7197-7200	05 12 27 17	05 14 34 16
12056	BASALT - DOC. SAMPLE		05 14 31 28	

TABLE 1. CONTINUED

<u>LRL SAMPLE NO.</u>	<u>SAMPLE CLASS</u>	<u>70 MM PHOTO COVERAGE</u>	<u>TRANSCRIPT REFERENCES (AET)</u>
12057	FINES AND CHIPS FROM BOTTOM OF ALSRC - DOC. SAMPLE		
12060	FINES - TOTE BAG - FROM SURVEYOR SCOOP?		05 14 29 15
12061	CHIPS - TOTE BAG - FROM SURVEYOR SCOOP?		05 14 29 15
12062	BASALT - TOTE BAG		05 14 32 37      05 14 34 16
12063	BASALT - TOTE BAG		05 12 48 23
12064	DOLERITE - TOTE BAG		05 14 31 25      05 14 33 12
12065	PIGEONITE PORPHYRY - TOTE BAG		
12070	FINES - CONTINGENCY SAMPLE	46 6719-23	04 19 25 43
12071	CHIPS - CONTINGENCY SAMPLE	46 6719-23	04 19 25 43
12072	BASALT - CONTINGENCY SAMPLE	46 6719-23	04 19 25 43
12073	BRECCIA - CONTINGENCY SAMPLE	46 6719-23	04 19 25 43
12074	PART OF SAMPLE 12073	46 6719-23	04 19 25 43
12075	BASALT - CONTINGENCY SAMPLE	46 6719-23	04 19 25 43
12076	BASALT - CONTINGENCY SAMPLE	46 6719-23	04 19 25 43
12077	BASALT - CONTINGENCY SAMPLE	46 6719-23	04 19 25 43
12078	RESIDUE - FINES, CHIPS, SWEEPINGS FROM CURATOR PROCESSING		
12079	RESIDUE - FINES, CHIPS, SWEEPINGS FROM CURATOR PROCESSING		
12080	RESIDUE		

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