



APOLLO 15 VOICE TRANSCRIPT
PERTAINING TO THE GEOLOGY OF THE LANDING SITE

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INTRODUCTION

The fourth manned lunar landing occurred on July 30, 1971 when the lunar module Falcon landed in the Hadley-Apennine region of the Moon. Apollo 15 was the first mission to utilize a battery-powered vehicle aptly named "Rover" to extend the range of the astronauts surface exploration with a resultant 27.9 km of traverses. It was also the first mission with three EVAs which, along with the SEVA, produced double the amount of transcript concerning lunar geology than did either of the two previous landings.

This document is an edited record of the conversations between astronauts David R. Scott, and James B. Irwin on the lunar surface and EVA capcom Joseph P. Allen at Mission Control in Houston during the nearly 67 hours the astronauts were on the Moon. It is a condensation hopefully of all the verbal data having geologic significance. All discussions and observations documenting the lunar landscape, its geologic characteristics, the rocks and soils collected, and the photographic record are retained along with the supplementary remarks essential to the continuity of events during the mission. We have deleted the words of mechanical housekeeping and engineering data, attempting not to lose the personal and philosophical aspects of manned lunar exploration.

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 listed chronologically given in days, hours, minutes and seconds. These are the Apollo Elapsed Times (AET) after launch from the Kennedy Space Center which was 9:34 a.m. E.D.T. on July 26, 1971.

Figure 1 shows the vicinity of the landing site that was described, sampled, and photographed by the Apollo 15 crewmen.

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GLOSSARY OF TERMS, ABBREVIATIONS, ACRONYMS, AND SYMBOLS

APOLLO 15 CREW

CC	Capsule Communicator (Joseph P. Allen during the EVAs, other astronauts during other time periods)
CDR	Commander (David R. Scott)
CMP	Command Module Pilot (Alfred M. Worden)
LMP	Lunar Module Pilot (James B. Irwin)
MCC	Mission Control Center (unidentified speaker)
AET	Apollo Elapsed Time - since launch from Earth (days-hrs-mins-secs)
AGC	LRV readout on TV camera
ALSEP	Apollo Lunar Surface Experiments Package
BSLSS	Buddy Secondary Life Support System
COMP	Comprehensive Sample - scoop soil and rake sample of 3/8" to 1-1/2" rocks collected from a documented area approximately 1 meter square
CONT	Contingency Sample - bag of soil and rocks collected early in the EVA - sample reference in transcript keywording
Core	Drive tube coring device for collecting soil samples by driving the tube with a hammer (the deep core was obtained by a battery-powered, rotary, hand-operated drill)
CM	Command Module, "Endeavour"
DAC	Data Acquisition Camera mounted on the LRV
DB	Documented Bag
DOC	Documented Sample - soil and/or rocks that are documented by photography before and after sampling
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

GLOSSARY CONT'D.

EV (visor)	Extravehicular
EVA	Extravehicular Activity - astronaut activities on the lunar surface
FSR	Football-Sized Rock
ID	Identification
IFR	Instrument Flight Regulations
LCRU	Lunar Communication Relay Unit on the Rover
LM	Lunar Module, "Falcon"
LPDS	Landing Point Designator System
LRL	Lunar Receiving Laboratory
LRRR, LR cubed	Laser Ranging Retroreflector
LRV	Lunar Roving Vehicle - "Rover"
Mag/Mags	Magazine/Magazines - photographic
MESA	Modularized Equipment Stowage Assembly - a storage area on the LM that contains scientific equipment
NAV	Navigation
PAN	Panorama of 70 mm photographs
PHO	Photo, photographic reference in the transcript keywording
Plag	Plagioclase
PLSS	Portable Life Support System - backpack on EVA space suit
PSE	Passive Seismic Experiment
RAKE	Rake Sample - sample reference in transcript keywording
SAMP	Sample reference in transcript keywording
SCB	Sample Collection Bag

GLOSSARY CONT'D.

SESC	Special Environmental Sample Container
SEVA	Stand-up EVA
SIDE	Solar Ion Detection Experiment
SRC	Sample Return Container, "Rock Box"
SWC, Solar Wind	Solar-Wind Composition experiment
Strut	One of four legs 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
TRENCH	Trench Sample - sample reference in transcript keywording
***	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
(words)	Explanation of words probably said that were garbled during transmission
(words?)	Explanation of words possibly said that were garbled during transmission

EXPLANATION OF KEYWORDING

The purpose of the keywords enclosed in parentheses 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, 1, 2, etc.) where the speaker was, or between which locations (LM-1, 1-2, 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 at that particular moment. 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. The occasional exceptions can be inferred from the context of the transcript -- AET 06 04 02 25 -- where SAMP SESC 15013 is not necessarily referenced to any of the pan photo numbers keyed in the same 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 SAMP 15205 in the statement made at 05 02 51 22.

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 (where non-relevant statements are deleted) show the interval when those particular photos were taken even though not mentioned.

Conventions used in keyword sample and photo numbering:

SAMP 15015	- Sample number 15015
SAMP CONT 15020-26	- Sample contingency 15020 through 15026 inclusive
SAMP 15017-19, 27-28	- Sample numbers 15017 through 15019 and 15027 through 15028 inclusive
SAMP?	- Sample for which the number is unknown
PHO 85 11418	- Magazine 85, frame 11418
PHO 85 11353-82; 87 11730-58	- Magazine 85, frames 11353 through 11382 inclusive and magazine 87, frames 11730 through 11758 inclusive
PHO?	- Photo or photos possibly taken, or for which the numbers have not been identified
PHO DAC	- Photographic reference to the Data Acquisition Camera mounted on the Rover



The photographic base for this map is Apollo 15 panoramic camera frame AS15-9814. The station locations and traverse routes are from compilations by the Apollo Lunar Geology Experiment Team.

EXPLANATION

- Traverse solid where tracks shown on photograph
- - - Traverse dashed where inferred

Figure 1. Apollo 15 landing site showing LM location and area traversed by astronauts during EVAs.

GEOLOGIC CONDENSATION OF THE APOLLO 15 VOICE TRANSCRIPT

* * * * DESCENT * * * *

04 08 41 34 LMP 120 feet; minus 6. (DESCENT)

04 08 41 37 CDR Okay. I've got some dust. (DESCENT)

04 08 42 29 LMP Contact. (DESCENT)

* * * * LM WINDOW - PRE-SEVA * * * *

04 08 42 36 CDR Okay, Houston. The Falcon is on the plain at Hadley. (LM WINDOW)

- - -

04 08 46 38 CDR See the little elevation in front of us there? (LM WINDOW)

04 08 46 40 LMP I do. And that looks like it's across the Rille. (LM WINDOW)

04 08 46 43 CDR No, across the Rille. (LM WINDOW)

- - -

04 08 47 15 CDR No, we're not there. We're not too far from Salyut. (LM WINDOW)
I did find that, - I think.

- - -

04 08 49 47 CMP I had a beautiful view of the landing site going over, but I couldn't see anything. (LM WINDOW)

- - -

04 08 58 32 CDR Okay, Ed - we'll give you a little quick summary here before we get on with it. The general terrain looks exactly like what you had on 14. And many of the craters that we use for ID were completely washed out with no shadows, - that's probably because the topo data just wasn't that good. And I think we're setting a little off in attitude, but we're in fairly good shape. And when we get around to the SEVA, we'll try and pin down the location exactly. I had a little bit of dust at 150 and completely obscured at 50 feet. It was IFR from then on down. And the rest of it, you can probably see it as well as we could. (LM WINDOW)

- - -

04 08 59 40 CC Falcon, Houston. Do you have an estimate of your (LM WINDOW)
landing site?

04 08 59 50 LMP There's a long pause there, Ed. (LM WINDOW)

04 08 59 59 CDR As best I could find, I think we're fairly close to (LM WINDOW)
Salyut. But I guess the best thing to do is to
press on and get to the SEVA where we can take a
look around. It's very hummocky, and, as you know,
in this kind of terrain, you can hardly see over
your eyebrows. There's very little to tell us
exactly where we are in our local position.

- - -

04 09 57 22 CDR We're sure in a fine place here. We can see St. (LM WINDOW)
George; it looks like it's right over a little rise.
I'm sure it's much farther than that. We can see
Bennett Hill. We see something off at our - like -
1 o'clock that's a pretty good elevation - we're not
too sure of that - but we'll give you some more
detail later on.

- - -

04 09 59 02 CC Dave, we've got some vital questions down here. (LM WINDOW)
First, did you see the Rille on the way down?

04 09 59 12 CDR Sure, Joe - easy. (LM WINDOW)

- - -

04 10 39 54 CC Dave and Jim while you're timing that minute out, be (LM WINDOW)
advised that Endeavour is passing overhead. Al's
got you in sight, and I suspect there are two big
cameras that'll be brought to bear on you a little
later on.

04 10 40 11 CDR Okay, very good. I'll bet Al can tell you where we (LM WINDOW)
are better than we can.

04 10 40 15 CC Al says you're - - (LM WINDOW)

04 10 40 16 LMP Okay, Joe; that's a minute, and - - (LM WINDOW)

04 10 40 17 CC - - just north of Index.

(LM WINDOW)

04 10 40 18 LMP - - I've got - -

(LM WINDOW)

04 10 40 24 CDR North of Index, huh?

(LM WINDDW)

***** SEVA *****

04 10 44 20 LMP Overhead hatch; full opened and latched. (SEVA)
 - - -

04 10 44 38 CC Roger. Endeavour places you very near November
 crater, very close to November crater. (SEVA)

04 10 44 47 CDR Okay. A little short, huh? (SEVA)

04 10 44 54 CC A little short and a little north. (SEVA)
 - - -

04 10 46 35 CDR Okay, overhead hatch is open and latched. (SEVA)
 - - -

04 10 48 51 CDR Oh boy, what a view. (SEVA)
 - - -

04 10 50 05 LMP Okay, Dave you ready for me to hand you the map? (SEVA)

04 10 50 07 CDR Yes, I can see Pluton and Icarus - and Chain, Slide, (SEVA)
 *** St. George, Window, Spur - beautiful!
 - - -

04 10 52 11 CDR Okay, Joe, our bearing to Icarus is 338. (SEVA)
 - - -

04 10 52 53 CDR Okay. Another quick one: Bennett Peak is 255. (SEVA)
 - - -

04 10 53 20 CDR Make Hadley Delta at about 182. (SEVA)
 - - -

04 10 53 33 CC And, Dave, a bearing on a close feature if you can (SEVA)
 identify it, please.

04 10 53 39 CDR No, I can't right now, Joe. (SEVA)

04 10 53 42 CC Roger. (SEVA)

04 10 53 43 CDR I'll get on with the photography here. (SEVA)(PHO 85 11353-82; 87 11730-58)

04 10 53 45 CC Roger; we agree. (SEVA)

04 10 53 54 LMP Okay, you want 22 frames in this - in the stereo pan, Dave. (SEVA)

04 10 54 03 CC And, Dave, while you're firing them off there, does the trafficability look pretty good? (SEVA)

04 10 54 12 CDR Yes, it sure does, Joe. The largest fragment I can see right now on the surface is probably about 6 to 8 inches; however, inside the walls of Pluton, there are some pretty big chunks. (SEVA)

04 10 54 38 LMP Can you see the edge of the Rille up - Dave, can you see the edge of the Rille? (SEVA)

04 10 54 45 CDR No. (SEVA)

04 10 55 49 CDR Okay. 500, now. (SEVA)(PHO 84 11235-53)

04 10 56 25 CDR Okay, Joe. I'm taking a picture now of that bright, fresh crater just to the south of the famous St. George. And now over to Spur and Window, I believe. (SEVA)(PHO 84 11235-36)

- - -

04 10 57 47 CDR Looking back into the Sun is almost useless. *** blots everything out. (SEVA)

04 10 57 57 CC Roger, Dave. Any sign of the big mountain back there? (SEVA)

04 10 58 02 CDR Yes. You can see - "Big Rock Mountain" back there. (SEVA)

- - -

04 11 00 03 CDR Okay, Joe. We've got all the photos. Here you go, Jim. (SEVA)(PHO 84 11235-53; 85 11353-82; 87 11730-53)

04 11 00 09 CDR Okay. And let me start - by 12 o'clock, Joe, and I'll go around real quick on the far distant horizon. Apparently, across the Rille, I can see - just about our 1 o'clock, now - a very large mountain, which I'd have to call Hill 305. (SEVA)

04 11 00 32 CDR And all of the features around here are very smooth. (SEVA)
The tops of the mountains are rounded off. There are no sharp jagged peaks or no large boulders apparent anywhere the whole surface of - the area appears to be smooth, with the largest fragments I can see are in the walls of Pluton. There are no boulders at all on St. George, Hill 305, Bennett, or, as far as I can tell, looking back up at Hadley. Hadley's sort of in the shadow. It's a gently rolling terrain completely around - - 360 degrees - - hummocky, much like you saw on 14. The ridgeline - across the Rille, from Hill 305 around to 1 o'clock, seems to be - slightly lighter in albedo, with some white marks from craters, recent craters, apparently. Bennett Hill also has - a lighter-colored albedo. One face of it, that facing the Sun, now is almost completely white. As I come around to my 2 o'clock, the horizon is really the Northern Complex. I can see, as I mentioned before, Chain, Icarus, and Pluton are very rounded, subdued craters. It looks like the southern rim of Pluton is on the same level as our location here. The northern rim is somewhat higher. I'd say distances are difficult - - but maybe 50 meters higher. I can see the scarp on the other side of the north rim of Pluton. All of it very flat, smooth, and gently rolling. Inside walls of Pluton are - fairly well covered with debris, fragments up to, I'd estimate, maybe, oh, 2 to 3 meters, irregular, no layering, just sort of scattered around, and maybe the walls have 5 percent fragments. As I look on around the north, Mount Hadley itself is in the shadow, although I can see that the ridgeline on the top of Mount Hadley - it too is smooth. I see no jagged peaks of any sort. The hill I would call number 22 on your map - far distance - also looks smooth and rounded; no prominent features. I'll skip the distant field around to my 6 o'clock, because it's all in the shadow. And looking into the Sun, of course, obliterates almost everything. As I look on down to my - 7 o'clock, I guess I see Index crater here, the near field. But, back up on Hadley to the east of Hadley Delta, why, again I can see a smooth surface. However, I can see lineaments. I'll take a picture for you. There's some very interesting - (PHO?) take - Silver Pass and look at 13 on your map. I can't tell whether it's 13 or 16, right now, because

of the Sun. But there appear to be lineaments or lineations running - dipping through the northeast, parallel and they appear to be, maybe, 3 percent to 4 percent of the total elevation of the mountain, almost uniform. I can't tell whether it's structure or internal stratigraphy or what. But there are definite linear features there, dipping to the northeast, at about - oh, I'd say 30 degrees. And, as I look up to Hadley Delta itself, I can see what appears to be a sweep of linear features that curve around from the western side of Hadley Delta on down to the Spur down there. And they seem to be dipping to the east at about 20 degrees. These are much thinner - lineations on the mountain than I saw before. These probably are less than 1 percent of the total elevation of the mountain. The craters on the side of Hadley Delta are rather few. Around Window and Spur, those that you see on your maps are the only ones I can see, and there appear to be, oh, about a dozen of them in that particular area. I might associate those with a secondary cluster, if I took a guess at it. I see nothing that indicates any flow down - or a landslide down Hadley Delta, only some subtle changes in topography. There's one bright fresh crater right next to St. George on the eastern side with almost white albedo, and it's got an ejecta blanket about a crater diameter away. How are you copying so far?

04 11 06 11 CDR Okay. Coming on around to St. George, it again is a (SEVA) very subtle old crater, but in this case, I can see some lineaments running - dipping to the west at about 20 degrees, parallel to the rim of the crater. These too are very small, less than a percent, and continuous *** parallel. The rim of the crater is very subdued and smooth. Coming around - I'll just take a quick look at the near field for you here. It's about generally the same. The crater density is, I'd say, quite higher - somewhat higher than I expected. Sizes are mostly less than about 15 meters. The only large crater that I see is what I believe to be Index back here, about the 8 o'clock, and it has a very subtle rim, almost no shadow in the bottom of it. I think that's one of the things that was deceiving on the descent. There are very few deep dark craters in the area. The distribution of fragments appears to be less than *** 2 percent.

On the surface, they vary from a *** centimeter in size up to, maybe, 3 or 4 inches. Most of them appear to be angular. I see some white ones. I can give you some more of that out of the Window. Trafficability looks pretty good. It's hummocky; I think we'll have to keep track of our position, but I think we can manipulate the Rover fairly well in a straight line. And I - - can see the base of the Front. As near as I can tell - as a matter of fact, I think I see where the Front runs into the level ground, where we get that 5-degree inflection. I see no boulders over there whatsoever. Looks like we'll be able to get around pretty good.

04 11 08 05 CDR And as far as ALSEP deployment unfortunately, (SEVA)
looking straight ahead in zero phase - it's blocked out somewhat, but if there's continuity of the surface that I see in our general position, I don't think we'll have any trouble taking the ALSEP out 300 or so and placing it. I just noticed a couple of items on the far side of the Rille on the flat horizon sallyport west there. Looks like a couple of very large boulders on the horizon; just unique, two of them. They're quite bright and quite sharp. I cannot see Hadley C at all, as we thought we might be able to. Bennett Peak is about all I can see in inspection of Head Valley.

04 11 08 51 CC Roger, Dave. Is that down towards Head Valley? (SEVA)

04 11 08 53 CDR Yes, that's correct. And the trafficability up to (SEVA)
the Northern Complex looks the same. I see no large boulders. The slopes go up maybe 5 *** 10 degrees at the most. And beyond that, all the terrain looks pretty smooth. I can see some young, fresh craters in our vicinity, which are sort of interesting in that there's some very small debris - in the crater itself and on the rim, and it's somewhat lighter gray than the general surface, the debris being on the order of, oh, centimeters or so, but quite young and fresh. And I see at 8 or 9 - or 3 o'clock, a very deep crater, old crater, smooth. But I can't even see the bottom, and it can't be more than, oh, 60, 70 meters away. I think that's one of them I was avoiding on the way in. That very well may be November.

04 11 10 05 CC Roger, Dave. And how far away do you think that (SEVA)
might be. It sounds very exciting.

04 11 10 15 CDR Joe, distances are very deceiving. I'd guess maybe (SEVA)
60, 70 meters. There's another somewhat deeper one
just to the north of that. It looks to me, and Jim
has the same impression looking out the window, that
we're much closer to Pluton and St. George, and all
that stuff, than we expected to be.

- - -

04 11 12 18 CC Just out of curiosity, could you see any sign of the (SEVA)
South Secondary Cluster?

04 11 12 32 CDR There's a gentle rise, just to our south and - I (SEVA)
don't see anything that's really prominent, as far
as elevation. I think the elevations on the models
we've been working with were somewhat exaggerated,
because I just don't see that much detail looking up
towards Hadley Delta.

- - -

* * * * LM WINDOW - POST SEVA * * * *

- 04 11 28 36 CC We're wondering if you can tell, or have a feel, for (LM WINDOW)
whether you're in a crater, or the slope of the
spacecraft is, perhaps, caused by just a gentle
slope of the terrain there. Any feel for that?
- 04 11 29 35 CDR I guess to answer your question, we're not really in (LM WINDOW)
a big crater anywhere. I think there are possibly -
one gear may be in one of these small craters. And
as you might have heard Jim and I discussing,
there's a rather high crater density and I guess my
references to trafficability were really to
boulders, because that's what I was really most
concerned with on driving the Rover. There is a
fairly high crater density around. And, as I
mentioned, they range up to probably 8 to 10 meters
or so. And in our local area - let me give you a
rough count of the, oh, 8- to 10-meter ones. I
guess one every 15 to 20 meters. So there's a fair
number of medium craters. Nothing sharp, no
boulders, and it may be that one footpad is in one
of these craters that range on down to maybe 2
meters or 1 meter. And then there's a sharp break
in craters down to probably a foot or so. But it's
almost like 14, as I remember their pictures, quite
a variety of crater sizes, up to some certain
limits. I don't see anything on the 25-meter scale
that we hoped to expose the bedrock in our immediate
vicinity, although I can see some fresh ones - maybe
some rims out through the window here at 10 or 11
o'clock. But I can't really account for our
attitude right now. We'll just have to get out and
take a look.
- 04 11 31 57 CDR Okay, Joe, - there's so much here, I could talk to (LM WINDOW)
you forever. But, there's a large - I can see now,
we were in zero phase - - and without taking a close
look out the front window, I couldn't tell you - -
but, as I was coming down trying to select a spot to
land, I was trying to avoid these 8- to 10-meter
craters. And we have one out of our 4 o'clock - I
guess about 3 or 4 o'clock that I discussed before.
There is one directly in front of us almost - the
rim is almost on the shadow of the radar antenna
right now, and it appears to be an 8- to 10-meter

And there's one over to our 10 o'clock.
They're just all over, and it was sort of hard to
find a spot that was really level.

- - -

04 11 33 36 CDR But, before we go, I got to tell you about a rock (LM WINDOW)(SAMP 15015)
that's right out at 12 o'clock, right - almost at
the radar antenna shadow, and it's going to be gone
pretty soon. There's a dark, black, angular
fragment which is on the order of probably - I'd say
6 to 8 inches across. It's got some light-colored
apparent dust on it. It's unique on the surface.
All the other fragments appear to be white. And
this one really looks like a jewel. You can think
about that for awhile.

- - -

04 12 20 23 CC Dave, I guess the first thing that we might start (LM WINDOW)
with, is our estimated position of your landing
site. And we've got two inputs on that. Al, when
he passed over, got what seemed like a pretty
accurate hack on where you've landed, and he calls
it out as Bravo Romeo 2 - correction. Disregard.
Bravo Romeo 5, 75.5. And in the back room, the best
guess from the back room is Bravo Romeo 2, 75.2. In
both cases, it's very near November crater. It's
just a question of on which side of November are you
now sitting. So a tally ho on November crater will
tell us, I guess, exactly. As it is, we think we
know where you are to within about 100 yards.

04 12 21 28 CDR Okay. I tried to find November crater out there, (LM WINDOW)
Joe. And, I could see a fresh one to the north - a
fresh rim, but no bright ejecta, as you see on the
map there. But I guess I probably agree with you,
and I might run through what I saw from pitchover,
on down, and that might help you out a little bit.
It was quite a surprise.

- - -

04 12 22 04 CDR Well, anyway, I got the 3000-south call, which was a (LM WINDOW)
good call. And as we came down prior to P64, I
could see the Rille to the south, and I couldn't see
it up over the nose. And I got the distinct

impression, as I looked at Hadley Delta, coming into P64, that we were going to be way long. And, I guess - you know, I've never shot one of these landings before, and I got fooled a little bit there. And at pitchover, we were definitely quite a ways south, and I never saw Index crater all the way down. I saw what I thought was Salyut, and the one north of Salyut, which I sort of picked as a landmark to zero in on. I gave about four clicks right and then about two more right, as I remember, to get us back up to the north. And because we were south, I lost the four craters in a row that lead into Index. But I believe the topo relief is somewhat exaggerated in that our maps and models show good shadow at Index. And, as good a crater as that is from orbit - - it was very easy to pick up in orbit - - I never did locate it on the descent during the visibility phase. But I was able to see Earthlight, and that substantiated your call of being 3000 short. Now, after I got over a roll to come back up north with the LPDS, and Salyut - - what I thought was Salyut - - I redesignated short to bring us back to what looked like a reasonably smooth area. And then I just picked out a spot in between the holes down here, and I - put it down. And I guess I sort of have to agree with you that we're probably somewhere around November. And - let me think a little bit and see if I can remember seeing something that looked like November.

04 12 24 46 CC Dave, while you're thinking there, let me repeat a question I asked earlier. You described a very bright crater in one of your first descriptions. We're still looking for the azimuth, approximate distance, and size of that bright crater. (LM WINDOW)

04 12 25 09 CDR Well, the brightest crater I've seen is the one that was right on the rim, halfway up St. George, and it's almost white. And - is that the one you're thinking about? (LM WINDOW)

04 12 25 25 CC Stand by, Dave. I think there was another one. I'll get back with you on that in a minute. It was one that was a lot closer to you. And I've got another question now on the board in front of me here. We think you're near the edge of Aristarchus Ray. And, I wonder if you can recall anything about the local albedo changes. (LM WINDOW)

04 12 26 02 CDR No, Joe, I didn't see a thing. And, it's just all (LM WINDOW)
the same north and south, east or west in our
current position.

04 12 26 23 CC Roger, Dave. Copy that. And sorry on that crater (LM WINDOW)
call. That was my fault - the Aristillus -
Autolycus Ray.

- - -

04 12 26 49 CC Dave, while you're sipping your - cold tomato soup (LM WINDOW)(SAMP 15015)
there, was the black rock that you called out to us
on a crater rim?

04 12 27 04 CDR Yes, it is, Joe. It sure is. And it's a typical (LM WINDOW)(SAMP 15015)
crater to see. It's quite a subtle crater, but it's
out - well, LM shadow being like 30, maybe 28 meters
now. It's probably about 40 meters away, the rim of
the crater. And that black rock is sitting right on
the rim.

04 12 27 40 CDR Hey, Joe. Jim's just pointed out another black one (LM WINDOW)
now that must be 300 meters out. And it's so dark
that it looks like a shadow. It's just coal black,
and it looks like it might be about the same size.

04 12 27 58 CC Roger, Dave. Incredible. While you're peeking out (LM WINDOW)
there do you have any further observations on the
abundance, size, and distribution of the frags in
the nearby field of view?

04 12 28 17 CDR Yes. That's one we promised you. Yes. I'd say (LM WINDOW)
that, in the near field, the surface is covered by -
probably less than 1 percent of fragmental debris.
And, of that debris, I'd say 70 percent of it is on
the order of an inch to 2 inches, or less. And
maybe the other 30 percent seems to be in a range of
maybe 4 or 5 inches, something like that; no large
frags anywhere. They mostly - -

- - -

04 12 29 11 CDR Okay. Most of the fragments are light-colored, (LM WINDOW)
except for the two that we mentioned to you. In
fact, they all look white. I can see some that are
just stark white and some that are a lighter-gray.

- - -

04 12 30 36 CDR Okay, we heard that. Gee, I'm just looking down (LM WINDOW)
right in front of the LM here to try and get your
relative abundance, and I was about ready to say
that maybe, of these inch frags, there might be five
or six in a square meter. And I see what appears to (SAMP 15017-19, 27-28)(PHO 86 11604-07)
be a round glass ball. It's shiny, it casts a
rounded shadow, and it looks about the size - oh,
maybe an inch or so.

04 12 31 11 CDR I can see some lineaments on the surface which (LM WINDOW)
appear to be from the descent engine. They radiate
away from our position here. We'll take a closer
look at those later.

04 12 31 32 CC Roger, Dave. And, for the benefit of our fine (LM WINDOW)
Flight Director, maybe the name of that should be
called an "Aggie".

04 12 31 42 CDR Okay, Joe. We'll call that one our first "Aggie". (LM WINDOW)

04 12 31 46 CC And, Dave, the question on the bright crater, you (LM WINDOW)
described it as the one near the LM with lighter
-gray debris in it. And I'm sitting here wondering
if maybe that was November crater itself.

04 12 32 06 CDR Okay; there was one in that fresh debris. Light (LM WINDOW)
-colored around the rim. Although it was - did not
have a particularly raised rim. It was a level rim,
but there was a fair amount of debris around the
rim. And that was out about, my 2 o'clock, I guess.
Maybe you'd call that November. I guess what I was
looking for, relative to November, was the bright
ejecta blanket, which I don't really see.

- - -

04 12 44 27 LMP Okay, Joe. I have some frame numbers - frame counts (LM WINDOW)
for you.

04 12 44 38 LMP Mag 1 is reading 33. Mag K is reading 66. And mag (LM WINDOW)
Metro is reading 20.

- - -

04 20 26 11 CDR Okay, Houston. Hadley Base, here. We're ready to talk over the EVA plan with you, if you'd like. (LM WINDOW)

04 20 26 23 CC Roger, Dave. We're ready too. First of all, we'll talk about the changes in the traverse plan, which are very minimal. But for your planning, we're now showing a LM location on the grid map in the coordinates of Bravo Romeo 3 and 75.5. (LM WINDOW)

04 20 26 54 LMP Okay, Bob. We're going to have to get in the ETB and pull the maps out. Just a second. (LM WINDOW)

04 20 28 12 CC And that's over there near November. Okay. That's to write down. The rest of this, for a while anyway, is kind of just advisory. This new location adds approximately 0.6 kilometers to the EVA-1 traverse and, therefore, about 6 minutes driving time. However, that's only provisional, of course, and our indications of a beautiful flat plain out there may mean that we'll make up some of that time just in being able to drive faster than we were perhaps anticipating. If this is not the case - - (LM WINDOW)

04 20 29 02 CDR Before you get too far into that broad, flat plain out there, I hope we made it clear that there is a fairly good population of craters, which we're going to probably have to drive around. Even though there are no boulders, we're still going to have somewhat of a wander factor in avoiding the 3- to 4-meter craters. (LM WINDOW)

04 20 29 24 CC Okay. We realize that, Dave; and, in order to keep the EVA total time to the maximum of 7 hours, this 6 minutes of it has already been deleted from the activities of the LM at the end of the traverse. So that's where we've taken up the slack at the present time. And then beyond that, no further changes have been made to the EVA-1 timeline. (LM WINDOW)

04 20 29 56 CC Okay. Extra activities we'd like for you to include. We'd like the big glass ball that you saw in the vicinity of the LM - could be picked up, hopefully, with the contingency sample, if it's convenient; if not, it should be retrieved as part of the LRV preparation before the EVA traverse. The geology people, for obvious reasons, are rather (LM WINDOW)
(SAMP?)

interested in the large black rocks you described on the SEVA at 40 meters and 300 meters. And we'd like (SAMP 15015) to pick those up before you leave sometime. And I guess a little note here, which sounds like motherhood to me - "selected samples should be taken at the crew's convenience at the end of the EVA." As far as the Rover is concerned, in our new position - -

- - -

04 20 31 09 CDR Okay. We were just discussing the frags around the (LM WINDOW) LM, and we can see a number of interesting rocks out here. And we thought it might be better to wait until we get back to the LM to pick them up and make sure we didn't disturb the the surface around it, although we can pick them up fairly quickly in the beginning. I guess it's your choice. If you want to spend the time in the beginning or wait until we get back.

04 20 31 36 CC Roger, Dave. My first flip comment there was the (LM WINDOW) comment before you leave the Moon. The second comment on the "selected samples should be taken at the crew's convenience at the end of the EVA" was apparently intended by the geologists to mean selected samples of these black rocks and other interesting frags.

04 20 31 57 CDR Okay. Well, do you specifically want us to pick up (LM WINDOW)(SAMP 15015) the glass ball and the black rocks before we start the EVA 1?

- - -

04 20 32 24 CC Okay, Dave, you will put the glass ball at a higher (LM WINDOW)(SAMP?) priority. Apparently, because they're worried if the glass ball might get lost once the area gets mussed up a little bit, whereas the black rocks will probably still be there.

04 23 54 54 CDR Going down on the Rover's side. Okay; it's down. (LM)
Okay. Ease on down the ladder here.

04 23 55 50 CDR Okay, Houston. As I stand out here in the wonders (LM)
of the unknown at Hadley, I sort of realize there's
a fundamental truth to our nature; Man must explore.
And this is exploration at its greatest!

04 23 56 24 CDR Well, I see why we're in a tilt. We've got - that's (LM)
very interesting. There's so - so much hummocky
ground around here, we're on a slope of probably
about 10 degrees. And the left-rear foot pad is
probably about 2 feet lower than the right-rear foot
pad. And the left-front's a little low too. But
the LM looks like it's in good shape. Tell the
program manager I guess I've got his engine bell.
It's a little rise right under the center of the LM.
The rear leg's in a crater and the rim of the crater
is right underneath the engine bell.

- - -

05 00 00 00 LMP Okay, Dave. I'm going to come on out. (LM)

- - -

05 00 02 47 CDR And, Jim, I'm going to put a big circle around this (LM)(SAMP 15027)
glass ball, so we don't mess it up. It's pretty
neat.

05 00 02 56 LMP You want me to take it in the contingency sample? (LM)(SAMP 15027)

05 00 02 58 CDR Yes, wish we had - we ought to document it. We (LM)(SAMP 15027)
won't lose it.

- - -

05 00 03 31 LMP What did we decide? I'll get this glass ball here (LM)(SAMP 15027)
on the - -

05 00 03 34 CDR No, why don't you save it. Let's document it. It's (LM)(SAMP 15027)
- - I've got a circle around.

05 00 03 39 LMP Okay. I'm going to move out and get the contingency (LM)(SAMP CONT 15020-26)
sample.

- - -
05 00 04 45 LMP I think I can get a rock here. It's about 2 inches (LM)(SAMP CONT 15020-26)
subrounded in the contingency sample, along with the
soil.

- - -
05 00 05 43 LMP Okay, I have the contingency sample. I'm taking it (LM)(SAMP CONT 15020-26)
back to the ladder.

05 00 06 02 LMP No wonder we slipped, Dave. Boy, that's really soft (LM)
dirt there around the front footpads.

05 00 06 08 LMP Like about 6 inches deep of soft material. (LM)

- - -
05 00 07 43 LMP The crater here that I'm standing by, Joe, it's (LM)
about a meter in diameter. And then, there's a
smaller crater right in the center of it, and that
one has fragments around it that have glass exposed
on them, where the larger crater does not have any
glass exposed. Just the smaller crater within the
large one.

- - -
05 00 09 32 LMP Okay, mag C is going on the 16 millimeter. (LM)

- - -
05 00 12 28 LMP Contingency sample's on the platform, Joe. (LM)(SAMP CONT 15020-26)

- - -
05 00 14 19 CDR Now, to come down, don't disturb our little glass (LM)
ball. The Rover's going to come down into a slight
tilt to the left. But I think we'll be okay.

- - -
05 00 14 49 CDR Walking on all these slopes makes it sort of sporty, (LM)
doesn't it?

05 00 31 07 CDR Boy, is this dirt soft! Man! (LM)

05 00 31 15 LMP Like soft powdered snow. (LM)

- - -

05 00 37 47 CDR Boy, we're going to have a great time with all these (LM)
hills and mounds.

- - -

05 00 38 49 CDR You know. As I look back behind us. It almost (LM)
looks like if we'd landed in another, oh, 10 meters
aft and we'd have been in Surveyor crater.

- - -

05 00 41 27 CDR This is really tricky working on this slope in this (LM)
soft material.

- - -

05 01 06 11 CDR Okay. In the seat pan on the CDR side: mag E, mag (LM)
*** - mag Oboe, mag Kilo; the LRV map holder is out
and - get it stowed here in a minute.

05 01 06 48 CDR Mag Lima is on the *** - LMP's camera. (LM)

- - -

05 01 07 05 CDR 500 with mag Metro - is in the seat pan and tucked (LM)
away.

05 01 07 27 LMP And, Joe, in bag 2, I have the core stems and caps. (LM)
I put bag 2 under my seat.

- - -

05 01 44 35 CDR Okay, Jim, here we go. (LM-1)

05 01 44 37 LMP Okay, Dave. We want - a heading of 203. (LM-1)

05 01 44 44 CDR Okay, 203. (LM-1)

- - -

05 01 44 55 LMP Okay, we're moving forward, Joe. (LM-1)

- - -

05 01 45 16 LMP Heading directly south right now to miss some (LM-1)
craters off to our right - very subdued craters.

- - -

05 01 45 55 CDR 203, huh? Okay. (LM-1)

05 01 45 57 LMP 203 for - 2 miles. (LM-1)

05 01 46 05 CDR Okay. That's a nice young fresh one. (LM-1)

05 01 46 11 LMP Speed's varying between 8 and 10. (LM-1)

05 01 46 16 CC Roger. Our TV pan suggests, you can go straight for (LM-1)
St. George crater, and you'll find Elbow okay. And
we're suggesting you omit checkpoint 1 - Rhysling
crater should be a good landmark along the way, and
head 208.

05 01 46 36 CDR Okay. 208, Joe. (LM-1)

05 01 46 39 LMP Okay, we're doing 10 kilometers, now. Now we're (LM-1)
heading uphill; when we head uphill, it drops down
to about 8.

05 01 46 47 CDR No dust Joe, no dust at all. (LM-1)

05 01 46 57 LMP About 9 kilometers, now. (LM-1)

- - -

05 01 47 18 CDR Okay, I guess - could this be Rhysling right here, (LM-1)
Jim?

05 01 47 21 LMP Probably is - this large depression off to our left? (LM-1)

05 01 47 24 CDR Yes. Man I can see I'm going to have to keep my eye (LM-1)
on the road.

05 01 47 35 CDR Boy, this is - it's really rolling hills, Joe. Just (LM-1)
like 14. Up and down we go. Oh, and this must be
Earthlight, huh? Could that be? Boy, look at that;
we're going to have to do some fancy maneuvering
here.

05 01 47 55 LMP There's an elongate depression here before you get to Rhysling. I don't think we're to Rhysling yet - Rhysling ought to be about 1.4. We've only gone - see .4. (LM-1)

- - -

05 01 48 13 LMP Do you think that's probably Rhysling out about 11 o'clock to us, Dave? (LM-1)

05 01 48 18 LMP Out about - maybe 1 kilometer. (LM-1)

05 01 48 21 CDR Yes. Okay, Joe, the Rover handles quite well. We're moving at, I guess, an average of about 8 kilometers an hour. It's got very low damping compared to the one-g Rover, but the stability is about the same. It negotiates small craters quite well, although there's a lot of roll. It feels like we need the seat belts, doesn't it, Jim? (LM-1)

05 01 48 49 LMP Yes, really do. (LM-1)

- - -

05 01 49 51 CDR Look at this little fresh one - little fresh - boy, look at that! Miles of very angular frags all over the thing. (LM-1)

05 01 49 58 LMP Yes, we passed several of those. (LM-1)

05 01 50 02 CDR Okay; I'm going to cut down to the south here, Jim. (LM-1)

05 01 50 05 LMP Yes, that'd probably be best - because I think that's probably - let's see, range .7 - that's still not Rhysling. Shouldn't be. (LM-1)

05 01 50 21 LMP And we have a large subdued one at our 1 o'clock position, I'd estimate 50 kilometers wide - (LM-1)

05 01 50 36 LMP .8. (LM-1)

- - -

05 01 51 09 LMP You're only about half way - to checkpoint 1. We shouldn't - what I thought was Rhysling was probably not Rhysling; Rhysling is a larger crater, and - should be about 1.4 - from the LM. (LM-1)

- - -

05 01 52 00 CDR The zero-phase riding is pretty tough, Joe. We're (LM-1)
going to have to make sure we keep at an angle.
Once I look into zero-phase it all looks flat.
There's a nice little round 1-meter crater with very
angular frags all over the bottom and the rims, and
glass in the very center. About a meter across.

- - -

05 01 52 37 LMP Can't see the Rille at all from here. Still looking (LM-1)
for Rhysling.

05 01 52 49 LMP 1.1 - (LM-1)

05 01 52 54 CDR Okay, right now our bearing is 039 for 1.1. (LM-1)

- - -

05 01 53 28 LMP Yes. We have a large subdued one on our right about (LM-1)
- 60 meters wide with several small ones in the
center. By small, I mean about 10 meters in
diameter.

- - -

05 01 54 15 LMP Yes, I was looking at that one at 1 o'clock to us (LM-1)
right now. Very fresh angular block of lighter
-albedo material on the south rim.

05 01 54 25 LMP We kick up a little dust when we go through these (LM-1)
craters.

05 01 54 29 LMP Seems like when we get to the bottom, and I can see (LM-1)
the trajectory of the fragments coming from the - it
looks like - yes, they're coming from the front
wheels and coming up kind of around my arm and then
forward.

05 01 54 39 CDR Yes, but it's not dusty. I mean, there's - - (LM-1)

05 01 54 41 LMP No it looks like millimeter-type particles. (LM-1)

05 01 54 51 LMP Okay, let's see, the distance 1.3. Okay, I think (LM-1)
there's a large one coming up about 12:30 or 1:00
o'clock that could be Rhysling.

05 01 55 08 CC Jim, that sounds good or it could be the large one (LM-1)
to the northwest of Rhysling. Rhysling may be
coming up on your left now.

05 01 55 20 LMP Well, there's a large one over there, too, Joe, I - (LM-1)
- - -

05 01 55 30 LMP Our heading's about - averaging about 200 - 210. (LM-1)
- - -

05 01 56 08 CDR Okay, here's a big one right here on our left, Jim. (LM-1)

05 01 56 09 LMP Yes, but it's not - I don't think it's big enough to (LM-1)
be Rhysling.

05 01 56 12 CDR No, I don't think it is either. We got a ridge up (LM-1)
here in front of us, we'll - -
- - -

05 01 56 30 LMP That could be Rhysling, Dave; we'll find out when we (LM-1)
get up on top of this ridge.
- - -

05 01 57 14 LMP It just came up 1.7, and our relative bearing's 036. (LM-1)

05 01 57 21 LMP Hey, you can see the Rille - there's the Rille. (LM-1)

05 01 57 23 LMP Yes. We're looking down in it - down and across the (LM-1)
Rille, we can see craters on the far side of the
Rille.

05 01 57 33 LMP A lot of blocks. You ought to turn the camera on. (LM-1)

05 01 57 40 CDR Yes. Now we're getting into the blocky stuff - (LM-1)
about 1 foot, quite angular, irregular surface.

05 01 57 55 LMP We're right at the edge of the Rille, I bet you. (LM-1)

05 01 57 57 CDR Yes, sir. We're on the edge of the Rille, you'd (LM-1)
better believe it. I think we're heading right - -

05 01 58 01 LMP I don't see Elbow though. Oh, yes, I see Elbow. (LM-1)
Dave, we have to stay up on the high part of the
Rille, here.

05 01 58 08 CDR Yes. See, Elbow is not as prominent as we thought, (LM-1)
but there's a definite crater there.

05 01 58 13 LMP I see Elbow. (LM-1)

05 01 58 15 CDR Yes, it - subtle though - subdued. (LM-1)

05 01 58 18 CDR Hey, look there's a big block on the edge of the (LM-1)
Rille there that must be 10 meters. There are lots
of outcrops. But, on the far side, I don't see
anything that would suggest really layering.
There's a lot of debris, big angular blocks all the
way down, but nothing that you'd really call - exact
layers.

05 01 58 43 CDR Let me get us back up on it - back up on the ridge, (LM-1)
it's smoother.

05 01 58 47 LMP Yes, I think that heading was - we were on a heading (LM-1)
of a little too far west. We're getting back up on
the higher part of the Rille rim. At this point,
I'd estimate the slope is probably - what? About 3
degrees?

05 01 59 03 CDR Yes, there's a definite branch or rim that runs (LM-1)
along the Rille, maybe 70 - 80 meters from this -
the inflection point that drops down into the Rille,
don't you think, Jim?

05 01 59 15 LMP Yes. And, we might as well - we're heading right (LM-1)
toward - we'll head toward the east side of Elbow.

05 01 59 24 CDR Yes, we're in good shape. We can see Elbow, and we (LM-1)
can see the Front all the way down to the Spur.
And, there's not a big block on it.

- - -

05 01 59 42 LMP I see one large block, up about a quarter of the way (LM-1)
up the Front Dave.

05 01 59 51 CDR There's a big one partially buried. Oh, there's (LM-1)
some beautiful geology out here. Spectacular!

05 02 00 10 LMP Looking up at the Front now, Joe, I sure see the (LM-1)
linear patterns that Dave commented on before. With
the dip and everything.

- - -

05 02 00 24 LMP And, I sure get the impression that - almost looks (LM-1)
like a slump feature, but we'll take some good
pictures of that, because you see the same
linear-type pattern in the east side of the Rille.
And note the linear pattern there is parallel.
Almost like layering in the Rille. And, then as you
look upslope - up the Front, that layering takes
that dip to the northeast that Dave had mentioned
earlier.

05 02 01 02 CC Roger, Jim. And can you actually see the east side (LM-1)
of the Rille, towards the south there?

05 02 01 09 LMP Oh, yes. I can see, looking directly south - the (LM-1)
exposure that faces northwest. I can look down and
I can see - I think I can see Hadley C down there.

05 02 01 24 LMP Yes, I think I can see the south rim of Hadley C. (LM-1)

05 02 01 38 LMP Okay, let's see - well, we can see Elbow. But (LM-1)
anyway, when we get there - -

- - -

05 02 01 50 LMP It should be 2.7, so we got another .7 to go. (LM-1)

05 02 02 00 LMP Speed's been generally about 10 clicks. (LM-1)

05 02 02 11 LMP Yes. And again looking to the south along the edge (LM-1)
of the Rille that faces to the northwest, I can see
several large blocks that have rolled downslope.
Very large blocks that are about three-quarters of
the way down the - slope - into the Rille. That's
just at the base of St. George.

05 02 02 40 LMP And - we're heading about 165 - right now. Tried to (LM-1)
stay on the fairly level and smooth part of the
Rille rim. But looking over to the edge of the
Rille at this point, I see a large concentration of
large boulders - large rocks. And I'd estimate the
size - they're angular, and - they're all of the

same color and texture as far as I can tell from here. See that *** ? Well, you'd better watch the road, Dave.

- - -

05 02 03 28 LMP It's the first good concentration of large rocks (LM-1)
that I've seen. Very similar to the large rocks
that - that 14 saw up at the top of Cone.

- - -

05 02 03 51 CDR Okay, relative - right now, Joe, our bearing is 18 (LM-1)
and range is 2.3.

05 02 04 08 LMP Okay; now, Joe, I can - see the bottom of the valley (LM-1)
- Head Valley that leads down toward Hadley C. I
can see the bottom of the Rille - it's very smooth.
I see two very large boulders that are right on the
surface - there, on the top of the very smooth
portion of the bottom of the Rille. And the one to
the southeast, I can see the track of where it's
rolled downslope.

05 02 04 53 CC Roger, Jim. Copy. And is the bottom V-shaped or (LM-1)
fairly flat?

05 02 04 59 LMP I'd say it's flat. I'd est - well, it's hard to (LM-1)
estimate. I'd estimate maybe - oh, 200 meters wide
of a flat area in the bottom. Oh, and I can see
what we thought was Bridge crater. And - it
definitely would not have been a place to cross
Hadley Rille. It's just a depression in the west
wall of the Rille. And I - boy, at this vantage
point, there's sure a lot more blocks exposed on the
far side of the Rille. I'm contrasting now the
Rille to the southeast - - and the Rille to the -
side of the Rille to the northwest.

- - -

05 02 06 33 CDR I might add to Jim's comment, that the near side of (LM-1)
the Rille wall is smooth without any outcrops, there
by St. George, and the far side has got all sorts of
debris. It almost looks like we could drive down in
on this side, doesn't it?

05 02 06 49 LMP I'm sure we could drive down; I don't think we could (LM-1)
drive back out.

05 02 07 00 LMP Oh, now - I can turn around and look to the (LM-1)
northwest - where the Rille trends to the north.
Now, let me concentrate on Elbow for the moment.

- - -

05 02 08 04 CDR There's old Elbow. (LM-1)

05 02 08 07 LMP Is it? (LM-1)

05 02 08 08 CDR There's a real fresh one down here. (LM-1)

05 02 08 10 LMP No, Elbow's larger than that. (LM-1)

05 02 08 12 CDR Yes, but there's - hey, there's a nice fresh one (LM-1)
then.

05 02 08 14 LMP Yes, but you want to go a little farther east. See, (LM-1)
that's Elbow out at 11:30.

05 02 08 19 CDR Oh, yes. Roger. Gosh, that's a long way away. (LM-1)

05 02 08 23 CDR Distances are very deceiving. *** like we've been (LM-1)
driving for an hour. Are you sure that's Elbow, Jim?

05 02 08 34 LMP Yes. Yes, you want to go farther east, Dave. (LM-1)

05 02 08 51 LMP You have Elbow out at our 1 o'clock position. (LM-1)

05 02 08 53 CDR Shoot, this is Elbow right here, I believe, my (LM-1)
friend.

05 02 08 56 LMP Yes, this is Elbow right here. (LM-1)

05 02 08 58 LMP Yes, this large one. (LM-1)

- - -

05 02 09 01 CDR Yes, that's some big fellow, isn't it? (LM-1)

- - -

05 02 09 37 CDR Okay, let's go right up on the ridgeline there, I see some debris. Maybe we can get some - a fresh one in the rim. Be looking down-sun. Oh, look at this baby climb the hill. (LM-1)

- - -

05 02 10 21 LMP We got a good slope here about, - I'd say 10 degrees; we're going up right now. (LM-1)

- - -

05 02 10 33 LMP Okay, now we're up on the high part, and we're on the east rim of Elbow. (LM-1)

- - -

05 02 10 46 CDR Okay, we're at our first stop. (1)

- - -

05 02 11 11 LMP 185, 011, 045, 032, 105, 112, 085, 087. (1)

- - -

05 02 13 41 LMP Okay, I'm taking a pan. (1)(PHO 85 11398-415)

05 02 14 31 CDR Did you get your pan? (1)(PHO 85 11398-415)

05 02 14 35 LMP Got the pan. (1)(PHO 85 11398-415)

- - -

05 02 14 50 LMP Okay. A quick radial sample here. (1)(SAMP 15065)(PHO 86 11530-32; 85 11416-17)

05 02 14 52 CDR Yes. Let me find you one. Here, Jimmer. Right over here's one. I kick dust all over them so easy. How about that one right there? Think we can get that in the bag? (1)(SAMP 15065)

- - -

05 02 15 56 LMP Number 156. (1)(SAMP 15065)

- - -

05 02 16 05 LMP It's very friable. (1)(SAMP 15065)

05 02 16 07 CDR Looks like a breccia all right, quite friable. But, (1)(SAMP 15065)
 I see a lot of sparklies in there. No glass.
 Subangular, with lots of dust on it.
 - - -

05 02 16 36 CDR Okay, we'll hop up here and get another one. (1)(SAMP 15070-76)(PHO 85 11418-19; 86 11533-35)

05 02 16 59 CDR Okay, here's one about the same size. You're a (1)(SAMP 15070-76)
 little too big. Take this one right here, Jimmer.
 Oh, I see a large chunk in there.

05 02 17 16 LMP Get a little soil on this one, huh? (1)(SAMP 15070-76)

05 02 17 17 CDR Yes, man. (1)(SAMP 15070-76)

05 02 17 34 LMP Yes, I got the down-sun. (1)(SAMP 15070-76)(PHO 85 11418)

05 02 17 37 LMP Get the location shot here. (1)(SAMP 15070-76)(PHO 85 11419)

05 02 17 38 CDR Okay, Joe. These are buried about - an inch or so. (1)(SAMP 15070-76)
 The one I have is subangular; it's covered with
 dust, but beneath the dust - by golly it's a - it's
 quite friable and - I see olivine. Look at this,
 Jim. In the sunlight, would you call that olivine?
 And, there is a big lath in there. Look at the big
 lath about a centimeter long and a millimeter wide.

05 02 18 15 CDR Plag. (1)(SAMP 15070-76)

05 02 18 17 CDR It's light-gray - millimeter-size grains, with - (1)(SAMP 15070-76)
 like 2-millimeter-size phenocrysts in it. Gosh.
 - - -

05 02 18 38 CDR Bag number 157. (1)(SAMP 15070-76)

05 02 18 41 CDR Let me get you another one. My goodness! Let's get (1)(SAMP 15070-76)
 another one out of here.

05 02 18 55 CDR That one's really buried. (1)

05 02 18 56 LMP A little too big to go in there. (1)

05 02 18 58 CDR Yes. There's a little one. Okay, let me just stick (1)(SAMP 15070-76)
 it in.

05 02 19 08 LMP Going to put any soil in there? (1)(SAMP 15070-76)

05 02 19 10 CDR Yes, give me the bag. I'll fill it up, too. Dig a little light trench in there, and we'll - I got a feeling that Dr. Schmitt's going to win his bet. Not that part, get another part. Not where we picked the rock up, right in front of it. Okay, that's good. Just - hit the - spot, too. (1)(SAMP 15070-76)

05 02 19 38 LMP Okay, a little bit more. (1)(SAMP 15070-76)

05 02 19 39 CDR Okay, you just try it again. Get another one and just pour real smooth, and I'll catch. (1)(SAMP 15070-76)(PHO 85 11418)

05 02 19 50 CDR That a boy. That a boy. Good show. Okay. That ought to be enough for them to take a look at. Okay, 157. (1)(SAMP 15070-76)(PHO 85 11419)

- - -

05 02 20 25 CDR *** I'm going to get the picture. Get the picture. Okay, let's hop on out and get one more. Yes, it's pretty sparse out here. Gosh, we're only - not very far at all. I'm not sure that the ones out here aren't thrown up from *** (1)(SAMP 15070-76)(PHO 86 11535)
(SAMP 15080-88)(PHO 85 11420-21; 86 11536-39)

05 02 20 42 LMP I don't know that this is representative too much of Elbow. (1)(SAMP 15080-88)

05 02 20 46 CDR I don't think so, either. But, let's pick up a couple - one more anyway, since we're out here. I see a little one. Got to be careful not to kick the dust all over them when you get there. Jim, I see sort of a miniature raindrop here, it looks like. (1)(SAMP 15080-88)

05 02 21 10 LMP Yes, just behind you is one of those fresh craters, too, with a lot of glass in it. (1)(SAMP 15080-88)

- - -

05 02 21 53 CDR Okay, Joe. I've got another subangular fragment here. Rough surface texture. And, knock a little dust off of it, and it looks like a very fine-grained, gray - rather solid frag. I don't see any significant pits or any significant-size crystals in there. It might just be because the surface covering; but just a smooth, fairly hard rock. (1)(SAMP 15080-88)

05 02 22 28 CDR So far, I haven't seen any pits on any of these. (1)(SAMP 15080-88)
And, most of them are about one-fifth buried. Okay,
here's another one that's got - on the underneath
side of that - I hope I don't lose these tongs - on
the underneath side of this frag, Joe, I can see
some soil that is caked on the bottom, about 1
millimeter thick, and maybe down in the place from
which I got it, we could sample. Why don't we get
it - I'll take a picture and you can scoop that. (PHO 86 11539)
And there's another one that has a large - -

- - -

05 02 23 12 CDR Okay, 158. (1)(SAMP 15080-88)

- - -

05 02 26 50 CC Jim, could we - - have a heading reading as you (1)
climb on there?

05 02 26 56 LMP Yes, heading's 1 - 185, Joe. (1)

05 02 27 05 CDR Oh, my. I just kicked up a hole here, at the rim of (1)
this little crater. Seems to be all white, much
lighter albedo.

- - -

05 02 28 36 CDR Mark. *** roll. (1-2)

- - -

05 02 29 05 LMP Okay, we're moving out again at about 7 - 8 clicks. (1-2)
Heading 180.

05 02 29 15 LMP We want about a 225. (1-2)

- - -

05 02 29 33 LMP As we drive along, there's several craters 3 to 5 (1-2)
meters in diameter. There's a rather large one out
at 1 o'clock to us now. We have a heading of 215.
It looks fairly recent - there are a lot of angular
blocks on the rim of it.

- - -

05 02 30 25 CDR Careful. Here, let me. Boy, that's a nice fresh (1-2)
one. There's the answer to - gosh. Bump! Sure
hate to go by that one. Okay.

- - -

05 02 30 47 CDR Yes, that's the freshest we've seen. It's a great (1-2)
one.

05 02 30 53 LMP Oh, I see a - oh, there's - another fresh one over (1-2)
there at about - 11 o'clock.

05 02 30 58 CDR Okay, it's about 20 - 25 meters across, and it (1-2)
looked like it excavated the bedrock; it had a very
blocky ejecta blanket and blocky rims, and the
ejecta blanket was about halfway out. Blocks on the
order of about a foot and a half - at the largest.
And some angular, some quite angular.

05 02 31 16 LMP Bet there's glass in the bottom of that one. (1-2)

05 02 31 17 CDR Yes, there sure is. (1-2)

05 02 31 19 LMP Yes, we're starting a slight upslope now. (1-2)

05 02 31 26 LMP As we approach the Front. And what a beautiful view (1-2)
looking up that slope.

05 02 31 31 CDR Isn't that, and you can see the lineaments come down (1-2)
cutting across there can't you? Going from - let's
see; it's got to be northeast or southwest, huh?
Okay, let's pick a - let's just head up the slope
here.

- - -

05 02 31 57 CDR Ho, ho, ho - look at these here. Deep, subdued, (1-2)
but - -

05 02 32 07 LMP Deep, but there's not much fresh ejecta around them. (1-2)

05 02 32 10 CDR No. Man, steep slopes, that must be 30 degrees on (1-2)
the side. And a little old crater that couldn't be
more than 10 meters across. We're heading for St.
George, I think, huh?

05 02 32 23 LMP Yes. Now, there are some blocks now that look like (1-2)
they're a foot - angular blocks. They're - seem
like they're on the surface Dave. Look over there
at 11:30.

05 02 32 40 CDR Yes, they are. Most of them have been buried at (1-2)
this time, and those seem like they're right on the
surface.
- - -

05 02 33 12 LMP Hey, we're reading 3.8 right now - - (1-2)

05 02 33 30 LMP There's a large block - looks like about a 5-footer (1-2)
out at 1 o'clock - angular block.

05 02 33 35 CDR Yes, you're right. Why don't we go there? It's - (1-2)
we're - you can tell we're going uphill.

05 02 33 43 LMP Yes, speed's dropped down to 7 clicks. (1-2)

05 02 33 49 CDR Yes, if we just go straight over to that big one - - (1-2)
- - -

05 02 33 58 LMP Okay; we're going to a big block here, Joe. It's (1-2)
one we just can't afford to miss. What it is to
look at a big block; we're going to look at a big
block.

05 02 34 09 CDR It's the only big block I see anywhere. (1-2)

05 02 34 12 CDR Hey, we could get to that fresh one, Jim. Hang on - (1-2)
hang on, digging in.
- - -

05 02 35 40 LMP Okay, Joe. If you're ready to copy, here we go: (2)
280, 017, 055, 039, 105, 110, 090, 090.
- - -

05 02 36 53 LMP *** I'm taking a pan. (2)(PHO 85 11422-38)
- - -

05 02 37 09 LMP I'll do it, Dave. Okay. The heading - is 270; and (2)
the bearing, 0.17.

- - -

05 02 38 44 CDR Okay, Jim; let's go sample this rock - - (2)(PHO 85 11422-38)

05 02 38 47 LMP Let me take a pan here, Dave. (2)

- - -

05 02 39 26 CDR There is one boulder! Very angular, very rough (2)
surface texture. Looks like it's partially - well,
it's got glass on one side of it with lots of
bubbles, and they're about a centimeter across. And
one corner of it has got all this glass covering on
it; seems like there's a linear fracture through one
side. It almost looks like that might be a contact;
it is, within the rock. It looks like we have a -
maybe a breccia on top of a crystalline rock. It's
sort of covered with glass; I can't really tell, but
I can see a definite linear feature through one side
of it which is about a fifth, and the glass covers
both sides of what I guess I'm calling a contact.
And there's also, parallel to that contact, one
surface, which is quite flat, only for about 8
inches or so. Looks like it's been chipped off.
The boulder itself is on the order of about a meter
across and maybe a - gee, it looks like a half meter
thick or so. It's got a fillet up one side, and the
other side is in a shadow. I can't really tell
whether - it doesn't look like it's filled. It's
got a fillet on the downslope side, and - the
upslope side is open and free. As a matter of fact,
it looks like it's almost excavated beneath it.

05 02 41 04 LMP It looks fairly recent, doesn't it, Dave? (2)

05 02 41 07 CDR Yes, it sure does. It sure does, and I can see (2)
underneath the upslope side; whereas, on the
downslope side, it's piled up. Boy, that is really
something.

05 02 41 17 LMP Hey, let's get some good pictures of that before we (2)(PHO 85 11439-40; 86 11544-45)
disturb it too much.

- - -

05 02 42 13 LMP Go up topside here and photo the other side of it. (2)(PHO 86 11544-45)

05 02 42 26 CDR You get the down-sun? (2)(PHO 85 11439)

05 02 42 27 LMP Yes. (2)(PHO 85 11439)

05 02 42 28 CDR Okay. Now, I think to not disturb things too much, let's try the fillet first. I'll get you a bag. (2)(SAMP 15210-14)(PHO 86 11544-45, 56-57; 85 11439-40)
And then we'll corner the rock.

05 02 42 48 LMP I'm stepping on a piece of glass, right by the tongs. I'll remember that. (2)

05 02 42 54 LMP Yes. See if I can get a bag out. Okay; 180. (2)(SAMP 15210-14)

05 02 43 02 LMP For the fillet material. I'll get the fillet right here. (2)(SAMP 15210-14)

05 02 43 06 CDR Wait, wait. Before you do, let me poke a picture at it. Okay; go ahead. (2)(SAMP 15210-14)(PHO 86 11548)

05 02 43 14 LMP Little beads of glass in there in some places. (2)(SAMP 15210-14)
- - -

05 02 43 49 CDR Okay. Now, let's get some typical soil, couple of feet away. (2)(SAMP 15220-24)(PHO 85 11439-40; 86 11544-45, 56-57)

05 02 44 00 CDR Hey, you know what we're going to do when we get through with this thing, Joe? We're going to roll it over, and we're going to sample the soil beneath. (2)

05 02 44 07 LMP Yes, I'll take it right out here by the gnomon. (2)(SAMP 15220-24)

05 02 44 09 CDR Yes; good idea. It hasn't been disturbed. (2)(SAMP 15220-24)

05 02 44 15 CC That a boy, Dave. That might fill a square for the football-sized rock. (2)
- - -

05 02 44 42 CDR Okay; 181. (2)(SAMP 15220-24)
- - -

05 02 44 54 CDR Give me your other bag, Jim; I'll put it in. (2)

05 02 44 56 LMP Glad you can enjoy it with us. Yes, sir, Joe. Tell (2)
me this isn't worth doing, boy.

05 02 45 08 CDR Okay. Now we got the fillet, we got the soil; now (2)(SAMP 15205-06)(PHO 86 11549-51)
we need to sample the rock. (PHO 86 11552-53)

- - -

05 02 45 19 LMP Okay. I got it. Look at the vesicles in that rock. (2)

05 02 45 22 CDR Those are glass bubbles. (2)

05 02 45 24 LMP Glass bubbles; yes. (2)

05 02 45 26 CDR Okay. Hey, listen; I want to get a closeup of that (2)
contact. Hold on to this a second, okay? Let me
get my trusty tongs. As a matter of fact, if you'll
pull the bag out, Jim, I'm going to get a quick
selected sample here.

05 02 45 46 CDR I've got a little piece of glass right there. I can (2)(SAMP 15095)(PHO 86 11549-51)
get up the hill to it. Think I can put that in
there? See that beauty? Oh, I'll hold the hammer.
Okay; don't want to drop that one. But not - put in
some soil.

05 02 46 28 CDR Grab some soil right there with the tongs; it'll (2)(SAMP 15090-93)(PHO 86 11549-51)
stay. It seems to be fairly cohesive here. Look at
that.

- - -

05 02 47 03 LMP Okay. Let's see - we got those. Now, let me get a (2)(PHO 86 11552-53)
closeup. Hold the hammer.

- - -

05 02 47 21 CDR Okay; we'll take Gary's little formula here. See if (2)(PHO 86 11552-53)
we can't get a picture of that contact. Nice close
picture for him.

05 02 47 34 CDR Right there. *** 10. Okay. I go on the other (2)
side. Doesn't that look like a contact to you, Jim?

05 02 47 47 LMP Yes. It does. (2)

05 02 47 52 CDR Okay; right exactly there. Okay; I think that'll do (2)(PHO 86 11551)
it. Now your hammer. If we can't get - oh, let me
take a couple of after pictures before - -
- - -

05 02 48 29 CDR After there, for the fillet. And after there, for (2)(SAMP 15200-04, 06)(PHO 86 11546-47, 58-60; 85 11440)
the material around. Okay. Let's try the old
hammer.
- - -

05 02 49 28 LMP Dave, I think, up on top here, if you hit it, it (2)
will break.

05 02 49 33 LMP Yes, right there. Yes. Yes, it's coming loose. (2)(SAMP 15200-04, 06)
- - -

05 02 50 01 CDR Boy, you ought to see the down-sun, down - oh, look (2)
at underneath the rock! We got to roll it over and
get some of that too. Underneath the rock is, looks
like, either glass bubbles or vesicles; I can't tell
which because it's in the shadow.
- - -

05 02 50 36 LMP Watch it; I'll go up and get this one. Dark black, (2)(SAMP 15200-04, 06)
very fine-grain basalt. By golly!

05 02 50 56 LMP Yes, I'll get it. Here, let me get the tongs, and (2)(SAMP 15200-04, 06)
let's get those two. I was hoping I could get a
larger frag here.
- - -

05 02 51 22 CDR Yes, but don't put them both in the same bag. Let's (2)(SAMP 15200-04, 06)
separate the bags. Here, give me that bag. I'll
fold the bag up, and you get the other - here - yes,
I can - - 160, Joe, is the *** for the - yes, 160 is
for the rock that's on the - or the chip off the
corner uphill. I hope that makes some sense to you,
but when you get the pictures back and it's the one
that doesn't appear to have any phenos in it. It
just looked like a fine-grained basalt,
nonvesicular. Now the other one that Jim - are you (SAMP 15205)(PHO 86 11546-47, 52-53, 58-60; 85 11439-40)
getting it? Here, let me hold the bag for you.

05 02 52 05 LMP How about doing a dumbbell fragment there beside it? (2)(SAMP 15205)
You didn't knock that off, did you?

05 02 52 15 CDR The dumbbell frag beside it? (2)(SAMP 15205)

05 02 52 17 LMP Yes, hold the bag here. I'll show you what I mean. (2)(SAMP 15205)

05 02 52 18 CDR Okay. No, I think that fell off, Jim. That looks (2)(SAMP 15205)
like the same kind of stuff.

05 02 52 26 LMP This one right here? (2)(SAMP 15205)

05 02 52 27 CDR Yes, it fell off when I hit, I guess. (2)(SAMP 15205)

05 02 52 28 LMP But I didn't see it fall off, though. (2)(SAMP 15205)

05 02 52 31 CDR I didn't either, but I don't think - - (2)(SAMP 15205)

05 02 52 32 LMP It looks like a different type of rock. (2)(SAMP 15205)

05 02 52 33 CDR It sure does. I'm sure it was there when we (2)(SAMP 15205)
started.

- - -

05 02 52 43 LMP Got a lot of glass. (2)(SAMP 15205)

- - -

05 02 52 51 LMP Lots of glass on it, but can't tell the inside too (2)(SAMP 15205)
well.

05 02 53 05 LMP Okay; what number is that? (2)(SAMP 15205)

05 02 53 10 CDR 161. (2)(SAMP 15205)

05 02 53 12 CDR Frag on the top of the rock. (2)(SAMP 15205)

- - -

05 02 54 35 CDR Okay; roll it over. (2)

05 02 54 44 CDR Oh, me. It looks like a breccia. (2)

05 02 54 47 LMP It sure is. The top layer is a breccia. You can (2)
see it. There that baby's over.

- - -

05 02 55 27 LMP A couple of pictures, and we'll get some of that material underneath the rock. (2)(SAMP 15230-34)(PHO 86 11561-66, 69)

05 02 55 50 CDR Oh, there's a great big glass bubble on that rock. (2)

- - -

05 02 56 12 CC As soon as you finish this sample, we'd like for you to start on the comprehensive and we need frame counts. (2)(SAMP 15230-34)(SAMP COMP 15100-05, 10)

05 02 56 19 CDR Yes, we're starting. Jim, get a scoop of that underneath. Let me go around to the other side and get a picture. (2)(SAMP 15230-34)(PHO 86 11563-66)

- - -

05 02 56 48 CDR Okay, I got the pictures. (2)(SAMP 15230-34)(PHO 86 11561-66)

05 02 56 53 LMP The bag? (2)(SAMP 15230-34)

05 02 56 54 CDR Okay, let me get it; 182. (2)(SAMP 15230-34)

05 02 56 58 LMP Looks like pristine material, all right. (2)(SAMP 15230-34)

- - -

05 02 57 12 LMP Give me another scoop, if you can. Just kicked a little in there, but that's all right. Gee - good shot. Good shot. Okay; we're in business. (2)(SAMP 15230-34)

05 02 57 28 LMP Meantime, I'm going to configure here for a comprehensive. (2)(SAMP COMP 15100-05, 10)(PHO 86 11567-68, 72-73; 85 11441-42)

- - -

05 02 58 25 CDR On the bottom of the rock, Joe, it seems to be gray where there's no surface alteration, but there is a surface covering. And in one portion, there's some glass and almost looks like slickensides across the glass, and it's about - 4 inches by 4 inches. And then there's - oh my, one whole corner of that thing that's loaded with glass. That's just an unreal rock - - (2)(PHO 86 11569-71)

- - -

05 02 59 16 LMP Okay; I have a picture, cross-sun. (2)(PHO 85 11442)

05 02 59 24 CDR Now a down-sun. (2)(PHO 85 11441 or 86 11569)

05 02 59 26 LMP Okay. (2)(PHO 85 11441 or 86 11569)

05 02 59 53 LMP Okay; I'm going to start to rake, Dave. (2)(SAMP COMP 15100-05, 10)

- - -

05 03 00 17 CDR Okay. There's one swath - about a meter long. (2)(SAMP COMP 15100-05, 10)

- - -

05 03 00 35 CDR If you can. You've got two little frags - well, that's better than nothing. Got a bag? It's number 186. (2)(SAMP COMP 15100-05, 10)

- - -

05 03 01 01 LMP Try another couple swaths here - - (2)(SAMP COMP 15100-05, 10)

05 03 01 03 CDR - - yes, just keep going across in that direction. That'll work. We're bound to get something. (2)(SAMP COMP 15100-05, 10)

05 03 01 09 CDR Joe, the soil is dark-gray, and it's fine-grained, and I haven't seen any difference in granularity between the LM and our position at all. It all looks about the same. It's fairly cohesive with very few fragments in it. Jim's getting about three or four with each scoopful - well, two or three. (2)(SAMP COMP 15100-05, 10)

- - -

05 03 01 56 CDR Man, we are really up high. Rolling smooth hills as far as you can see. And on the - near side of the Rille as we go down to - or up to the north, why, there seems to be quite a bit of debris, whereas in our present position near St. George, there is very little. It might be covered just with a downslope - movement. (2)

- - -

05 03 02 35 CDR Well, we don't have much for all that raking. (2)(SAMP COMP 15110)

- - -

05 03 02 39 CDR Let's take one more swath. That's about, I think, (2)(SAMP COMP 15110)
all we can do then. There's just not that much in
there. Boots go in about an inch or so when you
press on them. Packs it down nice and smooth.
Guess you can see the dust jumping up as we walk.
At the bottom of the Rille near the Twins - - I can
see several very large boulders. Very angular, and
I guess when I say large, they must be 10 meters
across. They're sort of unique in the bottom of the
Rille. In that particular area, the other ones look
like they're half the size anyway. And there does
seem to be quite a bit of debris up there along
where the Twins are, up on the rim.

05 03 03 37 LMP Okay, Dave. That one was a little more fruitful - - (2)(SAMP COMP 15110)
looks like about five or six.

05 03 03 41 CDR Let's call it quits there - - and get some soil? (2)(SAMP COMP 15100-05)

05 03 03 48 LMP Okay. (2)(SAMP COMP 15100-05)

- - -

05 03 04 04 LMP Do you want soil with that comprehensive? (2)(SAMP COMP 15100-05)

05 03 04 06 CC Roger. One bag soil with the comprehensive, and (2)(SAMP COMP 15100-05)
then double core.

05 03 04 13 CDR Okay. Let me picture this here where my big foot (2)(SAMP COMP 15100-05)(PHO 86 11572-73)
went.

05 03 04 28 CDR Okay; I got it Jim. You can get your soil. (2)(SAMP COMP 15100-05)(PHO 86 11572-73)

- - -

05 03 04 32 CC And, Dave, could we get a bag number for the frags? (2)(SAMP COMP 15115-19, 25, 35, 45-48)

- - -

05 03 04 38 LMP It must be 186. I've got 187 for the soil. (2)(SAMP COMP 15100-05, 10, 15-19, 25, 35, 45-48)

- - -

05 03 04 59 CDR Okay; the next thing on the agenda is a double core. (2)(SAMP CORE 15007-08)(PHO 86 11575-78; 85 11443-45)

- - -

05 03 05 06 CDR Okay. Hey, Joe, we've got a crater that looks sort (2)
of fresh up here, oh, a hundred meters or so, looks
like, with a fairly fresh rim. Would you like a
double core on the rim of that, or would you like us
just to pull it right here?

05 03 05 28 CDR There's a change in albedo on the rim; it's much (2)
lighter.

05 03 05 31 CC Roger, Dave, drive the core right through the rim. (2)

- - -

05 03 06 03 CDR Okay. Here we go. Head up to the crater. Think we (2)
can get there without any trouble?

05 03 06 09 LMP This one right here, you mean? (2)

05 03 06 11 CDR No, I was thinking of the bright one. (2)

05 03 06 14 LMP That'll probably take a good 5 minutes to get up (2)
there.

05 03 06 16 CDR Yes, you're right. I guess - well, we'd be pushing (2)
it.

05 03 06 23 CDR Joe, I guess we'd take 5 minutes to get up there. (2)
What do you think?

05 03 06 27 CC Negative. Drive the core where else you think might (2)
be convenient.

05 03 06 34 CDR Oh, we've got a good place here. We've got a fairly (2)(SAMP CORE 15007-08)
deep crater; it must be about 10 meters across, and
a meter and a half or so deep, and we'll pick the
rim of that - there's a fresh impact crater in the
rim anyway, which looks like it pulled out some - -

- - -

05 03 07 24 CDR Okay. Let's give it a double core here. Bet we get (2)(SAMP CORE 15007-08)
a deep double core. Hey, Jim?

- - -

05 03 07 40 LMP I was going to take a location shot. (2)(SAMP CORE 15007-08)(PHO 85 11443-45)

05 03 07 43 CDR I think you'll get location. (2)(SAMP CORE 15007-08)(PHO 85 11443-45)

- - -

05 03 08 20 CDR Hey, Joe, the boulder we just sampled is the only (2)
one of its size anywhere to be seen. There's a
fairly fresh crater up a little ways, maybe another
half a kilometer or so, but - -

- - -

05 03 09 35 LMP That's as far as I can push it. (2)(SAMP CORE 15007-08)

05 03 09 37 CDR I got the picture; go ahead. (2)(SAMP CORE 15007-08)(PHO 86 11577)

05 03 09 39 CDR Okay. It's a - we've got one full core, second core (2)(SAMP CORE 15007-08)
is going in about 2 inches per hammer stroke.

05 03 09 46 CDR And we've got almost a second core. Got another (2)(SAMP CORE 15007-08)
couple of inches to go, Jim. Doing good.

- - -

05 03 10 03 CDR Okay; that's good, men. All the way in. Good show. (2)(SAMP CORE 15007-08)(PHO 86 11578)

- - -

05 03 11 35 CDR Okay. Rammer went in about 6 inches. (2)(SAMP CORE 15007-08)

- - -

05 03 12 01 CC And, Dave, we're standing by for a number on the (2)(SAMP CORE 15007-08)
core.

05 03 12 06 CDR Yes, the top one is 03, Joe. (2)(SAMP CORE 15007-08)

- - -

05 03 15 40 LMP It's the middle one in Dave's sample bag. (2)(SAMP CORE 15007-08)

- - -

05 03 16 03 CDR Okay. Why don't you get your stereo pan, and I'll (2)(PHO 85 11446-65)
get the big camera out. I can get myself back.

- - -

05 03 17 12 LMP Going to have a little moving base on that pan. (2)(PHO 85 11446-65)

- - -

05 03 17 57 CDR Five hundred. Okay. Okay, Joe, I'm going to give you - looks like I got some pretty good contrast looking up to the northwest. I'll give you the far side of the Rille - the vertical and the horizontal. And I'll use a - let's see - - (2)(PHO 84 11254-91)

- - -

05 03 18 27 CDR Okay. How's a 250th and an 8th look to you. (2)(PHO 84 11254-91)

- - -

05 03 19 35 CDR Okay; the first horizontal strip, Joe, is on the upper layer - not layer - upper region - of the farside. I can't really see our A, B, C, D that we thought we might see. (2)(PHO 84 11254-91)

05 03 20 06 CDR Okay. And then about one-third of the way down - and there's a nice, big, very interesting outcrop over there, which looks like vertical jointing in a big block, with a horizontal layer on the top; the block must be, oh, 2 percent of the Rille height and it must be about the - oh, twice that across, with the layer maybe one-quarter of the height of the block, and I got a 500 of that. I'll also take you a 500 vertical in the same area. (2)(PHO 84 11254-91)

- - -

05 03 21 18 LMP The camera count on Dave's camera is 54, Joe. (2)

05 03 21 27 LMP And the camera count on the 500 is 61. (2)

- - -

05 03 23 13 CDR Okay; 115 on Jim's camera. (2)

- - -

05 03 26 02 CDR Here we go; rolling again. We'll try getting home on the NAV system here. Oh, look at that big fresh one in the side of the rim. *** that stereo pan, so we're right up - - (2-3)

- - -

05 03 26 45 LMP Yes, that's the *** well, we're going to have to go (2-3)
to the right to go around Elbow.

05 03 27 23 CDR We're moving at about 5 clicks. And the slope - I'd (2-3)
guess about 6 or 7 degrees on going cross-slope.

- - -

05 03 28 04 LMP Yes, we know our tracks are to the right of us. (2-3)

05 03 28 07 CDR Yes, we're in good shape. Heading right toward (2-3)
Mount Hadley.

- - -

05 03 28 17 CC - - any idea of whether you can see the LM or not? (2-3)

05 03 28 21 CDR Well, Joe. I took a look when we were up there, and (2-3)
I couldn't see it.

05 03 29 36 CDR Yes. Yes. We just did a christy. Okay; we're down (2-3)
- it's fairly level now and we're going to start
upslope but we're on - just about on the south rim
of Elbow.

- - -

05 03 30 24 LMP Yes, now we're up to 9 clicks; you have to swing to (2-3)
the right here, Dave, whenever you can.

05 03 30 33 LMP We want to get up on the ridgeline here. (2-3)

- - -

05 03 30 47 CDR Up-sun isn't too bad though, you know? There's a (2-3)
lot more definition than straight down-sun. I
don't think we'll have any trouble driving up-sun,
because the craters seem to show up pretty well.
Have you noticed here on Elbow, it seems like
there's a very subtle bench on the southern side?

05 03 31 03 LMP Yes, I kind of got the idea there were several (2-3)
subtle benches in the downslope - particularly on
the eastern wall.

- - -

05 03 31 13 CDR Oh, there's a big boulder. We just crossed over a (2-3)
buried rounded boulder. Must've been a meter and a
half across, with - of course, it's all gray - -

05 03 31 24 LMP Gets pretty rough up ahead, Dave. (2-3)

05 03 31 15 CDR Yeah, man. No kidding. Lots of debris. There! (2-3)
Some Rover tracks. How about that? Yes, here they
are. Somebody else has been here.

05 03 31 41 CDR Yes, you know they really don't sink in very far. (2-3)

05 03 31 44 CDR I'd say less than a half an inch, if that, but (2-3)
they're here.

- - -

05 03 31 53 CDR I'm going to do the NAV system here, once we get (2-3)
squared away and get out of the hole. Incidentally,
Joe, I don't think we saw any indication of flows or
a slide or anything coming off of Hadley Delta
there. - - I didn't see anything that looked like a
change in granularity or - any subtle - scarps of
any sort. Did you notice any, Jim?

- - -

05 03 32 42 LMP You know, looking out to the east now, Dave, I see (2-3)
some little very subtle ridges. I think they're
ridges rather than craters and it's probably - well,
it's out toward the Secondary Crater Cluster.

- - -

05 03 33 04 CDR Okay, bearing 11 for a 3.3 kilometers. We'll see (2-3)
how that - -

05 03 33 15 CDR Hey, here's some footprints, Jim. (2-3)

05 03 33 18 CDR Hey, see that white albedo I kicked up over there? (2-3)

- - -

05 03 33 25 LMP I think I see something reflecting over there. I (2-3)
think that's the LM.

05 03 33 29 CDR Sure is. See the reflection? (2-3)

05 03 33 30 LMP See the reflection of it at 12 o'clock? (2-3)
 - - -

05 03 33 39 CDR Sure do. And we're heading right straight for it on (2-3)
 a bearing of 11 degrees, except for the wanders
 through the craters.
 - - -

05 03 34 56 LMP Looking over to the east, Dave, I see a very large (2-3)
 crater, and it could very well be - -

05 03 35 01 CDR Could it be Dune? (2-3)

05 03 35 03 LMP No, it's probably too close to be Dune. (2-3)

05 03 35 06 LMP Maybe it's Fifty-four. (2-3)

05 03 35 09 LMP I think it's Fifty-four. (2-3)
 - - -

05 03 35 23 CDR Hey, look at this rock right on the sur - hey, you (2-3)
 know, see that one on the surface there?

05 03 35 28 CDR I'll bet you - I wouldn't be surprised if it didn't (2-3)
 come from the crater. Too bad we can't stop.
 There's a rock that was sort of rounded, but had a
 rough surface texture to it, about a half a meter in
 size, and it was about 10 meters downstream from a
 nice fresh crater that had a lot of angular debris
 in the bottom and the walls.

05 03 35 54 CDR There are a lot of little craters around here - (2-3)
 little being less than a meter - which are very
 rough, have a lot of debris - right up to the rim
 and over the top side of the rim, and no ejecta
 blanket to speak of, but the whole inside of the
 wall - take a half a meter crater and it's filled
 with angular, gray, fragmental debris on the order
 of inch size - or less, very uniformly distributed,
 fairly well sorted. Like - maybe the debris is from
 one of our Aristillus or Autolycus friends. And
 there's a lot of it, so I think we'll have a chance
 to get it later on.

05 03 36 53 CDR They're rather shallow craters, too. Let's say that (2-3)
they're only about - oh - 1 to 6. Hang on, Jim.

05 03 37 07 LMP Yes, look at - there's a large flat rock over at 1 (2-3)
o'clock.

05 03 37 12 LMP That's several large rocks there. (2-3)

05 03 37 14 LMP Must be 5 feet in diameter. (2-3)

05 03 37 18 LMP Concentration in this one area - and then there's a (2-3)
large one down in the pit of that subdued crater.

- - -

05 03 37 36 CDR Ooh, look at that - ooh, oh! Look at that one. It (2-3)
almost looked like pahoehoe, didn't it?

05 03 38 33 LMP Dave, did you comment on the horizontal bedding in (2-3)
Hadley - looking out the foot of Hadley, that spur
that comes out northwest.

05 03 38 42 CDR The lineations across there? (2-3)

05 03 38 44 LMP Yes. The horizontal. (2-3)

05 03 38 46 CDR Yes. There are two or three of them right at the (2-3)
base.

05 03 38 48 CDR I didn't see those yesterday. It was all in the (2-3)
shadow.

05 03 38 50 LMP Yes. Joe, there's definitely a horizontal pattern (2-3)
in the spur of Hadley.

05 03 39 06 LMP Just at the base. (2-3)

- - -

05 03 39 09 LMP And then as you go up above that - and, again, (2-3)
that's - maybe only 10, 15 percent of that
particular exposure of the spur, then there's a
definitely linear pattern that looks like it dips 30
degrees to the west. How come we stopped?

05 03 39 32 CDR I got to put my seatbelt on. (2-3)

05 03 39 42 CC Dave, stand by for mark when you start. Help us on (2-3)
our speed calculations.

- - -

05 03 39 57 CDR Mark. (2-3)

- - -

05 03 40 41 LMP We can see several craters on Hadley. Hard to (2-3)
estimate what the size of them is, but the ones that
I can resolve seem to be a fairly uniform size, as I
can resolve from this distance.

- - -

05 03 41 43 CDR We gave you a mark when we started, Joe. That stop (2-3)
was maybe 15 seconds.

05 03 41 53 CDR And we're moving about 10 clicks. (2-3)

05 03 41 56 CDR Now this large one ahead, it could be - no, we're (2-3)
not close enough yet to be Rhysling. Look at this
boulder here, Jim.

05 03 42 11 CDR Okay; we're coming out across either an elongate (2-3)
crater, or two that are kind of joined up - running
east-west, kind of a double and we're going across
the bridge between them.

05 03 42 25 LMP And it must be, maybe 30 meters across on each one (2-3)
of them with no debris and they're smooth on the
bottom.

- - -

05 03 42 41 CDR Oh, there's some vesicular basalt right there, boy. (2-3)(SAMP 15016)(PHO 86 11579-87)
Oh, man! Hey, how about it, let's - just hold on 1
second, we've got to have - -

05 03 42 50 LMP Okay; we're stopping. (3)

- - -

05 03 44 14 LMP You know, Joe, these small fresh craters that we've (3)
commented on - whatever caused them, must create or
indurate the soil into the rocks - creates its own -
own rocks, because there's just a concentration of
rocks around the very fresh ones. And the small I'm
talking about may be a foot to 3 feet diameter.

- - -

05 03 47 08 CDR Mark. We're go - moving. (3-LM)

- - -

05 03 47 47 CDR There's a pretty fresh one right up ahead, Jim. (3-LM)
Looks like about 10 meters across, and it's got up
to 6-inch frags around the rim - maybe 15, 20
percent of the rim has frags in it but nothing - no
significant ejecta blanket, which I think is typical
of all these around here. That one looks like it's
maybe a meter and a half deep. Too bad, we can't
get in it, and I bet it has glass in it, too.

05 03 48 18 LMP You know, you can almost tell the ones that are (3-LM)
going to have glass - - by looking at them before
you get there.

05 03 48 21 CDR That's right, you sure can. (3-LM)

05 03 48 22 LMP Yes. Hey, we were up to about 11 or 12 clicks on (3-LM)
that last burst.

- - -

05 03 48 44 LMP Okay, right now we're going at 10 clicks, and I'm (3-LM)
reading about 10 amps.

- - -

05 03 49 13 LMP Okay, we're 1.7 so we - should be near Rhysling. (3-LM)

05 03 49 22 LMP In fact, we ought to be - Rhysling ought to be off (3-LM)
to our right.

05 03 49 26 CDR Hey, there's a pretty sharp one right there. It's (3-LM)
not big enough though.

05 03 49 35 LMP Do you agree, Houston? We're reading 013 to the LM, (3-LM)
and we're at 1.6. We ought to be able to see
Rhysling.

05 03 49 45 CC We agree, Jim. It should be about a 125-meter (3-LM)
crater.

05 03 49 52 LMP Okay. We're cutting at 12 now. (3-LM)

05 03 49 57 CDR Gee, I don't see it, do you? (3-LM)

05 03 49 59 LMP No, there's one over here at 2 o'clock that's fairly (3-LM)
deep and might - -

05 03 50 06 CDR It's deep, but it's not near that big. It's only (3-LM)
- - like - 10, 15 meters across.

05 03 50 12 LMP Haven't really seen any large enough that we'd call (3-LM)
Rhysling, Joe.

05 03 50 22 CC Okay, Jim, it may just be - - (3-LM)

05 03 50 23 CDR We see the old LM. (3-LM)

05 03 50 24 CC - - hidden by the undulations. (3-LM)
- - -

05 03 50 41 LMP Yes. Occasionally as we drop down in these - you (3-LM)
know, I kind of get the impression, Dave, we're go -
it's almost like - well they're depressions and then
there's the rises, and they're generally
perpendicular to our direction of travel.

05 03 50 57 CDR Yes? Now that you mention it, you're right. Sure (3-LM)
does seem that way, doesn't it? We're just going up
and down the - ha - now watch your frequency.
Whoop; watch out; hang on. On that one. Hang on
the next. Oh, ho.

05 03 51 16 LMP Like just small valleys that are trending upslope, (3-LM)
Joe. And - we go down low enough so that we can't
see the LM anymore. Won't see him until we get on
top of the next rise. They're very gentle valleys.
And they're about - would you say - 60, 70 meters
across?

05 03 51 41 CDR Yes. (3-LM)

05 03 51 54 LMP And, you know, the terrain, looking from the east here - is just a gentle rise to the east. It looks like, oh, 2 or 3 percent. Notice that, Dave? (3-LM)

05 03 52 07 LMP Right to the base of the Apennines. (3-LM)

05 03 52 11 LMP Right up to - the Swann range there. (3-LM)

05 03 52 18 LMP Now when we go out on EVA 2, why, it'll be uphill going out, and probably downhill all the way back. (3-LM)

- - -

05 03 52 56 LMP And rather than this being the plains, as such, I get the idea it's the - kind of a base of a very gentle talus slope. (3-LM)

05 03 53 08 CDR Yes, that's right. We're not on a flat plain; it looks like it slopes down from the Swann range over there into the Rille, and then when you get to the Rille rim, there's another slight break down to a sharp break. The slight break goes, maybe, 50, 60 meters, and then you drop off steep into the Rille. It doesn't look like we're in - a basin so much, although if I look to the left, Jim, I can see a rise - up to the Rille. (3-LM)

05 03 53 36 LMP Well, there might be a rise, you know, there at the Rille. (3-LM)

05 03 53 41 LMP Yes. Rise at the Rille. But you're definitely right, we're traveling on a slope to the left right now. (3-LM)

05 03 53 48 CDR And, boy, you really get that impression if you, you know, look east, look up-sun. (3-LM)

- - -

05 03 54 11 LMP Yes, those are pretty big mountains to fly over, aren't they? Here's a nice, subtle crater - about 70 meters across, with a sharp, 15-meter one on the rim, which scattered debris out. But no big ejecta blanket, no rays. (3-LM)

05 03 54 33 CDR We can't see the LM now. And we're traveling at about 12 clicks. (3-LM)

05 03 55 20 CDR Let's see, 018 degrees for .7, so right over the next rise, we should see homeplate. (3-LM)

05 03 55 34 CDR And I think I see, on the surface here, lineaments that are trending about - northwest-southeast, Jim. Do you get that feeling? Morton's little lineaments. Look as we go across here and if you think about them, if you look down there. (3-LM)

05 03 56 04 LMP Not convinced, Dave. (3-LM)

05 03 56 05 CDR Not convinced, huh? (3-LM)

05 03 56 07 LMP Look right ahead of us here where we're driving I see lineaments that are parallel with our direction of - - motion. (3-LM)

05 03 56 13 CDR That's right. I see those, too. (3-LM)

- - -

05 03 56 18 CDR There's the LM. (3-LM)

- - -

05 03 56 52 CDR Oh, Joe, wish we could stop and pick up hundreds of rocks; there's so many. There's a little one sitting on the rim of a crater that's on a pedestal. It's a - looks like a smooth, gray rock, subangular, and it was sitting up on a pedestal it looks like. Right on the very rim of the crater, and it was the only frag near the crater. (3-LM)

- - -

05 03 57 32 LMP Hey, look at the - would you think that the albedo's - changed there were we landed? (3-LM)

05 03 57 38 CDR Sure is; it's lighter-colored. (3-LM)

05 03 57 40 LMP Sure is. Is this probably Index over here to the right, Dave? (3-LM)

05 03 57 43 CDR Yes, un-huh. Yes. (3-LM)

05 03 57 47 CDR Not very distinct, is it? That's Index. Our position is - like we're - I guess we're a little - just a little east then - of our planned landing site. (3-LM)

05 03 58 08 LMP - - I think that the position they have picked out is pretty good. (3-LM)

05 03 58 11 CDR It's close, but it looks like it might be a little south. (3-LM)

05 03 58 15 CDR Hey, we're - - our NAV system's starting to wander now. We got a range of .2 and a bearing of 34 and we're heading about 015 into the LM, and it's just almost in front of us so - I think it's doing very well though. (3-LM)

05 03 58 37 CDR Hey, do you know I think I almost landed in a crater, Jim. Look at the one on the right there. (3-LM)

- - -

05 03 58 52 LMP It's right - you know, it's just west - looks like it's just west, northwest of Index. (3-LM)

05 03 59 04 CDR Okay; come back here, and we want to park it - towards the ALSEP side. Okay, swing around. Yes, I landed right in a little bench there, huh? No wonder. (3-LM)

05 03 59 18 LMP Just on the - northwest rim of that crater. (3-LM)

05 03 59 21 CDR Yes. Yes. I was hoping - I think I saw that big crater - I was hoping by keeping like a foot per second forward all the way in, and it'd keep us out of something like that. (3-LM)

05 03 59 35 CDR Joe, we're back at the LM, by the way. (LM)

- - -

05 03 59 55 LMP There's a lot of glass fragments around here. (LM)

05 03 59 58 LMP More than I've seen any other - - (LM)

05 04 00 02 CDR Yes. If that's Index over there and this is the one (LM)
that's northwest of Index - gee, that puts us a -
you know what? That puts us really at - position D
- yes, let's see that'd be a 7 - 75.5 and Baker
Queen. Yes, and, you know, I can see why now, I
thought that was Salyut, because Index is so subtle,
and there's another one that is just to the north of
Salyut, which I was going to call the landing site.
Okay, we're parked.

- - -

05 04 01 10 LMP Okay; here are the Rover readings; 315, 059, 103, (LM)
001, 100, 107, 95, and 95, and motor temps are both
lower limit.

- - -

05 04 04 09 CC Okay, thank you. And, Jim, as you unload the gear (LM)
from the PLSS's, we'd like for you to put the spare
core tube, core tube cap, and SESC in bag 2 as you
put bag 2 on the handtool carrier.

- - -

05 04 06 27 CC Roger; and, Jim, perhaps you could get bag 2 on the (LM)
right-hand side of the handtool carrier.

- - -

05 04 09 17 CC Put it under the seat, Jim, and get bag 2 - - on the (LM)
right side.

- - -

05 04 18 13 CDR Okay, the other number on that core tube is 01, by (LM)
the way.

05 05 30 44 CDR Okay. I've got a 115 on your camera. We're okay. (LM)

05 05 31 22 CC Dave, are you picking up Jim's camera now? (LM)

05 05 31 27 CDR I've got Jim's camera. I'm going to take the (LM)(PHO 85 11466-71?; 86 11588-97)
pictures.

- - -

05 05 33 21 CDR Okay, Joe. I got the LR cubed pictures, and it's still super clean. (LM)(PHO 85 11468-69)
 - - -

05 05 35 42 CDR Get out of the way and I'll get the Central Station here real quick. (LM)(PHO 86 11592)
 - - -

05 05 42 49 LMP Okay. Heading is 315; bearing 059, 103, 001, 100, 110, 100, 100, and motor temps are still off peg low. (LM)
 - - -

05 05 46 30 CDR Okay, Joe. Into the ETB goes CDR's camera, and mag November with 76 frames. (LM)
 - - -

05 05 47 01 CDR Okay. LMP camera, mag Lima, 119 frames. (LM)

05 05 47 41 CDR Hey, Joe. The unused mags, I guess we want to take them back in, right? (LM)

05 05 47 45 CC That's affirmative. (LM)

05 05 47 53 CDR Yes. Delta and Echo coming in. (LM)

05 05 48 00 CDR Kilo coming in. Oboe coming in. (LM)
 - - -

05 05 48 59 CDR Mag Metro with 62 - 61 frames. (LM)
 - - -

05 05 49 23 LMP Although we do have one large rock here that we might as well carry up. (LM)(SAMP 15016?)
 - - -

05 05 49 42 CC And, Dave, we need maps yet and Charlie Charlie off the DAC. (LM)
 - - -

05 05 50 23 CDR Okay. Oh, boy! Do you know you had a camera jam on (LM)
that, Jim?

05 05 50 31 CDR The film jammed in the mag, and - it stripped the (LM)
threads, in the film. Whew! Mag Charlie; you got a
nothing on Charlie. Let's go! Move! Charlie's in
the ETB.

- - -

05 06 00 08 CC Dave, I guess we don't have anything else for you (LM)
right now. It's been a outstanding EVA here; why
don't you go ahead and get in at your leisure.
Might want to pick up that glass rock on your way
in.

- - -

05 06 02 31 CDR And I'm going to - - pick up a - - couple of rocks. (LM)(SAMP 15015)
Yes, sir.

05 06 03 05 CDR Oh, my! I couldn't resist this one, Jim. (LM)

05 06 03 14 LMP That the glass one? (LM)

05 06 03 15 CDR Oh, look at what I got! You wouldn't believe it! (LM)
Okay, pick up the ETB.

05 06 09 28 CDR Okay, hatch is closed and locked. (LM)

* * * * BETWEEN EVA 1 AND 2 * * * *

05 07 13 48 CC Hadley Base, this is Houston. If you have loose (BETWEEN EVAS)
rocks in the cabin and need containers for them,
we're suggesting cover bag number 2, or cover bag
number 4.
- - -

05 07 44 46 CDR Okay. SRC number 1 is stowed. It weighed 36 (BETWEEN EVAS)
pounds. And collection bag number 4 weighs 15
pounds.
- - -

05 08 20 24 CDR Hey, that's great! Can you see the tracks? That's (BETWEEN EVAS)
good. Maybe you can see the ALSEP.

05 08 20 49 CDR Yes, it's west about 300 feet. (BETWEEN EVAS)
- - -

05 08 51 49 CC Okay, fine. When you took the double core, did you (BETWEEN EVAS)(SAMP CORE 15007-08)
notice any soil falling out of the core tubes while
you put the caps on?

05 08 52 04 CDR Yes, there was a slight amount of loss from the (BETWEEN EVAS)(SAMP CORE 15007-08)
lower and a little bit from the upper, but very
little.

05 08 52 11 CC Okay, that sounds good. And regarding the question (BETWEEN EVAS)
about the Rover track, Jim, you told us they were
one-half inch deep or less, and we're wondering if
that was a typical number over the course of the
entire traverse, as far as you could notice?

05 08 52 34 LMP Well, that was my impression. Half an inch in (BETWEEN EVAS)
general but Dave probably has another comment.

05 08 52 41 CDR No, Joe, I'd say no more than a half an inch. It (BETWEEN EVAS)
seems to ride very lightly; I think the bearing on
the surface is very light -

05 08 53 10 CC Okay, Dave, thank you. Now a series of questions (BETWEEN EVAS)
about the heat flow. We want you first to describe
the drilling characteristics, and do you think
you're drilling into a layer of rock?

05 08 53 28 CDR I'd say yes, Joe. The drilling characteristics are (BETWEEN EVAS)
- the gradually increasing requirement for force to
get it in are more so than any force I experienced
in the ones in training, even though they had the
packed soil. One time we did have some that was
packed so tightly I couldn't even get it in, but
that was because of the weak battery on the training
unit at the time. The drilling, - it requires more
and more force the deeper you get. And, you could
probably see the TV there at the end on the second
one, I had the second probe about half way in, and I
was putting almost my entire weight. Even though
it's one-sixth, there was quite a bit of force
behind that drill, much more than I've ever
experienced in any training. And I had the
impression that, yes, we're drilling through rock.

- - -

05 09 01 41 CC We'd like to know what your best estimation of the (BETWEEN EVAS)
LM's position is?

05 09 01 57 CC And, Dave and Jim, let me give you some background (BETWEEN EVAS)
on that. We've got several points that are in a
very tight cluster around the first location we gave
you. We think, however, because of bootstrapping a
location from Elbow crater backwards using the Rover
navigation system, we think that you may be
mistaking Last crater for Index crater. And I want
you to consider this as you look at your map and
think about your present position.

- - -

05 09 05 20 CDR Okay, Joe. How about 73.3 Bravo Sierra 4? And I (BETWEEN EVAS)
guess that's because we are on the northeast side of
a - double crater.

- - -

05 09 05 51 CC Could you give us - just a rough guess, a quick
rundown as to where the samples at Station 1 were
taken with respect to the rim of Elbow, and we're
interested in distance and direction from the rim.
Just a rough guess. (BETWEEN EVAS)(SAMP 15065, 70-76, 80-88)

05 09 06 38 CDR Okay, Joe, 70.9, Bravo Echo 5, and we moved out
about 200 feet to the east of that point in picking
up the C radial sample. (BETWEEN EVAS)(SAMP 15065, 70-76, 80-88)

05 09 07 06 CC Near Elbow crater, Dave, you mentioned that your
footprints exposed white soil. We wonder if this
was a common occurrence. Did you observe similar
white soil in footprints elsewhere? (BETWEEN EVAS)

05 09 07 27 CDR Joe, I sort of kicked through a rim of a small,
1-meter subdued crater; and, as I did that, I kicked
up the white soil. And so I kicked a couple of more
times and it spread out; and whether I was -
breaking up a very friable rock or not, I don't
know. But there was a couple of kickfuls of dirt
that was white, and as we came back past it on the
return trip to the LM, why, I pointed it out to Jim
and he saw it too. And I'm not sure whether that
was just at that one small crater, which was an old
crater, or whether that was typical of that
particular area. We just didn't have time to look
at it. (BETWEEN EVAS)

05 09 08 12 CC And coming back to Station 1, Elbow crater, could
you give us a quick rundown on the changes in rock
distribution around Elbow crater and, if possible,
maybe even the changes in rock types there? (BETWEEN EVAS)

- - -

05 09 09 00 LMP Joe, our clocks were running pretty fast when we
were there, and I guess - we didn't get a chance to
look at the distribution very well. As I remember
it, there were more blocks - not really blocks, but
large fragments, on the order of 6 inches to a foot,
more on the southern rim, although it wasn't really
heavily concentrated; I'd say 10 percent of the
surface at most. There was more on the southern rim
than on the northern rim. And the ones we sampled
all looked pretty much the same. As I remember, the (BETWEEN EVAS)

radial sample didn't show a great difference in rock type. Although, as you know, we just didn't - a chance to do much - looking and thinking then.

05 09 09 57 CC But, once again, regarding Elbow crater, Jim you called out to us a bench around the east side of Elbow and you were looking down into Elbow from higher up on the Front. We wonder if you could compare that bench with breaks in the slope of the Rille wall. (BETWEEN EVAS)

05 09 10 31 LMP Joe, when I commented on bench there, I would estimate two or three different levels that were very subdued possible benches in Elbow, and I did not see any immediate relation between those subdued benches in Elbow and the Rille. (BETWEEN EVAS)

05 09 11 04 CC Questions about Station 2. The first one, being, what rock samples did you get from Station 2, and we're more interested in the samples that did not come from the large boulder, but rather what other samples did you get there? (BETWEEN EVAS)

- - -

05 09 11 51 LMP Okay, Joe, our sum total at Station 2 was two chips off the large rock, soil from the fillet, soil adjacent about a couple of feet away from the rock, soil from beneath the rock, and the double core, and the comprehensive. (BETWEEN EVAS)(SAMP 15007-08, 90-95, 100-105, 110, 115-119, 125, 135, 145-148, 200-206, 210-214, 220-224, 230-234)

- - -

05 09 12 27 CC - - regarding the boulder, do you think possibly that the black part of the boulder might be a big clast in a coarse breccia? (BETWEEN EVAS)

05 09 12 45 CDR No, I'm not sure, Joe. The breccia that was in there was glass-covered, and there was an exposure after I took a chip out of it that was a breccia not unlike 14. As a matter of fact, I'd say it was almost typical of 14's, but maybe only second or third order. There definitely was a linear - I call it a contact. Whether it might have been a very large clast inside a very large rock, there's no telling. But there was a definite line there which (BETWEEN EVAS)

differentiated two types of rock within that big boulder, and I really wouldn't want to guess whether that was a large clast or not.

05 09 13 30 CC Could you tell us where the samples which came off the boulder were taken in relation to this contact that you called out on the boulder? In other words, where did the chips come loose from? (BETWEEN EVAS)(SAMP 15205-06)

05 09 13 48 CDR Okay; if you consider the boulder being divided in fifths, one-fifth of it was a different type, apparently, by this sort of topographic contact. We took one chip from that side and one chip from a corner on the other side. (BETWEEN EVAS)(SAMP 15205-06)

05 09 14 07 CC We'd like for you to summarize the relationship of mare and Apennine Front in the Elbow - St. George area. And, we're looking for any evidence whatever of a contact, an albedo change, or a change in coarse-frag abundance. (BETWEEN EVAS)

05 09 14 33 CDR Joe, we looked, and we discussed it before we went out, and we've discussed it since we came back, and we honestly didn't see anything. (BETWEEN EVAS)

- - -

05 09 14 42 CC Roger, Dave; and you discussed it, then, about the same way during the traverse. So it sounds very consistent to us. Do you think that you can drive to either Spur or to Window crater? (BETWEEN EVAS)

05 09 15 53 CDR Well, there are a number of craters down there in the area of Spur and Window, and those are the only craters up on the Apennine Front. And there are several the same size as Spur and Window, which I think were not evident on the photography because of the albedo and the Sun. I think we could get to some of those craters, yes. I'm not sure it would be Spur or Window, but there are some craters up on the side of the Front I'm fairly sure we could get to. (BETWEEN EVAS)

05 09 16 30 CC Was the abundance of white and light-gray rocks described in the vicinity of Falcon the same seen along the entire route to St. George, or did this abundance of white and light-gray rocks seem to vary? (BETWEEN EVAS)

05 09 17 06 CDR Joe, I think we have a great variety of fragments (BETWEEN EVAS)
out here. I wouldn't want to pin down any
particular type in any area until we had more time
to look. We've got a couple of surprises for you.
We have one fragment on the order of 6 inches which (SAMP 15016)
is a fairly well rounded, highly vesicular basalt
with vesicles on the order of 3 millimeters all over
it, apparently quite old and rounded, and it's a
brown - a brownish-gray. We also have a large piece (SAMP 15015)
of glass, just sheer glass, apparently, which is
about a foot long and about 6 inches wide and very
rough-textured surface; and that was the one that
was right out the front window here that I described
yesterday. And the basalt we picked up halfway back (SAMP 15016)
when I had to change my seatbelt; I saw it on the
ground, and I just couldn't resist it. And it's
unlike anything you've seen from the Moon before as
is the large piece of glass. And I think those are
indicators, to me, that we have a great variety of
samples out there, and we really need to do some
good careful looking as we head down towards the
Front.

- - -

05 09 21 40 CC Do you have any feel for whether the frags around (BETWEEN EVAS)
the small fresh craters that you've called out to us
are, in general, pieces of the projectile or do you
think they're ejecta frags?

05 09 22 06 CDR Well, Joe, we're pretty sure they're projectile (BETWEEN EVAS)
frags, and that's when we really need to stop and
sample.

- - -

05 18 51 36 LMP Okay. The ETB is loaded per checklist and the (BETWEEN EVAS)
additional mag is mag Papa.

- - -

05 18 59 19 CC Okay, Jim. Add 16-millimeter mag Delta Delta to the (BETWEEN EVAS)
bag load first of all, and then on your
70-millimeter camera, that's the LMP 70-millimeter
camera, take off - we assume - that Kilo Kilo is on
it now. We'd like you to take that off and put Papa
Papa onto your camera.

05 18 59 50 LMP You're suggesting we take 16-millimeter Delta off (BETWEEN EVAS)
and take mag K off my camera and put Papa on my
camera, but probably carry Kilo out with us.

05 19 00 08 CC That's affirmative, Jim. Carry Kilo Kilo with you, (BETWEEN EVAS)
and I think you said it right. But take Delta Delta
along, also, in the bag.

- - -

05 19 43 46 CC Okay, that sounds like good news. I'm going to (BETWEEN EVAS)
start with our general rationale for the six-and-
one-half-hour EVA we're coming up on here, and then
I'll get down to some details. I won't give you all
the details of the traverse right now, but a lot of
them I think we can pick up as we go along,
depending really on what we see as we travel along.
Basically, the EVA will last, as I said, 6 hours 30
minutes, and this is based on our experience from
yesterday. Consequently, the EVA-2 traverse
distance has been shortened somewhat to provide good
geological exploration with a minimum of travel
time, primarily at the Front. We're going to strike
out for the Front first, just as planned; however,
we're going to skip Station 4 for the time being,
range along the Front, and we may very well pick up
Station 4 and its corresponding activities on the
way home. We're looking for craters like Spur
crater and Window crater, but I'm using these only
as examples of craters that have plainly excavated
Front material for us, and have provided a variety
of fragments to sample. We want to return to the LM
with about 1 hour and 30 minutes remaining. And
Dave, we're going to ask you to invest some few more
minutes on the drilling activity; we've got fairly
detailed procedures for you to follow, and I'll go
into those when it seems a reasonable time to do so.
Jim, at the same time, we're going to ask you to
carry out some miscellaneous tasks around the LM -
while Dave's out at the drill site. And finally,
with about 45 minutes remaining, and this is a
one-time-special good deal for you, Jim, we're going
to carry out Station 8 activities in the vicinity of
the LM. In other words, we will not do our Station
8 activities on our homewardbound journey from the
Front. Now I'll stop here and ask questions, and
then I'll go into some more detailed rationale for
the way the traverse will break out later on.

05 19 46 23 CDR Okay, Joe. That sounds like good planning to us. (BETWEEN EVAS)
We're all set. Go ahead.

05 19 46 30 CC Okay, Dave. Thank you. I'm going to go through the (BETWEEN EVAS)
stations and the rationale behind some of our
decisions now, starting with the first one. Egress
the LM, we'll have a couple of small housekeeping
chores for you to get out of the way on the Rover
for us. And they're basically - we're going to give
- invest 30 more seconds in our front-steering
problem, and we'll - perhaps a minute in taping up
the TV antenna cable, and I'll be back to you on
that a little later. Then we're going to strike out
immediately for the Front, in other words, head
south. We want to delete Station 4, outbound, and
the rationale is, as all of us already know, the
priority on that is considerably lower than other
stations. And we may very well pick up Station 4 on
the way home anyway. We're not going to try to
range all the way down to Front crater; we think
there are plenty of craters similar to Front along
the way, and the long-travel time decreases our
geology time along the Front. Now, we want to
reroute our Front traverses to the area of Window
crater and Spur crater; in other words, Stations 6
and 7, the Station 6 and 7 area right there in the
highly touted boudinage. And we're going to depend
very much on the observations from the two of you,
and it's going to be dealer's choice - your choice
on exactly where you'd like to range and where you'd
like to carry out your major sampling tasks. Let me
emphasize that we're looking now, primarily for a
wide variety of rock samples from the Front. You've
seen the breccias already. We think there may very
well be some large crystal igneous, and we'd like
samples of those and whatever variety of rocks which
you're able to find for us - but primarily, a large
number of documented samples and fragment samples.
We're going to add a comprehensive rake and soil
sample someplace in this area. Once again, we'd
like you to try the rake but, if it doesn't work -
with about the first swipe across the surface, we'll
give that up as a bad idea; just don't want you to
spend too much time using the rake. I'll unkey now
and ask for any more questions.

05 19 49 18 CDR No, no questions Joe. You're really talking our (BETWEEN EVAS)
language today. Go.

05 19 49 23 CC Roger, Dave. Finally, and I've touched on this (BETWEEN EVAS)
already - we'll return - well okay, on our way home,
once again we'll skip Station 8, but don't get your
hopes too high, Jim, because we're going to pick
that up right before we ingress the LM, and we're
just going to carry that out closer to the LM than
we had previously planned. We're going to ask you
to pick up the miscellaneous tasks around the LM,
Jim, while Dave is out working at the ALSEP site.
And finally, the two of you will start on Station 8
activities at the LM, together, after Dave finishes
with the - working around with the drill. And that,
basically, is it. Let's see, let me go back through
again, and comment on a few new activities we've
added to - we'll want you to carry out in addition
to things on your checklist, listed under Station 6
and Station 7. And I'll have to unkey and shuffle
papers here a minute, and I'll be right back with
you.

05 22 27 19 CDR Okay, down the ladder to the plains of Hadley. (LM)

- - -

05 22 38 23 CDR Okay. Underneath the CDR's seat pan, I have the 500 millimeter with mag M attached. I have mags Oboe, Papa, and Kilo; and mags Foxtrot and Epsilon. I guess that goes with better things, and I'll put Delta on the 16 millimeter here in a minute.

- - -

05 22 45 08 CDR And mag Delta is on the 16 millimeter, and it seems to be working okay. (LM)(PHO DAC)

- - -

05 22 56 55 CDR Joe, bag number 162 has that little glass Aggie in it. (LM)(SAMP 15017-19, 27-28)(PHO 86 11604-07)

05 22 57 24 CDR Plus another couple little samples that were sitting there. Okay, we'll get you - up. Okay, hand me the hammer. (LM)(SAMP 15017-19, 27-28)(PHO 86 11604-07)

- - -

05 23 01 28 CDR Okay. Got the 70-millimeter camera and the bags and antenna stowed, taped; I'll close the other LRV battery covers here. (LM)

- - -

05 23 06 19 CDR Okay, roll is 1 to the left; pitch is about - oh, 1 down; and bearing, distance, and range have recycled to zero and the heading on there now is 305; and the sun shadow device is about - oh, a half to 1 to the right. (LM)

- - -

05 23 09 01 LMP Okay, Joe. We'll park it at 283. Reading about 284 now. Bearing, distance, and range, of course, are zero; amps are 100, 108, 68, 78, and motor temps: forward and rear are off-scale low. (LM)

- - -

05 23 11 13 LMP Okay, we're off, Joe; we're moving. (LM-6)

05 23 11 20 CC Roger; and we're marking. We want you to proceed (LM-6)
towards checkpoint number 1. Your general heading
is 160 at 1.9 clicks and this may take you down
between Salyut and Index craters.

- - -

05 23 12 00 LMP Joe, I'm going to start the camera here. Will you (LM-6)
keep track of it? I'm on 12 frames per second.

05 23 12 05 CDR Wait a minute. Why don't you hold off for awhile, (LM-6)
Jim?

05 23 12 08 LMP Okay. Never mind. (LM-6)

- - -

05 23 12 48 LMP Okay, on our left, now, we have a very large subdued (LM-6)
crater. I'd estimate 4 or 5 hundred meters across.
It has a crater of about 25 meters on its eastern
innerwall about half way to the bottom. And on that
smaller crater there's some rock exposed. Looks
like some bedrock exposed, in that particular
crater.

- - -

05 23 13 56 LMP I guess it's the largest crater that I've seen, Joe (LM-6)
- as far as *** - -

05 23 14 07 LMP Okay, we're heading 155 and at our 1 o'clock (LM-6)
position, there is the A Doublet. Shoot, I think it's
the doublet we drove across yesterday. I'll tell
you in a moment when we see our tracks. Do you want
to talk, Dave?

- - -

05 23 14 58 LMP Okay, Joe. I mentioned those - it's really a (LM-6)
triplet arrangement here that we just passed on our
right. I did not see our tracks.

05 23 15 07 LMP So we're - oh, definitely east of our track from (LM-6)
yesterday.

05 23 15 15 LMP We're heading 170. (LM-6)

05 23 15 28 CC Okay, Jim. And you - - (LM-6)

05 23 15 29 LMP And our range is 0.5. (LM-6)

05 23 15 30 CC - - may very well be coming up on Arbeit crater. (LM-6)

05 23 15 34 CDR I think we are. (LM-6)

05 23 15 37 LMP I think so. There's a fairly fresh one here with - (LM-6)
angular blocks on the rim.

05 23 15 46 LMP That's pahoehoe. (LM-6)

05 23 15 49 LMP Yes, the largest ones I would estimate 2 or 3 feet, (LM-6)
angular. There's one on the southeast rim that has
a flat top. In fact, it looks like a rectangular
block. But there are several fragments down there
that have the pahoehoe texture that Dave mentioned
yesterday.

- - -

05 23 16 21 LMP Okay, range is 0.6. We're heading 160. (LM-6)

05 23 16 29 CDR And we're doing about 8 to 9 clicks. (LM-6)

- - -

05 23 16 60 LMP Okay, coming up on our right is a very subdued (LM-6)
crater again. No blocks at all on its rim, and it
is about 50 meters in diameter.

05 23 17 17 LMP Okay. We stopped, Joe. (LM-6)

05 23 17 24 CDR Now we're going again, Joe. (LM-6)

05 23 17 27 LMP And I see a very large crater over at 1 o'clock. (LM-6)

05 23 17 35 LMP Yes. Okay, we've stopped. (LM-6)

- - -

05 23 18 35 LMP And we're gradually increasing. A very gentle slope. (LM-6)

- - -

05 23 18 57 LMP Dave, if you could swing to the right here, we could go by the rim of Earthlight, what Joe is calling Earthlight. (LM-6)

- - -

05 23 19 09 CDR No, let's go to the left. We're not going to stop at Earthlight. Let's go left. (LM-6)

- - -

05 23 19 29 LMP I get the impression out to our left that there is a shallow depression there. (LM-6)

05 23 19 35 CDR Gee, over to the left there is a big hole. Huh? See it over there? (LM-6)

05 23 19 42 CDR A big subtle crater. Oops, and we're coming up on a sharp one. (LM-6)

05 23 19 50 LMP Hey, you got those two ahead of us there? (LM-6)

05 23 20 08 LMP Okay, we're heading 140; we're out to 1.0. (LM-6)

05 23 20 16 LMP Doing 9 clicks. (LM-6)

05 23 20 22 CDR I think we're going by a very large one here; over at the 9:30, 9 o'clock, Jim, huh? (LM-6)

05 23 20 29 LMP It could be Domingo. (LM-6)

05 23 20 30 CDR No, it's too big. (LM-6)

05 23 20 31 LMP Too big for Domingo? (LM-6)

05 23 20 33 CDR Couple of hundred meters. (LM-6)

05 23 20 51 CC Dave and Jim, that could be possibly Index crater, if you started from where we thought. The distance is right on that and continue on towards checkpoint 1. (LM-6)

05 23 21 05 CDR Okay, I would say that probably was Index. It was (LM-6)
about that size.

- - -

05 23 21 20 CDR Going for - yes, okay, we're 1.2 now. (LM-6)

05 23 21 28 CDR There's a nice deep one there that's smooth and (LM-6)
rounded, about 30 meters across.

05 23 21 34 LMP You know, on one of these trips, we ought to stop at (LM-6)
one of these very fresh ones and really tap one.

- - -

05 23 21 43 LMP I mean these small ones, you know, just filled with (LM-6)
rock debris and glass in the middle. Just do a
systematic sampling on it.

05 23 21 54 LMP Like this one over here at 1 o'clock. (LM-6)

05 23 21 55 CDR Yes, I know what you mean. Okay, bearing is now 3 - (LM-6)
39 and our range is 1.3. Look out, oh!

- - -

05 23 23 04 LMP Okay, we've got the right bearing. We're at 1.4 (LM-6)
now, Joe.

- - -

05 23 23 20 LMP Okay, there's a crater on our right now about 50 (LM-6)
meters in diameter with a lot of gray fragments on
its rim. And we're just passing one that's sitting
right on the surface - about 2 feet subangular. I
can look out now and see the South Cluster and in
the - I get the impression of perhaps, some
horizontal beds in the first mound in the South
Cluster. I do see a lot of blocks over in that
direction - particularly on the second mound - the
west side of the second mound that appears to be in
the secondary cluster.

05 23 24 14 LMP Over in - probably over the area of Crescent. Okay, (LM-6)
we're 1.7 - and - again we have a very fresh crater
on our left with - several blocks.

05 23 24 36 CDR The blocks about a meter or so and the crater is (LM-6)
probably about 15 meters, like it might have been
excavated or been a secondary, huh?

05 23 24 47 LMP Yes, well, notice all the debris here, that the (LM-6)
surface is covered with more debris in this
particular area than what we've seen before.

05 23 24 54 LMP Just around that particular crater. (LM-6)

05 23 24 56 CDR Yes, more being probably 2 percent. (LM-6)

05 23 25 01 CDR It's noticeably more. (LM-6)

05 23 25 04 CC Roger. We copy that. And, Jim, you may want to (LM-6)
start your camera, if you think this is a good area,
and don't hesitate to fire off shots from the hip
with your 70 millimeter.

- - -

05 23 25 32 LMP Okay, I'm starting my camera, Joe. (LM-6)(PHO DAC)

- - -

05 23 25 44 CDR Reckon we can get between those two there? (LM-6)

05 23 25 59 CDR It's a bridge between two about 20 meters in (LM-6)
diameter, a little doublet and the one on the left
has got a bunch of debris, and the one on the right
has got nothing, huh, or very little.

05 23 26 12 LMP Boy there is a very large crater over on our - 1 to (LM-6)
2 o'clock position.

05 23 26 18 LMP That's the largest one - oh, I guess it would be (LM-6)
equal maybe larger than - well larger than Elbow,
certainly.

05 23 26 26 CDR Yes, it looks like it. You can't see too much of it (LM-6)
but it does - -

05 23 26 29 LMP I don't see that on the map. (LM-6)

05 23 26 33 CC Dave and Jim, we think you might be looking at (LM-6)
Earthlight now. It might be - its long dimension is
greater than the east-west dimension.

05 23 26 44 LMP Okay, well that's certainly true. Certainly true. (LM-6)
 Okay, you would have us east of Earthlight.

05 23 26 56 LMP Hey, here's a big deep one here about - maybe 50 (LM-6)
 meters - okay, and on the south - I can just barely
 see the - western slope of Earthlight. But the
 southern slope of it, I can also see, has several
 blocks on it.

05 23 27 25 CDR Hey, Jim. Check the camera. I don't think it's (LM-6)
 running. I don't see any change in the - - the
 quantity indicator. Why don't you feel it?

05 23 27 39 CDR The film isn't - apparently is not running through. (LM-6)

05 23 27 44 LMP Okay, it's stopped now. (LM-6)
 - - -

05 23 27 57 CDR Okay, point it to the forward. Let's see if it will (LM-6)
 - I just noticed that the film counter wasn't going.
 - - -

05 23 28 21 LMP Okay, bearing is 358; range is 2.2. (LM-6)

05 23 28 29 CDR I think bearing's 338. (LM-6)

05 23 28 36 CDR You said 358. (LM-6)

05 23 28 38 LMP Okay, 338. (LM-6)
 - - -

05 23 29 00 LMP Get around this blocky area here. (LM-6)

05 23 29 09 LMP Oh, it looks like we're coming down - have to go (LM-6)
 through a small valley - ***

05 23 29 15 LMP That valley off to the left. (LM-6)

05 23 29 18 CDR Oh, yes. And that's a north-south trending, isn't (LM-6)
 it?
 - - -

05 23 29 31 CDR Looks like - it looks more like a valley, you know, (LM-6)
that runs east-west.

05 23 29 35 LMP Yes, sure does. (LM-6)

05 23 29 47 CDR Look at that big hole there, Jim. Are we up on (LM-6)
Dune? Yes, there's a rampart over there.

05 23 29 54 LMP I was wondering whether we were - could possibly be (LM-6)
on Dune.

05 23 29 58 CDR Could we be at Dune? (LM-6)

05 23 29 59 LMP Or Crescent? (LM-6)

05 23 30 00 CC Dave, I think you're probably - - (LM-6)

05 23 30 01 CDR Crescent? Boy, that's the biggest one we've seen. (LM-6)

05 23 30 02 CC - - looking into Crescent. (LM-6)

05 23 30 06 LMP Yes, I guess you're right, Joe, because this little (LM-6)
one - just to the right of us here, I see it on the
map. So - yes, that's Crescent.

05 23 30 15 CDR Yes, I guess you're right. That's a big fella isn't (LM-6)
it?

05 23 30 21 LMP In fact, Dune should be dead ahead, Dave; so we'll (LM-6)
probably have to steer a little to the right to go
around the western side of Dune.

05 23 30 31 CDR Here's a blocky area here. (LM-6)
- - -

05 23 30 59 CDR Hey, we're in a debris field now, Joe with fragments (LM-6)
on the order of 6 inches to a foot, in general, and
maybe - oh, I'd say almost 5, 8 percent coverage.
Wouldn't you, Jim?

05 23 31 11 CDR And there are some that are up to a couple of feet (LM-6)
that require some maneuvering.

05 23 31 21 CDR Let's see, I think I'll go left around this one, (LM-6)
Jim, and then swing over to the right.

05 23 31 27 CDR Lots of - the smaller ones are deeper here. Man, (LM-6)
there's one and that's got direction to it - about 4
meters across and a big block in it on one side - on
the south side.

05 23 31 45 CDR *** being about a meter. (LM-6)

05 23 31 46 CC - - just like a secondary impact from the north. (LM-6)

05 23 31 51 CDR That's just exactly what it looks like, Joe. (LM-6)

05 23 31 54 LMP Okay, range is 2.7. (LM-6)

05 23 31 59 LMP Should be Dune straight ahead. (LM-6)

05 23 32 03 CDR Yes, which way do we want to go around? I'll tell (LM-6)
you -

05 23 32 05 LMP To the right. (LM-6)

05 23 32 06 CDR Right, yes. Okay. Looks like the better way to go (LM-6)
from here. Up a little hill here, about 5 - oh, I'd
say this must be a 5, 7 percent grade. The Rover's
going right up just like it knows what it's doing.

05 23 32 28 COR Okay, coming right. I've got to get up on the rim (LM-6)
here where I can take a look.

05 23 32 34 CC Okay, Jim. And turn off the 16-millimeter camera, (LM-6)
please. The film should be run through.

05 23 32 40 CDR Okay. Not a single motion on the little ball on the (LM-6)
indicator, Joe.

- - -

05 23 32 59 LMP Okay, we can definitely look down in the Dune (LM-6)
crater.

05 23 33 07 LMP Man, it sure likes the - a ray of blocks that run (LM-6)
north and south on the southern slope of the crater.

05 23 33 20 CDR Yes, and there's no big rampart like we were (LM-6)
thinking we'd see.

05 23 33 29 COR Man, look at some of those big ones Jim. They're (LM-6)
like - 3 meters across.

05 23 33 40 LMP Okay, we're heading now 250 to get over on the west (LM-6)
side of Dune.

- - -

05 23 34 00 LMP And we're doing 10 clicks. (LM-6)

05 23 34 32 LMP Yes, when we get clear of the west side here, Dave, (LM-6)
we could just head - about 180.

05 23 34 41 LMP 170. (LM-6)

05 23 34 51 CDR Lots of debris here, woeee! Up again to about 5 to (LM-6)
7 percent. Very rough-textured, subangular blocks -
gray, partially buried - some of them, and some of
them are on the top, huh?

- - -

05 23 35 17 LMP Okay, bearing is 348 and range is 3.0. (LM-6)

05 23 35 22 LMP Look up at that Hadley Delta, Dave. Don't you get (LM-6)
the impression that those craters, secondary on the
side there, are oriented, going right up the slope?

05 23 35 32 CDR Oh, yes, you called them right, I think - (LM-6)
secondaries. I think they just splattered right up
the slope. Because they're the the only craters on
the side of the mountain.

05 23 35 39 LMP Yes. And they're lined up so nicely. Good-sized (LM-6)
one ahead, Dave.

05 23 35 48 LMP Avoid that fella - stuck in there. Hey, we're going (LM-6)
south.

05 23 36 16 LMP Okay, we're on the - about the southwest side now of (LM-6)
Dune crater. As Dave mentioned, we're heading 155
now. A very fresh crater at our 1 o'clock position
with a lot of angular blocks, very slight raised rim
about 2 feet above the general surface, but a very
fresh crater. It seems like the albedo was lighter
around that one - than others that we've seen. In
fact, you might be able to see that on your map,
Joe. The lighter albedo in the southwest side of
Dune. It's a fresh crater - -

- - -

05 23 37 30 CDR Okay, that bearing now is 348 at 33. (LM-6)

05 23 37 36 LMP Wouldn't it be nice, Dave - - if we could - line up (LM-6)
with that chain of secondaries - - going up the side
of Hadley Delta.

- - -

05 23 37 55 CDR I'm going to stop right here and take a little (LM-6)
break.

05 23 37 56 LMP Okay. Look at 12:30. See that large block sitting (LM-6)
up about - I'd guess it's a quarter of the way up
Hadley Delta. One of the few - well, probably the
only large block on the side of Hadley Delta.

05 23 38 14 CDR Yes. Hey, by the way, we're stopped now, Joe. (LM-6)

05 23 38 21 CDR Yes - I just wanted to take a little break for a (LM-6)(PHO 85 11472-80)
minute. Jim, why don't you pull your camera up and
swing it around and get a pan? Let me hold the maps
for you.

05 23 38 53 CDR I'll bet you can get, you know, almost - 90 or 100 (LM-6)(PHO 85 11472-80)
degrees of pan there.

- - -

05 23 39 25 LMP Okay, we got about a 90-degree there, Dave. (LM-6)

- - -

05 23 40 10 CDR Okay, we're moving, Joe, by the way. (LM-6)

05 23 40 17 LMP I think one of those craters there dead ahead, Dave, (LM-6)
would probably be Spur, up on the side. Yes.

05 23 40 26 LMP Probably the large one at 12 o'clock. (LM-6)

05 23 40 34 CC Okay, Dave and Jim, thinking downstream a little (LM-6)
bit, we want to drive past checkpoint 2; continue on
towards checkpoint 3, and this is our reconnoiter
run along the boudinage of the Front.

- - -

05 23 41 00 CC We're looking in particular for fresh craters, lots of frags, good sampling drill holes into the Front and mare. (LM-6)

05 23 41 11 CDR Roger. And a sweep, and the high water lines and all those good things. (LM-6)

05 23 41 26 CDR Incidentally, Joe, thinking back on something we saw yesterday down towards Mount Hadley, we saw three sort of suggestions of beddings or horizontal linear lines at the base of Mount Hadley. And I got to thinking last night, maybe that was the high water mark for the basin at one time, because there are only three of them down there, and they were unique at the base of that mountain. (LM-6)

05 23 42 02 CDR I think we're arriving at the Front here pretty soon. And the debris has sort of diminished quite a bit. Sort of like we're out of the secondaries. (LM-6)

05 23 42 17 CC Dave or Jim, could you give us an estimate of the *** numbers of rock types you're looking at. Have you seen two populations so far? (LM-6)

05 23 42 30 LMP Oh, it looks like breccia as far as I can tell, Joe, just driving along. (LM-6)

05 23 42 37 CDR Yes, I sort of agree, Joe. The Sun is about 45 degrees to us right now, and it's sort of tough to see any differences in the rock types. They all look relatively the same. (LM-6)

05 23 43 01 LMP Okay, we're moving at 10 clicks; we're at 347 on bearing and 3.9 on the range. (LM-6)

05 23 43 13 LMP And I'd say the terrain is good for driving, isn't it, Dave? (LM-6)

05 23 43 18 CDR Yes, it's a lot better here. (LM-6)

05 23 43 23 LMP Make better time here along the Front. (LM-6)

05 23 43 24 CDR Yes, sir. In fact, I bet you we just went by - you know, we just changed terrain type almost distinctly there, Jim. (LM-6)

05 23 43 34 CDR You know, we don't have the deep craters anymore. (LM-6)
The deepest around here may be half a meter or so,
and we don't have the rocks, the debris on the
surface; just a few. As a matter of fact, right
here at 347, range 4.0, it's pretty smooth.

05 23 43 56 CDR There's a crater. A subtle depression; no debris. (LM-6)
We can navigate that one all right.

05 23 44 03 LMP There are some fairly good blocks sitting up by (LM-6)
themselves there - - at 11:30. But I guess our
primary objective is the crater.

05 23 44 13 CDR Yes. We'll hit that first. Boy, that's a big (LM-6)
mountain when you're down here looking up, isn't it?
My oh my! This is as big a mountain as I ever
looked up.

05 23 44 30 CDR Hey, look at the little chain of craters in that one (LM-6)
directly ahead.

05 23 44 37 LMP Yes, there are - let's see 1, 2, 3, 4 - at least 4 (LM-6)
lined up going upslope.

05 23 44 43 CDR Yes, right in the wall of the crater. (LM-6)

05 23 44 46 CDR Just perfectly linear and perfectly uniform craters, (LM-6)
little ones, maybe - -

05 23 44 49 LMP Yes, but look there's a rock in below those. I (LM-6)
wonder if it could have bounced down.

05 23 44 53 CDR No, it couldn't have made that many. Yes, we're - (LM-6)
going down into a little depression that runs along
the Front. We came over another north-south
trending ridge, and we're going down a little bit,
and then we're going to start up again.

- - -

05 23 45 20 CDR We're starting upslope. (LM-6)

05 23 45 26 LMP I'd estimate 3 to 5 degrees. (LM-6)

05 23 45 30 CDR Yes. Okay, good. Take a little lean to the left (LM-6)
here. No, those weren't very big holes at all were
they? I guess the shadow made them look -

05 23 45 43 CC Dave and Jim, what was the bearing - - (LM-6)

05 23 45 45 CDR Okay, we're 348 for 4.3, Jim. (LM-6)

05 23 45 46 CC - - on that chain of craters you described? (LM-6)

05 23 45 50 CDR Joe, it was just a very subtle, little - maybe (LM-6)
half-foot craters of the size of a 4-meter crater
that showed up very well in the shadow.

05 23 46 04 CDR And we're right - and that was just in our 348 for (LM-6)
4.3 - where we are right now. And we've stopped,
and let's take a gander around and see which way we
ought to head.

05 23 46 18 LMP Do you know, Dave, if we could make it out that far (LM-6)
directly ahead of us - look at those large blocks.

05 23 46 24 LMP *** come down slope. Yes. At 12 o'clock. (LM-6)

05 23 46 28 LMP Okay, that's as good a way as any. (LM-6)

05 23 46 33 CDR We'll head 140 from here. (LM-6)

05 23 46 36 CC That sounds good, and can you see Spur as you look (LM-6)
up the slope?

05 23 46 41 CDR Yes, sir. Dead ahead. It's very visible. And (LM-6)
right up on the side, about - oh 5 percent up the
slope of Hadley Delta, is a very large block on the
surface all by itself, very large, and - gee, it
must be 5 meters. Huh, Jim?

05 23 47 01 LMP The one at 12 o'clock. (LM-6)

05 23 47 02 CDR Yes. (LM-6)

05 23 47 03 LMP Oh, I bet you that's - I'd say 5 times that size, (LM-6)
because that's another 3 kilometers down there.

05 23 47 11 CDR All right. I'd buy anything. It sure looks big. (LM-6)

- - -

05 23 47 32 CDR We rolled about a minute ago. (LM-6)

05 23 47 40 CDR And we're right now 347 for 4.4. A little (LM-6)
depression here, Jim.

05 23 47 47 CDR I get the feeling we're leaning left. (LM-6)

05 23 47 55 LMP Each time we stop, you want to take a look to the (LM-6)
left there and see how the slope rises abruptly up
toward Hadley Delta.

05 23 48 01 CDR You're right. (LM-6)

05 23 48 03 LMP Like we're driving in a valley. (LM-6)

05 23 48 10 CC Dave and Jim, what would you think - - (LM-6)

05 23 48 11 CDR Yes, that's hard work to the old Rover, too. (LM-6)

05 23 48 12 CC - - of the suggestion of going to Spur directly from (LM-6)
your present position and use that as your first
station?

05 23 48 21 CDR Yes, I think that might be a good idea, Joe. Let us (LM-6)
get out and do a little geology and take a look
around. I think - - Jim, wouldn't Spur be right
about 12:30 to us?

05 23 48 35 LMP Yes. (LM-6)

05 23 48 41 CDR Do you have some coordinates for Spur, Joe? Because (LM-6)
there's a large block - - on the slope of the Front
that we can sample.

05 23 48 56 LMP That Spur should be in that vicinity. We're doing 8 (LM-6)
clicks.

05 23 49 03 CC Okay, Dave and Jim, Spur is at bearing 346, range (LM-6)
4.6.

05 23 49 12 LMP Oh, we're at Spur then. (LM-6)

05 23 49 13 CDR We're at Spur. But I don't see it. (LM-6)

05 23 49 18 CC Okay, by that, really - - (LM-6)

05 23 49 19 CDR Do you see it? (LM-6)

05 23 49 20 LMP No. (LM-6)

05 23 49 21 CC - - we just mean an equivalent crater. I guess (LM-6)
continue your reconnoiter along the Front. Sounds
good.

05 23 49 30 CDR Okay. I don't know how high we want to go on the (LM-6)
Front.

05 23 49 33 LMP I don't either. But we don't want to go too high. (LM-6)
I don't think we're - -

05 23 49 36 CDR Hey, that must be - - maybe to the right there, (LM-6)
Spur. Huh Jim?

05 23 49 40 LMP Okay, I'll buy that. Yes. (LM-6)

05 23 49 41 CDR Yes. That's Spur. (LM-6)

05 23 49 43 CDR Okay, let's head over to this ridge at 11 o'clock. (LM-6)
- I think that's Spur right over there.

05 23 49 47 LMP You don't want to hit Spur now? (LM-6)

05 23 49 48 CDR No, let's go on down to this rise right in front of (LM-6)
us. Okay?

05 23 49 53 LMP Okay, we know where Spur is. We're passing it - (LM-6)
it's at our 3 o'clock position. And we're bearing
346, 4.7, Joe.

05 23 50 06 LMP And we're moving along the Front now. (LM-6)

05 23 50 15 CDR Do you think - I think we can do a little contour (LM-6)
travel here, Jim. And on the way back pick up that
big block up there.

05 23 50 24 LMP Okay. In other words - I see what you mean - angle (LM-6)
uphill.

05 23 50 27 CDR Yes, angle uphill here - - a little bit. (LM-6)

05 23 50 36 CDR Boy, it's right into the Sun, isn't it? (LM-6)

- - -

05 23 50 50 LMP Oh, as we drive up sun here, I'm looking to the left, and I can see Mount Hadley. And the linear patterns in it are really remarkable - dipping to the northwest. And the pattern runs from the very top - the whole mountain has the same linear pattern. (LM-6)

05 23 51 20 LMP Very closely spaced. And - it has the same direction as the dipping beds I mentioned yesterday that intersected the horizontal beds or high water marks that Dave just talked about, when we looked at the Spur on high Hadley. (LM-6)

05 23 51 47 CDR Okay, see this little crater up on the ridge line here at 1 o'clock? I think that's where I'll head, Jim. We'll call that something or another and you know, I can see an inflection point here as we go upslope. Another inflection point. (LM-6)

05 23 52 03 LMP Just above us here. (LM-6)

05 23 52 05 LMP Yes. How far east do we want to go? (LM-6)

05 23 52 08 CDR I think this ought to do it. (LM-6)

05 23 52 11 CC Dave and Jim, the first thing we need is just a good sampling stop - - (LM-6)

05 23 52 13 LMP A lot of debris. (LM-6)

05 23 52 14 CC - - to get a general look around, and we want a crater like Spur or anything similar. But one that's provided a lot of frags for us and perhaps a lot of rock types to sample. (LM-6)

05 23 52 27 LMP Well, we haven't seen any besides the Spur just yet. (LM-6)

05 23 52 30 CDR There aren't any like that, Joe. Just aren't any. They're all very subtle up here. (LM-6)

05 23 52 37 CC Okay, Dave. I guess we want to continue on towards the east, and keep your eyes open. (LM-6)

05 23 52 45 CDR Well, we're up on a little ridge here. And I think it would do well for us to stop here and sample the rocks we can see in this area, and then head over to that boulder, there. See how we do, okay? (LM-6)

- - -

05 23 53 21 CDR Yes, we have a number of fragments in our local (LM-6)
area, none having really been excavated from a
particular crater. There is no crater up here which
has excavated a lot of debris. They're all very
subtle and old, but there are rocks on the surface.
So, I think, our best shot here is to hop off and
gather up a number of these rocks in our vicinity.
I bet we can get - oh, 10, 12 very easy, and then -
think about that.

05 23 53 49 LMP There's one of those - very fresh craters over at 11 (LM-6)
o'clock - -

05 23 53 55 LMP There are several of those around. (LM-6)

05 23 53 56 CDR Okay. Rover power is off. (6)

- - -

05 23 54 03 LMP Okay, Joe; here's some readings. 195, 343, 065, (6)
050; 92, and 100; 75, 81; and motor temps are both -
off scale low.

- - -

05 23 54 43 CDR We're on a steep slope. Your belt is caught. Just (6)
a minute. Just a minute. Okay, hold on there. By
golly, Joe. This Rover is remarkable. I'm telling
you, we have climbed a steep hill, and we didn't
even really realize it. And, we were going like 10
clicks up this hill, and we're on a slope of - -

- - -

05 23 55 07 CDR Eight to 10 degrees. And we can look back and see (6)
the whole - we can see the LM just as loud and clear
as can be.

- - -

05 23 55 26 LMP Oh, boy! Okay. I'll take a pan. (6)(PHO 85 11481-97)

- - -

05 23 56 37 LMP You know, I want to take a picture upslope, Dave, (6)
but I can't. I can't get the camera pointed up that
way.
- - -

05 23 58 13 CDR Okay. Let's go up first, so we can come downhill. (6)
And, there's one of those fresh little craters.

05 23 58 17 CDR Let's go sample that one. (6)(SAMP 15240-45)(PHO 85 11498-500; 86 11609-15)

05 23 58 25 LMP Got glass in the bottom. (6)(SAMP 15240-45)
- - -

05 23 59 31 CDR Okay. I'll get you a bag. And, it looks to me like (6)(SAMP 15240-45)
the best thing to do - would be to - scoop the side
- scoop the center where the glass is. Oh, what a
beautiful sight. You know, we're a long way from
the LM. At least, we can see it.

05 23 59 58 LMP We never did remark on that very white crater out (6)
there northwest of the LM, did we?

06 00 00 03 CDR No, I don't think we did. It's really, really white (6)(SAMP 15240-45)
though, isn't it? Yes, I've got your bag, and it's
number 1 - -

06 00 00 09 LMP And we're going to sample the glass in the middle of (6)(SAMP 15240-45)(PHO 85 11498-500; 86 11609-15)
it.

06 00 00 12 CDR Yes. Start with the middle, and we'll pick up the (6)(SAMP 15240-45)
rim, too.

06 00 00 23 LMP It all felt kind of welded together. (6)(SAMP 15240-45)

06 00 00 30 CDR Hey, get me another load. (6)(SAMP 15240-45)

06 00 00 33 LMP I hope it stays together for us. (6)(SAMP 15240-45)

06 00 00 37 LMP Like fragments all glued together. What an (6)(SAMP 15240-45)
intricate pattern.
- - -

06 00 00 56 CDR Get you another one. (6)(SAMP 15240-45)

06 00 01 00 CC Okay, Dave. And is that still bag number 163? (6)(SAMP 15240-45)

06 00 01 04 CDR Yes. Yes, the next one coming up is 164. And, why (6)(SAMP 15240-45)(SAMP 15250-54)(PHO 85 11498-500;
don't you skip the rim there, Jim. 86 11609-15).

06 00 01 20 LMP A little more? (6)(SAMP 15250-54)

06 00 01 21 CDR Yes, let's get a good bag full. (6)(SAMP 15250-54)

06 00 01 24 CDR Okay, Joe. It's very fine light-gray - the rim is (6)(SAMP 15250-54)
very fine.

- - -

06 00 02 00 LMP You ought to look up toward - Mount Hadley. You can (6)
see that linear pattern.

06 00 02 22 CDR Okay, Jim. Let's find ourselves a couple of frags (6)(SAMP 15290-95)(PHO 85 11501-02; 86 11616-20)
down here. There are three within easy range over
here.

- - -

06 00 02 50 LMP We could go after some little ones but - (6)

06 00 02 53 CDR Right there in front of you, Jim. That big one. (6)(SAMP 15290-95)
Get that one.

- - -

06 00 03 35 LMP We're sampling a rock right now. (6)(SAMP 15290-95)

06 00 03 57 LMP The number on this bag is 188. (6)(SAMP 15290-95)

06 00 04 00 CC Roger, Jim. Copy 188. And have you noticed a (6)(SAMP 15290-95)
variety of rock types or just one general kind?

06 00 04 09 CDR Okay. Let us go through them, Joe, as we pick them (6)(SAMP 15290-95)
up, because we can't tell any difference as they sit
on the surface. They're all covered with dust.
And, the first one here is a fine-grained breccia -
a microbreccia. And, it's got - it looks like a
third order with white clasts in it. The matrix is
dark-black, and it has glass within a fracture on
the side. Not unlike some of the 14's.

06 00 04 38 LMP I'll put some soil in. (6)(SAMP 15290-95)

06 00 04 40 CDR Get that other frag right next to it, Jim. Here let me - I'll get it. Okay, good boy. (6)(SAMP 15290-95)

06 00 04 47 CDR And, Joe, the soil is very powdery here. (6)(SAMP 15290-95)

06 00 05 03 CDR Okay. Same thing. Some kind of fragment *** (6)(SAMP 15290-95)

06 00 05 11 CDR Okay. You give me the bag, and why don't you take a little scoop right there by the side of the - - where those two were. (6)(SAMP 15290-95)

- - -

06 00 05 52 CDR Okay, 188, to confirm again. (6)(SAMP 15290-95)

06 00 06 05 LMP Dave, there's one upslope with a flat side. (6)

06 00 06 08 LMP Maybe we could take that back as - take it back as a large one. Do you want to wait until we get over to a fresh crater? (6)

06 00 06 17 CDR Let's wait until we get to a fresh crater. (6)

06 00 06 20 CDR See if we can get some more typic - here's one down here - to your right. (6)

06 00 06 26 CDR Let's just make a little circle around the old Rover here and find some variety. (6)

- - -

06 00 07 14 CDR Okay. Okay; this is a fairly large subangular fragment which is about 20 percent buried. I'm not sure we'll get that in the bag. (6)(SAMP 15298)(PHO 85 11503-04; 86 11621-23)

06 00 07 28 LMP I don't think we will, Dave. (6)(SAMP 15298)

06 00 07 30 CDR Well, we've got it anyway. See what it looks like here. (6)(SAMP 15298)

06 00 07 37 CDR On the bottom - see, it looks like - a light-gray microbreccia with some white clasts of millimeter size in it, and that's about all. And, the bottom side has slickensides. And I do see some glass spattered on one side. And I also see - one little - looks like an orange crystal in there - like it (6)(SAMP 15298)

might be a little piece of olivine. It's got
definite reddish-orange color to it.

06 00 08 12 CDR Get the picture before I step in it. (6)(SAMP 15298)

- - -

06 00 08 23 LMP I'm sorry. Do you want to try putting it in the bag? (6)(SAMP 15298)

06 00 08 26 CDR This is definitely a different kind of breccia, Joe. (6)(SAMP 15298)
It's only got light-gray millimeter-size clasts in
it, with a fine-grained gray matrix. In the clasts,
there are about - gee, I'd say 10 percent of the
total frag. So it's somewhat different. Here, I
can hold it with both hands, if you can stick it in.
Let me hold the bag.

06 00 08 51 LMP Got the bag? (6)(SAMP 15298)

06 00 08 52 CDR If you can get the thing in there. (6)(SAMP 15298)

06 00 09 06 LMP I don't think we will make it, Dave. (6)(SAMP 15298)

06 00 09 07 CDR - - I don't think so either. I got it. Let go, let go *** (6)(SAMP 15298)

06 00 09 14 CDR Okay. That's going in your collection bag as a (6)(SAMP 15298)
single. And, I think you can remember it, Joe.
Sorry about the bag; it just fell. I let it go.
It's got slickensides on it.

06 00 09 34 CDR Okay, Jimbo. Keep going around the old Rover here, (6)
and see if we can find another interesting looking
one.

06 00 09 49 CDR As you can see, probably, with the TV, Joe, there (6)
just isn't much in the way of debris around here.
It's all -

- - -

06 00 10 12 CDR Okay. Jim, there's one sitting on top of this (6)
little crater over here. Reckon you can get over
here to it.

06 00 10 18 LMP Yes. I was trying to recover that bag, but I gave (6)
up on it.

06 00 10 27 CC And, Jim, on your pan, were you able to sweep around (6)(PHO 85 11481-97)
the full 360 degrees?

06 00 10 34 LMP Yes. (6)(PHO 85 11481-97)

06 00 10 36 LMP Yes, I have a pan. I'll take another one probably (6)(PHO 85 11481-97)
before we leave the area, so you get a little stereo
effect.

06 00 10 48 LMP You can tell we sank in about 2 or 3 inches *** (6)
material.

06 00 10 54 CDR Jim, I would say that this fragment here hit right (6)(SAMP 15299)(PHO 85 11505-06; 86 11624-28)
before its position. You see that little spot? See
that little spot right there in front?

06 00 11 08 CDR I think that rock hit there. (6)(SAMP 15299)

06 00 11 10 LMP Yes. You can convince me of that. (6)(SAMP 15299)

06 00 11 13 CDR And it - we'll just have to take a look at it. We (6)(SAMP 15299)
can get the pictures here. Wonder from whence it
came. If it did hit there it was traveling - -

06 00 11 25 LMP Traveling west. (6)(SAMP 15299)

06 00 11 26 CDR Yes. East to west, and it left a little mark about (6)(SAMP 15299)
a foot from its present position. And its present
position is on the surface, to about 4 inches,
subangular. And we'll pick it up and take a look at
it. As a matter of fact, I'll see if I can't get a
closeup of the little spot that it hit here. Now,
if I can lean down. Okay. Did you get the
down-sun, Jim? (SAMP 15299)(PHO 85 11506)

06 00 11 56 LMP Yes. (6)(SAMP 15299)(PHO 85 11506)

06 00 12 02 CDR Now, pick it up. (6)(SAMP 15299)

06 00 12 10 LMP That stuff is really soft. (6)(SAMP 15299)

06 00 12 11 CDR Yes. Help me get it with the scoop. That a boy. (6)(SAMP 15299)

- - -

06 00 12 47 CDR Okay. Let me get down here. Let me use my tongs - (6)(SAMP 15299)
to pick it up.

- - -

06 00 12 54 CDR Hey, hold it right there. Up a little more. I got (6)(SAMP 15299)
it.

06 00 13 16 CDR Man, it's really covered. But it's a very rough (6)(SAMP 15299)
surface, very sharp, basically a subangular rock,
but with quite a jagged, craggy surface on it. And
I can see some spots in there. I guess I'd just
have to call it a breccia. It'll never fit in
there. Just let me put it in your bag.

06 00 13 37 CDR And I think we have it fairly well documented. It's (6)(SAMP 15299)
in collection bag number 3, which will help you keep
track of it.

06 00 13 47 CDR They're either big ones, or they're little small (6)(SAMP 15299)(PHO 86 11628)
ones. Okay; got the picture.

06 00 13 58 LMP There's a crater over to the west, Dave, that has a (6)
very light albedo that's - -

06 00 14 02 CDR Yes, let's head that way with the Rover when we get (6)
going.

06 00 14 06 CC Okay. Dave and Jim, when - - you reach a good (6)
stopping point, we've got a couple of questions.

06 00 14 17 LMP While you're asking them, I think I'll take another (6)(PHO 85 11507-22)
pan.

06 00 14 23 CC And, Dave, while he is doing that, could you tell us (6)
how far away and in what direction is the large
block which you described?

06 00 14 33 CDR Yes, Joe. We intend to head in that direction. (6)
It's right now - due west. It's probably, oh,
3/10ths of a kilometer or something. And I think
it's on the same slope - maybe upslope a tad from
where we are now, but not too much. And on the way,
there's a nice fresh light-albedo crater, maybe a
couple of meters across. So maybe we ought to pick
up those two.

- - -

06 00 15 45 LMP Hey, swing around and get the down-sun, Dave. (6)(SAMP 15255-57)(PHO 86 11631)

06 00 15 48 CDR Here, let me get it. I'm in a better position, Jim. (6)(PHO 86 11631)

06 00 16 01 CC Dave, do you think that that fresh crater you're (6)
looking at might be Spur crater? We put your
present position as halfway between Window and Spur.

06 00 16 14 CDR No, I don't think. It's too small, Joe. I think we (6)
picked up Spur as we went by a little while ago. We
saw it.

06 00 16 25 CC Okay. We agree with you exactly here, Dave and Jim. (6)
And we want you, when you leave this station, to
move back towards the west. In other words, towards
the direction of the rille, and looking especially
for fresh craters.

06 00 16 43 CDR Okay, Joe. Okay; another little microbreccia. Bag (6)(SAMP 15255-57)(PHO 86 11629-32)
number is 190.

06 00 17 05 CDR You can take another. Get this other one here. (6)(SAMP 15255-57)

06 00 17 12 CDR Oh, boy. Look at the bottom of that, Jim. (6)(SAMP 15255-57)

06 00 17 15 LMP All glassy, isn't it? (6)(SAMP 15255-57)

06 00 17 17 CDR Yes, I hope. Glass all over the bottom of that one. (6)(SAMP 15255-57)
And it looks like another microbreccia. And I don't
see any pits in any of these, at all. I do see a
couple of glass - yes, there, this one's got a
couple of very small glass-filled pits, but most of
them are pitless. Okay; 190.

06 00 17 37 LMP Did you put any other soil in it? (6)(SAMP 15255-57)

06 00 17 39 CC Roger. 190. (6)(SAMP 15255-57)

06 00 17 40 LMP - - *** it's typical. (6)(SAMP 15255-57)

06 00 17 46 CDR Okay, Joe. I took the down-sun from a different (6)(SAMP 15255-57)(PHO 86 11632)
side of this one - I mean the cross-sun from a
different side on this one. Do you want to ***
that? Okay. And want to stick that in my bag
and - -

- - -

06 00 17 59 CDR Let's go down and take a look at this little crater (6)
right here. There's a little small crater, I guess
you can see, Joe, at about 2 o'clock to the TV now.
And - -

- - -

06 00 18 34 CDR Okay. Okay; let's move down here. Downhill, with (6)
care. Now, it looks like the same - look down at
the bottom of that crater - another little crater
with a bunch of debris in it.

06 00 19 19 CDR Hey, look at the little bench on this one. (6)

06 00 19 21 LMP Yes, I was going to remark about that on the (6)
downslope side.

06 00 19 25 CDR Yes. I took a picture of it. (6)

- - -

06 00 19 49 CDR Jim, I'd suggest we go down to that little bench. (6)

06 00 19 51 LMP Yes. We could actually walk in. We could do a (6)
radial sample.

06 00 19 55 CDR Yes. Boy, look at how this zero phase just wipes (6)
everything out. Man. We can get this here easy -
because we don't want to go too far downhill,
because we don't have *** climb back up to our Rover
friend. Jeepers, this - they're all too big.

06 00 20 27 LMP Notice you're kicking up some white material there, (6)
Dave?

06 00 20 29 CDR Hey you're right. (6)

06 00 20 32 LMP We ought to trench it. (6)

- - -

06 00 20 44 LMP Trench or a core? (6)

- - -

06 00 20 56 CDR Why don't we go to the upper rim up there and pick up the core Joe - Jim, on the way back up? (6)

06 00 21 02 CDR Let's get this fragment here - or a bunch of these little ones I guess. (6)(SAMP 15258-59, 68-69, 85-89)(PHO 86 11633-37; 85 11523-24)

- - -

06 00 21 37 CDR Okay. I think the big one is too big to put in, as usual. Of course, we'll never be satisfied with that, but I'll take some of these others. (6)(SAMP 15258-59, 68-69, 85-89)

06 00 21 47 CDR I think they're the same. Dust off a little bit. Another breccia. (6)(SAMP 15258-59, 68-69, 85-89)

06 00 22 03 LMP Bag number is 192. (6)(SAMP 15258-59, 68-69, 85-89)

06 00 22 12 CDR Hold it and I'll get a bunch of these frags right here. (6)(SAMP 15258-59, 68-69, 85-89)

06 00 22 18 LMP Not much glass. (6)(SAMP 15258-59, 68-69, 85-89)

06 00 22 34 CDR Okay. That ought to do it. Why don't you close it up, and I'll - put it *** here. Dying to look at that big rock. (6)(SAMP 15258-59, 68-69, 85-89) (SAMP 15265-67)(PHO 85 11523-24; 86 11633-34, 38-40)

- - -

06 00 23 00 CDR Yes. Let me borrow your hammer just a - I'll take one whack and see if it will come open. (6)(SAMP 15265-67)

06 00 23 06 CDR The visibility - hold my tongs, please. Let's see if we - we've got any variety up here. (6)(SAMP 15265-67)

06 00 23 19 LMP - - *** friable to what you're trying to get. (6)(SAMP 15265-67)

06 00 23 21 CDR Sure is. Not bad for a beginner. Okay. Give me the tongs, and let's just get another bag and pick up those two little frags there. What do you say? (6)(SAMP 15265-67)

- - -

06 00 23 57 CDR Okay. A microbreccia with millimeter white clasts, and there's a gray clast in there that's about 3 millimeters. It looks a little different. Let me go down and get this other one that came up. (6)(SAMP 15265-67)

06 00 24 11 LMP And 193 is the number on the bag. (6)(SAMP 15265-67)

- - -

06 00 24 22 CDR Okay. Well, would you like a trench or a core, Joe? (6)
We'll give you your choice today.

- - -

06 00 24 39 CDR Okay. We'll go up and trench it first and see if (6)
it's worth coring.

06 00 24 46 CDR Let's go up on the upper rim up there, and work our (6)
way back up to our Rover friend.

06 00 25 09 CDR Right up here where it's nice and fresh. (6)

06 00 25 25 CDR Hey, Jimmy - dig me a little trench when you get up (6)
here.

- - -

06 00 26 03 LMP Look at those linear features on Mount Hadley, Dave, (6)
if you get a chance to look up there.

06 00 26 11 CDR Oh, yes! My word! Look it, the dip's to the (6)
northwest, right?

06 00 26 18 CDR Oh, yes! It's a big - looks like a big block tilted (6)
up on its side.

06 00 26 23 CC And just like you called it - - and we're going to (6)
ask for 500-millimeter pictures of that when you get
back to the Rover.

06 00 26 32 CDR Boy, I was just going to say, we'd better take some (6)
500-millimeter pictures of it. Okay, Jim's (SAMP TRENCH 15260-64)(PHO 86 11641-46; 85 11525-26)
trenching. Hey, the other side, Jim, I can't see
you.

- - -

06 00 26 52 LMP I can trench it here. (6)(SAMP TRENCH 15260-64)

06 00 26 53 CDR *** just right, right like you got it. Keep (6)(SAMP TRENCH 15260-64)
digging. That's fine. Boy, when you put your scoop
in, it smooths it out flat just like plaster.

06 00 27 07 LMP I was going to say like cement. (6)(SAMP TRENCH 15260-64)

06 00 27 08 CDR Yes. I can't see any layering because the scoop just - - (6)(SAMP TRENCH 15260-64)

06 00 27 15 LMP Yes. It's all - very similar in color. (6)(SAMP TRENCH 15260-64)

06 00 27 22 CDR Can't tell whether - nice and cohesive, it holds a straight wall very well. It's very fine powder, just like - graphite. (6)(SAMP TRENCH 15260-64)

06 00 27 36 CDR Okay. Well, why don't we call that a trench? Wouldn't that be nice if you could do that at Station 8? (6)(SAMP TRENCH 15260-64)

- - -

06 00 28 27 LMP Get the pictures? (6)(SAMP TRENCH 15260-64)(PHO 86 11641-46)

06 00 28 28 CDR Yes. I think so. The rim, as all rims around are - very soft. (6)(SAMP TRENCH 15260-64)(PHO 86 11641-46)

06 00 28 38 LMP Did you hear him, Dave, he wants the SESC from the bottom of that. (6)(SAMP TRENCH 15012)

06 00 28 43 LMP Let me get a bag; I'll sample the bottom. (6)(SAMP TRENCH 15260-64)

- - -

06 00 29 14 LMP First scoop? (6)(SAMP TRENCH 15260-64)

06 00 29 16 LMP Just one. (6)(SAMP TRENCH 15260-64)

- - -

06 00 29 28 CDR No, listen. Hey, Joe, listen; we're going to go over to this fresher crater, we hope. Maybe we ought to get it there rather - unless you really need it here. Because there's the little trip back to the Rover. (6)(SAMP TRENCH 15012)

06 00 29 45 CC Dave, that's affirm. You will be moving over towards the fresher crater, and stand by, I'll get another reading on your core tube. Copy, you've gotten the SESC out of the bottom of the trench now. (6)

06 00 29 57 CDR We haven't, Joe, you missed it. 166 the bag. We (6)(SAMP TRENCH 15012)
 didn't get the SESC - - we just got a sample from (SAMP TRENCH 15260-64)
 the bottom of the trench. And since we have to walk
 back uphill to the Rover to get the SESC - -

06 00 30 10 LMP No, it's on your back. (6)(SAMP TRENCH 15012)

06 00 30 11 CDR Oh, just do it. (6)(SAMP TRENCH 15012)

- - -

06 00 30 22 CC And Jim, if material has fallen into the trench, you (6)(SAMP TRENCH 15012)
 might want to scoop it out again.

06 00 30 31 LMP No, I don't think any has. We're very neat. (6)(SAMP TRENCH 15012)

06 00 30 35 CDR Watch it - stand out of the - don't get too far down (6)(SAMP TRENCH 15012)
 in that there crater.

06 00 30 42 CDR Why don'tcha scoop out the bottom on this side a (6)(SAMP TRENCH 15012)
 little bit, Jim.

06 00 30 48 LMP Out the bottom, you say? (6)(SAMP TRENCH 15012)

06 00 30 49 CDR Yes, dig it a little deeper, I think you can (6)(SAMP TRENCH 15012)
 probably - get the thing deeper and -

06 00 31 18 LMP You want me to hit bedrock, I know. (6)(SAMP TRENCH 15012)

06 00 31 21 CDR Yes. Okay; I can't see in the bottom of it, but go (6)(SAMP TRENCH 15012)
 ahead. Dig her. Have a scoop load. I think the
 wall collapsed on you.

06 00 31 42 CDR Get your scoop up. That's it. That's it. That's (6)(SAMP TRENCH 15012)
 good, Jim. That's about half - can you get another
 one? Hey, don't slide down in there, that's really
 slippery.

- - -

06 00 32 14 CDR Yes, that's good. Boy, it's really easy to - pick (6)(SAMP TRENCH 15012)
 it up and dump it out, isn't it?

06 00 32 32 CDR Why don't you - - you work yourself out of that (6)(SAMP TRENCH 15012)
 crater to your left. If you try to come up like I
 did, you're - ***

06 00 33 06 LMP Let's see, we probably ought to put that SESC in your bag. (6)(SAMP TRENCH 15012)

- - -

06 00 33 18 CC And, Jim, did you get an after picture of that? (6)(SAMP TRENCH 15012)(PHO 86 11644-46)

06 00 33 22 CDR I'll get it, I'll get it Joe. (6)(SAMP TRENCH 15012)(PHO 86 11644-46)

06 00 33 35 LMP Okay; it's in. (6)(SAMP TRENCH 15012)

06 00 33 39 CDR Okay. And if you'll move out of the way, I'll see if I can get in there and take the picture. (6)(SAMP TRENCH 15012)(PHO 86 11644-46)

06 00 33 49 CC And, Dave, while you're taking that picture, we'll be asking for a core tube after that. We want you to use an upper core, because we only have one lower in the bag right now. (6)(PHO 86 11644-46)

06 00 34 06 CDR Very well Joe, we'll get you a core right now. (6)(SAMP CORE 15009)(PHO 86 11647-51; 85 11527-29)

06 00 34 15 LMP You know, it's unfortunate, Dave, that we didn't take that down at the lower rim where the white was exposed. Here I don't see the white. (6)

06 00 34 22 CDR Yes, I didn't either. Maybe we ought to go back down there and do that. (6)

06 00 34 26 LMP Seems like we'd save the core for someplace where there was definite layering. (6)

06 00 34 35 CC Jim, we've got that double left. Do you suppose you could drive a single core down where it's white? (6)(SAMP CORE 15009)

06 00 34 46 CDR Yes, we could. Let's go do that. Yes, let's go take advantage of what we know down there on the albedo. (6)(SAMP CORE 15009)

- - -

06 00 35 08 CDR By the fresh spot down there. (6)(SAMP CORE 15009)

06 00 35 14 CDR Okay; you sure see the change. Right up on the high point here. (6)(SAMP CORE 15009)

06 00 35 32 LMP Above the bench. Let's try it right there. (6)(SAMP CORE 15009)

06 00 35 46 CDR Yes, boy, the soil is more granular here, too. (6)(SAMP CORE 15009)
Quite a difference from one side of the rim to the other.

06 00 36 08 LMP I'm probably just about out of film. Why don't you (6)(PHO 85 11527-30)
check with my mag?

06 00 36 17 CDR Yes, 180. Okay. (6)

06 00 36 24 LMP Okay, Joe. And you're suggesting using an upper (6)(SAMP CORE 15009)
here?

06 00 36 27 CC That's affirmative, Jim, an upper. (6)(SAMP CORE 15009)

06 00 36 38 CDR Okay. I don't think you'll need your hammer, but (6)
I'll get it anyway.

06 00 36 50 LMP Yes, and I'll get up on the uphill side here. (6)

06 00 37 00 LMP Okay; it's in position. (6)(SAMP CORE 15009)

06 00 37 01 CDR Okay; I got the picture. 07's the number, Joe. (6)(SAMP CORE 15009)(PHO 86 11649)

06 00 37 07 CDR Easy. Neat *** hey all the way in very easily with (6)(SAMP CORE 15009)
a push, Joe.

06 00 37 17 CDR Yes, it'll be soft, bring it out - be gentle. Don't (6)(SAMP CORE 15009)
auger it.

06 00 37 31 CDR You got it? (6)(SAMP CORE 15009)

06 00 37 32 LMP Yes. (6)(SAMP CORE 15009)

06 00 37 37 CDR Yes. Watch out. Watch out. Jim, watch out. (6)(SAMP CORE 15009)
You're over by the bench now; don't go any farther backward.

06 00 37 42 LMP Oh, I thought you meant I was about to lose the (6)(SAMP CORE 15009)
core.

06 00 37 44 CDR Just don't step backward any farther. Wait, let me (6)(SAMP CORE 15009)(PHO 86 11651)
get the picture - I'll just walk over there, Jim.

06 00 38 12 CDR Good core, Joe. (6)(SAMP CORE 15009)

- - -

06 00 38 29 CDR Put that in my bag. Don't step backwards. (6)(SAMP CORE 15009)

06 00 38 42 CDR Okay, Joe. I'd suggest that we drive on down to that white crater and take the 500's from there. (6)
And I can do 500's while Jim's taking a pan. How's that sound?

06 00 38 52 LMP Okay; it's in, Dave. (6)

06 00 39 00 CC Okay, Dave. That sounds like a good idea. We'd like a frame count from you before you leave - - and (6)
Jim, you may be coming up on a mag change, depending upon your frame counts.

06 00 39 14 LMP Yes. Mine's 180. (6)

06 00 39 18 CC Roger. Better change it. (6)

06 00 39 22 LMP I wish you'd pack the slope a little better, Dave. (6)

06 00 39 25 CDR Yes - we'll get them to do that next time. But look at the Rover tracks; I'm going to take some pictures (6)(PHO 86 11652-55)
of the Rover tracks here. And our boot prints, both. Look at the difference. That old Rover is light.

- - -

06 00 39 50 CC A little something for the soil mechanics, sounds great. And we'd like for you to put several scoops (6)(SAMP 15270-74, 81-84)(PHO 86 11656-57)
of the soil in bag number 6 on the handtool carrier when you get back to the Rover.

06 00 40 02 CDR Okay. Go ahead, Jim. Yes, that's a great picture but don't fall down. (6)

06 00 40 10 LMP That'd be even a better picture. Do you know the surface here is harder than it was over at the - - (6)
near the crater. At least you'll get a comparison. Boy, those chevrons do a good job of compacting the soil.

06 00 40 46 CDR Man, you know I'd sure hate to have to climb up here. (6)

- - -

06 00 41 21 LMP Okay. Joe wants scoops of soil in - bag 6, huh? (6)(SAMP 15270-74, 81-84)
That the one on the back of the pallet? Must be.

06 00 41 29 CDR Why don't we put them in a sample bag, Joe? (6)(SAMP 15270-74, 81-84)
- - -

06 00 41 40 CC Suit yourself, Dave, that sounds good. (6)(SAMP 15270-74, 81-84)

06 00 41 41 LMP *** the sample, I guess, the typical soil by the (6)(SAMP 15270-74, 81-84)
Rover.
- - -

06 00 42 08 CDR Why don't you - yes, get the down-sun and we'll just (6)(SAMP 15270-74, 81-84)
scoop - right here.

06 00 42 15 CC And, Dave and Jim, we're after a large volume here, (6)(SAMP 15270-74, 81-84)
so shovel it in.

06 00 42 22 CDR All right. Bag number 167. Beginning to shovel (6)(SAMP 15270-74, 81-84)
large volume.

06 00 42 37 CDR Maybe if you go uphill, Jim - you stand uphill. (6)(SAMP 15270-74, 81-84)
- - -

06 00 42 53 LMP Trouble, a large volume means shovel it, but you (6)(SAMP 15270-74, 81-84)
can't very well transfer it.

06 00 43 02 CDR Whoop! Easy, easy. Okay. Good. Good load - get (6)(SAMP 15270-74, 81-84)
another one.

06 00 43 24 LMP About all we can put in there. (6)(SAMP 15270-74, 81-84)

06 00 43 25 CDR Yes, that's a large volume. (6)(SAMP 15270-74, 81-84)

06 00 42 34 LMP Hey, you're a champion bag shaker, Dave. (6)(SAMP 15270-74, 81-84)

06 00 43 41 CC Yes, sir; yes, sir; three bags full. (6)(SAMP 15270-74, 81-84)

06 00 43 46 CDR You know what I like about doing the bags up here, (6)(SAMP 15270-74, 81-84)
Jim; there's no air in them when you fold them up.
Okay; and 167 goes in your bag.

06 00 44 03 CDR After picture. (6)(SAMP 15270-74, 81-84)(PHO 86 11657)

06 00 44 04 CC Regarding the 500-millimeter camera, we want you to take those pictures from here, and Jim can be changing out his magazine while you take the big camera pictures. (6)(PHO 84 11292-349)

06 00 44 20 CDR I guess you're thinking of - the lighting might change over there and we wouldn't get them because of the - getting closer to - looking up-sun, huh? (6)(PHO 84 11292-349)

06 00 44 28 CC Quite possible, and we might want some more photos from there as well. We have the film. (6)(PHO 84 11292-349)

- - -

06 00 45 30 CC Okay. And Dave, can you press on with those big camera pictures? (6)(PHO 84 11292-349)

06 00 45 37 CDR Sure can. Couldn't get them until I got the other film out though. (6)(PHO 84 11292-349)

- - -

06 00 46 26 COR We'll try about - 250 and 8 huh? That sound all right to you? (6)(PHO 84 11292-349)

06 00 46 33 CC Roger, sounds good. (6)(PHO 84 11292-349)

06 00 46 38 CDR Yes, the camera seems to be working all right. All right, I'll get you - oh, there's some outcrops up at the top. (6)(PHO 84 11292-349)

06 00 47 17 LMP Okay; mag Papa's on my camera, Joe. (6)

- - -

06 00 47 48 LMP Dave, that mag's on - behind the hand controller. (6)

- - -

06 00 50 48 COR Okay, Joe, I got the 500 pictures and - I took first - Mount Hadley; two horizontal strips up at the top where there are some outcrops, and probably the only two craters that I can see on the side of any sizable size. And then a vertical strip through one of the outcrops, and a vertical strip through another outcrop, and then two craters that are in - guess what we'd call - the forward leading edge of (6)(PHO 84 11292-349)

Swann mountain over there, which are quite prominent craters. And then I swung over to a bright fresh one that we see - oh, to the northwest, way out. And then I turned back around to Hadley Delta and shot upslope at Hadley Delta, and picked up the debris that seems to be exposed up on the top of Hadley Delta. And now the frames say 120.

06 00 51 53 LMP Dave, as long as you got it out, don't you think you (6)(PHO 84 11292-349)
ought to take a picture of those large ones? Up to
the east? In that suggestion of layering just to
the right of the large one?

06 00 52 03 CDR Yes, I guess so. Let's do that. Except that it's (6)(PHO 84 11292-349)
so much up-sun, Jim, I'm not sure we're going to get
anything in them.

- - -

06 00 52 20 CC On - I forgot - the 16-millimeter, we want you to (6)
change out that mag, run the camera at 1 foot per
second for 10 seconds and then go back to normal.

06 00 52 50 CDR I took about 4 more pictures on the 500, Joe, (6)(PHO 84 11347-49)
looking out at Silver Spur and the blocks that are
exposed up there.

06 00 53 01 CC Okay, Dave. Out of curiosity, did you photograph (6)(PHO 84 11324-25)
the LM with the big camera?

06 00 53 09 CDR Oh, how did you guess, Joe? (6)(PHO 84 11324-25)

06 00 53 20 CDR You're ahead of me all the time. Hey, the film's (6)(PHO DAC)
jammed in that camera, too. That's a problem.

06 00 53 28 CC Roger. Copy, the film was jammed in the DAC. And (6)(PHO DAC)
change out that magazine, please. Install a new
one, and start it running at 1 frame per second for
10 seconds.

- - -

06 00 54 14 LMP Okay; 1 frame per second, Joe. Here we go - 10 (6)(PHO DAC)
seconds.

- - -

06 00 55 05 CC Jim, while you're there, can you look over and get a (6)
frame count off of Dave's camera, please?

- - -

06 00 55 46 LMP Okay; it's 130. On Dave. (6)

- - -

06 00 56 04 LMP Going back to 12 frames per second. You want me to (6)(PHO DAC)
run it at that speed? You want me to turn it on at
that speed now, Joe, and see if it'll work?

- - -

06 00 56 36 LMP I think it might be - this one might be working, Joe (6)(PHO DAC)
- - because we're at the full mark on the mag.

06 00 56 49 CC Roger, Dave. And Jim, turn off the DAC until we (6)(PHO DAC)
start driving and then we'll get some - moving.

06 00 56 59 LMP Okay; it's off. (6)(PHO DAC)

06 00 57 05 CC Okay, troops, we're looking beautiful. We'll ask (6)
you to move back towards the west - towards the
large block you saw there, which we think is near
Spur crater, and drive towards the fresh crater that
you've described to us.

- - -

06 00 58 29 CDR Okay, Houston. We're moving out. (6-6A)

06 00 58 32 CC Roger. Got your mark. Dave, we're thinking - we (6-6A)
want to drive over towards that large block, and if
you think it's reasonable, we'll ask for about a
15-minute stop there. And afterwards, we'll move on
towards the fresh crater. What do you think?

06 00 58 49 CDR Oh, I think that's a good idea. I don't think we're (6-6A)
going to get any more variety of anything by going
farther to the east - on the Front, Joe. I think
we've seen the variety that we're going to see -
except for working our way back.

- - -

06 00 59 19 CDR Okay. Now here's a little fresh crater, Jim - with (6-6A)
white albedo, but I think that's probably a
secondary. I don't think that's excavated or
anything, do you?

06 00 59 27 LMP No. (6-6A)

06 00 59 29 CDR Let's head for that block. (6-6A)

06 00 59 30 LMP Yes. I lost that block. I hope you - it's just (6-6A)
over the ridge, I guess.

06 00 59 36 CDR Yes. Yes, we'll take it sort of slow here going (6-6A)
down-sun.

06 00 59 40 LMP Yes, we're heading 278. (6-6A)

06 00 59 44 CC Roger, Jim. And you might want to start the DAC. (6-6A)(PHO DAC)

06 00 59 46 LMP Bearing 345; range - yes, I'm glad you reminded me. (6-6A)(PHO DAC)

06 01 00 03 LMP Remind me to stop it when we get there. Boy, you (6-6A)(PHO DAC)
know, looking upslope, look how much more hummocky
it is. It's just a - different terrain.

06 01 00 13 CDR It sure is. It sure is. Pretty hummocky and (6-6A)
driving is much sportier.

- - -

06 01 01 11 CDR Okay; Rover's stopped. (6A)

06 01 01 13 LMP Okay; it looks like - from this position - I'd say (6A)
that's probably Spur down there, the large one,
Dave.

06 01 01 18 CDR Oh, yes. Definitely. (6A)

06 01 01 19 LMP Where you got blocks in - - the north rim. (6A)

06 01 01 24 CC Beautiful, Jim. Try to get a lock on that beauty - -(6A)

06 01 01 25 LMP There's a real fresh one just down-sun from here. (6A)

06 01 01 26 CC - - and maybe some other landmarks around it so we (6A)
can drive down to it.

- - -

06 01 01 36 CDR - - we'll get to Spur for you, no problem. (6A)

- - -

06 01 01 51 LMP Okay, the readings, Joe. 287, 347, 069, 050, 097 - (6A)
- 100, 80, 90, and motor temps are lower limit.

- - -

06 01 02 42 LMP Man, is this a steep slope. (6A)

- - -

06 01 03 25 CDR Yes, that's right, Joe. And the slope is real (6A)
steep. And - like I'd mentioned before, the
sighting device doesn't transmit enough light to
really make it very easy to find the Earth. It
could take me a couple of minutes there to be - just
to find you, and I think you've seen the same thing.
But if you would like, I'll give it a try.

06 01 03 45 CC Negative, Dave. We agree with you exactly. We're (6A)
in good shape. Just proceed carefully on - - the
soft powder.

06 01 03 56 CDR Yes, we're going to do that because it really is. (6A)
But you can't say that we didn't sample the Apennine
Front.

06 01 04 07 CC Jim, did you turn the DAC off yet? (6A)(PHO DAC)

06 01 04 12 LMP Yes, I did, Joe. (6A)(PHO DAC)

06 01 04 15 LMP It's off, and I'm reading a half a mag. (6A)(PHO DAC)

06 01 04 19 CDR Okay; let's attack that boulder. You got your (6A)
hammer?

06 01 04 29 CC Hey, troops, I'm not sure you should go downslope (6A)
very far, if at all, from the Rover.

06 01 04 40 LMP I think we can sidestep back up. (6A)

- - -

06 01 04 50 CDR Okay; I'm halfway, and I'll go back first. Why (6A)
don't you stay there, Jim?

06 01 04 53 LMP Okay. Come back up. (6A)

- - -

06 01 05 06 LMP I know it. Should have parked right beside it. (6A)

06 01 05 15 LMP If you will, - - I'll walk down, Dave. Want me to (6A)
carry some of those tools?

- - -

06 01 05 26 CDR The footing is all right, except that you have to (6A)
work pretty hard - to get back up, so - think what
I'm going to do - - as Jim walks down - wait a
minute until I get there, Jim.

06 01 05 47 CDR Hold on, Jim. Wait a minute, Jim. Don't go yet. (6A)
Let me drive the Rover down there.

- - -

06 01 06 02 CDR Oh, Joe. I can see where the Earth is in general. (6A)
We're going to make a change here. I'm going to
drive down. If I get successfully down there, then
Jim can walk down. So we don't have to expend all
the energy.

06 01 06 18 LMP And there's a beautiful little rock track here in - (6A)
it went in a circular arc.

06 01 06 23 LMP Yes. It rolled into the hill. It's amazing. (6A)

06 01 06 27 CDR Well, photograph it. (6A)(PHO?)

06 01 06 29 LMP Yes, I am. Instead of going straight down the hill, (6A)(PHO?)
it curved into the hill.

06 01 06 37 LMP Yes. A little angular fragment, Joe, about 2 inches (6A)
long.

06 01 06 48 LMP Came down slope - - curved into the hill and (6A)
stopped.

- - -

06 01 07 16 LMP Meantime, I'll be taking a pan from here, Dave. (6A)(PHO 90 12179-98)
 - - -

06 01 07 23 LMP Looks like it's going to be our high point. (6A)
 06 01 07 26 CDR It's the high point. (6A)
 - - -

06 01 10 20 LMP That pan's complete, Joe. (6A)(PHO 90 12179-98)
 06 01 10 26 CC Roger, Jim. Copy that. And, understand you're proceeding down towards that large block now. (6A)
 06 01 10 40 CDR Very gently. And I'll even put the old girl downhill here, Jim. (6A)
 - - -

06 01 11 19 CDR Okay. Stand by. Too far from the rocks. (6A)
 06 01 11 32 CDR Okay, Jim, you can come on down now. (6A)
 06 01 11 33 LMP Yes. I estimated a what - 20-degree slope? (6A)
 06 01 11 44 LMP Fifteen or 20? (6A)
 06 01 11 45 CDR Closer to 15, probably. (6A)
 - - -

06 01 12 08 CDR Tell you what, Jim. We'd better abandon this one. (6A)
 - - -

06 01 12 18 LMP Okay. Well, let me take a picture here anyway. (6A)
 - - -

06 01 12 42 LMP Are you really - let me hold that Rover and you come up and look at this, because this rock has got green in it, a light-green - - color. Come on. (6A)(SAMP 15400-05)(PHO 86 11658-61; 90 12199-200)
 - - -

06 01 12 58 LMP The first green rock I've seen - light-green. (6A)(SAMP 15400-05)

- - -

06 01 13 34 CC Dave and Jim, use your best judgment here, the (6A)
block's not all that important, and we'd like you to
spend most of the remaining time at Spur crater.
The remaining Front time, that is.

- - -

06 01 13 58 CDR No, we're okay. It's just that this slope's pretty (6A)
steep, and I just cannot take too much time - here.

06 01 14 09 CDR It's a big breccia - that's all it is. (6A)(SAMP 15400-05)

06 01 14 22 LMP About halfway up, maybe you have to look down-sun to (6A)(SAMP 15400-05)
see it. It looks like a light-green layer, not
necessarily a thick layer. Light green.

06 01 14 34 CDR You mean on the surface? (6A)(SAMP 15400-05)

06 01 14 36 LMP Yes, on the surface. (6A)(SAMP 15400-05)

06 01 14 38 CDR Hey, you're right. (6A)(SAMP 15400-05)

06 01 14 43 CC Can you photograph it, Jim? (6A)(SAMP 15400-05)

06 01 14 48 LMP I took a couple. Easy, Dave. (6A)(SAMP 15400-05)(PHO 90 12199-200)

06 01 15 03 CDR Did you take it down-sun? (6A)(SAMP 15400-05)(PHO 90 12199-200)

06 01 15 04 LMP Yes, I took two down-sun, at 7 feet. (6A)(SAMP 15400-05)(PHO 90 12199-200)

06 01 15 16 CDR Okay. Take a couple of cross-sun's here. (6A)(SAMP 15400-05)(PHO 90 11658-59)

06 01 15 24 LMP Be great if we'd get some of that - - green (6A)(SAMP 15400-05)
material.

06 01 15 30 CDR I'll get it. I think I can get it with my tongs all (6A)(SAMP 15400-05)
right.

- - -

06 01 15 59 CDR It seems to be a - surface material or else it's a (6A)(SAMP 15400-05)
very frangible clast in this big piece of breccia.
Dig my tongs into it.

06 01 16 16 LMP Sure it's green and not just white albedo again? (6A)(SAMP 15400-05)

06 01 16 20 CDR No, it's green. (6A)(SAMP 15400-05)

06 01 16 22 LMP It looks green. And - - I noticed just downslope (6A)(SAMP 15400-05)
from the rock, you kicked up the surface and there's
some more green there.

06 01 16 40 CDR Getting a little. (6A)(SAMP 15400-05)

06 01 16 50 LMP This rock is - about 3 meters long. (6A)(SAMP 15400-05)

06 01 16 59 LMP Subangular - very rough-textured surface. And the (6A)(SAMP 15400-05)
surface that's facing northwest - is the dark,
typical breccia. And it looks like - what appeared
to me - like there's a layer - there that might be a
foot and a half, 2 feet thick, appears the - a light
-greenish color. Dave's sampling right now.

06 01 17 36 LMP And on the side to the southeast is again the (6A)(SAMP 15400-05)
breccia. Isn't that right, Dave?

06 01 17 43 CDR Yes. And I got a little frag. Don't drop it. (6A)(SAMP 15400-05)
There. And I got some green, and I got a frag out
of the breccia.

06 01 18 03 CDR It's fairly loose - breccia, as breccias go. Oh, (6A)(SAMP 15400-05)
and there's a great big white clast on the inside,
but - man, like an inch or so.
- - -

06 01 18 55 CDR 168, Joe. Got a little bit of the green, and I got (6A)(SAMP 15400-05)
a chunk about 3 inches of the rock itself.

06 01 19 10 CDR And I think we'll call it quits on that one. (6A)

06 01 19 12 CC Sounds good, Dave. We're interested in moving (6A)
towards Spur - -
- - -

06 01 19 25 LMP Yes. It's going to take us a while to work (6A)
downslope.
- - -

06 01 20 01 LMP Hand it to me, I'll put it under my seat. (6A)

06 01 20 03 CDR I can put it under mine. It won't go anywhere. (6A)
 Trouble is, if I get on first, I'm not sure you're
 going to have a seatbelt.
 - - -

06 01 20 52 CDR Tell you what might be better, Jim. Let me ease on (6A)
 down the hill here to a flatter spot for you to get
 on. Okay?

06 01 21 03 CDR You see right at 1 o'clock there, it levels out in (6A)
 that little depression.
 - - -

06 01 21 29 LMP Yes. In fact, I'd just as soon meet you down where (6A)
 it's level.

06 01 21 35 LMP If you want, I'll meet you at Spur. (6A)

06 01 21 36 CDR Oh, no. Just going to go right down here. Easier (6A)
 for you to get on.
 - - -

06 01 22 40 CDR Okay. Okay, Joe. We're moving now. (6A-7)
 - - -

06 01 22 59 CDR Not now, Joe, let us ease our way down. (6A-7)
 - - -

06 01 23 19 CDR I'll take a little right turn here. Okay. Came up (6A-7)
 all right; should be able to go down all right.
 - - -

06 01 24 02 CDR We're almost to Spur now. (6A-7)

06 01 24 09 CDR Parking instructions. Okay. Let's see, do we want (6A-7)
 to hit the upper rim or the lower rim of Spur?

06 01 24 18 LMP You see that large block on - - the northern rim. (6A-7)

06 01 24 22 CDR Yes, I think we should work down to the northern (6A-7)
 rim, right?

06 01 24 25 LMP Yes, if we're going to - - sample any blocks there (6A-7)
on the rim, that'd be the place to do it.

06 01 24 31 CC Sounds good to us. And, Dave, we'd like for you - - (6A-7)
to park east of the area you're going to be working
in, - - so we can look down-sun. And park facing
west, and we'll give you a NAV update later.

06 01 24 47 CDR Okay. We're in good shape, Joe. That one wall (6A-7)
there has quite a bit of debris, doesn't it?

06 01 24 59 LMP Yes, and it looks like it's - again has a linear (6A-7)
pattern running north and south.

06 01 25 07 CDR Almost does. (6A-7)

06 01 25 14 LMP We're talking about the debris that's exposed on the (6A-7)
north wall - of Spur. And the slope here at Spur is
- oh, 8 to 10 degrees.

06 01 25 46 CDR Okay; I'm parking east on a level slope here. (6A-7)

06 01 26 11 CDR Right down by all the *** crater. Be a nice place (6A-7)
to park.

- - -

06 01 26 25 CDR Yes. Yes, I think we're just about level, right (6A-7)
there.

- - -

06 01 26 42 CDR We're at Spur crater, Joe. (7)

06 01 26 46 LMP I'll give them the shadow device, too. Okay; the (7)
heading is 290, 349, 7.3, 4.7, 095, 100, 82, 90;
motor temps are both lower limit.

06 01 27 15 LMP And, the shadow is - it's 4 degrees left. (7)

- - -

06 01 28 12 LMP I'm off and I'm going to take a pan. (7)(PHO 90 12201-22)

06 01 30 11 LMP We picked up some more green material here, Dave. (7)

- - -

06 01 30 13 CDR Sure it isn't that light gray albedo stuff? (7)

06 01 30 15 LMP No, it looks green. (7)

- - -

06 01 30 23 LMP No, I see white; I see a light green; and I see a brown. (7)

- - -

06 01 31 59 LMP Roger. You don't think there's green here, huh? (7)

06 01 32 05 CDR No, Jim. I don't know. I think it's a gray. (7)
Difference in the gray in the albedo. At least,
that would be my guess.

06 01 32 25 LMP On, it might be the EV visor that makes it look (7)
green. But, it's worth sampling. Notice that large
rock on the northwest side, just on the inner edge
there.

06 01 32 56 LMP Clearly a breccia. Look at the clasts; you can see (7)
the clasts from here.

06 01 33 01 LMP And, it looks like it's a different color rock. (7)
Well, it's a dark -

06 01 33 12 CDR Okay, let's go sample the rim over here. (7)

06 01 33 16 CDR Down-sun - to your handy-dandy camera movement. (7)

06 01 33 26 LMP Houston, you should be pointing right at the LM. (7)

06 01 33 38 CDR Okay, Jim. There's a good pile of rocks right here. (7)(SAMP 15410-19)(PHO 86 11662-65; 90 12223-24)

06 01 33 42 LMP Hey, look at that light colored rock with - - it (7)(SAMP 15410-19)
almost looks like a white vein on top of the other
rock.

- - -

06 01 33 53 CDR Yes. It's a breccia. It's a dark-gray rock that (7)(SAMP 15410-19)
looks like a - actually it looks like a big pinnacle
with a small gray and white breccia on top of it.
The pinnacle is about 6 inches across and 4 or 5
inches high. On top of it is about a 2- to 3-inch

subangular frag with a light-gray - or medium-gray matrix, and about 20 percent white clasts in it. Really unique. It stands out - it's amazing. Okay, Jimmy. Let's gather some data.

06 01 34 30 LMP You've got a sample there, right? (7)(SAMP 15410-19)

06 01 34 31 CDR Yes. (7)(SAMP 15410-19)

- - -

06 01 35 00 LMP Okay. Oh, there are sparklies and all kinds of breccia *** the soil (7)

06 01 35 12 CDR It's sort of caked on the top. Yes. Another black matrix fine-grained with white clasts - millimeter size - and there are some very fine-grained little sparkles in there though. (7)(SAMP 15410-19)

06 01 35 35 LMP Okay. I even see some vesicles in it. (7)(SAMP 15410-19)

- - -

06 01 35 43 CDR 194. (7)(SAMP 15410-19)

06 01 35 49 LMP Yes. Let me get the other one that is sitting right next to it. Look how the upper layer of the soil here is caked. (7)(SAMP 15410-19)

06 01 36 01 CDR No, better yet, why don't you gather some soil? We gave it - - (7)(SAMP 15410-19)

- - -

06 01 36 10 CDR We'll get it to you. Yes. Let's get soil in this bag. (7)(SAMP 15410-19)

06 01 36 18 CDR Right there by the rock. (7)(SAMP 15410-19)

06 01 36 21 CDR Leave the rock whole. (7)(SAMP 15410-19)

06 01 36 23 CDR Is that a glass one, sitting right below it? (7)(SAMP 15410-19)

06 01 36 27 LMP It sure looks like it. It was under it, wasn't it? (7)(SAMP 15410-19)

06 01 36 30 CDR Yes. Yes. Let me take a picture. Just a minute, (7)(SAMP 15410-19)(PHO 86 11662-63)
 let me take a picture, and why don't you pick up
 that little piece of glass and put it in the bag,
 too.
 - - -

06 01 36 52 CDR Okay, I got the picture. (7)(SAMP 15410-19)(PHO 86 11662-63)

06 01 36 54 CDR Pick up that little rock. (7)(SAMP 15410-19)

06 01 36 59 CDR That a boy. Okay, let me get a picture. I think (7)(SAMP 15421-27)(PHO 86 11664-69; 90 12225-26)
 the next order of business is that neat one there.

06 01 37 10 LMP Okay, well, there, too - just to the west of you, (7)(SAMP 15421-27)
 Dave, is some of that - what we've been calling
 green material - clearly visible? See what I mean?
 - - -

06 01 37 31 LMP Okay. I'd call it light gray but, we'll check it (7)(SAMP 15421-27)
 when we get home.

06 01 37 38 CDR Well, it's definitely different from the next rock, (7)(SAMP 15421-27)
 or the one we just picked up.
 - - -

06 01 37 46 CDR Okay. Sure is. That's awful big, but I think we (7)(SAMP 15421-27)
 ought to sample here anyway, all those little frags.

06 01 38 06 CDR I've got to admit it really looks green to me, too, (7)(SAMP 15421-27)
 Jim, but I can't believe it's green.
 - - -

06 01 38 51 CDR Man, that looks almost - now it's gray. The visor (7)(SAMP 15421-27)
 makes it green, Jim.

06 01 39 03 LMP It's green. (7)(SAMP 15421-27)

06 01 39 04 CDR A different shade of gray. (7)(SAMP 15421-27)

06 01 39 10 CDR But it's a very light-green, very fine-grain, sure (7)(SAMP 15421-27)
looks like a basalt with some very - less than
millimeter-size vesicles in it, maybe 5 percent or
so. It's a subangular rock. It's friable maybe
it's not a basalt. I can scrape it off with my
glove and I put some streaks in it, in case anybody
wonders what that is when we get back. But, it's
definitely different from anything we've seen
before. 195 - let me get another one here.

06 01 39 53 CDR With the visor on, Joe, I was about ready to call it (7)(SAMP 15421-27)
a dunite, but I opened up my visor, and I was wrong.
I didn't get to call it what I wanted to. Here's
another one of the same stuff, Jim.

06 01 40 15 LMP Okay, why don't you get a sample - let me take a (7)(SAMP 15421-27)(PHO 90 12225)
picture, and you get a sample of the soil, okay.
Why don't you just scoop in between them.

06 01 40 30 CDR Yes. I think this is a big frag here, but, it - - (7)(SAMP 15421-27)
broke when it hit. All these pieces are roughly the
same.

06 01 40 37 LMP Yes. Not much soil here, really. (7)(SAMP 15421-27)

06 01 40 40 CC Dave and Jim, is it your impression that you are (7)(SAMP 15421-27)
sampling on the ejecta blanket of Spur crater, now?

06 01 40 48 CDR Yes, sir; probably from the deepest part, because (7)(SAMP 15421-27)
we're right on the rim.

06 01 40 59 LMP Okay, 195. (7)(SAMP 15421-27)

06 01 41 15 CDR Okay. Now let's go down and get that unusual one. (7)(SAMP 15415)(PHO 86 11670-72; 90 12227-28)
There's a dense - and there's another unusual one;
look at the little craters here, and the one that's
facing us. There is a little white corner to the
thing.

06 01 41 34 CC Okay, Dave. Get as many of those as you can, and (7)(SAMP 15415)
you might be watching for a place where you think
the rake might help you.

- - -

06 01 41 48 CDR Okay, there's a big boulder over there down-sun of us, that I'm sure you can see - Joe, which is gray. And it has some very outstanding gray clasts and white clasts, and oh, boy - it's a beaut! We're going to get ahold of that one in a minute. (7)

06 01 42 07 LMP Okay, I have my pictures, Dave. (7)(SAMP 15415)(PHO 90 12227-28)

06 01 42 10 CDR Okay, let's see. What do you think the best way to sample it would be? (7)(SAMP 15415)

06 01 42 14 LMP I think probably - could we break off a piece of the clod underneath it? Or I guess you could probably lift that top fragment right off. (7)(SAMP 15415)

06 01 42 23 CDR Yes. Let me try. Yes. Sure can. And it's a white clast, and it's about - oh, boy! (7)(SAMP 15415)

- - -

06 01 42 44 LMP Look at the - glint. (7)(SAMP 15415)

06 01 42 46 LMP Almost see twinning in there. (7)(SAMP 15415)

06 01 42 47 CDR Guess what we found? Guess what we just found? (7)(SAMP 15415)

06 01 42 52 LMP I think we found what we came for. (7)(SAMP 15415)

06 01 42 53 CDR Crystal rock, huh? Yes, sir. You better believe it. (7)(SAMP 15415)

06 01 42 58 CDR Look at the plag in there. (7)(SAMP 15415)

06 01 43 00 CDR Almost all plag. *** as a matter of fact - oh, boy, I think we might - ourselves something close to anorthosite, because its crystalline and there's just a bunch - it's just almost all plag. What a beaut. (7)(SAMP 15415)

06 01 43 18 LMP That is really a beauty. And, there's another one down there. (7)(SAMP 15415)

06 01 43 22 CDR Yes. We'll get some of these. (7)(SAMP 15415)

06 01 43 27 CDR Ah, ah. Beautiful. Hey, let me get some of that clod there. No, let's don't mix them - let's make this a special - one. I'll zip it up. (7)(SAMP 15415)

06 01 43 37 CDR Make this bag 196, a special bag. (7)(SAMP 15415)

06 01 43 41 CDR Our first one. Don't lose your bag now, Jim. Oh, (7)(SAMP 15415)
boy. Okay, let's get some of the other - maybe - (SAMP 15431-35)(PHO 86 11670-74; 90 12227-28)
let me take a picture first in here. I got it. No
sweat. Now, we got to think of how to get that
other piece there. Maybe if you could put your
scoop in it, and break off a chip - do you think?

06 01 44 10 LMP I think I can just - I think it's just a clod. (7)(SAMP 15431-35)
Don't you?

06 01 44 12 CDR I don't know. Try it. Put your scoop there in the (7)(SAMP 15431-35)
middle and break off a chip.

06 01 44 21 LMP It's not a clod, is it? (7)(SAMP 15431-35)

06 01 44 23 CDR Yes. It is a clod. (7)(SAMP 15431-35)

06 01 44 27 LMP Want to take this piece here? (7)(SAMP 15431-35)

06 01 44 28 CDR Yes. Let me get you a bag. Wait. Let me take a (7)(SAMP 15431-35)
picture first, so you know which one we got. Okay.
Go ahead. Number 170.

- - -

06 01 44 47 CDR Boy, that's a beautiful rock - - (7)(SAMP 15431-35)

06 01 44 48 CC - - are you working on the outside of the crater or (7)(SAMP 15431-35)
are you - - over the lip right now?

06 01 44 55 CDR Oh, just a tad over the lip on a little bench, but (7)(SAMP 15431-35)
it's -

06 01 45 00 LMP I don't know whether it'll fit in the bag or not. (7)(SAMP 15431-35)
Got it?

06 01 45 03 CDR No. It dropped. See if you can pick it up again. (7)(SAMP 15431-35)
I think it'll fit in the bag, Joe - Jim.

06 01 45 09 LMP A little frangible. (7)(SAMP 15431-35)

06 01 45 10 CDR Yes. It really is. I think I can get it with the (7)(SAMP 15431-35)
tongs. Here.

06 01 45 22 CDR There's a contact sort of - on there. We ought to try and get the contact if we can. Okay, babe. Open the bag. (7)(SAMP 15431-35)

06 01 45 46 CDR That a boy. Good show. Post-pick-up picture. Okay; roll that beauty up. Let's go get some more of that. (7)(SAMP 15431-35)(PHO 86 11674)

06 01 45 58 LMP I think we ought to get over to that big rock. (7)

06 01 46 00 LMP Before we run out of time. (7)

06 01 46 03 LMP Because I think that big rock is probably more important. (7)

06 01 46 04 CDR It's a big breccia, though. *** (7)

06 01 46 05 CC Dave, we think you might be about to run out of film. (7)(SAMP 15431-35)

06 01 46 07 CDR - - this in the bag, that's right. (7)(SAMP 15431-35)

06 01 46 14 CDR All right, Joe. Jim, this one we got to pick up, and then we'll go to the big rock. And if you could - put that in my bag - and then check my film. Joe, this crater is a gold mine. (7)

06 01 46 45 CC Jim - - get a reading on Dave's camera for us, please. (7)

06 01 46 51 LMP Oh, he's got a lot left. He's only reading 145. (7)

06 01 47 29 CC Dave and Jim - - did you fill a bag after 170? If so, we missed the number and we can probably sort it out later. (7)

06 01 47 47 CDR This one. No, we - I think that was the last one, Joe. We'll rely on you to sort it out later. (7)

06 01 47 54 CDR Okay, I have - oh - look at this, Jim. (7)(SAMP 15455)(PHO 86 11675-77; 90 12229)

06 01 47 58 LMP Ha, what a contact! (7)(SAMP 15455)

06 01 48 01 CDR I've got - man, oh man. I got about a 4 incher, Joe. It's subrounded, and on one half of it, we have a very dark-black, fine-grained basalt with some - it looks like some very thin laths in it of (7)(SAMP 15455)

plag - nothing else. And, in one region, there is some millimeter-type vesicles along a linear pattern very close to the contact. And, the other side of the contact, we have a pure, solid-white, fine-grained frag, which looks not unlike the white clasts in the 14 rock. But it's a beautiful contact in here. And, we'll call this one bag number - - 198.

- - -

06 01 49 07 CDR Hey, isn't that super? Get the picture. (7)(PHO 90 12229)

06 01 49 15 LMP Yes, I got the picture. (7)(PHO 90 12229)

06 01 49 16 CDR Don't fall down. Okay. We'll ease over to that big rock. Looking on the way for anything else unusual. (7)

06 01 49 39 CDR It's another clod that evidently hit. Let's sample it just to get the - distribution around the circumference of the rim here. Okay. You want to put that bag in my pocket? (7)(SAMP 15465-69)(PHO 86 11678-81; 90 12230)

- - -

06 01 50 25 CDR Okay, got enough fingers left to get me another one? (7)(SAMP 15465-69)

- - -

06 01 50 40 CDR Don't think we can get a scoop on this one. I think it's going to - oh, look at this one. (7)(SAMP 15465-69)

06 01 50 50 CDR Don't move out of that - your shadow. No. I got a big - is that glass, or is that basalt? Look at that frag there. Let me take a picture from where - it came from under that rock. (7)(SAMP 15465-69) (PHO 86 11681)

06 01 51 08 CDR Yes. It looks like a big piece of glass. It's got some bubbles in it. Oh, look at that. Isn't that pretty? (7)(SAMP 15465-69)

- - -

06 01 51 15 LMP That's a glass-coated breccia. (7)(SAMP 15465-69)

- - -

06 01 51 21 CDR It's shiny. 199 (7)(SAMP 15465-69)

06 01 51 28 CDR Let me get some more of this, Jim. (7)(SAMP 15465-69)

06 01 51 34 CDR There's another piece of the frag that it went with. (7)(SAMP 15465-69)

- - -

06 01 51 58 CC Dave and Jim - - we're very pleased with your (7)
documented samples here. We think you ought to give
some thought pretty shortly now, to getting us - a
rake sample, if you can find a good area. And then
we're going to go for some bulk collection - just a
lot of soil filling sample or collection bag 6.

06 01 52 20 LMP It seems a shame. We got to go over and sample that (7)
big one there.

06 01 52 22 CDR Yes. We'll do that. Throw it in. (7)

- - -

06 01 53 24 CC Okay, Dave, while you're working there we're (7)(SAMP 15445)(PHO 86 11682-94)
thinking that we'd prefer just a very quick sampling
of the large rock, if at all. And perhaps just a
quick photographic documentation of that large rock
and then some rake sample.

- - -

06 01 54 02 CC Dave and Jim, the science input now is that we want (7)(SAMP 15310-92)(PHO 90 12231-34)
to forget that large block entirely. We want a - as
large a collection of smaller frags as you can get
us, and you'll probably be working near the Rover
for those.

- - -

06 01 55 02 CDR I'll get the gnomon. And while you're putting the (7)(SAMP 15445)(PHO 86 11682-94)
rake on I'll photograph this thing, anyway.

06 01 55 09 CDR I think it looks very much like the 14 rocks. (7)(SAMP 15445)

06 01 55 13 CDR Though, it looks maybe a little darker-gray. (7)(SAMP 15445)

- - -

06 01 56 40 CDR There's a convenient piece broken off, right here. (7)(SAMP 15445)
 - - -

06 01 57 19 LMP Yes, and while I'm raking, there's a rock over there (7)(SAMP 15459)
 that has some - a linear pattern in it, that you
 might want to look at while I'm raking.

06 01 57 26 CDR Okay, let me get the pictures of the place. (7)(PHO 86 11682-94)

06 01 57 30 CC And, Jim, how's your raking going? Are you pulling (7)
 off any small frags?
 - - -

06 01 57 39 CDR Got to document the area first here, Joe. (7)
 - - -

06 01 57 50 LMP Yes, that's what I was thinking. That's good. You (7)(SAMP 15459)
 see that rock over at your - just a little south of
 you?

06 01 58 03 CDR Oh, I just ran out of film. (7)

06 01 58 06 CDR Oh, my! Well, we can get that later. Let me (7)
 change film mags while you rake, Jim.

06 01 58 13 CDR And, you'd better take the - - (7)(PHO 90 12231-34)

06 01 58 14 LMP Let me - I'm surprised you're running out - already, (7)(PHO 90 12231-34)
 though you must have taken a lot of pictures over
 there.
 - - -

06 01 58 45 CDR All right, Joe. And, mark bag 171 for a frag off of (7)(SAMP 15445)
 that big boulder. I'm pretty sure it was exposed
 right on the surface, fairly clean - right next to
 the boulder and looked like the same material.
 - - -

06 01 59 17 CDR And I think I'll brush off the camera for you, and I (7)
 can brush off my camera before I change the film.
 - - -

06 01 59 20 LMP And, Joe, this looks like a pretty good place to rake. I've raked one swath here about 2 feet long and I've collected - oh, about 15 rocks. (7)(SAMP 15310-92)(PHO 90 12231-34)

06 01 59 42 CDR Put them in a big pile; I'll be right, over. (7)(SAMP 15310-92)

06 01 59 54 LMP Oh, I don't know whether I want to do that, Dave. (7)(SAMP 15310-92)

- - -

06 01 59 59 LMP Though I think we can fill up the bag pretty fast, here. (7)(SAMP 15310-92)

06 02 00 02 CDR Okay, then, you take the pictures and I'll just change my film later. (7)

06 02 00 11 CDR Save the film changing here. Let me get you a bag. (7)(SAMP 15310-92)

06 02 00 20 CDR Oh, yes. You did get a bunch. 172. (7)(SAMP 15310-92)

06 02 00 36 LMP Okay. Got a little more swath. (7)(SAMP 15310-92)

06 02 00 38 CDR Yes. It's about 1 meter long and one rake-width wide. (7)(SAMP 15310-92)

- - -

06 02 01 07 CDR Glass on some. Most of them are rounded; right size. (7)(SAMP 15310-92)

06 02 01 21 CDR Okay, do another one. (7)(SAMP 15310-92)

- - -

06 02 01 43 CDR Yes. Sure miss that yo-yo. Oh, good! That's three swaths 1 meter long apiece. (7)(SAMP 15310-92)

06 02 02 04 CDR Damn bag isn't full yet. Let's shoot for a full bag. What do you say? Take it just a second to go one more sweep there. (7)(SAMP 15310-92)

- - -

06 02 02 26 CDR Good. Shake any more in the - yes. That's too bad; (7)(SAMP 15310-92)
we didn't get many out of that one. Why don't you
take one over - let me move the gnomon about 3
inches here, and take one on this side, Jim. Okay?
Move the gnomon back about a foot. Why don't you
take a swath here and I'll - -

06 02 02 53 LMP Yes, you know, because we're moving farther - - a (7)(SAMP 15310-92)
little farther from the rim - - you get less and
less each swath.

06 02 02 59 LMP This one ought to be a more fruitful one. Either (7)(SAMP 15310-92)
that or my arm is getting tired.

- - -

06 02 03 14 CDR How about a double core here, Joe? Got any ideas on (7)
that one?

06 02 03 19 CC Dave, we're coming up on the departure time about 10 (7)(SAMP 15310-92)
minutes from now. All we really need is soil from
this same area. And we're making money hand over
fist. Maybe a few walnut-sized rocks, if there's
some around.

- - -

06 02 03 37 CDR We got a whole bagful of those in the comp. And (7)(SAMP 15310-92)
that's in 172.

06 02 03 43 CC Roger; copy 172. I guess all we need is a soil (7)(SAMP 15300-08)(PHO 90 12231-34)
sample from this area and perhaps even larger rocks,
if there's some grapefruit- to football-size rocks
there.

06 02 03 54 CDR Yes. Yes, we'll just finish off Jim's collection (7)(SAMP 15300-08)
bag here. I want to stow it anyway. Oh, look at (SAMP 15307)
that glass - spherule down there. See that big one?

06 02 04 08 CDR Why don't you back off and document the area. Let (7)(SAMP 15307)
me get my tongs and pick that up.

06 02 04 12 CDR Perfectly round, about *** (7)(SAMP 15307)

- - -

06 02 04 26 LMP Keep an eye on the spherule. (7)(SAMP 15307)

- - -

06 02 04 50 CDR My little paw. So I'll get you a bag; let you take (7)(SAMP 15300-08)
a picture of that. I'll get a bag; then you can get (PHO?)
the soil.

06 02 05 02 LMP Where you going to put that little spherule? (7)(SAMP 15307)

06 02 05 04 CDR In the bag. (7)(SAMP 15307)

06 02 05 05 LMP Not with the soil, though, are you? (7)(SAMP 15307)

06 02 05 07 CDR Yes. (7)(SAMP 15307)

06 02 05 09 CDR Came out of the soil. I just didn't want to miss (7)(SAMP 15307)
it. We'll remember that. That goes in bag number
173, and, well, our friends in the back room are
writing that down right now.

- - -

06 02 05 24 CDR Little fat ball. (7)(SAMP 15307)

06 02 05 25 CC - - five minutes, and we still need the soil. (7)(SAMP 15300-08)

06 02 05 29 CDR It's coming right now. (7)(SAMP 15300-08)

06 02 05 37 LMP A little more? (7)(SAMP 15300-08)

06 02 05 38 CDR Yes. Let's fill the bag. (7)(SAMP 15300-08)

06 02 05 50 LMP Is that a full bag there? (7)(SAMP 15300-08)

06 02 05 51 CDR Yes, sir. That's a full bag. That's a full bag. (7)(SAMP 15300-08)

06 02 06 06 CDR Okay. Better have a - 90 percent bag for sure. (7)(SAMP 15300-08)
The - -

06 02 06 17 LMP Don't pour your spherule out. (7)(SAMP 15307)

- - -

06 02 06 32 CDR Yes. Here, let me put this in your backpack. Stand (7)(SAMP 15300-08)
there; that's good. I'll get it.

06 02 06 49 CDR I'm going to get a couple of big rocks, Jim. Then (7)
we'll just fill your bag and - call it a day - here.

- - -

06 02 07 29 CDR Why don't you come over here and get your scoop and scoop me up one big rock? (7)(SAMP 15459)(PHO 90 12235-36)

06 02 07 35 CDR Now - and get your camera on it, because I don't have any film. How about this one right here that looks like it has some layering in it? Maybe. (7)(SAMP 15459)

06 02 07 46 LMP Yes, that's the one I was talking about. (7)(SAMP 15459)(PHO 90 12235-36)

- - -

06 02 07 52 CDR Yes, I've got my foot right there. Why don't you take a couple of cross-suns real quick? (7)(SAMP 15459)(PHO 90 12235-36)

06 02 07 55 CDR Seven feet, cross-sun? A little too far away, old buddy? (7)(SAMP 15459)

06 02 08 06 CDR Okay. Now come grab your scoop and we'll take it. (7)(SAMP 15459)

06 02 08 14 LMP It's a pretty big one to try and get with a scoop. (7)(SAMP 15459)

06 02 08 17 CDR Yes; you're right. I don't see anything else. (7)(SAMP 15459)

06 02 08 19 LMP This little fracture. (7)(SAMP 15459)

06 02 08 25 CDR Too big. Get another one. (7)(SAMP 15459)

06 02 09 27 LMP Oh! Here, Dave. (7)(SAMP 15459)

06 02 08 28 CDR Oh, sure. (7)(SAMP 15459)

06 02 08 29 LMP Good boy. (7)

06 02 08 31 CDR Get that one on your side. (7)

06 02 08 40 CDR Getting it. That a boy. There. (7)

- - -

06 02 09 21 LMP Yes. Man! I got it. (7)

06 02 09 28 CDR Good. Okay; fill that square. Okay, Jim. Let's get on the Rover and head back. (7)

- - -

06 02 10 09 CDR Yes. I'm going to put it in a seat pan now. Then, (7)
 why don't you put your bag in here. Here, let me
 have it. I'm going to put your bag in there. Your
 carrier is awful loose, and I don't want to lose
 that bag. Put this on a handtool carrier.

06 02 10 31 LMP What's in there? Rock? (7)
 - - -

06 02 10 39 CC How many big rocks did you pick up? One? (7)(SAMP 15459)

06 02 10 42 CDR Yes, one, Joe. That's - we're about out of time, (7)(SAMP 15459)
 here.

06 02 10 49 CC We think you should be climbing - - aboard now. (7)
 Looks like you really put some weight on our
 suspension system when you loaded it there.

06 02 11 00 CDR Ha! Wait until you feel this bag. (7)
 - - -

06 02 12 26 CC What's the reading, Jim? You probably won't need (7)
 it.

06 02 12 31 LMP 290. (7)

06 02 12 35 CC Torque it to 293, please. 293. (7)
 - - -

06 02 14 37 LMP Okay, Joe. When we leave here, I'm in a position to (7)
 shoot some film.

06 02 14 46 LMP We'll get some downhill motion, here. (7)
 - - -

06 02 15 31 CC Dave, we want you to head toward Station 4, and (7)
 we'll advise you on - - what your rate looks like
 and the tasks that we want you to carry out once you
 arrive. Just start off in the direction of Station
 4, please.

06 02 15 47 LMP Okay; give me a heading. I can see it over there, (7)
 Dave.

06 02 15 52 LMP I see about 330. Would you - that's not going to mean much to you until you get down to the level. (7)

06 02 16 00 CDR That's right. And the camera's running, Joe. (7)

06 02 16 09 CDR We're rolling. (7-4)

06 02 16 18 CDR Hey, your camera's loose on the swivel, Jim. (7-4)

06 02 16 23 LMP No, I'm getting a pan, here. (7-4)

06 02 16 25 CDR Oh, really? Oh. That's an awful fast pan. (7-4)

06 02 16 28 LMP No, I just wanted to make sure it was running. (7-4)

06 02 16 31 CC Dave, you'll want to trend - - for - course 346, and it's about 1.7 clicks to Station 4. (7-4)

- - -

06 02 17 34 CC And, Jim. When you finish photography, we're standing by for description. (7-4)

06 02 17 43 LMP Well, I just had the camera running, Joe. Remind me to turn it off when it runs out of film. (7-4)(PHO DAC)

06 02 17 48 LMP We've got about half a mag on it. (7-4)(PHO DAC)

06 02 17 50 CC Roger. And you're running at 12 frames per second, I imagine. (7-4)(PHO DAC)

06 02 17 57 CDR Right. But we're going down-sun on it - just this. Down-sun isn't going to be very good on the photography, Joe, because the zero phase just washes it out completely. (7-4)(PHO DAC)

06 02 18 12 CC No problem, Dave. Jim might want to swing the camera around and point it more towards the right. (7-4)(PHO DAC)

06 02 18 21 LMP Well, we're heading directly downhill, now. We're cross-sun. (7-4)

06 02 18 27 CDR Yes, I'm looking out at the - hey, are we looking at the - the big crater dead ahead? (7-4)

06 02 18 33 LMP It's Dune, yes. (7-4)

-- --

06 02 18 40 CDR You want to hit the southern *** ? (7-4)

-- --

06 02 18 46 LMP But, again, that's - yes. We didn't see the levee, (7-4)
or rampart, on the eastern side.

06 02 18 57 LMP So probably any place on the southern rim would be (7-4)
good. Although, from here, it almost looks like you
could drive around the eastern rim of - Dune. Boy,
there's a crater just east of Dune; it looks very
recent, and it has - a great number of blocks - that
I can see from here. And the largest - from this
vantage point - again, you've probably - y'all have
probably seen it on TV. The largest crater, which
was Arrowhead - we named Arrowhead - really runs
east-west, which we mentioned before, rather than
north-south. And on the northern side of a large
crater - elongate crater, which runs north -
east-west, on the north side, there are a great
number of rocks exposed.

06 02 20 07 LMP And we're intersecting our tracks here, as we go (7-4)
downslope.

-- --

06 02 20 23 LMP Probably just follow the tracks, huh? (7-4)

06 02 20 24 CDR Yes, probably to Dune. (7-4)

-- --

06 02 20 33 LMP Yes. Okay, we're heading 320; bearing's 350, and (7-4)
range is 4.3.

-- --

06 02 21 02 CDR Yes, we're about down out of it, now. What a (7-4)(PHO 90 12179-98)
beautiful sight man! Well, we didn't get to 500 in
stereo up there, but you got a pan, didn't you?

06 02 21 16 LMP Yes. (7-4)(PHO 90 12179-98)

06 02 21 26 LMP Boy, I can't get over those lineations, that layering at Mount Hadley. (7-4)

06 02 21 29 CDR Boy, I can't either. That's really spectacular. (7-4)

06 02 21 31 LMP That's really beautiful. Talk about organization! (7-4)

06 02 21 37 LMP That's the most organized mountain I've ever seen. (7-4)

06 02 21 40 CDR Yes, they're so uniform in width. (7-4)

06 02 21 45 CDR Nothing we've seen before has had the same - thickness of each bed. Yet those are - - (7-4)

06 02 21 54 LMP Uniform thickness from the very top to the bottom. (7-4)

06 02 22 02 LMP And looking to the north on that Spur that we talked about yesterday, we can see the horizontal bed again. (7-4)

06 02 22 09 CC Roger, Jim; copy. Any idea of the dimension on that thickness? (7-4)

06 02 22 20 CDR Actually, I'd estimate it's relatively thin, but - yes, I'd say that it's probably - if you took the ridge line on Mount Hadley, which is practically horizontal at our present position, and put that into 100 percent, then I'd say those lineations across there - the bedding across there are probably like a quarter of a percent. Wouldn't you, Jim? (7-4)

06 02 22 48 LMP A third. Yes. (7-4)

06 02 22 49 CDR Certainly less than 1. (7-4)

06 02 22 51 CDR Must be - if you look across the ridge line and then look at the dip to the - northwest there, you could count a couple of hundred, anyway; couldn't you? (7-4)

06 02 22 59 LMP Yes. (7-4)

06 02 23 03 CDR Apparently you couldn't see that on TV. (7-4)

06 02 23 08 CC - - not at all. Hopefully, it's in the photographs, but we're marking it down - - (7-4)

- - -

06 02 23 18 CDR And then if you look horizontal, half - well, all the way up, I guess that - - would be slumping. (7-4)

06 02 23 27 LMP Yes, there is. I see it now. Yes. (7-4)

06 02 23 29 CDR It just looks like slump, probably. (7-4)

06 02 23 31 CDR Because they're discontinuous, subhorizontal lines, which are pretty much cross-bedded, if it was bedding, and I don't think it is. It just looks like slump-pattern ground. (7-4)

06 02 23 51 CC And what kind of progress are you making now, Jim. (7-4)

- - -

06 02 23 56 LMP Oh, we're going at about 8 clicks. (7-4)

- - -

06 02 24 03 LMP And we're heading 340, bearing 349, range - 3.9. (7-4)

06 02 24 23 LMP And we're going up a slight slope, following our track. (7-4)

- - -

06 02 24 48 CDR Okay, here's that little tilt. Hang on. Easy does it. Okay. (7-4)

06 02 25 10 LMP There's the LM directly ahead of us. (7-4)

06 02 25 13 LMP Bearing - yes, bearing is right on. Right on the money. (7-4)

06 02 25 30 LMP Now we're going 11 clicks. (7-4)

06 02 25 41 CC Roger, Jim. Copy. And are you progressing towards Dune crater now? (7-4)

06 02 25 48 LMP Yes. Well, we're following our tracks. We thought when we got up here just south of Dune, we'd probably head north-northeast. (7-4)

06 02 26 00 CDR Big boulder on the surface. About a foot. (7-4)

- - -

06 02 26 09 CC - - and just a factor into your thinking, we can (7-4)
 afford a very short stop in the vicinity of Station
 4. It doesn't have to be really very close. We're
 interested in either documented samples or a rake
 sample there, if you think it looks like a good area
 for a rake sample.

06 02 26 33 LMP But you'd still like the station - to be on the - (7-4)
 southern rim, I would think.

06 02 26 38 CDR Sure! (7-4)
 - - -

06 02 26 55 LMP Let's see, at about a 12 o'clock position ought to (7-4)
 be a good sampling station.

06 02 27 02 LMP Okay, we're heading off now at 025. Heading (7-4)
 directly toward the southern rim of Dune.
 - - -

06 02 27 28 CC Roger. The mag's run out on your camera, Jim. You (7-4)
 should shut that off, and we don't want you to stray
 too far from your Rover tracks. Head back more or
 less the way you came. We have time for about a
 10-minute stop someplace south and perhaps a little
 west of Dune crater.

06 02 27 48 CDR Roger, Joe. We'll do that. We're just on the rim (7-4)
 of Dune right now.

06 02 27 53 CC Okay, and, Jimmy, did you turn the camera off? (7-4)

06 02 27 58 LMP I did, Joe, but apparently it didn't run past - I (7-4)
 still have - about 40 - 45 percent left.
 - - -

06 02 28 24 CDR This is a good spot right here. (7-4)

06 02 28 27 LMP Oh, look at those large blocks on that west wall. (7-4)

06 02 28 30 CDR Yes, man! Look at the large one right here. Gee, (7-4)
 let me get this off.

06 02 28 43 CC Standing by for your mark when you stop. And either (7-4)
 Dave or Jim, we're going to need you - for camera
 and LCRU and the camera lens brushed off before you
 continue.

06 02 28 59 LMP Okay; we've stopped, Joe. (4)

06 02 29 01 LMP We're reading - 292, 292, 347, 8.9, 3.4, 94100, 89, (4)
 90; motor temps, both - low.

- - -

06 02 30 09 LMP For a 10-minute stop, Dave, I don't think the rake (4)
 is very good.

06 02 30 19 CC Just depending on however you read the fragment (4)
 distribution.

06 02 30 27 LMP There are a lot of large fragments here, Joe. (4)

06 02 30 31 CDR Jim, I've got to change my film mag here. (4)

06 02 30 33 LMP Okay; I'll take a pan. (4)(PHO 90 12237-48)

06 02 32 34 LMP Camera's stopped working. (4)(PHO 90 12237-48)

06 02 32 36 CDR It has? Maybe you're out of film. (4)

06 02 32 41 LMP I just put this on. (4)

06 02 32 45 CC Is it your camera, Dave? (4)

06 02 32 46 CDR Is it - well, I'll take the pictures. Let's get one (4)
 sample. Jim's out of film, or his camera stopped,
 and I can take the pictures.

- - -

06 02 33 06 CDR Jim, let's get down here by these boulders. (4)

06 02 33 12 CDR I think we can get a pretty good distribution. (4)

06 02 33 20 LMP Joe, I have a partial pan there, and my camera (4)(PHO 90 12237-48)
 stopped working.

06 02 33 50 CDR These two right here, Jim. (4)

06 02 33 52 LMP Okay, you've got to take the pictures. (4)

06 02 33 53 CDR Yes, I'll take all the pictures, if you'll get - a (4)
bag out.

- - -

06 02 34 41 CDR Get a bag and you get some soil here. Watch that (4)(SAMP 15470-78)(PHO 87 11759-64)
big one. I want to get that one, too. (SAMP 15495)(PHO 87 11759-64)

06 02 35 00 CDR Okay; good. Why don't you zip the bag. And let me (4)(SAMP 15470-78)
get that other big rock, that -

06 02 35 41 LMP In your bag. (4)(SAMP 15495)

- - -

06 02 36 02 CDR Okay, hold this bag, and it's number 174. (4)(SAMP 15495)

06 02 36 12 CDR And there's one before that came off Jim's bag rack. (4)

- - -

06 02 36 32 CDR There's 204 in there now. It must have been 203. (4)(SAMP 15470-78)
Okay, back up a little bit, Jim, so I can get the
picture. That a boy. Okay. Put that in my pack.
Just catch a couple more.

06 02 36 51 LMP The large gray one on your right with large vesicles (4)(SAMP 15499)(PHO 87 11767-68, 79)
on it.

06 02 36 55 CDR Yes, that big boulder. Yes, man. (4)(SAMP 15499)

- - -

06 02 37 07 CDR Huge vesicles. Oh, look at the plagioclase in (4)(SAMP 15499)
there. Man, look at the laths, Jim; it's beautiful.
Whooo! Vesicles in this must be about 2 to 3 inches
- - in size and it's a big boulder.

- - -

06 02 37 44 LMP Boy, that's a real beauty. (4)(SAMP 15499)

06 02 37 47 LMP Want to try and knock a piece off, here? (4)(SAMP 15499)

06 02 37 50 LMP Should come off pretty easy. (4)(SAMP 15499)

06 02 37 51 CDR Sure looks like it. Get all these. (4)(SAMP 15499)

06 02 38 12 CDR Okay. Should be able to get it right here in the middle. (4)(SAMP 15499)

- - -

06 02 38 42 LMP Okay; that's enough, Dave. (4)

- - -

06 02 39 16 LMP Now put that large one in my pack. (4)(SAMP 15498?)(PHO 87 11765, 69)

- - -

06 02 39 26 CDR How about that? I don't know what it had in it, but (4)
it sure didn't have those good rocks in it; and
that's why I put those good rocks in the - oh, well,
win a few and lose a few.

06 02 39 40 CDR Put that in my pack; will you, Jim? Okay; this is a (4)(SAMP 15499)
large corner of a vesicular rock that's the big
boulder sitting here.

06 02 30 53 LMP Just about all we're going to be able to put in your (4)(SAMP 15499)
bag.

06 02 39 57 LMP Yes, it's just about filled. (4)(SAMP 15499)

06 02 39 58 CDR Okay. Hey, maybe - let me get those two frags there (4)(SAMP 15485-87)(PHO 87 11765-70)
from the center. Give me - - those tongs. You can
get out a bag.

- - -

06 02 40 12 CDR Okay. Head them up and point them out. 204. (4)(SAMP 15485-87)
Better let me get the other one. Two frags from the
center of the - -

- - -

06 02 40 36 CDR 204 for the two frags in the center of the boulder. (4)(SAMP 15485-87)
And the big chip off the top that's got the vesicles (SAMP 15499)
in it is in my pack, solo.

06 02 40 50 CDR And that's not much for Dune, but I think it's (4)
representative.

06 02 40 58 CDR I hope it's representative because it - okay. Put (4)(SAMP 15485-87)
that in my bag, Jim?

- - -

06 02 41 46 CDR Boy, underneath that one is another one with larger (4)
vesicles in it.

- - -

06 02 43 18 CC Jim, when you get settled, you can check the camera (4)
on 12 frames per second and turn it on again,
please.

06 02 43 29 LMP Yes. I don't know why it didn't come on last time, (4)
Joe.

- - -

06 02 44 08 CDR Oh, no, I didn't put a bag on you, did I? Yes, (4)
that's right. We're okay.

06 02 44 12 LMP What did you do with that bag? (4)

06 02 44 13 CDR I stuck it on the hand tool carrier so it - (4)

- - -

06 02 44 18 CDR Well, I had me worried, too. I knew the one with (4)
the good rocks, I hadn't lost, because I stuck that
in the seat pan. But I thought I'd put one on you,
and now I remember I started to put it on you, and
your harness looked loose, so I stuck it on the hand
tool carrier where it's got a lock. So we're okay.

- - -

06 02 44 51 LMP Okay, it looks like the camera is working, Joe. (4)
It's just hard to press that in all the way.

- - -

06 02 45 44 CDR Mark. We're rolling. (4-LM)

- - -

06 02 46 22 LMP Boy, there sure are a lot of neat rocks in the Dune. (4-LM)
Too bad we can't spend some more time.

- - -

06 02 46 36 CC And, Jim, you might want to start the camera. (4-LM)

06 02 46 41 LMP Yes, it's running, Joe. (4-LM)

- - -

06 02 46 56 CDR Yes, I'll come right now. Past this little bump. (4-LM)
And we're in a little boulder field. And about a
foot, at the biggest, down to about 6 inches.

06 02 47 10 LMP Yes, it looks like from a crater that hit on the rim (4-LM)
of Dune.

06 02 47 16 LMP Joe. We're heading on a bearing of 350, range 3.3. (4-LM)

06 02 47 20 CDR Okay, and we're on our tracks. (4-LM)

- - -

06 02 47 59 LMP Yes, I guess in a couple craters, we remarked that (4-LM)
we saw a boulder distribution that looked like it
was linear, like it was a ray pattern.

06 02 48 08 LMP But we never did get a chance to really sample any (4-LM)
of those as I recall, there was one on the - we saw
one on the - what, south side of the Dune, on the
way down.

06 02 48 24 LMP We could probably save some time going back by not (4-LM)
following the tracks, you know, because we can see
the LM.

06 02 48 30 CDR Yes, you're right. I think we ought to head right (4-LM)
straight on. We can see home.

06 02 48 33 LMP The only big one over there - only big crater over (4-LM)
that way would probably be Earthlight.

06 02 48 40 LMP I think that's probably Earthlight that we see at 12 (4-LM)
o'clock.

06 02 48 48 LMP If we stay - west of Earthlight, we ought to save a (4-LM)
little distance.

06 02 48 52 CDR Yes. Lets get out of this little boulder field (4-LM)
first. Okay, now we'll take a little left here. Oh
well, we can look at Pluton. We'll see Pluton all
the way. And the LM is silhouetted right against
the base of - Pluton so we can't miss that. And
just to the right of it is - Schaber Hill which
we'll be heading for tomorrow. Okay, by the way,
Joe, I guess we ought to tell you about what we saw
at that last stop. We gathered a few quick samples (SAMP 15485-87; 15495, 98-99)
that were covered with dust, which we didn't look at
very carefully, just so we could get ahold of them.
Then the very large boulder, which was probably
about 6 feet, sticking up out of the ground, with a
very large 3- to 4-inch vesicles was a very
fine-grained, dark, black, basalt with maybe - gee,
I'd say 15 percent plag in it, wouldn't you Jim?

06 02 50 00 LMP Yes, very fine lath. (4-LM)

06 02 50 02 CDR Yes, a very fine lath and on the top, it had some (4-LM)
smaller millimeter-size vesicles, and adjacent to it
was another - lighter-gray vesicular basalt, which
was uniform in vesicularity, in which we didn't have
time to sample, but - the vesicles in that looked
similar to that one rock that we got yesterday, Jim.
The rounded one? Remember that was in the bag
alone. Anyway, these vesicles were, gee, I'd say 4
millimeters to - some of them were a centimeter all
the way through it. And they seemed to - the two
rocks seemed to be in contact with each other.
Unfortunately, we didn't have time to sample the
second one, but we did get a fairly good sample of
the - corner of the first one and the central part (SAMP 15499)
near one of the vesicles. (SAMP 15485-86)

06 02 50 57 CC Roger, Dave. Beautiful description. And, Jim, you (4-LM)
might - stop the camera now. It's probably run
through the film load, and we'd like clicks and amps
reading please.

06 02 51 15 LMP Okay, we're doing - wpll, that can wait - okay, the (4-LM)
camera is empty, Joe, and we got some coverage
there.

06 02 51 38 LMP And we're going at about 10 clicks; amps reads about (4-LM)
10.

06 02 51 52 LMP That might be Earthlight up ahead, Dave. (4-LM)

06 02 51 54 CDR I think you're right. I guess we'd better go east (4-LM)
of it, huh?

- - -

06 02 52 05 LMP We might end up on our tracks. (4-LM)

06 02 52 07 CDR Oh, I don't know. I think we'll make it up. (4-LM)

06 02 52 27 CDR Cross-sun is pretty good, you know? (4-LM)

06 02 52 29 LMP Yes. Visibility-wise. Yes, coming down this (4-LM)
morning. I guess we looked over at Earthlight,
didn't we?

06 02 52 44 CDR Yes. (4-LM)

06 02 52 45 LMP Commented on the southern rim of it. (4-LM)

06 02 52 54 CDR Yes, we're in good shape now. It's a straight shot. (4-LM)
See the old LM sitting out there? Start making out
detail on it. Range, 2.4. I think we're closer
than that.

- - -

06 02 53 37 CC Roger. For both of you now: Dave, we want you to (4-LM)
stop at the LM and you'll have to offload your
collection bags and get configured for the next part
of the EVA. Jim, we want you to run a malprocedure
on your camera. If you can't get that mag to work,
put on mag Kilo Kilo and then your first job will be
the LM site pans and then photographs of the descent
engine and photographs of the Solar Wind -
composition experiment, the window shade. Those
three sets of photographs. Do you copy?

- - -

06 02 54 53 LMP As far as Dave's bag, Joe, - I forget the number on (4-LM)
it, but I'll just take out the core tubes that we
have not used, and then it will be ready to go in
SRC 2. Is that correct?

- - -

06 02 55 32 LMP Okay. And I figure - think you can get through (4-LM)
there, Dave?

06 02 55 39 CDR No. I'm going to go around to the right. Miss this (4-LM)
boulder here. There's a directional set of ejecta
in it.

06 02 55 46 LMP It sure is. (4-LM)

06 02 55 47 CDR Look at that. It's right straight out one side. It (4-LM)
would be a good place to take a radial sample. That
thing came in from - let's see - we'll be going - -

06 02 55 58 CDR Yes, we're going north and the ejecta pattern is (4-LM)
spread out due west about 20 meters across, and it
must go out a good 150 meters or so.

06 02 56 08 LMP To the east, right? (4-LM)

06 02 56 09 CDR Yes. And our bearing is 347 and our range 2.0 - at (4-LM)
that point.

- - -

06 02 57 25 LMP Yes - you going to go around to the right? (4-LM)

- - -

06 02 57 36 CC Roger, Dave. Be advised that the ALSEP is picking (4-LM)
up the rumble of the Rover rolling across the
plains.

- - -

06 02 57 58 LMP - - there are our tracks, Dave - - (4-LM)

- - -

06 02 58 03 CDR Yes, man. Hey, I think this is Index, Jim. (4-LM)

06 02 58 07 LMP The one on our left here? (4-LM)

06 02 58 08 CDR Yes. In fact, I'm pretty sure it's Index. It's got the nice side crater in the north - (4-LM)

06 02 58 19 LMP Yes, I thought Index had a larger crater though on the north side. (4-LM)

06 02 58 22 CDR Well, I don't know how large large is anymore. (4-LM)

06 02 58 25 CDR I give up on distances and sizes. (4-LM)

06 02 58 27 LMP Yes, we're 01.7. (4-LM)

06 02 58 30 CC It's probably Arbeit. (4-LM)

06 02 58 31 CDR No. It couldn't be it then. (4-LM)

06 02 58 32 LMP I don't think so. (4-LM)

06 02 58 34 CDR Arbeit, yes, yes, that's right, that's right. We came by that before. Yes. I - we might as well just - head on over those tracks, because we know we're straight - (4-LM)

06 02 58 52 LMP Notice that crater at 12:30 to us now. (4-LM)

06 02 58 55 CDR Yes. The fresh one. (4-LM)

06 02 58 56 LMP It's fresh and has a very light albedo. (4-LM)

06 02 58 58 CDR That's November. Got to be November. Yes. That's clearly November crater. (4-LM)

06 02 59 07 LMP Yes, we're heading 360; the bearing's 340; and the range 1.5. (4-LM)

06 02 59 15 CDR And we were pointing right at November at the time. So, Index is over there on the right. (4-LM)

06 02 59 30 LMP Making me seasick. (4-LM)

- - -

06 02 59 48 CDR Pretty good machine, isn't it? (4-LM)

06 02 59 56 LMP It sure is. Couldn't ask for better. And we're (4-LM)
going 12 clicks.

06 03 00 46 LMP Talk about dusty. Whew! (4-LM)

06 03 00 49 CDR Yes, bo. But, you know, it sure doesn't kick up as (4-LM)
much as I thought it would.

- - -

06 03 01 01 LMP In this kind of terrain. (4-LM)

06 03 01 02 CDR And you sure wouldn't climb that hill - like we did. (4-LM)

06 03 01 10 LMP Notice that white colored rock there that we just (4-LM)
went over.

- - -

06 03 01 25 LMP Okay. We're still going at 12 clicks - heading 340. (4-LM)

06 03 01 30 CC Roger. Copy, Jim. And I'm wondering if you caught (4-LM)
sight of the small crater you saw outbound, which
you described as having bedrock in the bottom?

06 03 01 43 LMP Haven't - don't think we've come that far yet. (4-LM)

- - -

06 03 02 02 CC We - - are interested - - in a NAV reading - an (4-LM)
odometer reading, and we're going to measure how far
away that is from the LM.

- - -

06 03 02 24 LMP Looks like November has a lot of blocks, too, but I (4-LM)
can't see any *** I thought the crater that looked
like it had bedrock was off to the east of our
tracks.

06 03 02 34 CDR It is. Over here to our 11 o'clock. I mean. No, (4-LM)
I'm sorry, you're right. I was thinking of a
different one, Jim. November has a raised rim which
is, I think, unique around here.

06 03 02 49 LMP Kind of a large rock to the north of November. (4-LM)

06 03 02 55 LMP That's - it looks like it's half buried. (4-LM)

06 03 03 12 LMP Now, this fresh crater that we're coming up ahead. (4-LM)
I know we've talked about it but I don't know
whether there was any bedrock.

- - -

06 03 04 13 CDR Yes, I think this is the one we called. Isn't it, (4-LM)
Jim.

06 03 04 16 LMP Looks like it excavated bedrock. (4-LM)

06 03 04 18 CDR There are frags on the side. It's got a light (4-LM)
albedo. It's relatively fresh. I think this is the
one, isn't it?

06 03 04 27 LMP Well, we'll give it to them anyway. 352 for 0.7. (4-LM)

- - -

06 03 04 41 CC Dave and Jim, a comment about your equipment off (4-LM)
load. The off loading should go exactly as if it
were at the end of EVA 1 with regards to
transferring core tubes, and so forth. Only the
collection bag numbers will be different. And we'll
try to talk you through that.

06 03 05 04 LMP Yes, you'd better - I just didn't see that crater (4-LM)
that I - that wasn't the one, Dave.

06 03 05 18 CDR Don't think so? (4-LM)

06 03 05 19 LMP No, because it was one - it was to the east of us (4-LM)
and I looked out and saw a layer of bedrock about a
quarter of the way up on the wall.

- - -

06 03 05 49 LMP We're almost back to the LM. The freshest one was (4-LM)
the one that that Dave just gave you the
coordinates. On.

06 03 06 06 LMP Unless this might have been the one. (4-LM)

06 03 06 10 LMP Right here. *** (4-LM)

06 03 06 24 LMP That wasn't the one, that's too large. (4-LM)
 - - -

06 03 07 05 CDR Yes. Tracks upon tracks, Jim. (4-LM)

06 03 07 10 LMP Yes, it looks like a thoroughfare. It looks like a (4-LM)
 freeway.
 - - -

06 03 07 12 CDR Yes, okay. We'll take this fork here. (4-LM)

06 03 07 22 CC And, Dave, as you know, the only thing we have to (4-LM)
 worry about, especially with regard to kicking dirt,
 the Solar Wind composition experiment, and the LRV
 which is pretty far away.
 - - -

06 03 08 04 CDR Okay, Jim, I'm going to drop you off right here. (4-LM)
 - - -

06 03 08 18 CC Okay, the first thing I guess - - is to off load the (LM)
 gear as if you were out at the ALSEP site, with
 regard to transferring cores, et cetera. And we
 marked - - your stop.
 - - -

06 03 08 51 CC And, Jim, standing by for your LRV readouts, if (LM)
 you're still there.

06 03 08 57 LMP Yes, I am Joe. I'm reading 004, 018, 12.5, 002, 91, (LM)
 98, 92, 98, and motor temps are low.
 - - -

06 03 10 07 CC Dave, basically, you just want to unload the (LM)
 collection bags that you're carrying. We want to
 wind up with collection bag number 2 on the hand
 tool carrier and number 3 under Jim's seat. In
 addition to that - - we want number 5 on the hand
 tool carrier.

06 03 10 37 CDR Two and 5 on the hand tool carrier. Okay. (LM)

06 03 10 40 CC Roger. And 2 is under Jim's seat right now. We (LM)
want to trade that out for number 3 going under the
seat.

- - -

06 03 11 37 CC Jim. Put on mag Kilo Kilo on that camera, please. (LM)

06 03 11 43 LMP I was wondering, is Dave going to need his camera (LM)
out there?

06 03 11 46 CDR No, why don't you take mine. Mine happens to have (LM)
Kilo on it.

- - -

06 03 11 58 LMP Okay, bag 7. See, this is EVA-3 bag here. (LM)

06 03 12 04 CC Roger, bag - - number 2 should be under that seat as (LM)
well.

06 03 12 12 LMP Joe, what - we know - let's see you want 2 and 5 on (LM)
the hand tool carrier, and the rest under the seat,
is that correct?

- - -

06 03 12 41 CDR Okay. I'd like to take this little cargo here, and (LM)
take it right over to the MESA.

06 03 12 47 LMP What bag number is it? (LM)

06 03 12 48 CDR Well, that's the bag that goes in bag 5. And bag 5 (LM)
goes in the SRC. Jim, just let me take out the
unused core tubes. Joe, speak up now if there is
anything else you want to put in bag 5. I'm going
to take it over to the MESA. Yes, there's no sense
in putting bag 5 on the handtool carrier, Joe,
because it's just about full. Why don't we put it
on the MESA or in the SRC, or something.

06 03 13 28 LMP Dave, when you take your camera off, just leave it (LM)
on my seat.

06 03 13 31 CC Dave, the only problem is, if we're able to get the (LM)
 deep samples using the drill stems, we'd like them
 in the SRC. I guess we'll leave it up to you, your
 choice. We - maybe better just to take bag 5 over
 there right now and forego that little nicety.

06 03 13 51 CDR Just a minute, Jim. Just a minute. Now, Joe, you (LM)
 didn't say anything about getting deep cores. You -
 that's why - here, let's take 3 and put it over
 there. Keep it there. Let me take 2 back, because
 now that I know that they want to try and get the
 deep cores, we do need bag 2.

06 03 14 08 LMP Yes, that's the first time anybody said anything (LM)
 about that. That's bag 5, Dave.

- - -

06 03 14 20 LMP If you get the cores, bring them back, and we'll put (LM)
 it in there. I just won't load it in the SRC.

06 03 14 25 CDR We'll hold the SRC open. (LM)

- - -

06 03 14 36 CDR Hey, Jim, I'm going to leave you my camera - - right (LM)
 here, on the MESA, huh?

- - -

06 03 14 47 CDR Yes, let me read the numbers on it first. Of (LM)
 course, it's not on all the way, but it's reading
 89.

06 03 15 00 CDR Get that, Joe? My camera 89? (LM)

06 03 15 34 LMP I think we only have two bags to go up this time. (LM)

- - -

06 03 16 43 LMP Listen, those rocks that are under the seat. I'll (LM)
 put those in bags - well, that bag that's under
 there before you drive off.

06 03 16 51 CDR No, there isn't any bag under there now. I got it (LM)
 right here. It's 7.

06 03 16 58 CDR Okay, here's a bag here, 6. (LM)

06 03 17 01 CDR I don't know. Where do you want bag 7, Joe? (LM)

06 03 17 04 CC Bag 7 stays there, Dave. Leave it there. (LM)

06 03 17 24 LMP I was going to get those rocks and put it in this bag. Bag 6. (LM)

- - -

06 03 17 45 LMP I don't want to leave any rocks there. (LM)

06 03 17 48 CDR You're right. Okay. Is that the only one, or do we have another one? (LM)

06 03 18 00 LMP It's the only one. Put A under your seat, huh? (LM)

- - -

06 03 18 20 LMP I'll just hold up on the SRC closing until - (LM)

06 03 18 25 LMP Decide what your going to do out there. (LM)

06 03 18 28 LMP There's a couple of samples there we probably ought to put in here. (LM)

- - -

06 03 18 38 CC - - we want you to get your LM site pans - - (LM)(PHO 87 11785-840)
 pictures of the descent engine and Solar Wind (PHO 87 11841-42; 87 11781-84)
 composition pictures, and then I'll be back at you
 with the next job. And, Dave, standing by for when
 you're ready. And, I'll talk about your task coming
 up here.

- - -

06 03 19 17 LMP Okay, Joe, back at the - on the MESA, I have bags 5, (LM)
 6, - 3, 5, and 6.

- - -

06 03 19 36 CC Okay, Dave. We want you to park east of the ALSEP (LM)
heading toward the west, and as far east as is
comfortable for you. Once again with the dust
problem in mind - and we want you to clean the TV
camera and LCRU before you leave the Rover.

06 03 19 57 CDR Okay. Park east heading west. And, I'll just get (LM)
it fairly close to the Central Station and avoid the
dust. How does that sound?

06 03 20 10 CC Roger. Just don't drive too far west. Keep it (LM)
east, if you could, please.

06 03 20 19 COR Okay. Incidentally, at the Rover, our bearing was (LM)
018 and range .2. That's pretty good for a trip
like that.

- - -

06 03 21 15 COR Okay, I'm going to park right here. And if you get (ALSEP)
bored, there's a big chunk of dark-gray breccia with
white clast right in front of the left wheel. Have
fun looking at that, maybe.

- - -

06 03 27 08 CC And, Jim, how are you doing? (LM)(PHO 87 11781-842)

06 03 27 12 LMP Just about finished, Joe. (LM)(PHO 87 11781-842)

06 03 27 17 CC Okay, Jimmy. Sounds good. We want you to deploy (LM)(PHO 87 11781-842)
the flag after you finish the photography. And, we
are wondering at the moment where the two empty core
tubes are. If they are still in bag 5, we'll want
you to carry them in your hand out toward the ALSEP
station later on.

- - -

06 03 28 04 CC Jim, I don't - - know how to break this news to you, (LM)
but we are going to do Station 8 out at the ALSEP
site, or nearby. Saving it especially for you.

- - -

06 03 32 21 CC Okay, Jim. When you get out to the ALSEP site, once (LM)(PHO 87 11843-58)
again being very careful with your dust, and
particularly the exposed SIDE experiment, we'd like
for you to do a photo pan out there. And - stand
by. Let's see, stand by.

- - -

06 03 33 49 LMP Dave - Dave, I hope we get a chance to pick that (LM-ALSEP)(SAMP 15059)
rock up before we go back.

06 03 33 52 CDR Which one? (LM-ALSEP)(SAMP 15059)

06 03 33 54 LMP Over here. That black glassy one. (LM-ALSEP)(SAMP 15059)

06 03 33 56 CDR Oh, is it a nice one? (LM-ALSEP)(SAMP 15059)

06 03 33 58 LMP Yes - - get a look; sitting right on the surface. (LM-ALSEP)(SAMP 15059)

- - -

06 03 37 25 CC And - - have you taken a photo pan from the ALSEP (LM-ALSEP)(PHO 87 11843-58)
site?

06 03 37 30 LMP I'm on my way. No. (LM-ALSEP)(PHO 87 11843-58)

06 03 37 34 LMP I'll probably be running out of film. (LM-ALSEP)

06 03 37 39 LMP I'll have to go back and change mags. (ALSEP)

- - -

06 03 38 34 LMP Okay, the pan at the ALSEP site's complete. I'll go (ALSEP)(PHO 87 11843-58)
out and photo the heat flow. (PHO 87 11860; 92 12406-09)

- - -

06 03 41 08 LMP Okay, Joe, this mag ran out. I'm going to go back (ALSEP)
and change.

- - -

06 03 42 16 LMP I don't think we have another color mag out here, do (ALSEP)
we, Joe? We'll have to use black and white - -

- - -

06 03 42 31 LMP Does Oboe look good? (ALSEP)
 - - -

06 03 48 26 LMP Okay, Joe, the ALSEP pictures are complete. (ALSEP)(PHO 87 11860; 92 12406-09)

06 03 48 44 CC And, Jim - - we've decided it's about time you start (ALSEP)
 on your Station 8 trench, if you would, please.
 - - -

06 03 53 19 LMP Oh, I picked up a pink rock and a black rock. And (ALSEP)(SAMP 15058-59)(PHO 92 12410-15)
 they're documented. I'm just resting up for Station
 8.
 - - -

06 03 54 51 CDR Hey, Joe, if Jim took a picture of the heat flow (ALSEP)
 box, the one he took probably isn't representative
 of the proper alignment, which it now has.

06 03 55 01 LMP I'll come over and take another one. (ALSEP)(PHO 92 12416)
 - - -

06 03 55 41 LMP I picked up that black glassy rock, Dave. (ALSEP)(SAMP 15059)(PHO 92 12410-12)

06 03 55 44 LMP And I picked up another pink one that looked like it (ALSEP)(SAMP 15058)(PHO 92 12413-15)
 had a lot of the plagioclase glass in it.
 - - -

06 03 58 01 CC Roger, get Jim started on the ditching experiment, (ALSEP)
 if you would please, and then I've got another good
 one to lay on you here. Don't quite know how to
 explain it. We'd like for you to try to get the
 deep core for us with the drill.
 - - -

06 03 58 38 LMP Well, the thing is, do we want to do the whole (ALSEP)
 Station 8 activity - the comprehensive sample?

06 03 58 44 CDR Sure. I guess if they want to do Station 8, they (ALSEP)
 want to do Station 8.

06 03 59 20 CDR Yes, let me - hey, Houston; what would you rather have - 16-millimeter movies of Station 8 or TV movies of Station 8? (ALSEP)

06 04 59 52 CC Roger; and we'll take TV; that's plenty good enough. (ALSEP)

06 04 00 16 LMP Yes, and I'll get the comprehensive later, if we have a chance. (ALSEP)

06 04 00 18 CDR Okay, Jim, and you - - you better - boy. I better have your camera, because - I have - let's go out here where it's fresh. (ALSEP)

06 04 00 49 LMP You want me to dig down to bedrock. (ALSEP)(SAMP SESC 15013)(PHO 92 12417-19, 39-43; 88 11872-77)

06 04 00 50 CDR Oh, that's - yes, that's down. Yes. Bedrock. You remember how to - you know how the Rover would normally be - - (ALSEP)(SAMP SESC 15013)

06 04 00 55 LMP Yes, we need your - we need the pictures. (8)(SAMP SESC 15013)(PHO 92 12417-19)

06 04 00 58 CDR Yes, I'll get it. (8)(SAMP SESC 15013)(PHO 92 12417-19)

- - -

06 04 02 00 CDR And take a little right turn there and let me get the down-sun prepicture here. I've got it. Okay, have at it - while I go find my favorite little piece of gear. I see it. (8)(SAMP SESC 15013)(PHO 92 12419)

06 04 02 25 CDR Okay, my pan - out of the way real quick. (8)(SAMP SESC 15013)(PHO 92 12420-38)

06 04 02 56 LMP Joe, do you only want it 12 inches deep? (8)(SAMP SESC 15013)

06 04 03 01 CC Whatever you think is reasonable. (8)(SAMP SESC 15013)

06 04 03 05 LMP I'm down that far already. (8)(SAMP SESC 15013)

06 04 03 59 LMP The wall that I'm - too bad the TV's there, Joe. You can't see the wall. Too bad; the wall is very smooth. (8)(SAMP SESC 15013)

06 04 04 13 LMP The wall is fine, yet very cohesive. (8)(SAMP SESC 15013)

06 04 04 25 CC Any sign of layering? (8)(SAMP SESC 15013)

06 04 04 29 LMP No signs of layering. I do find some small fragments - white fragments, black fragments. I just exposed a very small fragment about 3 millimeters of a black clast. But the wall that I've got here is only - no signs of layering at all. (8)(SAMP SESC 15013)

06 04 05 23 CDR Okay, let me take your picture then. (8)(SAMP SESC 15013)

06 04 05 29 CDR Oh no. I think that - you're not getting the penetrometer all the way down there. It's a great trench. (8)(SAMP SESC 15013)

06 04 05 35 LMP But not wide enough, you don't think? (8)(SAMP SESC 15013)

06 04 05 37 CDR I don't think it'll be big enough for the ears. (8)(SAMP SESC 15013)

06 04 05 38 LMP Not long enough, huh? Okay. (8)(SAMP SESC 15013)

06 04 05 40 CDR Yes, I hate to tell you that. Sorry about that. (8)(SAMP SESC 15013)

06 04 05 45 LMP Do you want to make a bet on that one? (8)(SAMP SESC 15013)

06 04 06 05 LMP When I get down under the 12-inch layer, the surface is much harder to dig through. (8)(SAMP SESC 15013)

06 04 06 15 LMP Looks like more of that black glass fragments. Much more cohesive down about - (8)(SAMP SESC 15013)

06 04 06 33 LMP Well, we ought to get a good sample at the bottom of this. (8)(SAMP SESC 15013)

06 04 06 39 LMP Boy, it's easy to make a flat bottom because it's - so hard. I can see why Dave had a hard time digging through it - going through it now. (8)(SAMP SESC 15013)

- - -

06 04 07 39 CDR Okay. Change 16. (8)(PHO DAC)

06 04 07 55 CDR Okay. It looks like the Echo magazine worked okay. (8)(PHO DAC)

06 04 08 10 CDR Yes, sir. That's from me, and I'm going to put Foxtrot on the 16. (8)(PHO DAC)

- - -

06 04 08 35 CC Jim, that's a beautiful trench. Let's stop with that one and document it. We'll want samples from the bottom please. (8)(SAMP TRENCH SESC 15013)(PHO 92 12439-42)

06 04 08 42 LMP Say, I think I've hit bedrock. I think I've hit the bedrock! Okay, Dave, here you are. (8)(SAMP TRENCH SESC 15013)

- - -

06 04 09 26 LMP I'll take a break while you photo, Dave. Probably a good idea. (8)(SAMP TRENCH SESC 15013)

- - -

06 04 09 27 LMP I really do think I'm almost down to bedrock. It really is hard. (8)(SAMP TRENCH SESC 15013)

06 04 09 28 CDR Good idea. I'll come do some photo *** oh, that's a neat trench. (8)(SAMP TRENCH SESC 15013)(PHO 92 12439-42)

- - -

06 04 10 11 CDR It looks like it has a little color change down there, too. (8)(SAMP TRENCH SESC 15013)

06 04 10 14 LMP Yea, maybe a slight. Seems to get a little darker, a lighter and a little darker. (8)(SAMP TRENCH SESC 15013)

06 04 10 35 CDR I have the photos. (8)(SAMP TRENCH SESC 15013)(PHO 92 12439-42)

06 04 10 36 LMP Walls are just about vertical on the trench, Joe. (8)(SAMP TRENCH SESC 15013)

06 04 10 40 CDR Okay, we need an SESC. (8)(SAMP TRENCH SESC 15013)

06 04 10 43 CDR Three quarters full. (8)(SAMP TRENCH SESC 15013)

- - -

06 04 10 52 CC Okay, Dave and Jim. Jim, we think you can collect the samples here pretty well. And, Dave, in order to get that drill task accomplished, we're going to have to get you started on that shortly. (8)

06 04 11 07 CDR Okay, I - he can't get the SESC very well by himself, I don't think, Joe. It's tough for two of us to get. (8)(SAMP TRENCH SESC 15013)

06 04 11 20 CC Okay. When you finish that, press on with the drill. (8)

06 04 11 28 CDR Okay, I need another scoop. (8)(SAMP TRENCH SESC 15013)

06 04 11 37 CC And while you're looking down in there, how deep do you think it is now? (8)(SAMP TRENCH SESC 15013)

- - -

06 04 11 59 CDR Oh, I'd say it's 14-16 inches deep, Joe. (8)(SAMP TRENCH SESC 15013)

- - -

06 04 12 23 CDR White clast in there. A little bit more; keep coming. Good job. (8)(SAMP TRENCH SESC 15013)

06 04 12 32 CDR Yes, sir. We got 75 percent full. (8)(SAMP TRENCH SESC 15013)

06 04 12 35 LMP Okay, you're going to leave me, and I'll sample it myself. I guess I'll fill the bags myself then. (8)(SAMP TRENCH 15030-34, 40-44)

- - -

06 04 13 02 CDR Oh, yes. Guess what yes, I - oh, I think I can *** (8)
 Joe'll talk me through it. Hey, which bag do you
 want to put the SESC in, Joe, while I got it here?
 I'm sure you've been thinking of that. Ho. I
 didn't figure I'd get it. Yes, I'm going to toss
 this one in there - -

- - -

06 04 13 46 LMP Okay, Joe, I'm going to do a little sampling of the trench. (8)(SAMP TRENCH 15030-34)(PHO 92 12417-19, 39-43;
 88 11872-77)

- - -

06 04 14 34 CC Dave, is the SESC stowed now? (8)

06 04 14 39 CDR Oh, it's in a seat pan right now; we'll get to it later, Joe. (8)

- - -

06 04 15 26 LMP Okay, Joe. The soil sample from the bottom of the trench is in 252. (8)(SAMP TRENCH 15030-34)

- - -
06 04 16 13 LMP Joe, I'm going to skip sampling the - side, I'm just (8)(SAMP 15040-44)(PHO 92 12417-19, 39-43; 88 11872-77)
going to sample the top over here.

- - -
06 04 17 16 LMP Okay, Joe; on the top of the trench, 253. (8)(SAMP 15040-44)

- - -
06 04 21 48 CC Beautiful. And, Dave, you might check your film (8)(PHO DAC)
mag, if you're back at the Rover now - see if it's
run out, and I'm talking about the DAC - -

06 04 21 56 CDR No, it wouldn't have gone - run out by now, Joe. (8-LM)
That's what I'm saying. It wouldn't have run out by
now. I just turned it on; 12 frames per second, and
it looks like it's 90 percent gone.

- - -
06 04 27 15 LMP Okay, I ought to be collapsing the trench sides - I (8)
hope.

06 04 27 47 LMP Okay, I'm about 4 inches out from the side of the (8)
trench.

06 04 28 05 LMP And I'm pushing. It's bottomed out - - with a (8)
slight amount of collapse.

06 04 28 12 CC It won't collapse? (8)

- - -
06 04 28 13 LMP No, I'm continuing to push. Yes, it's collapsed! (8)

06 04 28 23 LMP I'll take quick pictures there, so you can see the (8)(PHO 92 12443)
locations of all those.

- - -
06 04 30 31 CC And, Jim, we want to end your tasks here, and we (8)
want you on the Rover, too, please.

06 04 30 41 LMP Let me take a few pictures here, and let me walk back. I can get there faster. (8)

06 04 30 45 CDR Get pictures of the drill will you, Jim? Take notes. Hey, just south of the drill, I really need a - I already did a pan here. Get your trench and get a couple of pictures of the drill to show its position. (8-LM)
(PHO 92 12420-38)

- - -

06 04 32 17 CDR Okay, Joe, I'm back at the LM. (LM)

06 04 33 11 LMP Hey, Dave, you do have some cores now to go in the SRC. Is that right? (LM)

06 04 33 18 CDR No, Jim, I didn't get them out yet. (LM)

06 04 33 19 LMP Okay. Well, I guess I'll go ahead and put the bag - that I have here in SRC 2. (LM)

06 04 33 28 CC Jim, if you can get the SESC in there that would be great, and then go ahead and close out that rock box. (LM)

- - -

06 04 36 00 CC And, Jim, are you packing the rock box yet? (LM)

06 04 36 07 LMP Yes, I am. (LM)

06 04 36 08 CC Roger. Did you happen to get a number off the SESC? (LM)

06 04 36 18 LMP No, I didn't, but - shoot, you ought to be able to track that one, Joe. (LM)

- - -

06 04 42 27 CDR Okay, got some more rocks on the seat pan, too, Jim. (LM)

- - -

06 04 43 17 LMP I'll come over and pick up those other rock samples. (LM)

06 04 43 33 CDR Okay, Joe, the AGC says you ought to have a picture. (LM)

06 04 43 37 CC We've got a beautiful picture. (LM)

- - -

06 04 44 51 LMP Okay, Dave, I've got all the rock samples *** (LM)

06 04 44 55 CDR Okay. Get the ETB and get all our film. (LM)

- - -

06 04 46 49 CDR Okay. Okay, Joe, mag Kilo is in the - somebody's (LM)
camera with a mag on it.

06 04 47 12 CDR Mag Lima is in the ETB; mag November, mag Delta, mag (LM)
Echo.

06 04 47 57 LMP Here's a camera, Dave. (LM)

06 04 48 01 CDR Okay. CDR camera with mag Oboe. (LM)

06 04 48 51 CDR Mag Metro. (LM)

- - -

06 04 50 21 CDR Well, we're just about done here. Mag Foxtrot into (LM)
the ETB. Get everything you needed out of the -
your seat pan?

06 04 50 32 CDR Got all the rocks? (LM)

06 04 50 33 LMP Yes. (LM)

06 04 50 34 CDR Okay. Guess I got all of the film. (LM)

06 04 50 56 CC Roger, Jim. At your leisure, we'd like for you to (LM)
deploy the American flag, please.

06 04 51 06 LMP Okay. Hey, we ought to keep that camera out, Dave. (LM)

- - -

06 04 51 18 LMP One with a color magazine. That is black and white, (LM)
though.
- - -

06 04 55 33 CDR Okay. Okay. Okay. I've backed up here so I get (LM)(PHO 92 12444-47)
all of that in there. There, that's good. Good.
Got the mountain, got the LM. Great.

06 04 56 32 LMP Okay. Oh, that is a good picture. (LM)

06 04 56 35 CDR Isn't that a neat picture? (LM)
- - -

06 04 56 54 LMP Okay, I'm taking you again, boss. (LM)(PHO 92 12448-51)
- - -

06 04 57 07 CDR You like that flag there, Joe? (LM)

06 04 57 10 CC It's beautiful. (LM)

06 04 57 15 CDR Yes. We think it's pretty nice, too. (LM)
- - -

06 04 59 36 CDR Oh, Jim, the maps. I almost forgot the maps. (LM)

06 04 59 45 CC Roger, Dave. I think you still need the mag from (LM)
the DAC and from the 500-millimeter camera.
- - -

06 04 59 54 CDR No, they're both in here, Joe. And I called them (LM)
both out. Both tucked away in ETB.
- - -

06 05 06 35 LMP I'm in. (LM)
- - -

06 05 08 51 CDR Okay. The SRC is in, Joe. (LM)

06 05 11 50 CDR Okay. I'm going to just carry the rock bags up. (LM)
It's a lot easier.

06 05 14 05 CDR I know. But what rock bag did I just give you? (LM)

06 05 14 09 LMP It's number 6. (LM)

06 05 14 16 CDR The ETB is in, Joe. (LM)

06 05 18 51 LMP Okay. Dave is coming up now. (LM)

06 05 26 14 LMP Cabin repress, closed. (LM)

* * * * BETWEEN EVA 2 AND 3 * * * *

06 07 32 13 CC Okay. Here's - on the black and white mag column (BETWEEN EVAS)
which - it has VV and WW, add Roger Roger.

06 07 32 43 CC Okay, Dave. You're down quite a bit. Scratch the (BETWEEN EVAS)
black and white magazine Mike Mike that was on the
500. Leave that onboard the LM, and you can use WW,
which is on the next line up there, for the 500
millimeter. Add two more 16 millimeters, Golf Golf
and Hotel Hotel.

06 07 33 12 CDR Okay. So far I've added Roger, scratched Mike, and (BETWEEN EVAS)
added Golf and Hotel in the 16.

06 07 33 19 CC Okay. You can use WW on the 500. (BETWEEN EVAS)

- - -

06 07 57 03 CDR Yes, we are too, we're - got a little over 100 (BETWEEN EVAS)
pounds today. Got up the side of the mountain. Got
a good look around. Things are going real well.
Oh, man, it was super, just super. We got some
great pictures for you. Yes, I tell you, I hope you
can see these Rover tracks, because outside the LM
here, it looks like a freeway.

- - -

06 16 26 31 CC And, Dave and Jim, basically the EVA is going to (BETWEEN EVAS)
last somewhere between 4 and 5 hours, so it will be
a short EVA. I'm told that we checked off the 100
percent science completion square sometime during
EVA 1 or maybe even shortly into EVA 2. From here
on out, it's gravy all the way, and we're just going
to play it cool, take it easy, and see some
interesting geology. It should be a most enjoyable
day. Over.

- - -

06 17 36 49 LMP Okay, Joe. Our inventory shows that we do not have (BETWEEN EVAS)
any more color mags available. Can you check your
inventory down there?

06 17 37 33 CC Hadley base, this is Houston. We think, Jim, that (BETWEEN EVAS)
mag Tango Tango is on your camera in the ETB now,
and Tango Tango is color. Over.

- - -

06 17 38 46 LMP Joe, this is Jim. We confirm. We do have color on (BETWEEN EVAS)
my camera.

- - -

06 18 48 45 CC Okay. Roger, Hadley base. Taking it from the top, (BETWEEN EVAS)
we're going to ask you to stop first at the ALSEP
site and spend a few minutes recovering the
successfully drilled core tube and, then follow that
with the Grand Prix photography. From there press
on towards Station 9, as planned. We're going to
skip the Delta stop in between. Station 9 is
exactly as we planned it. From Station 9, up to
Station 10, exactly as we planned it, and at Station
10, we're going to hit a branch point. We can
update you there when you arrive at Station 10. The
two options are basically, to head north for the
complex, although we think it's more probable we'll
just want to loop back towards the north across
Alligator Chain doing good mare sampling, and wind
up at Quark West crater, that's the western crater
of the Quark triplet, and use that as a Station 14
stop. Over.

06 18 50 07 CDR Okay. I guess we'll proceed on to Station 10 and (BETWEEN EVAS)
take a look at it there. I'd sort of - would like
to get up to the North Complex if we can.

- - -

06 19 29 06 CDR Okay. I'm out. (LM)

- - -

06 19 31 20 CC And, Dave, while you're waiting. A word about the (LM)
polarimetric filter. We are going to ask you to
pick that up from the MESA and put it on your camera
from the very first. We've got a dandy spot for you
to do some polarimetric photographs later on.

06 19 31 38 CDR All righty. Okay, I'm heading down, Jim. (LM)

- - -

06 19 32 10 LMP Sure. Okay, if you're clear, I'll come down. (LM)

- - -

06 19 35 41 CDR Okay, Houston. Into the CDR's footpan goes mag (LM)
Union.

06 19 36 00 CDR And we got a little bit on November, so we brought (LM)
that along. Organized here.

06 19 36 28 CDR The LMP's camera with Tango. (LM)

06 19 36 39 CDR CDR's can go - camera with Sierra. (LM)

06 19 36 52 CDR Mag Romeo. And mag Whiskey, which I'll put on the (LM)
500.

- - -

06 19 39 16 CDR Okay. Understand, Joe. And into the ETB go (LM)
16-millimeter Hotel, Juliet, and Golf.

06 19 39 43 CDR Item. And we'll put Foxtrot on the camera. (LM)

- - -

06 19 40 51 CDR Okay. I'll give you your maps so you can put them (LM)
on.

06 19 41 05 CC Dave, a reminder to pick up the polarimetric filter (LM)
when you're at the MESA.

- - -

06 19 42 58 CDR Okay, Joe; I have the polarimetric filter. (LM)

06 19 43 02 CC Okay, Dave, and just plug it on to your camera at (LM)
your convenience. You'll want to change the
exposure time to 1 over 125, and you might call out
the filter position.

- - -

06 19 46 09 LMP Joe, we have bag 7 on the lefthand side of the tool (LM)
carrier and bag 2 on the right side.

- - -

06 19 46 22 CC - - if it's easy to do just keep bag 2 under the (LM)
seat and follow your checklist normally. Bag 2 is
just an extra bag for us.

06 19 46 46 LMP We still have some tools in bag 2, Dave. I'll just (LM)
leave that bag there and put bag - our last
collection bag under my seat.

- - -

06 19 47 36 CC Jim this - - is Houston. We prefer bag 2 under your (LM)
seat shelf and bag 7 on the handtool carrier,
instead.

06 19 47 47 LMP Well, bag 7 is Dave's bag. It's on the left side. (LM)
It's just a question of which one you want on the
right side. In other words, which one do you want
on me?

06 19 47 57 CC Jim, bag 8 on the right side, please. And that's a (LM)
new bag.

06 19 48 03 LMP Okay, and you want bag 2 under the seat? (LM)

06 19 48 05 CC That's right, exactly. And then we can follow the (LM)
checklist exactly from here on in.

06 19 48 24 LMP So bag 2 is under my seat. Some of Dave's (LM)
equipment. I'm putting bag 8 on the right side of
the tool carrier.

06 19 49 02 LMP Got a lot of sample bags, Dave. I'm going to put (LM)
the extra ones under my seat.

- - -

06 19 54 18 LMP Give me bag number 8. I'm just closing the top on (LM)
this one.

- - -

06 19 57 32 CC Dave, while you're getting buttoned up there, when (LM)
you move out to the drill site, we'll want you to
photograph the collapsed material in the trench and
do a photo pan around the core there. And, Jim,
maybe you can see if you can pull the core out of
the ground while Dave's doing that, and then he'll
give you a hand.

- - -

06 19 58 11 LMP One thing, Dave, before you leave. (LM)(PHO 88 11863)

- - -

06 19 59 43 LMP Hope you took a couple because the first one was (LM)(PHO 88 11864-66)
probably exposed.

- - -

06 20 00 47 CDR We got mag Fox. Mag Fox on the 16. (LM)

- - -

06 20 01 09 CDR I can't get the polarimetric filter on right now. (LM)
I'll work on that.

06 20 01 28 CDR Okay. Too bad, because it just won't go on. It's - (LM)
such a tight tolerance on that thing anyway.

06 20 01 43 CC Your judgment, Dave. It's not going on, give it a (LM)
toss.

06 20 01 49 CDR Well, I think maybe it's so sticky I can - when we (LM)
get to where we need to do it, why, maybe I can just
stick it on there, because it's sticking pretty
good.
- - -

06 20 04 13 CDR And we're rolling. (LM-8)
- - -

06 20 05 02 CC Dave, while you're driving there, we're going to (LM-8)
want you to take apart our core stems. We'll have
Jim pack them away in bag 2, which is under his
seat, and then we'll do the Grand Prix photographs
before we start driving off toward Station 9.
- - -

06 20 19 02 CC Jim, we need pictures of your beautiful trench there (LM-8)(PHO 88 11867-77)
and the collapsed wall. And we'd like, I guess, a
photo pan around this remarkable core hole.
- - -

06 20 21 44 LMP Okay. I'm going to take these pictures that Joe (LM-8)(PHO 88 11867-77)
requested. And if you need any help, just holler,
and I'll be right back.

06 20 21 50 LMP Because I'm right here. Here's my trench now. (8)

06 20 22 22 CDR Okay, Joe. On the drill top end goes Alpha. (8)(SAMP CORE 15001-06)(PHO 88 11867-71, 78-81)

06 20 22 34 CDR On the bit goes Beta. (8)(SAMP CORE 15001-06)

06 20 23 00 LMP Okay. I have the photos of the trench. Did you say (8)(PHO 88 11872-77)
you wanted a pan from this location, Joe? (PHO 88 11878-81; 82 11047-64)

06 20 23 07 CC Roger. (8)

06 20 24 16 CDR Golly, there's some stuff in there. (8)(SAMP CORE 15001-06)

06 20 24 24 CDR Coming. Okay, Joe. On the top section goes (8)(SAMP CORE 15001-06)
Charlie.
- - -

06 20 24 43 LMP I grabbed your camera, Dave. (3)(PHO 82 11047-64)

06 20 24 45 LMP Mag's jammed *** (3)

06 20 24 55 CDR Okay. Hey, Joe, what bag do you want these core (8)
stems to go in?

06 20 25 00 CC Bag number 2, Dave. (8)

06 20 25 04 CDR Bag number 2 doesn't have any pockets. (8)

- - -

06 20 25 23 CC Negative, Dave. That's an extra bag now, and we'll (8)
keep that in mind.

06 20 25 50 CDR Okay. Delta is the cap on top of the next section. (8)(SAMP CORE 15001-06)

- - -

06 20 26 56 LMP Okay. The pan's complete here, Joe. (8)(PHO 88 11878-81; 82 11047-64)

06 20 27 02 CDR I think I'll take advantage of the time and put a (8)
black and white on my camera.

06 20 27 12 CDR You have a new mag on there today, Jim. It couldn't (8)
have been the one that failed yesterday.

06 20 27 17 LMP No, I had the color mag on there, TT. That's the (8)
one that was on there yesterday.

06 20 27 20 CDR No it wasn't, either. TT is brand new. (8)

06 20 27 23 CC That's right, Dave. Tango Tango is a brand new mag. (8)

- - -

06 20 30 49 CDR Okay. Thank you. Okay. Cap number echo *** the (8)(SAMP CORE 15001-06)
next section. Okay. Now, old buddy, if you think
you can have some luck taking that off - I'll tell
you what, got to break it again.

- - -

06 20 33 05 CDR Take that and the end of your right hand should come (8)(SAMP CORE 15001-06)
through, while I work on the rest of them here.
Okay. Foxtrot on the next section.

- - -
06 20 35 43 CC Dave and Jim, put that section on the ground, if you (8)(SAMP CORE 15001-06)
would, please. We'll pick it up on the way back.
And we want you to continue on with the Grand Prix.

- - -
06 20 36 08 CDR Yes, I think probably so. I don't know where we're (8)
going to put it in the Command Module. I'll think
of something. Let me see. Let me put it someplace
where we don't ding it. There's no place to put it.
I'll lay it right here on the treadle. I guess we
ought to take it back. There's more time invested
in that than anything we've done. Okay. Get your
camera.

- - -
06 20 36 59 CDR Got a good mag? Why don't you check it out and see (8)(PHO DAC)
if it runs.

06 20 37 01 LMP I did. I checked it out at 1 foot per second (8)(PHO DAC)
earlier.

06 20 37 06 LMP I'll give it a short burst here. (8)(PHO DAC)

- - -
06 20 44 44 CC Okay, Dave and Jim. That was a good try. Let's (8)
press on towards Station 9. Let's take a good clean
comfortable look at that Rille.

- - -
06 20 45 52 LMP I'll get those to you, Joe. Starting with heading (8)
72.

- - -
06 20 47 36 LMP Okay. Rover read-outs, Joe: 72 on bearing; (8)
distance, .2; range, 0; amp-hours, 90, 95, 100, 105;
and motor temps are still off-scale, low.

06 20 48 06 LMP Give me a heading - head west, man. We're heading (8)
toward Station 9. Head about - -

06 20 48 15 CDR Oh, I'd say 270, until they give us an update. (8)
- - -

06 20 48 20 CC - - Jim. 265 - - (8)

06 20 48 21 LMP Head a little to the north - - (8)

06 20 48 22 CC - - to 270 - - for about 1.8 clicks. And just enjoy (8)
it.

06 20 48 28 LMP And we're moving. (8-9)

06 20 48 29 CDR Yes. We're going around the ALSEP, too. (8-9)

06 20 48 35 CDR Yes. It's too bad the camera didn't work because (8-9)
there was some neat bumps there.

06 20 48 42 CDR Is that a glass ball right there? (8-9)

06 20 48 43 LMP Yes. (8-9)

06 20 48 44 CDR Right on top of the surface - - about 2 inches or (8-9)
so.

06 20 48 47 LMP There's several here. Here's one over at 1 o'clock. (8-9)

06 20 48 50 LMP Almost like a black spherule of glass. (8-9)

06 20 49 02 LMP Okay. We're heading - right now we're heading - (8-9)
swinging around more to the west. We're heading
270. Range, .1.

06 20 49 17 CC And shortly you'll be passing the Quark triplet (8-9)
that's on your right, probably, and we'll most
likely be directing you back towards the western
crater in that triplet for some mare sampling
towards the end.

06 20 49 36 LMP I see them and they look rather fresh. There's a (8-9)
lot of angular light-colored blocks - fragments on
the rim, Joe. So, mark our position here; we're
bearing - 110 and range, .2.

06 20 50 08 LMP We dropped into a shallow depression there, and that (8-9)
was the Quark triplet there on the northwest side of
that shallow depression.

06 20 50 17 CDR Ooo, but look at this nice, little, new fresh one. (8-9)

06 20 50 20 LMP Yes. But there're not too many fragments on the (8-9)
rim.

06 20 50 24 CDR No. You're right. Oh, there's a *** - - (8-9)

06 20 50 27 LMP There's a very large depression in ahead of it. (8-9)

06 20 50 31 LMP We don't want to drive through that. (8-9)

- - -

06 20 50 36 CDR Let's take a look at it. Look at the big boulder (8-9)
there, Jim.

06 20 50 42 CDR About 3 feet, angular. (8-9)

06 20 50 43 LMP A very large depression here. I'd say, let's go (8-9)
north of it.

- - -

06 20 50 45 CDR Yes, I think your right. (8-9)

06 20 50 50 LMP Oh, yes. I can't - I really can't tell how wide it (8-9)
is, but at the very shallowest - or the deepest
portion of it, it looks like there's a crater.

06 20 51 01 CDR I get the idea that it's - it looks collapsed north (8-9)
to south, doesn't it? Sort of looks elongate.

06 02 51 25 LMP Let's see, we're going about 8 clicks. And we're (8-9)
kind of dropping down as we go around the - and
we're heading 320 - we're - on the northeast rim of
this very shallow depression. By shallow, it - the
slopes are probably 3 degrees. And I guess the - at
the deepest part there, it's probably - oh, 200 feet
deep. Right now, we're on the north side of that
depression.

06 02 52 11 LMP Yes. Now, we're swinging around to the west, (8-9)
heading, 270. Heading right towards Bennett Hill.
Dave, I'm going to call that big crater, Wolverine.

06 20 52 42 LMP Okay, bearing is 113, and we're at .6. (8-9)

06 20 52 47 CDR There's another big one, Jim. Whoo, and look at (8-9)
that rock over there.

06 20 52 53 LMP Sitting right on the surface - - a black angular (8-9)
frag on the northwest - side about one-quarter of
the way down - - into the crater. But, a very
subdued crater. That block is - -

06 20 53 09 CDR Isn't that something? We're going to drive right by (8-9)
it, anyway.

06 20 53 15 CC And, Jim, don't hesitate to fire off pictures right (8-9)
and left here. We've got lots of film.

06 20 53 22 LMP Oh, I wish I could, Joe. (8-9)

06 20 53 31 LMP Okay, we've stopped. (8-9)

06 20 53 32 CDR Just for a second though. (8-9)

06 20 53 34 LMP You getting them? (8-9)

06 20 53 44 CDR Got it. (8-9)

06 20 53 48 LMP Okay, we're moving. (8-9)

06 20 53 51 CDR Hey, that's something, isn't it? I bet it chipped (8-9)
that hole, Jim. It went right in - it came from
that - it made that crater there. And it came from
250 - I mean 070. That angular projectile about a
foot across, Joe, had made a secondary about a meter
across, and it came from a 070 heading. I bet you
anything, because the - oh, that was neat. One part
of the frag was covered with glass, and the central
part of the crater was covered with glass.
Obviously a secondary, and obviously made by that
angular frag.

06 20 54 32 LMP Dave, we've got another shallow depression here up (8-9)
ahead. And I don't know whether - I'd say, we'd be
better off staying to the north, wouldn't you?

06 20 54 39 CDR I don't know. We're making good time. (8-9)

06 20 54 40 LMP Okay. Let's - - (8-9)

06 20 54 42 LMP - - let's go through it then. (8-9)

06 20 54 43 CDR There's a big - there's a big - - (8-9)

06 20 54 45 LMP A fresh one out at 1 o'clock. (8-9)

06 20 54 47 LMP A very - it looks like a large fresh one. There are (8-9)
a lot of angular, light-colored blocks on its rim.
Yes - - we're going through there huh?
- - -

06 20 55 03 CDR Down here to the left, it looks pretty flat. (8-9)

06 20 55 04 LMP Okay, we're heading through another shallow (8-9)
depression, similar to the last large depression
that we described. What's that fragment at 12
o'clock to us? Another piece of glass, I suppose.

06 20 55 17 CDR That shiny one here? (8-9)

06 20 55 18 LMP Yes. Another glassy fragment, angular - about 3 (8-9)
inches long, sitting right on the surface.

06 20 55 31 CDR And, you know, it's really - the surface is smooth, (8-9)
but its pretty rough out here. Smooth on a small
scale, and there's lots of - you really could get
lost here. Yes. Up and down.

06 20 55 47 LMP Up and down. Yes. It was great going uphill. (8-9)
Going up to the Front, you could always look back
and see the LM. It's like driving over the big sand
dunes in the desert.
- - -

06 20 56 05 CC Roger Jim - - pretty description. And you're (8-9)
looking for NAV readings of 1.8 clicks at 088, when
you're at Station 9.

06 20 56 15 LMP Okay, we're now on range. Bearing 101. And now (8-9)
there's another very large shallow depression. And,
Dave, they're all about the same size.

06 20 56 26 CDR Yes, you're right. Go around the south of this one. (8-9)

06 20 56 31 LMP I think they're the first really shallow (8-9)
depressions, they're very subdued craters we've
seen. And there are just three in a line that run
east-west.

06 20 56 40 CDR Yes, I'd say, they're probably about 100 meters (8-9)
across and maybe - what, 25 - 10, 15 meters deep?

06 20 56 48 LMP Yes. (8-9)
- - -

06 20 56 56 LMP Well, I thought we'd whip right over to the Rille. (8-9)
I didn't think we'd have this type of terrain.

06 20 57 11 LMP Look at that rock over at - oh, 1 o'clock. It's (8-9)
right - well it was on the horizon; like kind of a
pedestal.

06 20 57 18 LMP You can see a lot of them right on the horizon. (8-9)
Okay. We probably want to - when you can, Dave,
swing around to the west; we're going a little too
far south here.
- - -

06 20 57 45 CDR Roger. We're doing good. We're 092, now; heading (8-9)
slightly south.
- - -

06 20 58 02 LMP I was thinking, you know, just a good sample point (8-9)
- - along the rim. And, we can - minimize the
distance.
- - -

06 20 58 28 LMP I think I can see the far side of the Rille, now. (8-9)

06 20 58 32 CDR I think we're coming up on the rim of it. (8-9)

06 20 58 50 CDR Take a little jog over here to where it's a little (8-9)
smoother.

06 20 58 54 CDR It's a steep slope, isn't it? Yes, I think we can (8-9)
make it. No, it's another fresh crater.

06 20 58 59 LMP Yes, fresh crater. And, you do kind of get the (8-9)
impression there's a rille - or a rim here.

06 20 59 06 LMP A levee. Off to the left there, the higher part. (8-9)

06 20 59 12 LMP There's a rough one - rough terrain ahead of it. (8-9)

06 20 59 17 LMP We dropped down into another little valley. There's (8-9)
another one of those shallow depressions off on at 1
o'clock. Right now our bearing is 89, range 1.4.

06 20 59 29 CDR Look at this one, Jim. It must be - holy cow. This (8-9)
must be - I'm going to go around to the left here.
Yes. Towards the right, there's - fairly smooth on
the right. Yes, it's closer here.

06 20 59 45 LMP Okay, we're heading down into another depression. (8-9)
It has oh, one, two, three other recent craters.
The one of the southern rim looks to be the most
recent. In fact, it's kind of a doublet with a
smaller crater in the north rim of it.

06 21 00 03 CDR Well, look at the two here. Yes, this one. (8-9)

06 21 00 04 LMP Another doublet there on the left. (8-9)

06 21 00 10 LMP Okay; we're heading, 087. Right now, we're heading, (8-9)(PHO 82 11065)
2 - oh, about 250. Range, 1.5. Boy, look at the
fresh blocks ahead of us.

- - -

06 21 00 34 LMP I was going to say, that's probably Scarp crater. (8-9)

06 21 00 36 CDR Good fresh one. (8-9)

- - -

06 21 00 39 LMP It sure kicked up a lot of rocks. You - what are (8-9)
you going to do, go on the north side of it?

06 21 00 44 CDR I want to take a look and see if that's it. Yes. (8-9)
 Boy, it's really fresh with a lot of debris. Nice
 ejecta blanket. Nice ejecta blanket. Good typical
 one. That's Scarp. And we're 088 for 1.6. I'd say
 this is probably Scarp crater, wouldn't you?

06 21 01 09 LMP I would, because we can definitely see the far side (8-9)
 of - - the Rille now.
 - - -

06 21 01 44 LMP And we can definitely see the west side of the Rille (8-9)
 from here.

06 21 01 49 LMP Probably see - oh, 10 to 15 percent of the far side. (8-9)
 - - -

06 21 01 59 LMP And the reading, 267, 088, 2.2, 1.6, 90, 92, 100, (9)
 108, and motor temps are still low.
 - - -

06 21 04 00 CC And, Jim - - do you want some help on that (9)
 70-millimeter camera malprocedures?

06 21 04 09 LMP Well, I'm holding the trigger depressed and (9)
 advancing the film, manually, to see if it'll - -
 kick over. But it's not. I guess - it's not
 working. I guess, the only thing I could do at this
 point is change the mag.

06 21 04 26 CC Jim, before you do that, could - try rotating the (9)
 lens in front. It may be hung up between detents.

06 21 04 38 LMP Okay, I'll try that. You mean the locking device on (9)
 the lens itself?

06 21 04 42 CC That's right. (9)

06 21 04 49 LMP No, it's locked. Dave, you want to take the time (9)
 here to let me change the mag?
 - - -

06 21 05 01 CDR Yes, why don't you try it Jim? (9)

- - -

06 21 05 09 CDR I'll get a pan from the rim of Scarp. And the rim (9)(PHO 82 11066-92)
is very, very soft. My boot sinks in a good - if I
push on it, a good 4 inches. And the whole center
part of the crater is just full of debris. Very
angular, glass in the center. It's about - oh - I
guess, 40 meters across and maybe 5 or 6 meters - no
- not that much - 3 or 4 meters deep. And a
slightly raised rim. An ejecta blanket that goes
out about one crater diameter, quite uniform. I
don't see any rays. There are slickensides on some
of the fragments. And we'll get the sample in a
second here.

06 21 06 38 CC Jim, you might try cycling that camera without a mag (9)
in it, if we've caught you in time here.

- - -

06 21 07 06 LMP Yes, I think the camera's working, Joe. I'm going (9)
to put mag Romeo on.

- - -

06 21 07 51 CDR There's a little bench in the bottom of Scarp (9)(PHO 82 11095-97)
crater, halfway up - about a tenth the diameter of
the crater. And it's only in - and it seems to be
all the way around, somewhat irregularly.

06 21 08 13 CDR Okay, I'm going to get a couple of samples from the (9)(SAMP 15510-15)(PHO 82 11093-94, 98-100)
rim here - on the surface. Oops, the first one I
tried to pick up, just fell apart. Get a couple
pieces of it. Won't be able to look at it for you,
but I'll bring it home. It's a clod - it's just a
caked clod. And it's in 273.

06 21 08 42 LMP I'll come over there, Dave. I put on the other mag; (9)
it doesn't work. I think the shutter's working on
the camera, but the drive is not.

- - -

06 21 08 55 CDR Okay. This stuff is really soft; 273. (9)(SAMP 15510-15)(PHO 82 11093-94, 98-100)

- - -

06 21 09 27 LMP Well, if you want, Dave, I can take your camera and (9)
do all the documentation pictures.

06 21 09 30 CDR No, I can do it just as well. Look at that, there's (9)(PHO 82 11101-04)
slickensides on that one. Okay. Get some on the
rim.

06 21 09 43 LMP Boy, this is - well, you've probably commented - (9)
sure is a unique crater. Unique - that we've seen
so far.

06 21 09 55 LMP Very soft on the rim. (9)

06 21 09 56 CDR Isn't it, though? (9)

06 21 10 11 LMP Boy, you sink in about 6 inches. (9)

06 21 10 14 CDR Just like big pieces of mud, don't they? Okay, (9)
let's take a couple of steps out the rim here. I
got one on the rim.

06 21 10 25 LMP You did get the sample already? (9)

06 21 10 27 CDR Yes. Let's go down here - you know - a ways out in (9)(SAMP 15500-08)(PHO 82 11105-09)
the ejecta, and see if we can get a couple more.
Here's a nice big one. It's too big for the bag.
There's so much sparklies in it, Jim. Think we can
get that in the bag? I'll try.

06 21 10 56 LMP You know, this has the appearance of those small (9)(SAMP 15500-08)
ones that we sampled, with the exception, there's no
concentration of glass in the very center, except
every fragment has glass on it.

06 21 11 06 CDR That's right. Well, not every fragment, many of (9)(SAMP 15500-08)
these clods don't have any at all. Most of them
don't have any glass. Get that one there. Get me a
- oh, you got a bag, okay. Just a second here.

06 21 11 54 CC Dave and Jim, this is Houston. When you finish (9)
this, we suggest you move over closer towards the
rim of the Rille.

06 21 12 07 CDR Roger, Joe. Bag number 255. Covered with dirt, but (9)(SAMP 15500-08)
it looks just like a big piece of glass.

06 21 12 16 LMP You want me to put some fines in with this, Dave? (9)(SAMP 15500-08)

06 21 12 18 CC Roger, Jim, throw in a little soil there, please. (9)(SAMP 15500-08)

06 21 12 29 CDR You get - don't mess up where the rock was, but pick up that little glass ball next to you, too. See that little glass ball next to where you scooped up? (9)(SAMP 15500-08)

06 21 12 38 LMP To the left of it, you mean? (9)(SAMP 15500-08)

06 21 12 39 CDR Yes. (9)(SAMP 15500-08)

06 21 12 43 CDR Yes. That's all. That's it. Now we're about full. Bet you dropped it, Jim. (9)(SAMP 15500-08)

06 21 12 47 LMP Yes. (9)(SAMP 15500-08)

- - -

06 21 14 18 CDR Where's your camera? (9)

- - -

06 21 14 31 CDR Oh, yes. Let me take one crack at it here, before we go. (9)

- - -

06 21 15 31 LMP Yes, the shutter's driving, but the - it's not driving the film. (9)

06 21 15 47 CDR Want to carry it or chuck it in the - - (9)

06 21 15 49 LMP I think I'll just put it in the seat. (9)

06 21 16 28 CDR Joe, we'll try and see if we can - run your TV while we're running. (9)

- - -

06 21 16 50 LMP Ready. Okay, we're moving west. (9-9A)

06 21 17 03 CDR I'll be going about the same heading, Joe. Maybe you can - I'll just keep this heading and with any luck at all, you might be able to point out the Front and take a ride with us. Going slow. I see the camera moving. (9-9A)

06 21 17 17 LMP Boy, I - on the far side of the Rille there, Dave, I (9-9A)
 sure see layering - over at 1 o'clock.

06 21 17 24 CDR Okay, let's get up here first. Yes. Sure do. (9-9A)

06 21 17 38 CDR See if we can find one of the Twins here. (9-9A)

06 21 17 48 CDR *** get the feeling like we're coming up the Rille (9-9A)
 ridge line, don't you?

06 21 17 49 LMP I think the - *** one of the Twins was 30. There's (9-9A)
 a fresh one. That little boulder's *** good blocks
 down there.

- - -

06 21 18 12 LMP Good places all along here to sample - large blocks (9-9A)
 on this side of the Rille.

06 21 18 17 CDR Yes you're right. (9-6A)

06 21 18 18 LMP Look down there at 12:30. It looks like the block's (9-9A)
 there, almost in position.

06 21 18 23 CDR Sure do. That's a big outcrop. (9-6A)

06 21 18 26 CDR And we are on the terrace. And there is a terrace. (9-9A)

06 21 18 31 CDR Pretty good slope. (9-9A)

06 21 18 33 LMP We could probably drive down there, though. (9-9A)

06 21 18 35 CDR I think we can drive over - straight ahead, and stay (9-9A)
 on a fairly level contour. We don't want to - go
 down.

- - -

06 21 19 03 CDR Think that's rim crater, there. (9-9A)

- - -

06 21 19 17 CDR Yes. Think I'm going to park right up here. (9A)

- - -

06 21 20 54 CDR Certainly. We're off and stopped; and let me get on (9A)(PHO 89 12015-96)
with this task here.

- - -

06 21 21 02 CC Okay - - and, Jim, you may want to use Dave's camera (9A)
to record this on film, while Dave used - - the
500-millimeter camera.

06 21 21 14 LMP That's exactly what we're doing. (9A)

- - -

06 21 22 09 CDR I've got them right here; 90, 92 - the voltages, 68, (9A)
68; battery temperatures, 101 - and about 110; and
motor temps are off-scale, low. The bearing is 088;
the range is 1.8; distance, 2.5.

- - -

06 21 22 50 CDR I can see from up at the top of the Rille down, (9A)
there's - debris all the way. And, it looks like
some outcrops directly at about 11 o'clock to the
sun line. It looks like a layer. About 5 percent
of the Rille wall, with a vertical face on it. And,
within the vertical face, I can see other small
lineations - horizontal about maybe 10 percent of
that unit. And that unit outcrops along the Rille.
It's about 10 percent from the top, and it's
somewhat irregular; but it looks to be a continuous
layer. It may be portions of flows, but they're
generally at about the 10-percent level. I can see
another one at about 12 o'clock to the sun line,
which is somewhat thinner, maybe 5 percent of the
total depth of the Rille. However, it has a more
well-defined interior - internal layering of about
10 percent of its thickness. I can see maybe 10
very well-defined layers within that unit.

06 21 24 14 CDR As I go down the Rille, below this - okay - below (9A)
this upper layered - 10 percent - there seems to be
mostly debris in the order of large angular
fragments, maybe the largest being like 5 percent of
the total depth of the Rille. And then they
gradually break on down to very small fragments and
a talus slope. I see no significant collection of
talus at any level. It seems to be fairly uniformly

distributed in patches all the way down, to as far as I can see, to the bottom of the Rille. In looking on to my - 12:30 to 1 o'clock - on up the Rille - and, I guess we'll get a little closer, when we get down to sampling it down there. Why, it looks very much the same. Outcrops of this one unit, irregularly spaced, discontinuous, but along the general 10 percent of the top line; with the talus sliding down into the bottom of the Rille. I see no differences in color. However, the vertical section of the unit, which is exposed, looks to be somewhat lighter in gray. The blocks, which have fallen down into the talus, seem to have a more tan - or different tone of gray or color to them. Sort of like the fresh vertical section was more recently exposed. Let me - let you digest that for a minute, and let me take a bunch of 500's. I'll get you the vertical and the horizontal and - boy, there's lots of things to shoot at over there. Jim, where'd you take the pan? Right over here? (PHO 82 11110-27)

06 21 26 17 LMP There's a little circle on the ground. (9A)(PHO 82 11110-27)

- - -

06 21 26 44 CDR Okay. First, I'll get you a horizontal strip along the two outcrops. (9A)

06 21 27 02 LMP Okay, Joe. I just sampled a fragment here with a great number of vesicles about 2 millimeters in diameter. It's in 274. (9A)(SAMP 15528-29)(PHO 82 11119-20, 28-29)

06 21 27 24 CDR And, I'll get you a horizontal strip of the - I guess I have to say there is more accumulations of talus at about the 60 percent from the top level, that I can see, Joe. If I think about it for a minute, I can see more talus accumulation there, so that there might be some change in slope, but it's not apparent by looking at the slopes. And I'll get you a horizontal strip there. (9A)

06 21 28 10 LMP And down about - oh, 20 feet from where Dave's (9A)
 taking a picture, there's a block about 2 feet; it's
 almost rectangular. And, the top surface is covered
 with large vesicles. It almost looks like a contact
 there between a thin - that thin layer of vesicles
 and a more - a rock that's a little lighter in color
 with fewer vesicles. In fact, there's really
 horizontal orientation of the vesicles in this one.
 I'll take a closeup on it. (PHO 82 11130-32)

06 21 29 16 CDR Oh, and there's a - looks like a crater in the far (9A)(PHO 82 11130-32)
 wall, at about 9 o'clock to the sun line. It's a
 round, circular depression, almost doesn't look like
 the kind of crater that would occur in a slope like
 that. There's no buildup at the bottom. The rim
 seems to be fairly parallel to the slope of the
 Rille. Get that one.

06 21 29 51 CDR Horizontal strip across it. Horizontal strip above (9A)(PHO 82 11130-32)
 it, which should take in the upper 10 percent.
 Vertical strip through it.

- - -

06 21 30 14 LMP You are looking to the south along the rim, along (9A)
 this side of the Rille. Dave, could you comment on
 that horizontal bedding that's probably - oh, at
 least 1 kilometer south us? And higher elevation.

06 21 30 32 CDR On the other side? (9A)

06 21 30 33 LMP No, this side. (9A)

06 21 30 35 CDR No, I didn't even look on this side, to tell you the (9A)
 truth, Jim. I can see a couple of outcrops on the
 far side, which look like they might be in place at
 about the 40-percent level - of the Rille. Very
 large boulders with fractures in them, rounded.
 It's hard to tell whether they're really in place,
 but they may be in place covered by talus. And
 they're about 50 percent down. Let's see if there's
 any continuity to it. I can see some suggestions of
 continuity there. Jim, look at that. Well, it
 looks like the talus of fragments and fines is
 covering another layer or a suggestion of continuity
 of outcrops, which are rounded, at about the 40 to
 50 percent level down.

- - -
06 21 31 44 LMP You know, I'm really surprised - - that the bedding (9A)
is as obvious.

06 21 31 50 CDR Yes, it is. Yes. Okay, let's summarize your - oh, (9A)(PHO 89 12015-96)
frame number, yes; 76.

06 21 32 01 CDR I guess that'll do it for here. To summarize here, (9A)
I think we see from the top to the bottom, one
distinct layer about 10 percent, which has the
multilayers within it. And, another at about 40
percent, which looks like a solid unit of a somewhat
tanner hard rock, but it's covered with fines and
talus. And, we haven't seen to the bottom; I think
we'll get a chance to look further down on it.

- - -
06 21 32 43 LMP Yes, very soft there. (9A)

06 21 32 51 CDR I - stumbled over that rock. Okay. Ease that up (9A)
for me?

06 21 33 30 CC Okay, Dave - - you might check the lens; and, if it (9A)
looks reasonably clean, see if you could get the bit
of outcrop on the near side to the south.

- - -
06 21 34 04 LMP Joe, I'm documenting another rock - here that looks (9A)(SAMP FSR 15556)(PHO 82 11117-18, 33-35)
fairly - representative of what's - on the surface
here.

- - -
06 21 34 44 LMP See what I was talking about down there, Dave? (9A)

06 21 34 45 CDR No what do you see? (9A)

06 21 34 47 LMP I see a horizontal bedding. (9A)

06 21 34 49 CDR Oh, yes. I see what you're saying. Somewhat - (9A)
looks like it might be dipping very slightly to the
east.

06 21 34 57 LMP Yes. Right. You can see the exposed upper surface (9A)
of that layer.

06 21 35 02 CDR Yes. You're right. Yes, agree. Got it. (9A)

06 21 35 20 LMP *** you going to shoot some more, I'll go out and (9A)
get some more rocks there.

06 21 35 29 CDR Yes. Okay, that's enough 500 and - (9A)(PHO 89 12015-96)

06 21 35 35 LMP But I think we ought to - maybe either move (9A)
downslope - - to the large block.

06 21 35 42 CDR Yes. Let's go down there and sample. (9A)

06 21 35 44 CC Frame count, Dave? (9A)(PHO 89 12015-96)

06 21 35 46 CDR This time I'll look and make sure I don't fall over (9A)(PHO 89 12015-96)
some silly rock. 86, Joe.

- - -

06 21 36 09 LMP Why don't you head down, I'll be right behind you. (9A)(SAMP FSR 15557)(PHO 82 11110, 36-37)
I've got one more here I want to gather.

06 21 36 14 CDR Okay. Except I don't have a camera, so I can't do (9A)
anything. I'll go look - go look.

06 21 36 26 LMP Pick out one, and I'll come down and document it. (9A)

06 21 36 28 CDR Right. Let's - we'll just ease down to this outcrop (9A)
here in front of us. Good solid firm ground here,
Joe. Good footing. As you could probably see.

06 21 36 45 CDR And I'll see how it is going back up. Yes. No (9A)
problem coming back up.

06 21 37 00 CDR Ease back down. Oh, did you - oh, yes, you looked (9A)
at the big one there that has the - -

06 21 37 04 LMP Yes, I took some closeups of that. (9A)

06 21 37 06 LMP You should see the vesicles in there - and the (9A)
alignment - the orientation - of the vesicles.

- - -

06 21 37 17 CDR Oh, I can almost see - *** looks like little pits in (9A)
the dirt.

06 21 37 31 CC Dave - - is that a reasonable area for a rake (9A)
sample, do you think?

06 21 37 34 CDR No kidding. Yes, definitely, Joe. It sure is. (9A)

06 21 37 41 CC Okay, maybe that's the quick way to get a bunch of (9A)
them.

06 21 37 49 LMP I didn't bring the rake. (9A)

06 21 37 51 LMP We can take the rake sample near the Rover. Right? (9A)

- - -

06 21 37 59 CDR Here's some - oh, well, we got to get some of that. (9A)(SAMP 15530-38)(PHO 82 11126, 38-41)
Gosh, big angular blocks. Vesicles. It looks like
a basalt, and I think I see plag in it. To break a
chip off from one of those.

06 21 38 25 CDR Coming? (9A)

06 21 38 26 LMP Yes, right behind you. (9A)

06 21 38 27 CDR Okay. Let's sample this out - see these frags right (9A)(SAMP 15530-38)
on the surface here?

06 21 38 32 CDR Just looks like it came from somewhere. (9A)(SAMP 15530-38)

06 21 38 37 LMP Yes, they're all the same. (9A)(SAMP 15530-38)

06 21 38 42 LMP Pick one and I'll take the pictures. (9A)(SAMP 15530-38)

06 21 38 45 CDR Ok. Right there. We'll do that one right there. (9A)(SAMP 15530-38)

- - -

06 21 38 54 LMP Get a fragment off it, you mean? (9A)(SAMP 15530-38)

- - -

06 21 38 57 CDR That big one. Let me - - (9A)(SAMP 15530-38)

06 21 38 58 LMP Just this side of the gnomon. (9A)(SAMP 15530-38)

06 21 39 02 CDR The right; you're right. (9A)(SAMP 15530-38)

06 21 39 04 CC And, Dave and Jim. This'll be probably our last (9A)
documented sample that we'll have time for. We're
going to ask you to move on back to the Rover when
you're finished here for a rake sample.

- - -

06 21 39 29 LMP Yes, I thought that was - that's a big rock there. (9A)(SAMP 15530-38)

- - -

06 21 39 36 CDR Good picture. (9A)(SAMP 15530-38)

06 21 39 38 CDR Did you get the tube? (9A)

06 21 39 39 LMP Yes. (9A)

06 21 39 51 CDR Watch. Keep your eye on it. Did you see where that (9A)(SAMP 15530-38)
frag went?

06 21 39 58 LMP No, I didn't see that. (9A)

- - -

06 21 40 04 CDR Oh, oh, oh, oh, oh. Don't lose that one. (9A)(SAMP 15530-38)

06 21 40 06 LMP I see it. (9A)(SAMP 15530-38)

06 21 40 07 CDR Okay, I got the tongs. Get your bag out. (9A)(SAMP 15530-38)

06 21 40 37 LMP Are we going to have time to go down and sample the (9A)
bedrock?

06 21 40 39 CDR Apparently not. (9A)

- - -

06 21 41 05 CDR Joe, this is - it's a tan, fine-grained crystalline (9A)(SAMP 15530-38)
rock. I've got to say that, because it's got - up
to 2-millimeter laths of plagioclase in it randomly
oriented. And the matrix is a sort light-gray to
tan. It's a very well-indurated rock. On the
outside, I've got a nice glass-filled tip, and some
other pits in it. It's sure solid and - sure looks

crystalline. It's a beauty. It came from this large block over here at 275.

06 21 41 53 LMP You want to put some of those other fragments that are - - (9A)(SAMP 15530-38)
- - -

06 21 41 56 CDR Why don't I just get some of the other frags right there. (9A)(SAMP 15530-38)
- - -

06 21 42 08 CC Roger. If you think you can get pieces of true bedrock, we'll be willing to give up more sampling station on the way back to the LM. (9A)

06 21 42 27 LMP Yes, to the north of us. (9A)
- - -

06 21 42 30 CDR Yeah. Right over there I think that is true bedrock. (9A)(SAMP 15530-38)

06 21 42 34 CDR It's just too massive not to be. Ok, that one is too much. Watch it! Here let me hold that frag. Get a scoop for the fines, and then put the other frag in the bag too. Up - yes. That one - right there - that a boy. Okay. Okay, now. (9A)(SAMP 15530-38)

06 21 43 02 CDR Okay Joe, that chip off the old boulder there was 275. Why don't you get this one and I'll get - oh, man - seven bags. Let me get a bag off of you there. (9A)(SAMP 15535-36, 45-48)

06 21 43 20 CDR Okay. (9A)

06 21 43 28 CDR Sure miss having two cameras. (9A)

06 21 43 30 LMP Yes. Slow us down. (9A)

06 21 43 40 CDR Little ones here, and 278. (9A)(SAMP 15545-48)(PHO 82 11126, 38-41)

06 21 43 48 CDR Copy that. And out of sheer curiosity, how far back from what you would call the edge of the Rille are the two of you standing now? (9A)(SAMP 15545-48)

06 21 44 02 CDR All right. I don't know - well, from where the - (9A)(SAMP 15545-48)
about 50 meters from where I guess we'd say we see
real outcrops.

06 21 44 12 CC Roger Dave, how far back from the lip of the Rille (9A)(SAMP 15545-48)
do you think you are probably standing?

06 21 44 19 CDR I can't tell, I can't see the lip of the Rille. (9A)(SAMP 15545-48)

06 21 44 22 CC Okay. It looks like you are standing on the edge of (9A)
a precipice on TV; that's why we're asking.

06 21 44 29 CDR Oh, oh. Oh, gosh, no, Joe. It slopes right on down (9A)(SAMP 15545-48)(PHO 82 11141)
here. The same slope. It's just a little
inflection here. Jim, get your after pictures, too.

06 21 44 46 CDR Get a little closer, so you get that big chip out of (9A)(SAMP 15545-48)(PHO 11141)
there. A little closer, Jim. Yes, that's right.
Ok. Let's go down and get a chunk of the bedrock (SAMP 15595-98)(PHO 82 11126, 42-46)
here.

06 21 45 05 LMP Oh, you're getting the bedrock here, huh? (9A)(SAMP 15595-98)

06 21 45 06 CDR Yes. (9A)(SAMP 15595-98)

06 21 45 07 LMP Ok. I thought you were going to press on to the (9A)
north.

06 21 45 13 CDR Well, he said go get the bedrock, and I think we (9A)
ought to try and get it if we can. Because this
sure looks like a bedrock to me. I looked at the
Rille and down the Rille to the south and it's just
a - one great big massive layer of the same kind of
fragmental debris on the order of meters. Quite
well-rounded.

06 21 45 31 LMP Yes, but the thing that bothers me, Dave, is look to (9A)
the north there.

06 21 45 35 LMP And there's a flat area there, it looks like it (9A)
might be the top of the bedrock.

06 21 45 39 LMP And those blocks are - seem to be slightly (9A)
different.

06 21 45 43 CDR A little darker. (9A)

06 21 45 44 LMP Almost have columnar jointing. Look to the north (9A)
there.

06 21 45 47 CDR Yes, I see what you are talking about. Come on down (9A)(SAMP 15595-98)
here and let's get a frag off of one of these
boulders and then we'll head on back to the Rover.

06 21 45 54 LMP Okay. (9A)(SAMP 15595-98)

06 21 46 00 CDR That's a good one. (9A)(SAMP 15595-98)

06 21 46 13 CDR You get the cross-sun from over here, Jim? (9A)(SAMP 15595-98)(PHO 82 11143-44)
- - -

06 21 46 17 LMP Okay. (9A)(SAMP 15595-98)(PHO 82 11143-44)

06 21 46 28 CDR Okay. That's for the pictures. (9A)(SAMP 15595-98)(PHO 82 11143-44)

06 21 46 40 CDR Hey, Joe, these rounded fragments down here are on (9A)(SAMP 15595-98)
the order of meters in size; expose some very large
- oh, 2 - 3 centimeter vesicles - rather than the
finer stuff that Jim saw back there before. And I
believe, when I take a chip out of this, we're going
to find it's the same kind of crystalline basalt.
And they're all - well, they're subangular - looks
like they've been weathered. Fairly clean on the
surface and all buried. And I can look down to the
south, and it's just a whole mass of great big
boulders along the terrace here. And there's
another breakoff down into the Rille. And I guess,
we're just about at the lip.

06 21 47 26 LMP I got the pictures. (9A)(SAMP 15595-98)(PHO 82 11142-44)

06 21 47 40 CDR Beautiful stuff. Okay; I got them all located - in (9A)(SAMP 15595-98)
bag -

06 21 47 53 LMP Okay; 281. (9A)(SAMP 15595-98)
- - -

06 21 48 28 CDR Okay; this is a - looks like a darker, fine-grained, (9A)(SAMP 15595-98)
black, vesicular basalt, with vesicles on the order
of millimeters. Nonuniformly distributed. There
are a mass of plagioclase about 3 millimeters long,
and it may be a half a millimeter wide, randomly

oriented throughout. And that's about the only other mineral I see. Did you get the number on that, Jim?

06 21 48 57 LMP Yes. (9A)(SAMP 15595-98)

06 21 48 59 LMP I gave it to them. (9A)(SAMP 15595-98)

06 21 49 00 CDR There's one other frag down here that fell. About like that. Let me get a couple of rounded ones here, too, that are just on the surface. I can't tell what that is, but we'll put it in anyway, as representative of surface material - at least the fragmental surface. Okay; why don't you zip that one? Here let me zip it, and you can take the after (PHO 82 11145-46) picture, Jim.

- - -

06 21 50 29 LMP I just wonder if that rock to the north - - up there (9A) is the same.

06 21 50 33 CDR I don't know but - - (9A)

06 21 50 34 LMP Maybe we could stop there for the - maybe you can (9A) stereo pan.

06 21 50 38 CDR Yes. Ok, let's head back to the Rover. (9A)

- - -

06 21 50 44 CC Right on, Dave - - and we want a rake sample near (9A) the Rover - - and the soil sample with that - - and a double core, please.

06 21 50 47 CDR Did you want to take a position shot of that *** (9A)(PHO 82 11145-46) sample.

06 21 50 49 CDR Take a locator shot down there - - and then that (9A)(PHO 82 11145-46) way, okay?

06 21 50 52 LMP Okay. (9A)(PHO 82 11145-46)

06 21 50 53 CDR Yes. Get it at f:8 at infinity and maybe take (9A)(PHO 82 11145-46) another one up here - another 15 or 20 meters or so. Get a good stereo down to the south.

- - -

06 21 51 31 CDR Oooh! Ooh! You can see a boulder exposed to the surface here, which has got layering within it. (9A)
 It's been weathered away, apparently, and just the surface top is exposed but the boulder must be - oh, about a meter long with 2- to 3-inch layers in it. (PHO 82 11148-50)
 Would you get a picture of that where I stopped, Jim, just a quicky cross-sun? See where that thing is exposed there?

06 21 52 03 LMP Oh yes. (9A)(PHO 82 11148-50)

06 21 52 04 CDR See those little layers. (9A)(PHO 82 11148-50)

06 21 52 07 CDR Okay. I think a cross-sun stereo would be neat right there. (9A)(PHO 82 11148-50)

06 21 52 11 CDR Here. As a matter of fact, I'll drop the gnomon; that'll tell them what it was - just to get a real quick picture. Oh, you're kicking up white albedo. (9A)(PHO 82 11148-50)

06 21 52 23 LMP Yes. I know it. (9A)(PHO 82 11148-50)

06 21 52 24 CDR That's the only place I've seen it. Get a little closer, huh? (9A)(PHO 82 11148-50)

06 21 52 41 CDR Good. Too bad we don't have time to pick some up, but we'll get probably pieces. Good footing. (9A)

- - -

06 21 53 20 CDR Yes, I think there's probably good statistical samples to be had here. (9A)(SAMP RAKE 15612-89)(PHO 82 11123, 51-55)

- - -

06 21 53 42 CDR Hey, why don't you hand me the - camera? Oh, that's right. (9A)

06 21 53 47 LMP Okay, yes I will - so you can take pictures - while I'm - (9A)(SAMP RAKE 15612-89)(PHO 82 11151-55)

06 21 53 52 CDR While your raking. (9A)(SAMP RAKE 15612-89)(PHO 82 11151-55)

06 21 54 00 LMP If you take it off, it'd be faster. (9A)

06 21 54 12 LMP Okay. Pick a spot. I'll rake. (9A)(SAMP RAKE 15612-89)

06 21 54 17 CDR Why don't we take a few steps down, Jim? (9A)(SAMP RAKE 15612-89)

06 21 54 20 CDR So we get where there's more frags down here, I think. (9A)(SAMP RAKE 15612-89)

06 21 54 29 LMP Looks like they'll be large - too large down there. (9A)(SAMP RAKE 15612-89)

06 21 54 31 CDR No. Right here. *** a good spot. (9A)(SAMP RAKE 15612-89)

06 21 54 46 LMP I think I'll rake downhill. (9A)(SAMP RAKE 15612-89)

06 21 54 48 CDR Yes. Make it easy on yourself. Just a minute, let me get the down-sun here. *** (9A)(SAMP RAKE 15612-89)(PHO 82 11153)

06 21 55 07 CDR Have at it, partner. And I'll pick us out a route to go when we leave here. Get up to North Twin, and there's a nice outcrop up there, too. (9A)

06 21 55 24 CDR Yes, sir. Okay. 282. Ooop, oh, gee, I just walked right into your area. Sorry. Oh, your getting some. Looks like some laths, vesicular basalt, nonvesicular basalt. Do it again. (9A)(SAMP RAKE 15612-89)

06 21 55 49 CDR Yes. And I think I kicked up some more light-colored albedo. I think, if we have some time when you get through, we - ought to make a quick trench, here, maybe. It looks like maybe the upper couple of inches might be - the dark-gray and below it the very light-gray albedo. (9A)(SAMP RAKE 15612-89)

06 21 56 17 CDR Okay; there's two swaths about a meter long and one rake-width wide. (9A)(SAMP RAKE 15612-89)

06 21 56 24 CC Okay, Davy. And are those frags? (9A)(SAMP RAKE 15612-89)

06 21 56 33 CDR These are frags - that I have in my hand? Yes. They are. He's getting about - oh, 8 to 10 in each one, and it seems like there's a fair variety in there. (9A)(SAMP RAKE 15612-89)

06 21 56 48 CDR Yes. Hey, do it once. Let me move the gnomon here. We'll - they can reconstruct that. Take another swath over here so - (9A)(SAMP RAKE 15612-89)

06 21 56 57 LMP Do the *** so I can take two swaths, if you want. (9A)(SAMP RAKE 15612-89)

06 21 57 13 CDR Yes. It looks like you're getting a good - 2 to 3 inches down, as you rake through there. (9A)(SAMP RAKE 15612-89)

06 21 57 40 LMP I'll rake another one. Take one more. We'll fill the bag. (9A)(SAMP RAKE 15612-89)

06 21 57 44 CDR Hey, Joe, how about a quick single core here. (9A)(SAMP CORE 15010-11)(PHO 82 11123-24, 56-63)

06 21 57 49 CC Yes, sir, or maybe even a double core. We think maybe you can probably drive two of them. (9A)(SAMP CORE 15010-11)

06 21 57 56 CDR Ok. I think we probably can, too. I was just giving you a little bait there. (9A)(SAMP CORE 15010-11)

- - -

06 21 58 14 CDR Good. Good, comprehensive sample. Now we need some soil. I think that's probably the best one they'll see. (9A)(SAMP COMP 15600-10)(PHO 82 11123, 51-55)

06 21 58 54 CDR Ok. Get one more load. (9A)(SAMP COMP 15600-10)

06 21 59 01 LMP There's a big rock in there, huh? Ok, there you go. (9A)(SAMP COMP 15600-10)

06 21 59 09 CDR Ok, maybe one more. Let's get a - whole bag full. (9A)(SAMP COMP 15600-10)

06 21 59 23 CDR Yes. I think this is a number 1 kind, Joe, *** on to that, or you can put it in my pack while I zip this. (9A)

06 21 59 35 CDR 283 for the soil. (9A)(SAMP COMP 15600-10)

- - -

06 21 59 52 CDR Wait a minute. Here, I'll hand you this one; the other one, too. (9A)(SAMP COMP 15600-10)

06 21 59 56 CDR Now, I'll get yours. Okay, let me get the pictures. (9A)(SAMP COMP 15600-10)(PHO 82 11154-55)

- - -

06 22 00 29 CDR And, Joe, you can remember on this particular sample that I moved the gnomon about 2 feet, so Jim could get 1, 2, 3, 4, - I guess we got 5 swaths there. (9A)(SAMP COMP 15600-10)(PHO 82 11151-55)

06 22 00 51 CDR About a meter each. But you know, I don't know, a (9A)(SAMP CORE 15010-11)
double core - we may find ourselves driving into
bedrock if we're not careful.

06 22 01 01 LMP Yes, I'm afraid of that. (9A)(SAMP CORE 15010-11)

06 22 01 12 CDR There's a nice crater here - on the edge. Maybe we (9A)(SAMP CORE 15010-11)
hit the rim of that crater.

06 22 01 26 CDR Cut the rim of the crater, Jim. I bet we can do a (9A)(SAMP CORE 15010-11)
good one right there.

06 22 01 30 CDR And, I see some white-colored albedo near the - - (9A)(SAMP CORE 15010-11)

06 22 01 31 CC - - bad information I gave to you. I guess we'd (9A)(SAMP CORE 15010-11)
prefer it away from the rim.

- - -

06 22 01 41 CDR And there's light-colored albedo *** by the lower (9A)(SAMP CORE 15010-11)
side of the - -

- - -

06 22 01 52 LMP *** grab the core while you take the pictures. (9A)(SAMP CORE 15010-11)(PHO 82 11156-59)

06 22 01 56 LMP Both of them? Grab one at a time *** get the *** (9A)(SAMP CORE 15010-11)

06 22 02 01 CDR Yes. Put one on. I'll take the pictures, and then (9A)(SAMP CORE 15010-11)(PHO 82 11156-59)
I'll get you.

- - -

06 22 02 21 CC Jim, did you call the number? (9A)

06 22 02 26 LMP 09. (9A)(SAMP CORE 15010-11)

- - -

06 22 02 39 LMP You know, the - that light-colored albedo normally (9A)
occurs on the lower rim or the downhill rim.

06 22 02 48 CDR Yes. Go ahead, Jim. Get the other core. You're (9A)(SAMP CORE 15010-11)
right.

- - -

06 22 03 37 CDR Okay. I have the picture. (9A)(SAMP CORE 15010-11)(PHO 82 11159)

06 22 03 39 LMP Pushing. (9A)(SAMP CORE 15010-11)(PHO 82 11159)

06 22 03 41 LMP I'll push a little more. (9A)(SAMP CORE 15010-11)

06 22 03 42 CDR Yes. Got a half a tube - oooh. Good, nice. You got three-quarters? (9A)(SAMP CORE 15010-11)

06 22 03 46 LMP Yes. It feels like it's - hung up on a rock. (9A)(SAMP CORE 15010-11)

06 22 03 48 CDR Okay. I got the picture. Go ahead and hammer. Rock huh? No, it's going in. You're getting it. There's a full core. Have at it. You're getting a couple inches a stroke. Very nice. Ok. There's one and a half. Good. Doing good. (9A)(SAMP CORE 15010-11)(PHO 82 11160-61)

06 22 04 16 CDR Notice when you hit it, the whole ground around it raises up - for about an inch away from the core. You've got about three more smacks, and you ought to have it all the way in. (9A)(SAMP CORE 15010-11)

06 22 04 36 CDR Hey, good. I'll give you a double core on that. (9A)(SAMP CORE 15010-11)

06 22 04 39 CDR Good show. Ok, I got the picture. (9A)(SAMP CORE 15010-11)(PHO 82 11162)

- - -

06 22 04 57 CDR Ok. I got the cap. Go ahead and pull back. (9A)(SAMP CORE 15010-11)

- - -

06 22 05 20 LMP Yes. Yes, we went right through a rock. (9A)(SAMP CORE 15010-11)

06 22 05 24 LMP No wonder it was hard pounding. Got a rock right in the bottom of the - (9A)(SAMP CORE 15010-11)

- - -

06 22 05 36 LMP I'm not going to get too good a seal because - a portion of of the rock - you know. (9A)(SAMP CORE 15010-11)

- - -

06 22 07 33 CDR *** that one. Hey, we've got two handy-dandy core tubes. (9A)

- - -

06 22 07 50 LMP Ok, 4. And that was - let's see, 4 was the lower (9A)(SAMP CORE 15010-11)
and 60 was the upper.

- - -

06 22 08 11 CC Dave, while your getting loaded up there - - our (9A)(SAMP FSR 15555-56?)(PHO 82 11164)
next request is two undocumented 6-inch blocks, and
then we'll want you on the Rover driving north.

06 22 08 23 CDR Okay, Joe. After a picture. We're all loaded up. (9A)(PHO 82 11163)

- - -

06 22 08 38 CDR You get one and I'll get one. (9A)(SAMP 15555)

06 22 08 40 CDR It's a vesicular one. Hey, here's a good vesicular (9A)(SAMP 15555)
one.

06 22 08 48 CDR You got one that's vesicular, or not? (9A)(SAMP 15556?)

- - -

06 22 08 53 LMP Yes, I do. But - - I don't know if we want to be (9A)(SAMP 15556?)
too selective here if we're supposed to move on.

- - -

06 22 09 44 CDR A little bigger than 6 inches, but it was neat (9A)(SAMP FSR 15555-56?)
looking.

- - -

06 22 10 28 CC Dave and Jim - - we want you to climb aboard now and (9A)
head north about .3 or .4 clicks by the easiest
route, and we'll pick up the stereo pan with the big
camera.

06 22 10 46 CC And, Davy, we suggest you take those big camera (9A)
pictures of the same items you photographed before,
and, Jim, you can get the pan.

06 22 10 56 CDR Ok. Fine, Joe. Here, let me just give you my (9A)
camera now, Jim. Let's see how we're doing. 120 on
the frames on my camera, Sierra.

- - -
06 22 11 53 LMP We're not going that far, Dave. (9A)

06 22 11 54 CDR Yes. Three-tenths of a click, yes, let's get it - I (9A)
want you tied in.

- - -
06 22 13 41 CDR Okay. I'm strapped in. You're strapped in. Soon (9A)
as I can get the switches on here. Okay, Joe, now
you're going to have to say again where you want us
to go, because - -

06 22 13 56 LMP Just north, Dave, along the side of the rim. (9A)

06 22 13 58 CDR I thought you said something about 3/10ths of a (9A)
click, didn't you?

06 22 13 59 LMP Yes. (9A)

- - -
06 22 14 15 LMP Tell you when you get to 2.8, Dave - distance - I'll (9A)
let you know.

- - -
06 22 14 25 CDR Okay. We're moving, Joe. (9A-10)

- - -
06 22 14 41 LMP Fairly good soil. - - We're doing about 8 clicks. (9A-10)

06 22 14 49 CDR Look there's a big one. (9A-10)

06 22 14 51 LMP We're heading - 310 to 320. (9A-10)

06 22 15 00 CDR You don't want me to run us over that big one there, (9A-10)
do you?

06 22 15 02 LMP Please, not. (9A-10)

06 22 15 18 LMP About another 2/10ths to go; I'm reading - - 027 - (9A-10)
oh, another click, Dave. Maybe up by that large
block at 12:00 o'clock.

06 22 15 28 LMP If you can negotiate that? (9A-10)

06 22 15 29 CDR Gee, the one with the great big vesicles in it. (9A-10)

06 22 15 30 LMP Oh, notice that fresh one that's just this side of it? It looks like a light color, almost a yellow - ray that extends to the west of it? (9A-10)

- - -

06 22 15 40 LMP Oh, and - - very fresh crater right on the rim of it. (9A-10)

06 22 15 45 CDR Ooooh, look at this. This is one of the Twins. (9A-10)

06 22 15 48 CDR Man, we're right at it, and it's a deep fellow. (9A-10)

06 22 15 58 LMP Yes. There's a flat part over there to the left. (9A-10)

06 22 16 04 CDR Yes. Look at that great vesicular one there. Looks exactly like - uh, oh, - guess what we just lost again - the front steering. Oh, I know what - there. Turn the switch on; it works a lot better. (9A-10)

06 22 16 20 LMP We're at 2.8, Dave. So *** (9A-10)

- - -

06 22 16 24 CDR Let me get to this level spot over here. Okay, up on the rim of the Twin there would be a great place to take a pan. (9A-10)

06 22 16 34 LMP Either that or over on those rocks over at 11 o'clock. (9A-10)

06 22 16 38 CDR Yes, maybe, maybe. *** to the rim of the Twin there. (9A-10)

06 22 16 45 CDR Ok. We stopped, Joe. (10)

- - -

06 22 16 50 LMP Yes. Ok; heading 310, 093, 028, 020, 90, 92, 102, and 110. (10)

06 22 17 17 CC Ok, Jimmy. Thank you. And thinking downstream, (10)
 here, all we need is photography from this stop, and
 we're looking towards arriving back at the LM in
 about 45 minutes.

- - -

06 22 17 49 CDR Hey, Jim, up on the rim. Right over here on the (10)(PHO 82 11165-84)
 rim.

- - -

06 22 17 53 LMP Okay the rim of - - Twin. (10)(PHO 82 11165-84)

06 22 17 56 CDR Right there on the rim. Then you get the crater and (10)(PHO 82 11165-84)
 you can get - all over the place. Then I can take (PHO 89 12097-171)
 the 500 from up there, too.

06 22 18 56 CDR Ok, Joe. The crater is very uniform. It has debris (10)
 on the order of - oh, a foot or so - almost
 throughout. No accumulation of talus at the bottom,
 and it's got fines covering everything, nothing
 really sharply exposed. And most of the fragments
 are subangular and it looks like nonvesicular,
 although I do see one highly vesicular one right in
 the bottom. And it's about 60 meters across and
 maybe - oh, 10 meters deep, smooth sides, and a very
 slightly raised rim.

- - -

06 22 19 41 CDR And, as craters go around here, it's deep. (10)

06 22 19 57 CC Jim, are you taking your pan, now? (10)(PHO 82 11165-84)

06 22 20 02 LMP Yes. Pan's complete. (10)(PHO 82 11165-84)

06 22 20 04 LMP - - moving a little bit to the north. (10)

- - -

06 22 20 36 LMP Well, there's a large block there just to the north (10)
 of that, Dave. It looks like it might have a
 contact in it - between a dark, very vesicular
 basalt and that light-colored - tan.

06 22 20 51 CC Thank you, sir. And, Dave, are you firing off the (10)(PHO 89 12097-171)
big camera?

06 22 21 00 CDR Yes. (10)(PHO 89 12097-171)

06 22 21 16 LMP I've got an angular fragment here - subangular, (10)
about 4 feet by 5 feet, and the vesicles on - that
are facing to the southwest are very large vesicles,
about 3 inches, 2 to 3 inches in diameter. *** - -
then there's a gradual - - transition - -

06 22 21 42 CC Leave it there - - though, Jim. The Rover's not (10)
stressed for it.

06 22 21 45 LMP Oh, I'd love to bring it back. I guess I'll just (10)(PHO 82 11185-87, 90)
take some closeups here.

- - -

06 22 23 05 LMP Just to the north of this - the large one. I just (10)(PHO 82 11188-90)
mentioned, there're two other large fragments. And
there's a fracture, right between them, and they
also have the large vesicle pattern.

06 22 23 22 LMP I've already sampled this one. And the material (10)
that has the the large vesicles has long laths of
probably plagioclase.

06 22 23 38 LMP Yes, long lath's about - centimeter. (10)

06 22 23 45 CC Roger, Jim. We copy that. And as much as we hate (10)
to, we're going to have to get you aboard the Rover,
heading back across the mare towards the east,
please.

06 22 23 59 CDR 500 is 155. (10)(PHO 89 12097-171)

- - -

06 22 28 06 CC And the mare site, Dave; we will do a good mare (10)
site, but fairly near the LM.

- - -

06 22 28 49 CDR Ok, Joe. We're moving. (10-LM)

06 22 28 56 LMP Right to 093. (10-LM)
 - - -

06 22 29 12 CDR Oh, what a big mountain that Hadley is! Whew! (10-LM)

06 22 29 17 LMP Yes, it's beautiful. Might want to swing a little (10-LM)
 more to the left, here, Dave.

06 22 29 22 CDR Yes. Let me go around to the right of this - sure (10-LM)
 we can get between those two craters ahead of us
 there. Yes, think I'll come this way.
 - - -

06 22 29 56 CDR Okay, now turn to the right. (10-LM)

06 22 30 05 LMP 097, Dave. (10-LM)

06 22 30 08 LMP That's a friendly shallow depression there at - - (10-LM)

06 22 30 10 CDR Yes, we'll go south of that. (10-LM)
 - - -

06 22 30 25 CDR Boy, it's just over hill and dale, isn't it? (10-LM)
 - - -

06 22 32 49 LMP And I can see as I look to the east several places (10-LM)
 up the slope - "Big Rock" mountain where there're
 outcrops exposed.

06 22 33 05 LMP One about a quarter of the way up directly east from (10-LM)
 us - that was "Big Rock" mountain.
 - - -

06 22 33 14 CDR You know, Joe, "Big Rock-O-Candy" mountain. (10-LM)
 - - -

06 22 33 37 LMP I hope not. Haven't picked up our tracks yet - (10-LM)
 think we're probably still a little north of them.

06 22 33 44 CDR Yes. Because we came 3/10ths north. (10-LM)

06 22 33 50 LMP We're heading 105, range 1.4. (10-LM)

06 22 34 01 LMP Can't see the LM today. (10-LM)

06 22 34 06 CDR Oh, look at the mountains today, Jim, when they're all sunlit; isn't that beautiful? (10-LM)

06 22 34 09 LMP Really is. (10-LM)

- - -

06 22 34 20 LMP Dave, I'm reminded of a favorite biblical passage from Psalms. "I look unto the hills, from whence cometh my help." But of course, we get quite a bit from Houston, too. Okay, we're heading - 13, 140. (10-LM)

06 22 34 43 CDR We've got to go around this - - crater here, buddy. (10-LM)

- - -

06 22 35 10 CDR No. I think we're going - - to be going up and down the valleys here. (10-LM)

06 22 35 15 LMP No, I think I see the top of it, Dave; at 12:00 o'clock. (10-LM)

- - -

06 22 35 24 LMP Yes. And there are our tracks. (10-LM)

06 22 35 29 LMP And the Rover's a little black blob over there at about 12:30. (10-LM)

06 22 35 35 LMP That's exactly where the NAV system says it is. (10-LM)

06 22 35 46 CDR I think we'd do better going straight ahead on, don't you? (10-LM)

06 22 35 49 LMP Yes. Yes *** just got that one depression over that next ridge. Might want to just drive through it, huh? (10-LM)

06 22 35 56 LMP Wasn't that the deep one, though, that had the crater in the lower part? (10-LM)

06 22 36 02 CDR Yes. It's saying 093 and heading 08, so coming (10-LM)
right's going to help us some.

- - -

06 22 36 20 LMP Yes. This is a better route than we used coming (10-LM)
out.

06 22 36 34 CDR Wish we could get that 16-millimeter camera *** (10-LM)(PHO DAC)

06 22 36 37 LMP I'll change mags on it. (10-LM)(PHO DAC)

- - -

06 22 37 12 CC Jim, concerning that 16-millimeter camera, if you're (10-LM)(PHO DAC)
changing the mag out, you might try the one-frame-
per-second trick at the beginning. It worked
before.

06 22 37 25 LMP Yes, I did that this morning, Joe, on the mag. It (10-LM)(PHO DAC)
- - didn't work; I'll try it again, though.

- - -

06 22 38 03 LMP Boy, look at the few big boulders up there. (10-LM)

06 22 38 07 LMP Up on the slope of - - (10-LM)

06 22 38 08 CDR Yes, it's appropriately named, don't you think? (10-LM)

06 22 38 16 CDR It's the only one around here. (10-LM)

06 22 38 26 CC Dave and Jim, we think it will be just as easy for (10-LM)
you to bring them back, and we'll troubleshoot them.

06 22 38 50 CDR You know, so far in the past, our NAV system has (10-LM)
always been biased pointing us to the right a little
bit more than we should, so I'm going to bias it a
tad left here. Because I know if we get too far
left, we'll pick up our tracks. I've noticed on the
other two trips when we got back, it was asking us
to head 8 degrees or so to the right. So -

06 22 39 22 LMP See our tracks now - running to the east there - 12 (10-LM)
o'clock position. Just over that next ridge, we
should see the LM.

06 22 39 36 LMP Yes. Range now, .5. (10-LM)
 - - -

06 22 40 22 LMP Going about 11 clicks there. (10-LM)

06 22 40 28 LMP There's the LM, 12:30. (10-LM)

06 22 40 30 CDR How about that! By golly, we must have come just (10-LM)
 about straight back. And the bearing - - says 096.
 And I'm - -

06 22 40 39 LMP Hey, let me take a picture right here. (10-LM)(PHO 82 11195)
 - - -

06 22 40 42 CDR Yes, let me stop on the rim here and point you. (10-LM)(PHO 82 11195)
 - - -

06 22 41 16 CDR Still on a 5.6? (10-LM)(PHO 82 11195)

06 22 41 17 LMP Yes. (10-LM)(PHO 82 11195)

06 22 41 19 CDR That's a super picture. (10-LM)(PHO 82 11195)
 - - -

06 22 41 27 CDR Ok. Let's see. We'll go find the ALSEP site; I (10-LM)
 think we've been there before.
 - - -

06 22 42 19 CDR Jim, I'll go around the north here and - avoid the (10-LM)
 dust. Our trusty ALSEP.

06 22 42 37 CDR Hey, that's a pretty nice picture right there, Jim. (10-LM)
 Let me point you - -

06 22 42 44 LMP What kind of mag? (10-LM)

06 22 42 45 CDR Oh, you got black and white. Better change that (10-LM)
 mag, buddy. Ok, there you go right there.

06 22 43 02 LMP Yes, I'll change it out when we stop. (10-LM)

06 22 43 10 CDR Try slowing here. There's our trusty drill. (10-LM)

- - -

06 22 43 40 CDR We've stopped, Houston. We're at ALSEP. (LM)

- - -

06 22 45 23 LMP Okay, I have the treadle, stems, and I'm - heading back. (LM)

06 22 45 45 CDR Ok, I'm off the Rover, Joe. (LM)

- - -

06 22 46 52 LMP The heading is 001, 032, 5.1, 0, 8, 8, 90, 108, 113, (LM)
and motor temps are still low.

- - -

06 22 47 55 LMP Ok, cause I want to - we never have taken any dust pictures of the Rover. (LM)(PHO 82 11196-203)

06 22 47 59 CDR I'll do it right now. (LM)(PHO 82 11196-203)

06 22 48 01 LMP You need two cross-suns and one down-sun. (LM)(PHO 82 11196-203)

06 22 48 09 LMP At - f:11, 1/250th, 11 feet. (LM)(PHO 82 11196-203)

06 22 48 12 LMP Yes. And also the - got to take a photograph of the Solar Wind. (LM)

- - -

06 22 48 59 CDR Okay, I got a pan of the Rover. Let me have that stem, there. Jim, keep going the way you're going. Let me have the stem. Don't bother with the treadle, yet. Let's - (LM)(PHO 82 11196-203)

- - -

06 22 52 36 LMP Okay, I'm going to work with the 16 here and see what I can do. (LM)

- - -

06 22 53 00 CDR So, now we have a three-stem section and three one-stem sections. (LM)

- - -

06 22 53 26 CDR Here's the cap - and - I know it is here. Hotel is (LM)
the upper part of the three-stemmed section.

- - -

06 22 54 16 LMP I'll brush this mag Alpha. (LM)

- - -

06 22 54 29 CDR Ok, I'll get it, Jim. You try and get that 16 (LM)
millimeter working. You guys have almost lost
control on this camera, haven't you?

- - -

06 22 55 47 LMP Hey, Joe, I have mag Golf on here now. Go. (LM)

06 22 55 51 CC Roger. We need a EMU status check from both of you, (LM)
and we're 5 minutes from closeout. All we need is a
few grab samples.

- - -

06 22 56 37 LMP Joe, it sounds like it's running already at one (LM)
frame per second.

- - -

06 22 56 51 CC Roger, Jim, I'm sorry, I cut you out. Asking that (LM)
the undocumented samples go into the BSLSS bag.

- - -

06 22 57 12 CDR We'll do that. Just grab a bunch huh? (LM)

06 22 58 28 CDR Hey Joe, how about bag - oh well okay - BSLSS bag (LM)

06 22 58 56 LMP Joe, when I start the camera it runs for about 3 (LM)
seconds and then stops.

- - -

06 22 59 41 CC And, Jim, we've got another question - - (LM)

06 22 59 42 LMP Do you want to get that descent engine sample? (LM)(SAMP 15014)(PHO 88 11884-87)

06 22 59 43 CC - - on the photography for you. We would like a (LM)(PHO?)
picture of the Rover saddle which hung up on
original deployment. Do you have one of those
already?

06 22 59 56 LMP No, but I'll go get one, Joe. (LM)(PHO?)
- - -

06 23 00 02 LMP Dave, we have everything - everything in this bag (LM)
that you're going to put in it, right? In this bag
here?

06 23 00 06 CDR Yes. But how about the rocks under the seat? (LM)

06 23 00 08 LMP Yes. I've already put those in there. That's why I (LM)
wanted to get the right bag.
- - -

06 23 00 13 LMP Well, we've got a SESC in here - that has not been (LM)
used - of course, there're remaining caps.

06 23 00 28 CDR Okay, I'm working on the bag 2, right now, Joe. (LM)

06 23 00 38 CDR Taking the caps out of it that we have not used, (LM)
we've got an SESC here that hasn't been used, and
then I'm putting - the rocks and samples that are
under my seat in bag 2.

06 23 01 07 LMP Hey, Joe, I got your picture of the saddle - a (LM)
couple of them.
- - -

06 23 01 55 LMP Did you document this large one, Dave? (LM)

06 23 01 58 CDR Sort of. (LM)

06 23 02 01 LMP Okay, I'll try to get it in this bag, then. It'll (LM)
be a heavy bag. I think I'll wait and put that in
the - BSLSS bag.
- - -

06 23 03 35 LMP Yes, I'm ready to *** - - yes, well, we ought to get (LM)(SAMP 15014)
the descent engine sample first.

06 23 03 43 CDR Okay. Let's get the descent engine sample, Jim. (LM)(SAMP 15014)
 - - -

06 23 03 51 LMP I'll get the SESC. (LM)(SAMP 15014)

06 23 03 52 CDR - - yes, and a scoop. (LM)(SAMP 15014)

06 23 04 24 CDR We had to do so much work around the Rover, there's hardly a spot that's not - messed up. (LM)(SAMP 15014)

06 23 04 38 CDR Okay. Let me get the pictures. (LM)(SAMP 15014)(PHO 88 11882-87)
 - - -

06 23 05 44 CDR Yes, scoop up the top layer there right next to the one you just scooped. You can put the top half inch or so. (LM)(SAMP 15014)
 - - -

06 23 06 17 LMP Take that back - or you can just put it in my bag; that's where it's supposed to go. (LM)
 - - -

06 23 07 30 LMP - - will you take the - a down-sun of the Solar Wind, for me? (LM)(PHO 88 11888-89)

06 23 07 32 CDR Yes. Sure. (LM)(PHO 88 11888-89)

06 23 07 33 LMP F:11 at 7 feet. (LM)(PHO 88 11888-89)
 - - -

06 23 08 54 LMP You know, to collect these large rocks, Dave, if we had time, you could almost use the Rover and drive out there. (LM)

06 23 09 01 CDR No, I don't think we have time. (LM)

06 23 09 04 CC Jimmy, we've got plenty of rocks. (LM)

06 23 09 06 CDR Okay, down-sun. Ok, ok, good. I got the picture. (LM)(PHO 88 11888-89)
 - - -

06 23 09 35 LMP How much stuff there is on this sunscreen. (LM)
- - -

06 23 10 06 LMP It's not rolling up very well, Joe; I've got to roll (LM)
her up manually.
- - -

06 23 10 22 CDR Ok, Joe, Whiskey, Sierra, Victor - do you want any (LM)
of the 16 millimeters to stay out, or are we through
with those?

06 23 10 36 CC Dave, you might save one for the drive-away. Put (LM)
the rest in the ETB, please.

06 23 10 46 CDR Ok. Union, and I'll save Item - this would be a (LM)
good item for the drive-away.

06 23 10 57 CDR Juliett - and Hotel - and Kilo - and Foxtrot. (LM)
- - -

06 23 12 56 LMP Hey, I guess we might be able to consolidate the (LM)
contents of both those bags into one.

06 23 13 03 LMP But we can do that inside. (LM)
- - -

06 23 13 34 LMP Did you put my bag in my seat? (LM)

06 23 13 39 CDR Your bag? What bag? (LM)

06 23 13 41 LMP The collection bag off the side. (LM)
- - -

06 23 13 46 CDR I put it on the handtool carrier - give it to you (LM)
and you can consolidate. I guess those undocumented
ones we want to put in the BSLSS bag.
- - -

06 23 14 50 LMP You didn't put any rocks in the BSLSS bag. (LM)

06 23 14 53 CDR No, I didn't, because they're on the floor there. I (LM)
just never had a chance to get it up to put in
there.

06 23 14 58 LMP Dave, rather than waste time out here, I'm just (LM)
going to leave these all like they are. I think we
can stow them just as well that way.

- - -

06 23 15 07 LMP We ought to put them all over on the MESA table. (LM)

- - -

06 23 20 59 CC Roger. We're wondering if you could use that to (LM)
mail home an ounce of rocks, please.

06 23 21 06 CDR Well, all right. I'll do that. I'll bet we could. (LM)

06 23 21 14 CDR And I'll stick this on the ETB. Joe, hold your (LM)
camera right there. I'll be right back. There's
something I think you'll find rather interesting.
It'll only take a minute.

06 23 21 29 LMP I'll put this penetrometer drum in the ETB, Dave. (LM)

06 23 21 34 LMP As well as the - Solar Wind. (LM)

- - -

06 23 23 07 LMP Penetrometer drum, 70 millimeters, 500 millimeters, (LM)
16 millimeter.

- - -

06 23 23 16 LMP I can get the maps, if you want them. (LM)

06 23 23 17 CDR Ok, the Solar Wind is in there now, Joe. Solar (LM)
Wind, penetrometer drum. ETB.

- - -

06 23 24 32 CC And in particular, Dave, we're looking for mags (LM)
Tango and Romeo.

06 23 24 40 CDR Oh, I'm pretty sure I got them in, Joe. I was (LM)
reading all the - that stuff out to you. I hope -
got a chance to copy it all.

- - -

06 23 25 32 CC Jim, a word on that core stem. When one of you (LM)
takes it in - into the LM, you can stow it on the
floor against the mid-step, the Z-27 bulkhead.

- - -

06 23 27 17 CDR Ok. Oh, Jim. Oh, ho, ho. How about the (LM)
16-millimeter mag, Jim?

06 23 27 30 LMP One that didn't work? (LM)

06 23 27 32 CDR But it looks like it did. It's got a little on it. (LM)

06 23 27 39 CDR I wonder if they want us to bring mag Golf back. (LM)
We'd better bring it back.

- - -

06 23 28 38 CDR Here's mag Hotel in your camera, and I can't get (LM)
off; you might work on that while I drive *** hey,
hey Jim, would you check my lowers - lower hooks on
my PLSS. Are they hooked?

- - -

06 23 30 48 LMP Ok, I got that mag off, Dave. (LM)

06 23 30 50 CDR Good. Put it in the ETB. (LM)

- - -

06 23 34 12 CDR I think I'll just stay out here and put you at about (LM)
300 feet, which we are. There's a nice little rise
here. And I'll point you - you want to be heading
255. Yes, that's all messed up, too. Just
slightly, ok. South and west, I got a good spot for
you, Joe. Joe, what's my relative azimuth at the
Sun right now, with west?

- - -

06 23 35 24 CDR Okay, I think I've got a good place for you. Right (LM)
up on a rise. We're about 300 feet away. I think
you'll like this.

- - -

06 23 41 56 LMP Oh, fine, Joe. Transferred a few bags up to the (LM)
porch.

06 23 42 11 LMP We have about three more to transfer up. (LM)

- - -

06 23 48 59 CDR I can get one last pan here. (LM)(PHO 88 11895-925)

- - -

06 23 49 12 CDR Ok. One last comment on the mountain that's south (LM)
of Hadley. I can see some large outcrops on the
upper slopes - on the upper 10 percent. And they
really stand out and there's a talus downflow. As a
matter of fact, it almost looks like we have some
layering on the upper slopes - the upper 10 percent,
apparently - -

- - -

06 23 51 07 CC Dave and Jim, we're ready for you to move the (LM)
baggage up into Falcon and climb in.

- - -

06 23 53 39 CC Jim, while you're dusting there, how many suitcases (LM)
have you carried up?

06 23 53 41 LMP What's this? Oh, I only have - two up there. There (LM)
are two more down here plus the ETB - - and the core
stem up there on the porch - -

- - -

06 23 54 27 LMP Let's take that along and - oh, here's another mag. (LM)
Stick this in your pocket. That's a broken one.
I'll put it in for you.

- - -

06 23 55 34 LMP Okay, I'm getting in, Dave. (LM)

- - -

07 00 00 19 CDR Okay. Watch it. The caps are on not very tight; so (LM)
be careful.

- - -

07 00 00 37 CDR Okay; coming in. (LM)

- - -

07 00 01 26 CC - - we're hoping you've got four sample - four (LM)
collection bags and an ETB - - in the cabin with you
now.

07 00 01 36 LMP Yes, we do. (LM)

07 00 01 40 LMP We've even got the core stems. (LM)

- - -

07 00 01 49 CC And, Dave and Jim, I've noticed a very slight smile (LM)
on the face of the professor. I think you very well
may have passed your final exam.

* * * * ORBIT * * * *

08 00 47 01 CC I think the superfine job is the two of you; it was (ORBIT)
just most remarkable. Everybody down here is still
floating so high, they're having a hard time getting
down to all that data you gave us. And, you'll be
interested to know that - that we have sitting in
front of us, a preliminary report from each EVA of
the geology of the area that I would say is more
complete than our 90-day preliminary reports which
were issued on some of our other landings. It's
just most exciting.

08 00 47 38 CDR Well, it's because you've got the real professional (ORBIT)
backroom there. Those - those guys really know how
to put - put it together. Especially with the way
they were coming up with the new ideas, while we
were on the surface. That was really neat.

- - -

08 20 48 29 CC Fifteen, this is Houston with just a passing comment (ORBIT)
to Dave. We have Lee Silvers and Jim Head in the
back room - available for any questions or comments
concerning the lunar surface activities that you'd
like to make. ecthere anything on your mind you'd
like to discuss with them?

08 20 48 54 CDR Well, it shouldn't take more than about a couple of (ORBIT)
weeks, I guess, if we started now. I guess we got
a lot to discuss with them. We've talked it over a
little bit, and we've come to some conclusions about
rilles and mountains and those sort of things. And
I - I guess, rather than get into the details now,
we probably ought to wait until the debriefing. If
they have any questions for us, we'd be happy to
answer.

08 20 49 21 CC Okay. It's my understanding that they didn't - you (ORBIT)
- you gave them so much data they didn't really have
any questions left. But stand by, I'll see if they
- if they come up with some after you've invited
them to. Joe says, hey, they just might have - -

08 20 49 37 CDR Okay. (ORBIT)

08 20 49 38 CC - - something. So stand by. (ORBIT)

08 20 49 42 CDR Yes. That's right. I've never seen the day yet when those two didn't have some questions. (ORBIT)

08 20 49 47 CC You opened yourself up there, Dave. (ORBIT)

08 20 49 53 CDR Yes, that's good. We're ready. (ORBIT)

08 20 53 35 CC Fifteen, this is Houston. (ORBIT)

08 20 53 43 CDR Go ahead, Karl. (ORBIT)

08 20 53 46 CC Lee and Jim are sitting right beside me here; and their comment is they - they don't really want to ask very many questions and perturb the debriefing a week from now. But they do just have a couple. And the first one - the first one concerns a unique crater close to Scarp that you described as having about a 40-meter diameter, with a very soft rim. And the texture of the material in it was - instead of being fine angular fragments was more in the form of clods. They'd like to know a little bit more, if - if possible, about its location relative to Scarp, and any other comments you can make about the unique - the particular uniqueness of this crater. (ORBIT)

08 20 54 34 CDR Okay. Stand by 1. (ORBIT)

08 20 56 25 CDR Okay, Houston. I guess our answer to that is that we had interpreted that particular crater as being Scarp. Perhaps it wasn't. Perhaps we were near Scarp and that was a somewhat smaller crater. But, I guess, as we remember it, that was the one we had called Scarp, and it was, I believe, the only crater we really sampled as we approached Rim crater in the terrace there. And that particular crater had very soft rims - extremely soft, and all the fragments - the apparent fragments were very frangible. They just fell apart like dirt clods. And we did sample some, and we had a discussion I think at the time, and - and I guess we still don't exactly agree relative to the amount of glass that was present in the fragments. Jim seems to think there was a fair amount, and I - I don't remember any in (ORBIT)

particular. But it was a fairly uniform crater. And all the debris around the crater - as I remember, there was something like 20 percent or so of angular frags - all of it apparently would break apart very easy. And there were no solid fragments that we could see or distinguish. Of course everything is covered by dust. And we did sample some. And I guess that's about the size - the size of it. Is there anything more specific you'd be interested in?

08 20 58 20 CC Dave, this particular crater sounds more and more interesting to the people down here. And I guess the next question is what - was there anything about the crater, its shape or anything else, that would lead you to think it had a different origin than most of the other impact craters? (ORBIT)

08 20 58 44 CDR No, it - it's depth-to-diameter ratio was about par for the - for the course up there. And it had a slightly raised rim, and the rim may have been somewhat higher than - than others. But I wouldn't be able to distinguish that specifically. It - it was a rather standard-appearing crater, until we walked up onto the rim, and it was extremely soft. And, of course, we only sampled one edge of the rim there. We didn't get any circumferential sampling on it. So it might have been a - a unique part. But it looked pretty uniform all the way around. (ORBIT)

08 20 59 21 CC Roger. (ORBIT)

08 20 59 25 CDR And we did get the appropriate photographs plus a pan at that site, which, I think, when we go over during the debriefing - perhaps we can extract some more of what we saw. As you remember, at that particular time, we were pretty well hustling, and we didn't have a chance to do much looking at the maps as we got there. (ORBIT)

08 20 59 47 CC They say that's great. Thanks a lot. (ORBIT)

08 20 59 52 CDR Okay. Anything else? (ORBIT)

08 21 00 00 MCC Hey, Dave. You've done a lovely job. You just don't know how we're jumping up and down, down here. (ORBIT)

08 21 00 10 CDR Well, that's because I happened to have had a very good professor. (ORBIT)

08 21 00 16 MCC A whole bunch of them, Dave. (ORBIT)

08 21 00 22 CDR That's right. As a matter of fact, so many of them, it's just hard to - hard to remember it all. But we sure appreciate all you all did for us in getting us ready for this thing. And I'll tell you, I think Jim and I both felt quite comfortable when we got there, about looking around and - and seeing things. I just wish we had had more time, because, believe me, there is an awful lot to be seen and done up there. (ORBIT)

08 21 00 48 MCC Yes. We think you defined the first site to be revisited on the Moon. (ORBIT)

08 21 00 57 CDR Well, as we go around in lunar orbit here, I can look down - and I could just spend weeks and weeks looking. And I can pick out any number of superb sites down there which would take you several weeks to analyze on the surface. There is just so much here. To coin a phrase, it's mind boggling. (ORBIT)

08 21 01 18 MCC Beautiful, Dave. Thank you so much. (ORBIT)

08 21 01 24 CDR Yes, sir. And I hope someday we can get you all up here too. I - I think we really need to have some good professional geologists up here. As a matter of fact, good professional scientists of all disciplines, not only in lunar orbit, but right on the surface, because you all would just really have a field day, where - with your backgrounds and what you know. There's just so much to be gained up here. (ORBIT)

08 21 01 55 CC Great, Dave. Thanks a lot. (ORBIT)

* * * * * TRANSEARTH COAST * * * * *

- 11 06 24 45 CC Question number 2. Near Spur crater, you found what (TRANSEARTH COAST)(PRESS CONFERENCE)
may be "Genesis" rock, the oldest yet collected on
the Moon. Tell us more about it.
- 11 06 25 59 CDR Well, I think the one you're referring to was what (TRANSEARTH COAST)(PRESS CONFERENCE)
we felt was almost entirely plagioclase or perhaps
anorthosite. And it was a small fragment sitting on
top of a - a dark brown larger fragment, almost like
on a pedestal. And Jim and I were both quite
impressed with the fact that it - it was there,
apparently waiting for us. And we had hoped to find
more of it, and, I'm sure, had we more time at that
site, that we would have been able to find more.
But I think this one rock, if it is, in fact, the
beginning of the Moon, will tell us an awful lot.
And we'll leave it up to the experts to analyze it
when we get back, to determine its origin.
- 11 06 26 48 CC Question number 3. Apollo 15 is already being (TRANSEARTH COAST)(PRESS CONFERENCE)
described as one of the great events in the history
of science. Aside from the crystalline rock, what
other findings at Hadley-Apennine seem most important
to you?
- 11 06 27 06 LMP I guess, immediately, I think of the orientation (TRANSEARTH COAST)(PRESS CONFERENCE)
or organization that was revealed in the side of
Mount Hadley. There's 14,000 feet vertical relief
of vast mountain face exposed to us. And there was
layering in there that was most impressive for the
total 14,000 feet, and we commented on the number
of beds we could see. That really impressed me,
that you could have that much organization in - on
a large mountain on the Moon.
- 11 06 27 45 CC Question number 4. This is the toughest landing (TRANSEARTH COAST)(PRESS CONFERENCE)
area we have attempted to - to reach on the Moon.
Describe what it was like, flying into it.

11 06 27 59 CDR Well, I think, to begin with, we had every confidence that we could get to the landing site. (TRANSEARTH COAST)(PRESS CONFERENCE)
The trajectory had been modified such that we had adequate clearance over the mountains. And the first sight I had out the window was somewhere around probably 9 or 10,000 feet as we passed down below the upper elevations of Mount Hadley. And I could see Mount Hadley to my left before we pitch - pitched over and saw the - the plain at Hadley, and that was probably as impressive sight - a sight as I've seen. The landing itself, once we pitched over, was somewhat of a surprise in that the - the cratering was much more subtle than we had expected. Here was a great lack of any large fragments or boulders on the surface. It was apparently quite smooth, and those rather deep craters which we had anticipated using as landmarks because of their subtlety did not appear quite as readily as we had hoped. I think we did recognize our relative position east-west of the Rille because of the size of the Rille itself. I think we were a little off on the north-south, but close enough to handle the traverses in the Rover. I think that having a vehicle such as that - as that enables us to go into more complicated, difficult landing areas because it's not necessary to land on an exact point. We can take advantage of our mobility and land anywhere within a certain prescribed area which was initially our goal on this flight.

- - -

11 06 35 02 CC Question number 8 for Dave Scott. The drill seemed to drive you up the crater walls. What was the problem, and was it worth the time? (TRANSEARTH COAST)(PRESS CONFERENCE)

11 06 35 14 CDR I guess I'd anticipated that question. I think (TRANSEARTH COAST)(PRESS CONFERENCE)
the problem was a - a striking discovery. When we
went to Hadley Rille, we expected to find a regolith,
or the soil, about 5 meters thick. And with that in
mind, like 25 feet, I expected to have no trouble
putting the heat flow probes in or drilling the - the
core stem because of the expected soft soil. After
about 1 meter, I ran into hard rock, and my first
thought was it was an isolated rock somewhere within
the - the soil. But that was not the case.
Apparently, what we have is a very thin regolith or a
thin soil layer above solid rock. And with this in
mind, I think we brought back a core stem or a deep
drill-core of the Moon of basic bedrock or foundation
rock on Hadley Plain. I think that's a very
significant find. I think it will be very meaningful
to the scientists when they analyze it. The
perplexing problem was doing the actual drilling and
extracting the core stem. If you put a drill into
solid rock, it's very difficult to get it out. And
there at the end, it took both Jim and I with our
shoulders pushing, as hard as we could, up - to
extract the drill stem. But in the final analysis, as
I look back on it, I think it is indeed worthwhile.
At the - at the time it occurred, we were both
interested in moving out to the - the Northern Complex
and further geology, which Jim and I are both quite
interested in. And the mechanical task of doing the
drill at that time seemed what - somewhat less
important than seeking new - new finds in a new
geological area. But, in retrospect, I think we have
in fact, brought back one of the most significant
samples of the whole trip.

01 06 40 55 CC Question number 12 for Dave and Jim. You - you (TRANSEARTH COAST)(PRESS CONFERENCE)
didn't have time to get to North Complex, craters
which may have been formed volcanically and where
you thought some surprises might be found. Was
this a significant loss?

- - -

01 06 41 15 CDR Well, I'll start out and - and throw an answer (TRANSEARTH COAST)(PRESS CONFERENCE)
there. I think if you look back at the original
requirements for the landing at the Hadley-Apennines,
they were primarily to inspect the Front and the
Rille. It was only after a - a considerable amount of
study had been done and some rearrangement in the
Flight Plan - the timing to plan to go to the Northern
Complex. So the Northern Complex was, in fact, an
addition to the original requirement; it was a bonus.
And I think because Jim and I have spent so much time
with volcanics in our terrestrial geology work, that
we were quite interested in getting to the Northern
Complex to see if, in fact, it was a volcanic area.
But I don't believe we lost anything from the lunar
surface by not going there; only we would have had an
extra bonus had we been able to reach that point.
And, with that in mind, I hope that some day somebody
gets a chance to go back and take a look at the
Northern Complex. Jim, do you want to answer?

11 06 42 19 LMP No, I agree with everything you said. It was just (TRANSEARTH COAST)(PRESS CONFERENCE)
a little personal disappointment that we couldn't
get up there, because we - we thought we'd have
another beautiful view of the - the plains there and
the LM, a view almost as beautiful as it - as it was
from the side of Hadley Delta.

* * * * END OF TRANSCRIPT * * * *

TABLE 1. APOLLO 15 SAMPLE LISTING CROSS-REFERENCED TO APOLLO ELAPSED TIMES

<u>LRL SAMPLE NO.</u>	<u>SAMPLE CLASS</u>	<u>APOLLO ELAPSED TIMES (AET)</u>
15001	BOTTOM CORE TUBE	06 20 22 22
15002-05	CORE TUBES	06 20 22 22
15006	TOP CORE TUBE	06 20 22 22
15007	BOTTOM DRIVE TUBE - DOUBLE CORE	05 03 04 59 05 08 51 49 05 09 11 51
15008	TOP DRIVE TUBE - DOUBLE CORE	05 03 04 59 05 08 51 49 05 09 11 51
15009	SINGLE DRIVE TUBE	06 00 34 06
15010	BOTTOM DRIVE TUBE	06 21 57 44 06 22 00 51
15011	TOP DRIVE TUBE	06 21 57 44 06 22 00 51
15012	FINES - SESC 1	06 00 28 38
15013	FINES - SESC UNNUMBERED	06 04 00 49
15014	FINES - SESC 2	06 22 59 42
15015	ROCK - GLASS-COATED BRECCIA	04 11 33 36 04 12 26 49 04 20 29 56 05 06 02 31 05 09 17 06
15016	ROCK - PORPHYRITIC VESICULAR BASALT	05 03 42 41 05 05 49 23 05 09 17 06
15017-19	GLASS SHELL, GLASS OBJECT, & GLASSY MICROBRECCIA	04 12 30 36 05 22 56 55 06 22 59 42
15020-26	FINES & ROCKS - CONTINGENCY SAMPLE	05 00 03 39

TABLE 1. CONT'D.

<u>LRL SAMPLE NO.</u>	<u>SAMPLE CLASS</u>	<u>APOLLO ELAPSED TIME (AET)</u>
15027	ROCK - BRECCIA	04 12 30 36 05 00 02 47 05 22 56 57
15028	ROCK - BRECCIA	04 12 30 36 05 00 02 47 05 22 56 57
15030-34	FINES	06 04 12 35
15040-44	FINES	06 04 12 35
15058	ROCK - PORPHYRITIC BASALT	06 03 53 19 06 03 55 44
15059	ROCK - GLASS-COATED BRECCIA	06 03 33 49 06 03 53 19 06 03 55 41
15065	ROCK - GABBRO	05 02 14 50 05 09 05 51
15070-76	FINES & ROCKS - GABBROS	05 02 16 36 05 09 05 51
15080-88	FINES, ROCKS, & CHIPS	05 02 20 25 05 09 05 51
15090-93, 95	FINES & CHIP	05 02 45 46 05 09 11 51
15100-05, 10	FINES & CHIP	05 02 57 28 05 03 03 41 05 09 11 51
15115-19	CHIPS	05 02 04 32 05 09 11 51
15125	CHIP	05 02 04 32 05 09 11 51
15135	CHIP	05 02 04 32 05 09 11 51
15145-48	CHIPS	05 02 04 32 05 09 11 51
15200-04, 06	FINES & ROCK	05 02 45 08 05 02 48 29 05 09 11 51
15205	ROCK - BRECCIA.	05 02 45 08 05 02 51 22 05 09 11 51
15210-14	FINES	05 02 42 28 05 09 11 51
15220-24	FINES	05 02 43 49 05 09 11 51
15230-34	FINES	05 02 55 27 05 09 11 51

TABLE 1. CONT'D.

<u>LRL SAMPLE NO.</u>	<u>SAMPLE CLASS</u>	<u>APOLLO ELAPSED TIME (AET)</u>
15240-45	FINES & CHIPS	05 23 58 17
15250-54	FINES	06 00 01 20
15255-57	ROCKS & CHIP	06 00 15 45
15258-59	CHIP	06 00 21 02
15260-64	FINES	06 00 26 32
15265-67	ROCKS & CHIP	06 00 22 34
15268-69	CHIPS	06 00 21 02
15270-74	FINES	06 00 39 50
15281-84	FINES - SCB 3 RESIDUE	06 00 39 50
15285-89	CHIPS & ROCK - BRECCIA	06 00 21 02
15290-95	FINES & ROCK - BRECCIA	06 00 02 22
15297	CHIPS - SCB 3 RESIDUE	
15298	ROCK - MICROBRECCIA	06 00 07 14
15299	ROCK - BRECCIA	06 00 10 54
15300-08	FINES, CHIPS, & ROCK - BRECCIA	06 02 03 43
15310-92	FINES, CHIPS, & ROCKS	06 01 54 02 06 01 59 20
15400-05	FINES & ROCK - BRECCIA	06 01 12 42
15410-14	FINES	06 01 33 38
15415	ROCK - ANORTHOSITE	06 01 33 38 06 01 41 15
15417	CHIP	06 01 33 38

TABLE 1. CONT'D.

<u>LRL SAMPLE NO.</u>	<u>SAMPLE CLASS</u>	<u>APOLLO ELAPSED TIME (AET)</u>
15418	ROCK - BRECCIA	06 01 33 38
15419	CHIP	06 01 33 38
15421-27	FINES & ROCKS	06 01 36 59
15431-35	FINES & CHIPS	06 01 43 41
15445	ROCK - BRECCIA	06 01 53 24 06 01 58 45
15455	ROCK - BRECCIA	06 01 47 54
15459	ROCK - BRECCIA	06 01 57 19 06 02 07 29
15465-69	ROCKS & CHIPS	06 04 49 39
15470-78	FINES & ROCKS - BASALT	06 02 34 41
15485-87	ROCKS - BASALT	06 02 39 58 06 02 48 52
15495	ROCK - GABBRO	06 02 34 41 06 02 48 52
15498	ROCK - BRECCIA	06 02 39 16 06 02 48 52
15499	ROCK - BASALT	06 02 36 51 06 02 48 52
15500-08	FINES, CHIPS, & ROCK - BRECCIA	06 21 10 27
15510-15	FINES & CHIPS	06 21 08 13
15528	CHIP	06 21 27 02
15529	ROCK - BASALT	06 21 27 02
15530-38	FINES, CHIPS, & ROCKS - BASALT	06 21 37 59
15545-48	CHIPS & ROCKS - BASALT	06 21 43 40
15555	ROCK - BASALT	06 22 08 11

TABLE 1. CONT'D.

<u>LRL SAMPLE NO.</u>	<u>SAMPLE CLASS</u>	<u>APOLLO ELAPSED TIME (AET)</u>
15556	ROCK - BASALT	06 21 34 04 06 22 08 11
15557	ROCK - BASALT	06 21 36 09
15558	ROCK - BRECCIA	(PROBABLY COLLECTED AT STATION 9)
15561-65	FINES & CHIPS - SCB 2 RESIDUE	
15595-98	ROCKS - BASALT	06 21 44 46
15600-10	FINES & CHIPS - COMPREHENSIVE SAMPLE	06 21 58 14
15612-89	CHIPS	06 21 53 20
15901-12	CHIPS - DOC BAG RESIDUE	
15916-18	CHIPS - DOC BAG RESIDUE	
15924-27	CHIPS - DOC BAG RESIDUE	
15931-33	CHIPS - DOC BAG RESIDUE	
15936-43	CHIPS - DOC BAG RESIDUE	
15951	CHIP - SCB RESIDUE	
15954-57	CHIPS - SCB RESIDUE	

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