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

N. G. Bailey, et al

Geological Survey

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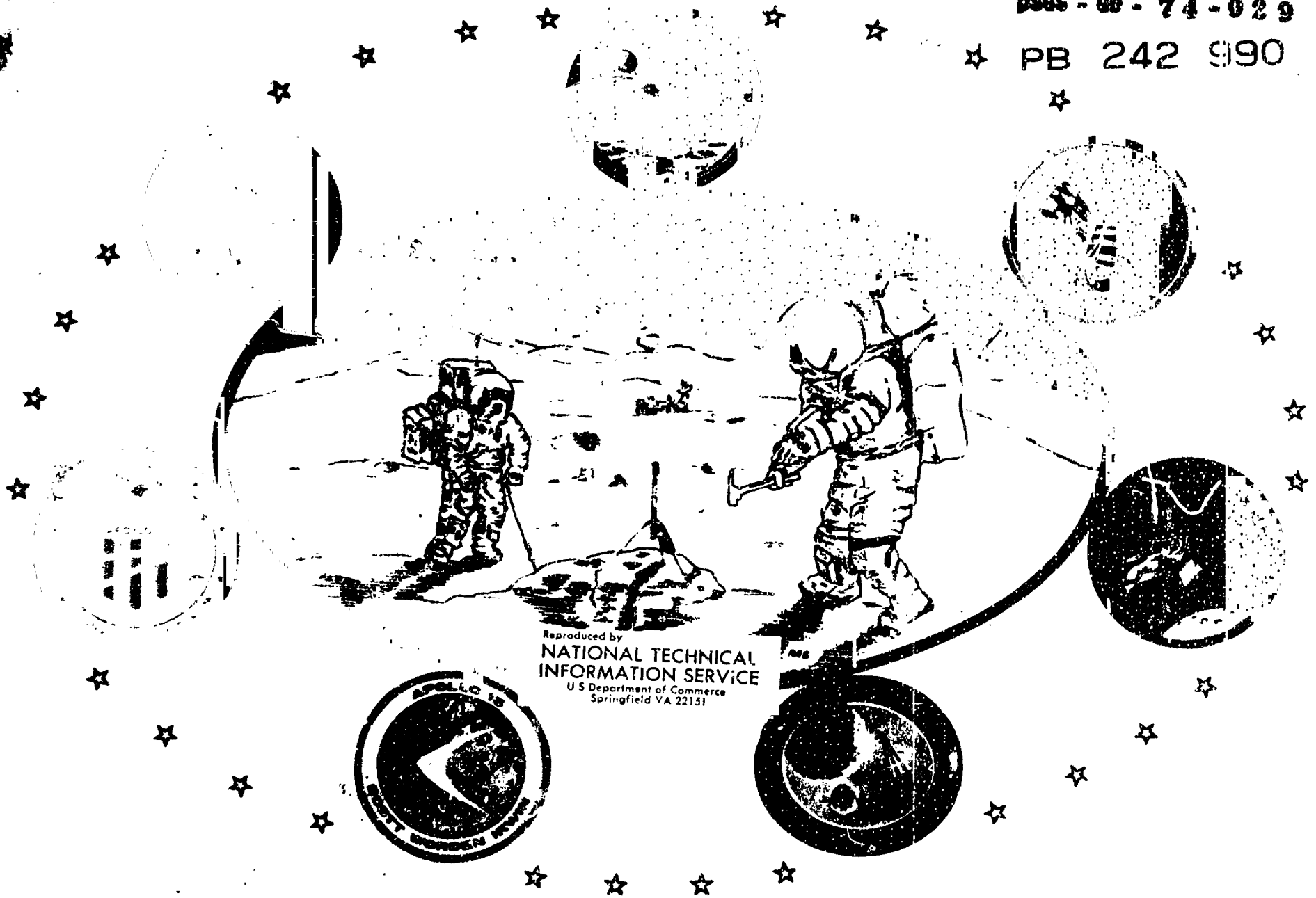

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APOLLO 15 VOICE TRANSCRIPT
PERTAINING TO THE GEOLOGY OF THE LANDING SITE

APOLLO 15 VOICE TRANSCRIPT

Pertaining to the geology of the landing site

by

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

1975

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This is Apollo Voice Transcript Volume No. 4 of a series to be produced for the six manned lunar landings

16. Abstracts
This document is an edited record of the conversations between the Apollo 15 astronauts and mission control pertaining to the geology of the landing site. It contains all discussions and observations documenting the lunar landscape, its geologic characteristics, the rocks and soils collected, and the lunar surface photographic record along with supplementary remarks essential to the continuity of events during the mission. This transcript is derived from audio tapes and the NASA Technical Air-to-Ground Voice Transcription and includes time of transcription and, photograph and sample numbers. The report also includes a glossary, landing site map, and sample table.

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Astonauts	0509
Lunar bases	2201
Lunar craters	0302
Lunar dust	0302
Lunar geology	0302
Lunar photography	0301, 1405
Lunar rock	0302
Lunar topography	0302

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22/A Space Technology, Astronautics

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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 [illegible] -- 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

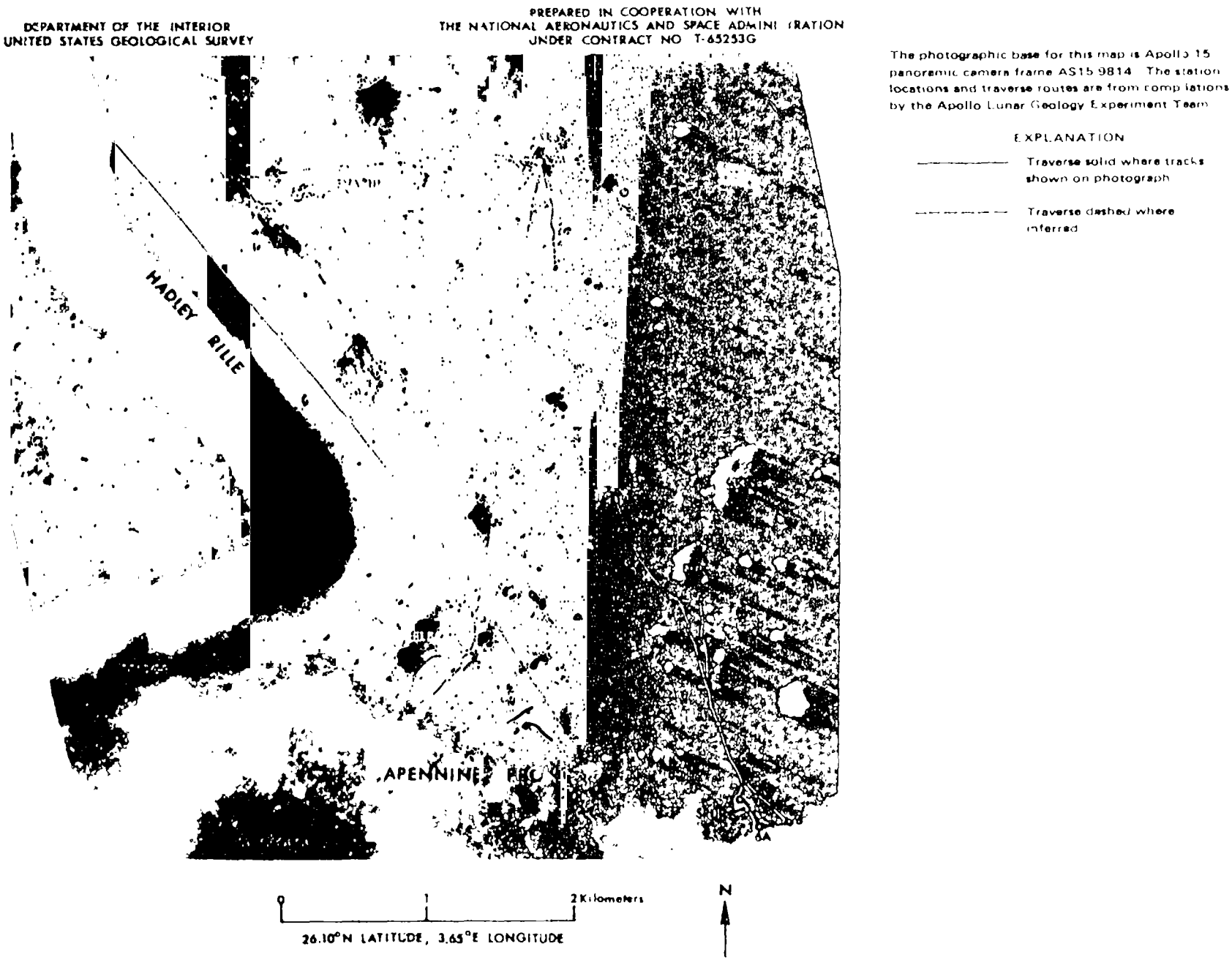

Figure 1. Apollo 15 landing site showing LM location and area traversed by astronauts during EVAs.

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. I did find that, - I think.	(LM WINDOW)
		- - -	
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, Co - 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 landing site?	(LM WINDOW)
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 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.	(LM WINDOW)

- - -

04 09 57 22	CDR	We're sure in a fine place here. We can see St. 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.	(LM WINDOW)

- - -

04 09 59 02	CC	Dave, we've got some vital questions down here. First, did you see the Rille on the way down?	(LM WINDOW)
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 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.	(LM WINDOW)
04 10 40 11	CDR	Okay, very good. I'll bet Al can tell you where we are better than we can.	(LM WINDOW)
04 10 40 15	CC	Al says you're - -	(LM WINDOW)
04 10 40 15	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)
	10 40 24	CDR	North of Index, huh?	(LM WINDOW)

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 [illegible] 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, *** St. George, Window, Spur - beautiful!	(SEVA)
		- - -	
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 [illegible] can identify it, please.	(SEVA)
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 a - in the walls of Pluton. There are no boulders at all on St. George, Hill 305, Bennett, or, as far a 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 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. (SEVA)

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, 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. (SEVA)

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 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. (SEVA)

04 11 10 05	CC	Roger, Dave. And how far away do you think that might be. It sounds very exciting.	(SEVA)
04 11 10 15	CDR	Joe, distances are very deceiving. I'd guess maybe 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.	(SEVA)
		- - -	
04 11 12 18	CC	Just out of curiosity, could you see any sign of the South Secondary Cluster?	(SEVA)
04 11 12 32	CDR	There's a gentle rise, just to our south and - I 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.	(SEVA)
		- - -	

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

04 11 28 36 CC We're wondering if you can tell, or have a feel, for 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? (LM WINDOW)

04 11 29 35 CDR I guess to answer your question, we're not really in 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. (LM WINDOW)

04 11 31 57 CDR Okay, Joe, - there's so much here, I could talk to 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 (LM WINDOW)

one. 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 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. (LM WINDOW)(SAMP 15015)

- - -

04 12 20 23 CC Dave, I guess the first thing that we might start 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. (LM WINDOW)

04 12 21 28 CDR Okay. I tried to find November crater out there, 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. (LM WINDOW)

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04 12 22 04 CDR Well, anyway, I got the 3000-south call, which was a 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 (LM WINDOW)

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 the same north and south, east or west in our current position.	(LM WINDOW)
04 12 26 23	CC	Roger, Dave. Copy that. And sorry on that crater call. That was my fault - the Aristillus - Autolycus Ray.	(LM WINDOW)
		- - -	
04 12 26 49	CC	Dave, while you're sipping your - cold tomato soup there, was the black rock that you called out to us on a crater rim?	(LM WINDOW)(SAMP 15015)
04 12 27 04	CDR	Yes, it is, Joe. It sure is. And it's a typical 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.	(LM WINDOW)(SAMP 15015)
04 12 27 40	CDR	Hey, Joe. Jim's just pointed out another black one 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.	(LM WINDOW)
04 12 27 58	CC	Roger, Dave. Incredible. While you're peeking out there do you have any further observations on the abundance, size, and distribution of the frags in the nearby field of view?	(LM WINDOW)
04 12 28 17	CDR	Yes. That's one we promised you. Yes. I'd say 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 - -	(LM WINDOW)
		- - -	
04 12 29 11	CDR	Okay. Most of the fragments are light-colored, 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.	(LM WINDOW)

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04 12 30 36	CDR	Okay, we heard that. Gee, I'm just looking down 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 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.	(LM WINDOW) (SAMP 15017-19, 27-28)(PHO 86 11604-07)
04 12 31 11	CDR	I can see some lineaments on the surface which appear to be from the descent engine. They radiate away from our position here. We'll take a closer look at these later.	(LM WINDOW)
04 12 31 32	CC	Roger, Dave. And, for the benefit of our fine Flight Director, maybe the name of that should be called an "Aggie".	(LM WINDOW)
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 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.	(LM WINDOW)
04 12 32 06	CDR	Okay; there was one in that fresh debris. Light -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.	(LM WINDOW)

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04 12 44 27	LMP	Okay, Joe. I have some frame numbers - frame counts for you.	(LM WINDOW)
04 12 44 38	LMP	Mag 1 is reading 33. Mag K is reading 66. And mag Metro is reading 20.	(LM WINDOW)

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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 provisionary, 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 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 - - (SAMP 15015)

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04 20 31 09 CDR Okay. We were just discussing the frags around the 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. (LM WINDOW)

04 20 31 36 CC Roger, Dave. My first flip comment there was the 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. (LM WINDOW)

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

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04 20 32 24 CC Okay, Dave, you will put the glass ball at a higher 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. (LM WINDOW)(SAMP?)

* * * * EVA 1 * * * *

04 23 54 54	CDR	Going down on the Rover's side. Okay; it's down. Okay. Ease on down the ladder here.	(LM)
04 23 55 50	CDR	Okay, Houston. As I stand out here in the wonders 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!	(LM)
04 23 56 24	CDR	Well, I see why we're in a tilt. We've got - that's 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.	(LM)
		- - -	
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 glass ball, so we don't mess it up. It's pretty neat.	(LM)(SAMP 15027)
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 won't lose it.	(LM)(SAMP 15027)
		- - -	
05 00 03 31	LMP	What did we decide? I'll get this glass ball here on the - -	(LM)(SAMP 15027)
05 00 03 34	CDR	No, why don't you save it. Let's document it. It's - - I've got a circle around.	(LM)(SAMP 15027)
05 00 03 39	LMP	Okay. I'm going to move out and get the contingency sample.	(LM)(SAMP CONT 15020-26)

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

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05 00 05 43	LMP	Okay, I have the contingency sample. I'm taking it back to the ladder.	(LM)(SAMP CONT 15020-26)
05 00 06 02	LMP	No wonder we slipped, Dave. Boy, that's really soft dirt there around the front footpads.	(LM)
05 00 06 08	LMP	Like about 6 inches deep of soft material.	(LM)

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05 00 07 43	LMP	The crater here that I'm standing by, Joe, it's 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.	(LM)

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

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

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

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

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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 hills and mounds.	(LM)
		- - -	
05 00 38 49	CDR	You know. As I look back behind us. It almost looks like if we'd landed in another, oh, 10 meters aft and we'd have been in Surveyor crater.	(LM)
		- - -	
05 00 41 27	CDR	This is really tricky working on this slope in this soft material.	(LM)
		- - -	
05 01 06 11	CDR	Okay. In the seat pan on the CDR side: mag E, mag *** - mag Oboe, mag Kilo; the LRV map holder is out and - get it stowed here in a minute.	(LM)
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 away.	(LM)
05 01 07 27	LMP	And, Joe, in bag 2, I have the core stems and caps. I put bag 2 under my seat.	(LM)
		- - -	
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)

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

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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 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.	(LM-1)
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 heading uphill; when we head uphill, it drops down to about 8.	(LM-1)
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)

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05 01 47 18	CDR	Okay, I guess - could this be Rhysling right here, Jim?	(LM-1)
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 on the road.	(LM-1)
05 01 47 35	CDR	Boy, this is - it's really rolling hills, Joe. Just 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.	(LM-1)

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)

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05 01 52 00	CDR	The zero-phase riding is pretty tough, Joe. We're 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.	(LM-1)

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

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

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05 01 54 15	LMP	Yes, I was looking at that one at 1 o'clock to us right now. Very fresh angular block of lighter -albedo material on the south rim.	(LM-1)
05 01 54 25	LMP	We kick up a little dust when we go through these craters.	(LM-1)
05 01 54 29	LMP	Seems like when we get to the bottom, and I can see 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.	(LM-1)
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 there's a large one coming up about 12:30 or 1:00 o'clock that could be Rhysling.	(LM-1)

05 01 55 08	CC	Jim, that sounds good or it could be the large one to the northwest of Rhysling. Rhysling may be coming up on your left now.	(LM-1)
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 be Rhysling.	(LM-1)
05 01 56 12	CDR	No, I don't think it is either. We got a ridge up here in front of us, we'll - -	(LM-1)
		- - -	
05 01 56 30	LMP	That could be Rhysling, Dave; we'll find out when we get up on top of this ridge.	(LM-1)
		- - -	
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 Rille, we can see craters on the far side of the Rille.	(LM-1)
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 - about 1 foot, quite angular, irregular surface.	(LM-1)
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 better believe it. I think we're heading right - -	(LM-1)

05 01 58 01	LMP	I don't see Elbow though. Oh, yes, I see Elbow. Dave, we have to stay up on the high part of the Rille, here.	(LM-1)
05 01 58 08	CDR	Yes. See, Elbow is not as prominent as we thought, but there's a definite crater there.	(LM-1)
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 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.	(LM-1)
05 01 58 43	CDR	Let me get us back up on it - back up on the ridge, it's smoother.	(LM-1)
05 01 58 47	LMP	Yes, I think that heading was - we were on a heading 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?	(LM-1)
05 01 59 03	CDR	Yes, there's a definite branch or rim that runs along the Rille, maybe 70 - 80 meters from this - the inflection point that drops down into the Rille, don't you think, Jim?	(LM-1)
05 01 59 15	LMP	Yes. And, we might as well - we're heading right toward - we'll head toward the east side of Elbow.	(LM-1)
05 01 59 24	CDR	Yes, we're in good shape. We can see Elbow, and we can see the Front all the way down to the Spur. And, there's not a big block on it.	(LM-1)
		- - -	
05 01 59 42	LMP	I see one large block, up about a quarter of the way up the Front Dave.	(LM-1)
05 01 59 51	CDR	There's a big one partially buried. Oh, there's some beautiful geology out here. Spectacular!	(LM-1)

05 02 00 10	LMP	Looking up at the Front now, Joe, I sure see the linear patterns that Dave commented on before. With the dip and everything.	(LM-1)
		- - -	
05 02 00 24	LMP	And, I sure get the impression that - almost looks 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.	(LM-1)
05 02 01 02	CC	Roger, Jim. And can you actually see the east side of the Rille, towards the south there?	(LM-1)
05 02 01 09	LMP	Oh, yes. I can see, looking directly south - the exposure that faces northwest. I can look down and I can see - I think I can see Hadley C down there.	(LM-1)
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 anyway, when we get there - -	(LM-1)
		- - -	
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 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.	(LM-1)
05 02 02 40	LMP	And - we're heading about 165 - right now. Tried to 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	(LM-1)

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

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

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

05 02 04 08 LMP Okay; now, Joe, I can - see the bottom of the valley - 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. (LM-1)

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

05 02 04 59 LMP I'd say it's flat. I'd est - well, it's hard to 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. (LM-1)

- - -

05 02 06 33 CDR I might add to Jim's comment, that the near side of 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? (LM-1)

05 02 06 49	LMP	I'm sure we could drive down; I don't think we could drive back out.	(LM-1)
05 02 07 00	LMP	Oh, now - I can turn around and look to the northwest - where the Rille trends to the north. Now, let me concentrate on Elbow for the moment.	(LM-1)
		- - -	
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 then.	(LM-1)
05 02 08 14	LMP	Yes, but you want to go a little farther east. See, that's Elbow out at 11:30.	(LM-1)
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 driving for an hour. Are you sure that's Elbow, Jim?	(LM-1)
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 friend.	(LM-1)
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 12	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, I see a lot of sparklies in there. No glass. Subangular, with lots of dust on it.	(1)(SAMP 15065)
		- - -	
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 little too big. Take this one right here, Jimmer. Oh, I see a large chunk in there.	(1)(SAMP 15070-76)
05 02 17 15	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. 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 ivine? And, there is a big lath in there. Look at the big lath about a centimeter long and a millimeter wide.	(1)(SAMP 15070-76)
05 02 18 15	CDR	Plag.	(1)(SAMP 15070-76)
05 02 18 17	CDR	It's light-gray - millimeter-size grains, with - like 2-millimeter-size phenocrysts in it. Gosh.	(1)(SAMP 15070-76)
		- - -	
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 another one out of here.	(1)(SAMP 15070-76)
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 it in.	(1)(SAMP 15070-76)

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. 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. And there's another one that has a large - -	(1)(SAMP 15080-88) (PHO 86 11539)
		- - -	
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 climb on there?	(1)
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 this little crater. Seems to be all white, much lighter albedo.	(1)
		- - -	
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. Heading 180.	(1-2)
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 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.	(1-2)
		- - -	

05 02 30 25	CDR	Careful. Here, let me. Boy, that's a nice fresh one. There's the answer to - gosh. Bump! Sure hate to go by that one. Okay.	(1-2)
		- - -	
05 02 30 47	CDR	Yes, that's the freshest we've seen. It's a great one.	(1-2)
05 02 30 53	LMP	Oh, I see a - oh, there's - another fresh one over there at about - 11 o'clock.	(1-2)
05 02 30 58	CDR	Okay, it's about 20 - 25 meters across, and it 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.	(1-2)
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 looking up that slope.	(1-2)
05 02 31 31	CDR	Isn't that, and you can see the lineaments come down 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.	(1-2)
		- - -	
05 02 31 57	CDR	Ho, ho, ho - look at these here. Deep, subdued, but - -	(1-2)
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 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?	(1-2)

05 02 32 23	LMP	Yes. Now, there are some blocks now that look like they're a foot - angular blocks. They're - seem like they're on the surface Dave. Look over there at 11:30.	(1-2)
05 02 32 40	CDR	Yes, they are. Most of them have been buried at this time, and those seem like they're right on the surface.	(1-2)
		- - -	
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 out at 1 o'clock - angular block.	(1-2)
05 02 33 35	CDR	Yes, you're right. Why don't we go there? It's - we're - you can tell we're going uphill.	(1-2)
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 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.	(1-2)
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 - hang on, digging in.	(1-2)
		- - -	
05 02 35 40	LMP	Okay, Joe. If you're ready to copy, here we go: 280, 017, 055, 039, 105, 110, 090, 090.	(2)
		- - -	
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 the bearing, 0.17.	(2)
		- - -	
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 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.	(2)
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 underneath the upslope side; whereas, on the downslope side, it's piled up. Boy, that is really something.	(2)
05 02 41 17	LMP	Hey, let's get some good pictures of that before we disturb it too much.	(2)(PHO 85 11439-40; 86 11544-45)
		- - -	

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. And then we'll corner the rock.	(2)(SAMP 15210-14)(PHO 86 11544-45, 56-57; 85 11439-40)
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 me this isn't worth doing, boy.	(2)
05 02 45 08	CDR	Okay. Now we got the fillet, we got the soil; now we need to sample the rock.	(2)(SAMP 15205-06)(PHO 86 11549-51) (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 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.	(2)
05 02 45 46	CDR	I've got a little piece of glass right there. I can 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.	(2)(SAMP 15095)(PHO 86 11549-51)
05 02 46 28	CDR	Grab some soil right there with the tongs; it'll stay. It seems to be fairly cohesive here. Look at that.	(2)(SAMP 15090-93)(PHO 86 11549-51)
		- - -	
05 02 47 03	LMP	Okay. Let's see - we got those. Now, let me get a closeup. Hold the hammer.	(2)(PHO 86 11552-53)
		- - -	
05 02 47 21	CDR	Okay; we'll take Gary's little formula here. See if we can't get a picture of that contact. Nice close picture for him.	(2)(PHO 86 11552-53)
05 02 47 34	CDR	Right there. *** 10. Okay. I go on the other side. Doesn't that look like a contact to you, Jim?	(2)
05 02 47 47	LMP	Yes. It does.	(2)

05 02 47 52	CDR	Okay; right exactly there. Okay; I think that'll do it. Now your hammer. If we can't get - oh, let me take a couple of after pictures before - -	(2)(PHO 86 11551)
		- - -	
05 02 48 29	CDR	After there, for the fillet. And after there, for the material around. Okay. Let's try the old hammer.	(2)(SAMP 15200-04, 06)(PHO 86 11546-47, 58-60; 85 11440)
		- - -	
05 02 49 28	LMP	Dave, I think, up on top here. if you hit it, it will break.	(2)
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 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.	(2)
		- - -	
05 02 50 36	LMP	Watch it; I'll go up and get this one. Dark black, very fine-grain basalt. By golly!	(2)(SAMP 15200-04, 06)
05 02 50 56	LMP	Yes, I'll get it. Here, let me get the tongs, and let's get those two. I was hoping I could get a larger frag here.	(2)(SAMP 15200-04, 06)
		- - -	
05 02 51 22	CDR	Yes, but don't put them both in the same bag. Let's 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 getting it? Here, let me hold the bag for you.	(2)(SAMP 15200-04, 06) (SAMP 15205)(PHO 86 11546-47, 52-53, 58-60; 85 11439-40)

05 02 52 05	LMP	How about doing a dumbbell fragment there beside it? You didn't knock that off, did you?	(2)(SAMP 15205)
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 like the same kind of stuff.	(2)(SAMP 15205)
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 started.	(2)(SAMP 15205)
		- - -	
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 well.	(2)(SAMP 15205)
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 see it. There that baby's over.	(2)

		- - -	
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, 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.	(2)(SAMP COMP 15110)
05 03 03 37	LMP	Okay, Dave. That one was a little more fruitful - - looks like about five or six.	(2)(SAMP COMP 15110)
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 then double core.	(2)(SAMP COMP 15100-05)
05 03 04 13	CDR	Okay. Let me picture this here where my big foot went.	(2)(SAMP COMP 15100-05)(PHO 86 11572-73)
05 03 04 28	CDR	Okay; I got it Jim. You can get your soil.	(2)(SAMP COMP 15100-05)(PHO 86 11572-73)
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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)

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05 03 05 06	CDR	Okay. Hey, Joe, we've got a crater that looks sort 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?	(2)
05 03 05 28	CDR	There's a change in albedo on the rim; it's much lighter.	(2)
05 03 05 31	CC	Roger, Dave, drive the core right through the rim.	(2)

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05 03 06 03	CDR	Okay. Here we go. Head up to the crater. Think we can get there without any trouble?	(2)
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 there.	(2)
05 03 06 16	CDR	Yes, you're right. I guess - well, we'd be pushing it.	(2)
05 03 06 23	CDR	Joe, I guess we'd take 5 minutes to get up there. What do you think?	(2)
05 03 06 27	CC	Negative. Drive the core where else you think might be convenient.	(2)
05 03 06 34	CDR	Oh, we've got a good place here. We've got a fairly 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 - -	(2)(SAMP CORE 15007-08)

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

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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 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 - -	(2)
		- - -	
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 is going in about 2 inches per hammer stroke.	(2)(SAMP CORE 15007-08)
05 03 09 46	CDR	And we've got almost a second core. Got another couple of inches to go, Jim. Doing good.	(2)(SAMP CORE 15007-08)
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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 core.	(2)(SAMP CORE 15007-08)
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 get the big camera out. I can get myself back.	(2)(PHO 85 11446-65)
		- - -	

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)

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05 03 26 45	LMP	Yes, that's the *** well, we're going to have to go to the right to go around Elbow.	(2-3)
05 03 27 23	CDR	We're moving at about 5 clicks. And the slope - I'd guess about 6 or 7 degrees on going cross-slope.	(2-3)

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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 Mount Hadley.	(2-3)

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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 I couldn't see it.	(2-3)
05 03 29 36	CDR	Yes. Yes. We just did a christy. Okay; we're down - it's fairly level now and we're going to start upslope but we're on - just about on the south rim of Elbow.	(2-3)

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05 03 30 24	LMP	Yes, now we're up to 9 clicks; you have to swing to the right here, Dave, whenever you can.	(2-3)
05 03 30 33	LMP	We want to get up on the ridgeline here.	(2-3)

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05 03 30 47	CDR	Up-sun isn't too bad though, you know? There's a 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?	(2-3)
05 03 31 03	LMP	Yes, I kind of got the idea there were several subtle benches in the downslope - particularly on the eastern wall.	(2-3)

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05 03 31 13	CDR	Oh, there's a big boulder. We just crossed over a buried rounded boulder. Must've been a meter and a half across, with - of course, it's all gray - -	(2-3)
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! Some Rover tracks. How about that? Yes, here they are. Somebody else has been here.	(2-3)
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 they're here.	(2-3)
		- - -	
05 03 31 53	CDR	I'm going to do the NAV system here, once we get 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?	(2-3)
		- - -	
05 03 32 42	LMP	You know, looking out to the east now, Dave, I see 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.	(2-3)
		- - -	
05 03 33 04	CDR	Okay, bearing 11 for a 3.3 kilometers. We'll see how that - -	(2-3)
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 think that's the LM.	(2-3)
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 a bearing of 11 degrees, except for the wanders through the craters.	(2-3)
		- - -	
05 03 34 56	LMP	Looking over to the east, Dave, I see a very large crater, and it could very well be - -	(2-3)
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 know, see that one on the surface there?	(2-3)
05 03 35 28	CDR	I'll bet you - I wouldn't be surprised if it didn't 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.	(2-3)
05 03 35 54	CDR	There are a lot of little craters around here - 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.	(2-3)

05 03 36 53	CDR	They're rather shallow craters, too. Let's say that they're only about - oh - 1 to 6. Hang on, Jim.	(2-3)
05 03 37 07	LMP	Yes, look at - there's a large flat rock over at 1 o'clock.	(2-3)
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 large one down in the pit of that subdued crater.	(2-3)
		- - -	
05 03 37 36	CDR	Ooh, look at that - ooh, oh! Look at that one. It almost looked like pahoehoe, didn't it?	(2-3)
05 03 38 33	LMP	Dave, did you comment on the horizontal bedding in Hadley - looking out the foot of Hadley, that spur that comes out northwest.	(2-3)
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 base.	(2-3)
05 03 38 48	CDR	I didn't see those yesterday. It was all in the shadow.	(2-3)
05 03 38 50	LMP	Yes. Joe, there's definitely a horizontal pattern in the spur of Hadley.	(2-3)
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, 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?	(2-3)
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 our speed calculations.	(2-3)
		- - -	
05 03 39 57	CDR	Mark.	(2-3)
		- - -	
05 03 40 41	LMP	We can see several craters on Hadley. Hard to 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.	(2-3)
		- - -	
05 03 41 43	CDR	We gave you a mark when we started, Joe. That stop was maybe 15 seconds.	(2-3)
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 not close enough yet to be Rhysling. Look at this boulder here, Jim.	(2-3)
05 03 42 11	CDR	Okay; we're coming out across either an elongate 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.	(2-3)
05 03 42 25	LMP	And it must be, maybe 30 meters across on each one of them with no debris and they're smooth on the bottom.	(2-3)
		- - -	
05 03 42 41	CDR	Oh, there's some vesicular basalt right there, boy. Oh, man! Hey, how about it, let's - just hold on 1 second, we've got to have - -	(2-3)(SAMP 15016)(PHO 86 11579-87)
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 commented on - whatever caused them, must create or indurate the soil into the rocks - create 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.	(3)
		- - -	
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. 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.	(3-LM)
05 03 48 18	LMP	You know, you can almost tell the ones that are going to have glass - - by looking at them before you get there.	(3-LM)
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 that last burst.	(3-LM)
		- - -	
05 03 48 44	LMP	Okay, right now we're going at 10 clicks, and I'm reading about 10 amps.	(3-LM)
		- - -	
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 to our right.	(3-LM)
05 03 49 26	CDR	Hey, there's a pretty sharp one right there. It's not big enough though.	(3-LM)

05 03 49 35	LMP	Do you agree, Houston? We're reading 013 to the LM, and we're at 1.6. We ought to be able to see Rhysling.	(3-LM)
05 03 49 45	CC	We agree, Jim. It should be about a 125-meter crater.	(3-LM)
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 deep and might - -	(3-LM)
05 03 50 06	CDR	It's deep, but it's not near that big. It's only - - like - 10, 15 meters across.	(3-LM)
05 03 50 12	LMP	Haven't really seen any large enough that we'd call Rhysling, Joe.	(3-LM)
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 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.	(3-LM)
05 03 50 57	CDR	Yes? Now that you mention it, you're right. Sure 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.	(3-LM)
05 03 [illegible]	LMP	Like just small valleys that are trending upslope, 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?	(3-LM)

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?	(-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 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.	(LM)
		- - -	
05 04 01 10	LMP	Okay; here are the Rover readings; 315, 059, 103, 001, 100, 107, 95, and 95, and motor temps are both lower limit.	(LM)
		- - -	
05 04 04 09	CC	Okay, thank you. And, Jim, as you unload the gear 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.	(LM)
		- - -	
05 04 06 27	CC	Roger; and, Jim, perhaps you could get bag 2 on the right-hand side of the handtool carrier.	(LM)
		- - -	
05 04 09 17	CC	Put it under the seat, Jim, and get bag 2 - - on the right side.	(LM)
		- - -	
05 04 18 13	CDR	Okay, the other number on that core tube is 01, by the way.	(LM)
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 pictures.	(LM)(EHO 85 11465-712; 86 11588-97)
		- - -	

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 47 01	CDR	Okay. LMP camera, mag Lima, 119 frames.	(LM)
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 that, Jim?	(LM)
05 05 50 31	CDR	The film jammed in the mag, and - it stripped the threads, in the film. Whew! Mag Charlie; you got a nothing on Charlie. Let's go! Move! Charlie's in the ETB.	(LM)
		- - -	
05 06 00 08	CC	Dave, I guess we don't have anything else for you 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.	(LM)
		- - -	
05 06 02 31	CDR	And I'm going to - - pick up a - - couple of rocks. Yes, sir.	(LM)(SAMP 15015)
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! Okay, pick up the ETB.	(LM)
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 rocks in the cabin and need containers for them, we're suggesting cover bag number 2, or cover bag number 4.	(BETWEEN EVAS)
		- - -	
05 07 44 46	CDR	Okay. SRC number 1 is stowed. It weighed 36 pounds. And collection bag number 4 weighs 15 pounds.	(BETWEEN EVAS)
		- - -	
05 08 20 24	CDR	Hey, that's great! Can you see the tracks? That's good. Maybe you can see the ALSEP.	(BETWEEN EVAS)
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 notice any soil falling out of the core tubes while you put the caps on?	(BETWEEN EVAS)(SAMP CORE 15007-08)
05 08 52 04	CDR	Yes, there was a slight amount of loss from the lower and a little bit from the upper, but very little.	(BETWEEN EVAS)(SAMP CORE 15007-08)
05 08 52 11	CC	Okay, that sounds good. And regarding the question 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?	(BETWEEN EVAS)
05 08 52 34	LMP	Well, that was my impression. Half an inch in general but Dave probably has another comment.	(BETWEEN EVAS)
05 08 52 41	CDR	No, Joe, I'd say no more than a half an inch. It seems to ride very lightly; I think the bearing on the surface is very light -	(BETWEEN EVAS)

05 08 53 10	CC	Okay, Dave, thank you. Now a series of questions 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?	(BETWEEN EVAS)
05 08 53 28	CDR	I'd say yes, Joe. The drilling characteristics are - 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.	(BETWEEN EVAS)
		- - -	
05 09 01 41	CC	We'd like to know what your best estimation of the LM's position is?	(BETWEEN EVAS)
05 09 01 57	CC	And, Dave and Jim, let me give you some background 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.	(BETWEEN EVAS)
		- - -	
05 09 05 20	CDR	Okay, Joe. How about 73.3 Bravo Sierra 4? And I guess that's because we are on the northeast side of a - double crater.	(BETWEEN EVAS)
		- - -	

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 the [illegible] 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 [illegible] - I call it a contact. Whether it might have [illegible] 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 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.	(BETWEEN EVAS)
		We have one fragment on the order of 6 inches which 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	(SAMP 15016)
		brown - a brownish-gray. We also have a large piece 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.	(SAMP 15015)
		And the basalt we picked up halfway back 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.	(SAMP 15016)
		- - -	
05 09 21 40	CC	Do you have any feel for whether the frags around 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?	(BETWEEN EVAS)
05 09 22 06	CDR	Well, Joe, we're pretty sure they're projectile frags, and that's when we really need to stop and sample.	(BETWEEN EVAS)
		- - -	
05 18 51 36	LMP	Okay. The ETB is loaded per checklist and the additional mag is mag Papa.	(BETWEEN EVAS)
		- - -	
05 18 59 19	CC	Okay, Jim. Add 16-millimeter mag Delta Delta to the 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.	(BETWEEN EVAS)

05 18 59 50	LMP	You're suggesting we take 16-millimeter Delta off and take mag K off my camera and put Papa on my camera, but probably carry Kilo out with us.	(BETWEEN EVAS)
05 19 00 08	CC	That's affirmative, Jim. Carry Kilo Kilo with you, and I think you said it right. But take Delta Delta along, also, in the bag.	(BETWEEN EVAS)
		- - -	
05 19 43 46	CC	Okay, that sounds like good news. I'm going to 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.	(BETWEEN EVAS)

05 19 46 23	CDR	Okay, Joe. That sounds like good planning to us. We're all set. Go ahead.	(BETWEEN EVAS)
05 19 46 30	CC	Okay, Dave. Thank you. I'm going to go through the 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.	(BETWEEN EVAS)

05 19 49 18	CDR	No, no questions Joe. You're really talking our language today. Go.	(BETWEEN EVAS)
05 19 49 23	CC	Roger, Dave. Finally, and I've touched on this 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.	(BETWEEN EVAS)

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.	(LM)
		- - -	
05 22 45 08	CDR	And mag Delta is or 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)

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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 towards checkpoint number 1. Your general heading is 160 at 1.9 clicks and this may take you down between Salyut and Index craters.	(LM-6)

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05 23 12 00	LMP	Joe, I'm going to start the camera here. Will you keep track of it? I'm on 12 frames per second.	(LM-6)
05 23 12 05	CDR	Wait a minute. Why don't you hold off for awhile, Jim?	(LM-6)
05 23 12 08	LMP	Okay. Never mind.	(LM-6)

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05 23 12 48	LMP	Okay, on our left, now, we have a very large subdued 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.	(LM-6)

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05 23 13 56	LMP	I guess it's the largest crater that I've seen, Joe - as far as *** - -	(LM-6)
05 23 14 07	LMP	Okay, we're heading 155 and at our 1 o'clock 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?	(LM-6)

- - -

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

05 23 15 07	LMP	So we're - oh, definitely east of our track from yesterday.	(LM-6)
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 - angular blocks on the rim.	(LM-6)
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, 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.	(LM-6)
		- - -	
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 crater again. No blocks at all on its rim, and it is about 50 meters in diameter.	(LM-6)
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 about that size.	(LM-6)
		- - -	
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 rounded, about 30 meters across.	(LM-6)
05 23 21 34	LMP	You know, on one of these trips, we ought to stop at one of these very fresh ones and really tap one.	(LM-6)
		- - -	
05 23 21 43	LMP	I mean these small ones, you know, just filled with rock debris and glass in the middle. Just do a systematic sampling on it.	(LM-6)
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 - 39 and our range is 1.3 Look out, oh!	(LM-6)
		- - -	
05 23 23 04	LMP	Okay, we've got the right bearing. We're at 1.4 now, Joe.	(LM-6)
		- - -	
05 23 23 20	LMP	Okay, there's a crater on our right now about 50 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 ge 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.	(LM-6)
05 23 24 14	LMP	Over in - probably over the area of crescent. Okay, we're 1.7 - and - again we have a very fresh crater on our left with - several blocks.	(LM-6)

05 23 24 36	CDR	The blocks about a meter or so and the crater is probably about 15 meters, like it might have been excavated or been a secondary, huh?	(LM-6)
05 23 24 47	LMP	Yes, well, notice all the debris here, that the surface is covered with more debris in this particular area than what we've seen before.	(LM-6)
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 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.	(LM-6)
		- - -	
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 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.	(LM-6)
05 23 26 12	LMP	Boy there is a very large crater over on our - 1 to 2 o'clock position.	(LM-6)
05 23 26 18	LMP	That's the largest one - oh, I guess it would be equal maybe larger than - well larger than Elbow, certainly.	(LM-6)
05 23 26 26	CDR	Yes, it looks like it. You can't see too much of it but it does -	(LM-6)
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 Earthlight now. It might be - its long dimension is greater than the east-west dimension.	(LM-6)

05 23 26 44	LMP	Okay, well that's certainly true. Certainly true. Okay, you would have us east of Earthlight.	(LM-6)
05 23 26 56	LMP	Hey, here's a big deep one here about - maybe 50 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.	(LM-6)
05 23 27 25	CDR	Hey, Jim. Check the camera. I don't think it's running. I don't see any change in the - - the quantity indicator. Why don't you feel it?	(LM-6)
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 - I just noticed that the film counter wasn't going.	(LM-6)
		- - -	
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 through a small valley - ***	(LM-6)
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 it?	(LM-6)
		- - -	

05 23 29 31	CDR	Looks like - it looks more like a valley, you know, that runs east-west.	(LM-6)
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 Dune? Yes, there's a rampart over there.	(LM-6)
05 23 29 54	LMP	I was wondering whether we were - could possibly be on Dune.	(LM-6)
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 one - just to the right of us here, I see it on the map. So - yes, that's Crescent.	(LM-6)
05 23 30 15	CDR	Yes, I guess you're right. That's a big fella isn't it?	(LM-6)
05 23 30 21	LMP	In fact, Dune should be dead ahead, Dave; so we'll probably have to steer a little to the right to go around the western side of Dune.	(LM-6)
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 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?	(LM-6)
05 23 31 11	CDR	And there are some that are up to a couple of feet that require some maneuvering.	(LM-6)
05 23 31 21	CDR	Let's see, I think I'll go left around this one, Jim, and then swing over to the right.	(LM-6)

05 23 31 27	CDR	Lots of - the smaller ones are deeper here. Man, 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.	(LM-6)
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 you -	(LM-6)
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 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.	(LM-6)
05 23 32 28	CDR	Okay, coming right. I've got to get up on the rim here where I can take a look.	(LM-6)
05 23 32 34	CC	Okay, Jim. And turn off the 16-millimeter camera, please. The film should be run through.	(LM-6)
05 23 32 40	CDR	Okay. Not a single motion on the little ball on the indicator, Joe.	(LM-6)
		- - -	
05 23 32 59	LMP	Okay, we can definitely look down in the Dune crater	(LM-6)
05 23 33 07	LMP	Man, it sure likes the - a ray of blocks that run north and south on the southern slope of the crater.	(LM-6)
05 23 33 20	CDR	Yes, and there's no big rampart like we were thinking we'd see.	(LM-6)
05 23 33 29	CDR	Man, look at some of those big ones Jim. They're like - [illegible] meters across.	(LM-6)

05 23 33 40	LMP	Okay, we're heading now 250 to get over on the west side of Dune.	(LM-6)
		- - -	
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, we could just head - about 180.	(LM-6)
05 23 34 41	LMP	170.	(LM-6)
05 23 34 51	CDR	lots of debris here, wooee! Up again to about 5 to 7 percent. Very rough-textured, subangular blocks - gray, partially buried - some of them, and some of them are on the top, huh?	(LM-6)
		- - -	
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 the impression that those craters, secondary on the side there, are oriented, going right up the slope?	(LM-6)
05 23 35 32	CDR	Oh, yes, you called them right, I think - secondaries. I think they just splattered right up the slope. Because they're the the only craters on the side of the mountain.	(LM-6)
05 23 35 39	LMP	Yes. And they're lined up so nicely. Good-sized one ahead, Dave.	(LM-6)
05 23 35 48	LMP	Avoid that fella - stuck in there. Hey, we're going south.	(LM-6)
05 23 36 16	LMP	Okay, we're on the - about the southwest side now of 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 - -	(LM-6)

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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 with that chain of secondaries - - going up the side of Hadley Delta.	(LM-6)

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05 23 37 55	CDR	I'm going to stop right here and take a little break.	(LM-6)
05 23 37 56	LMP	Okay. Look at 12:30. See that large block sitting 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.	(LM-6)
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 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.	(LM-6)(PHO 85 11472-80)
05 23 38 53	CDR	I'll bet you can get, you know, almost - 90 or 100 degrees of pan there.	(LM-6)(PHO 85 11472-80)

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

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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, would probably be Spur, up on the side. Yes.	(LM-6)
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 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.	(LM-6)

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05 23 41 00	CC	We're looking in particular for fresh craters, lots of frags, good sampling drill holes into the front and marc.	(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. 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.	(LM-6)
05 23 43 56	CDR	There's a crater. A subtle depression; no debris. We can navigate th t one all right.	(LM-6)
05 23 44 03	LMP	There are some fairly good blocks sitting up by themselves there - - at 11:30. But I guess our primary objective is the crater.	(LM-6)
05 23 44 13	CDR	Yes. We'll hit that first. Boy, that's a big 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.	(LM-6)
05 23 44 30	CDR	Hey, look at the little chain of craters in that one directly ahead.	(LM-6)
05 23 44 37	LMP	Yes, there are - let's see 1, 2, 3, 4 - at least 4 lined up going upslope.	(LM-6)
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, little ones, maybe - -	(LM-6)
05 23 44 49	LMP	Yes, but look there's a rock in below those. I wonder if it could have bounced down.	(LM-6)
05 23 44 53	CDR	No, it couldn't have made that many. Yes, we're - 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 [illegible] bit, and then we're going to start up again	(LM-6)
		- - -	
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 here. No, those weren't very big holes at all were they? I guess the shadow made them look -	(LM-6)

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 half-foot craters of the size of a 4-meter crater that showed up very well in the shadow.	(LM-6)
05 23 46 04	CDR	And we're right - and that was just in our 348 for 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.	(LM-6)
05 23 46 18	LMP	Do you know, Dave, if we could make it out that far directly ahead of us - look at those large blocks.	(LM-6)
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 up the slope?	(LM-6)
05 23 46 41	CDR	Yes, sir. Dead ahead. It's very visible And 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?	(LM-6)
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, because that's another 3 kilometers down there.	(LM-6)
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 depression here. Jim.	(LM-6)
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 left there and see how the slope rises abruptly up toward Hadley Delta.	(LM-6)
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 your present position and use that as your first station?	(LM-6)
05 23 48 21	CDR	Yes, I think that might be a good idea, Joe. Let us 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?	(LM-6)
05 23 48 35	LMP	Yes.	(LM-6)
05 23 48 41	CDR	Do you have some coordinates for Spur, Joe? Because there's a large block - - on the slope of the Front that we can sample.	(LM-6)
05 23 48 56	LMP	That Spur should be in that vicinity. We're doing 8 clicks.	(LM-6)
05 23 49 03	CC	Okay, Dave and Jim, Spur is at bearing 346, range 4.6.	(LM-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 continue your reconnoiter along the Front. Sounds good.	(LM-6)
05 23 49 30	CDR	Okay. I don't know how high we want to go on the Front.	(LM-6)
05 23 49 33	LMP	I don't either. But we don't want to go too high. I don't think we're - -	(LM-6)
05 23 49 36	CDR	Hey, that must be - - maybe to the right there, Spur. Huh Jim?	(LM-6)
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. - I think that's Spur right over there.	(LM-6)
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 us. Okay?	(LM-6)
05 23 49 5[illegible]	LMP	Okay, we know where Spur is. We're passing it - it's at our 3 o'clock position. And we're bearing 346, 4.7, Joe.	(LM-6)
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 travel here, Jim. And on the way back pick up that big block up there.	(LM-6)
05 23 50 24	LMP	Okay. In other words - I see what you mean - angle uphill.	(LM-6)
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)

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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	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 cont wards the east, and keep your eyes open.	(LM-6)
05 23 52 45	CDR	Well, we're up on a litt ere think it would do well for us to and sample the rocks we can see in this area head over to that boulder, there. See how ay?	(LM-6)

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05 23 53 21	CDR	Yes, we have a number of fragments in our local 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.	(LM-6)
05 23 53 49	LMP	There's one of those - very fresh craters over at 11 o'clock - -	(LM-6)
05 23 53 55	LMP	There are several of those around.	(LM-6)
05 23 53 56	CDR	Okay. Rover power is off.	(6)

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05 23 54 03	LMP	Okay, Joe; here's some readings. 195, 243, 065, 050; 92, and 100: 75, 81; and motor temps are both - off scale low.	(6)

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05 23 54 43	CDR	We're on a steep slope. Your belt is caught. Just 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 - -	(6)

- - -

05 23 55 07	CDR	Right to 10 degrees. And we can look back and see the whole - we can see the LM just as loud and clear as can be.	(6)

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05 23 55 26	LMP	Oh, boy! Okay. I'll take a pan.	(6)(PHO 85 11481-97)

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05 23 56 37	LMP	You know, I want to take a picture upslope, Dave, but I can't. I can't get the camera pointed up that way.	(6)
		- - -	
05 23 58 13	CDR	Okay. Let's go up first, so we can come downhill. And, there's one of those fresh little craters.	(6)
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 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.	(6)(SAMP 15240-45)
05 23 59 58	LMP	We never did remark on that very white crater out there northwest of the LM, did we?	(6)
06 00 00 03	CDR	No, I don't think we did. It's really, really white though, isn't it? Yes, I've got your bag, and it's number 1 - -	(6)(SAMP 15240-45)
06 00 00 09	LMP	And we're going to sample the glass in the middle of it.	(6)(SAMP 15240-45)(PHO 85 11498-500; 86 11609-15)
06 00 00 12	CDR	Yes. Start with the middle, and we'll pick up the rim, too.	(6)(SAMP 15240-45)
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 [illegible]	LMP	I hope it stays together for us.	(6)(SAMP 15240-45)
06 00 00 [illegible]7	LMP	Like fragments all glued together. What an intricate pattern.	(6)(SAMP 15240-45)
		- - -	
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 don't you skip the rim there, Jim.	(6)(SAMP 15240-45)(SAMP 15250-54)(PHO 85 11498-500; 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 very fine.	(6)(SAMP 15250-54)
		- - -	
06 00 02 00	LMP	You ought to look up toward - Mount Hadley. You can see that linear pattern.	(6)
06 00 02 22	CDR	Okay, Jim. Let's find ourselves a couple of frags down here. There are three within easy range over here.	(6)(SAMP 15290-95)(PHO 85 11501-02; 86 11616-20)
		- - -	
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. Get that one.	(6)(SAMP 15290-95)
		- - -	
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 variety of rock types or just one general kind?	(6)(SAMP 15290-95)
06 00 04 09	CDR	Okay. Let us go through them, Joe, as we pick them 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.	(6)(SAMP 15290-95)
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. 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.	(6)(SAMP 15298)
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 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.	(6)(SAMP 15298)
06 00 09 34	CDR	Okay, Jimbo. Keep going around the old Rover here, and see if we can find another interesting looking one.	(6)
06 00 09 49	CDR	As you can see, probably, with the TV, Joe, there just isn't much in the way of debris around here. It's all -	(6)
		- - -	
06 00 10 12	CDR	Okay. Jim, there's one sitting on top of this little crater over here. Reckon you can get over here to it.	(6)

06 00 10 18	LMP	Yes. I was trying to recover that bag, but I gave up on it.	(6)
06 00 10 27	CC	And, Jim, on your pan, were you able to sweep around the full 360 degrees?	(6)(PHO 85 11481-97)
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 before we leave the area, so you get a little stereo effect.	(6)(PHO 85 11481-97)
06 00 10 48	LMP	You can tell we sank in about 2 or 3 inches *** material.	(6)
06 00 10 54	CDR	Jim, I would say that this fragment here hit right before its position. You see that little spot? See that little spot right there in front?	(6)(SAMP 15299)(PHO 85 11505-05; 86 11624-28)
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 can get the pictures here. Wonder from whence it came. If it did hit there it was traveling - -	(6)(SAMP 15299)
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 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?	(6)(SAMP 15299) (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)

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06 00 12 47	CDR	Okay. Let me get down here. Let me use my tongs - to pick it up.	(6)(SAMP 15299)
		- - -	
06 00 12 54	CDR	Hey, hold it right there. Up a little more. I got it.	(6)(SAMP 15299)
06 00 13 16	CDR	Man, it's really covered. But it's a very rough 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.	(6)(SAMP 15299)
06 00 13 37	CDR	And I think we have it fairly well documented. It's in collection bag number 3, which will help you keep track of it.	(6)(SAMP 15299)
06 00 13 47	CDR	They're either big ones, or they're little small ones. Okay; got the picture.	(6)(SAMP 15299)(PHO 86 11628)
06 00 13 58	LMP	There's a crater over to the west, Dave, that has a very light albedo that's - -	(6)
06 00 14 02	CDR	Yes, let's head that way with the Rover when we get going.	(6)
06 00 14 06	CC	Okay. Dave and Jim, when - - you reach a good stopping point, we've got a couple of questions.	(6)
06 00 14 17	LMP	While you're asking them, I think I'll take another pan.	(6)(PHO 85 11507-22)
06 00 14 23	CC	And, Dave, while he is doing that, could you tell us how far away and in what direction is the large block which you described?	(6)
06 00 14 33	CDR	Yes, Joe. We intend to head in that direction. 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.	(6)

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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 looking at might be Spur crater? We put your present position as halfway between Window and Spur.	(6)
06 00 16 14	CDR	No, I don't think. It's too small, Joe. I think we picked up Spur as we went by a little while ago. We saw it.	(6)
06 00 16 25	CC	Okay. We agree with you exactly here, Dave and Jim. 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.	(6)
06 00 16 43	CDR	Okay, Joe. Okay; another little microbreccia. Bag number is 190.	(6)(SAMP 15255-57)(PHO 86 11629-32)
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. 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.	(6)(SAMP 15255-57)
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 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 - -	(6)(SAMP 15255-57)(PHO 86 11632)

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06 00 17 59	CDR	Let's go down and take a look at this little crater right here. There's a little small crater, I guess you can see, Joe, at about 2 o'clock to the TV now. And - -	(6)

- - -

06 00 18 34	CDR	Okay. Okay; let's move down here. Downhill, with 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.	(6)
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 downslope side.	(6)
06 00 19 25	CDR	Yes. I took a picture of it.	(6)

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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 radial sample.	(6)
06 00 19 55	CDR	Yes. Boy, look at how this zero phase just wipes 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. Jeeper, this - they're all too big.	(6)
06 00 20 27	LMP	Notice you're kicking up some white material there, Dave?	(6)
06 00 20 29	CDR	Hey you're right.	(6)
06 00 20 32	LMP	We ought to trench it.	(6)

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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; 86 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 86 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? We'll give you your choice today.	(6)
		- - -	
06 00 24 39	CDR	Okay. We'll go up and trench it first and see if it's worth coring.	(6)
06 00 24 46	CDR	Let's go up on the upper rim up there, and work our way back up to our Rover friend.	(6)
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 here.	(6)
		- - -	
06 00 26 03	LMP	Look at those linear features on Mount Hadley, Dave, if you get a chance to look up there.	(6)
06 00 26 11	CDR	Oh, yes! My word! Look it, the dip's to the northwest, right?	(6)
06 00 26 18	CDR	Oh, yes! It's a big - looks like a big block tilted up on its side.	(6)
06 00 26 23	CC	And just like you called it - - and we're going to ask for 500-millimeter pictures of that when you get back to the Rover.	(6)
06 00 26 32	CDR	Boy, I was just going to say, we'd better take some 500-millimeter pictures of it. Okay, Jim's trenching. Hey, the other side, Jim, I can't see you.	(6) (SAMP TRENCH 15260-64)(PHO 86 11 41-46; 85 11525-26)
		- - -	
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 digging. That's fine. Boy, when you put your scoop in, it smooths it out flat just like plaster.	(6)(SAMP TRENCH 15260-64)

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 didn't get the SESC - - we just got a sample from the bottom of the trench. And since we have to walk back uphill to the Rover to get the SESC - -	(6)(SAMP TRENCH 15012) (SAMP TRENCH 15260-64)
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 might want to scoop it out again.	(6)(SAMP TRENCH 15012)
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 in that there crater.	(6)(SAMP TRENCH 15012)
06 00 30 42	CDR	Why don'tcha scoop out the bottom on this side a little bit, Jim.	(6)(SAMP TRENCH 15012)
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 probably - get the thing deeper and -	(6)(SAMP TRENCH 15012)
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 ahead. Dig her. Have a scoop load. I think the wall collapsed on you.	(6)(SAMP TRENCH 15012)
06 00 31 42	CDR	Get your scoop up. That's it. That's it. That's good, Jim. That's about half - can you get another one? Hey, don't slide down in there, that's really slippery.	(6)(SAMP TRENCH 15012)
		- - -	
06 00 32 14	CDR	Yes, that's good. Boy, it's really easy to - pick it up and dump it out, isn't it?	(6)(SAMP TRENCH 15012)
06 00 32 32	CDR	Why don't you - - you work yourself out of that crater to your left. If you try to come up like I did, you're - ***	(6)(SAMP TRENCH 15012)

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 one.	(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. Quite a difference from one side of the rim to the other.	(6)(SAMP CORE 15009)
06 00 36 08	LMP	I'm probably just about out of film. Why don't you check with my mag?	(6)(PHO 85 11527-30)
06 00 36 17	CDR	Yes, 180. Okay.	(6)
06 00 36 24	LMP	Okay, Joe. And you're suggesting using an upper here?	(6)(SAMP CORE 15009)
06 00 36 27	CC	That's affirmative, Jim, an upper.	(6)(SAMP CORE 15009)
06 00 36 36	CDR	Okay. I don't think you'll need your hammer, but I'll get it anyway.	(6)
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 *** key all the way in very easily with a push, Joe.	(6)(SAMP CORE 15009)
06 00 37 17	CDR	Yes, it'll be soft, bring it out - be gentle. Don't auger it.	(6)(SAMP CORE 15009)
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. You're over by the bench now; don't go any farther backward.	(6)(SAMP CORE 15009)
06 00 37 42	LMP	Oh, I thought you meant I was about to lose the core.	(6)(SAMP CORE 15009)
06 00 37 44	CDR	Just don't step backward any farther. Wait, let me get the picture - I'll just walk over there, Jim.	(6)(SAMP CORE 15009)(PHO 86 11651)
06 00 38 12	CDR	Good core, Joe.	(6)(SAMP CORE 15009)

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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. And I can do 500's while Jim's taking a pan. How's that sound?	(6)
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 Jim, you may be coming up on a mag change, depending upon your frame counts.	(6)
06 00 39 14	LMP	Yes. Mine's 180.	(6)
39 18	CC	Roger. Better change it.	(6)
39 22	LMP	I wish you'd pack the slope a little better, Dave.	(6)
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 of the Rover tracks here. And our boot prints, both. Look at the difference. That old Rover is light.	(6)(PHO 86 11652-55)
		- - -	
06 00 39 50	CC	A little something for the soil mechanics, sounds great. And we'd like for you to put several scoops of the soil in bag number 6 on the handtool carrier when you get back to the Rover.	(6)(SAMP 15270-74, 81-84)(PHO 86 11656-57)
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 - - near the crater. At least you'll get a comparison. Boy, those chevrons do a good job of compacting the soil.	(6)
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? That the one on the back of the pallet? Must be.	(6)(SAMP 15270-74, 81-84)
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 Rover.	(6)(SAMP 15270-74, 81-84)
		- - -	
06 00 42 08	CDR	Why don't you - yes, get the down-sun and we'll just scoop - right here.	(6)(SAMP 15270-74, 81-84)
06 00 42 15	CC	And, Dave and Jim, we're after a large volume here, so shovel it in.	(6)(SAMP 15270-74, 81-84)
06 00 42 22	CDR	All right. Bag number 167. Beginning to shovel large volume.	(6)(SAMP 15270-74, 81-84)
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 can't very well transfer it.	(6)(SAMP 15270-74, 81-84)
06 00 43 02	CDR	Whoop! Easy, easy. Okay. Good. Good load - get another one.	(6)(SAMP 15270-74, 81-84)
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, Jim; there's no air in them when you fold them up. Okay; and 167 goes in your bag.	(6)(SAMP 15270-74, 81-84)
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	CDR	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	CDR	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 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?	(6)(PHO 84 11292-349)
06 00 52 03	CDR		Yes, I guess so. Let's do that. Except that it's so much up-sun, Jim, I'm not sure we're going to get anything in them.	(6)(PHO 84 11292-349)
			- - -	
06 00 52 20	CC		On - I forgot - the 16-millimeter, we want you to change out that mag, run the camera at 1 foot per second for 10 seconds and then go back to normal.	(6)
06 00 52 50	CDR		I took about 4 more pictures on the 500, Joe, looking out at Silver Spur and the blocks that are exposed up there.	(6)(PHO 84 11347-49)
06 00 53 01	CC		Okay, Dave. Out of curiosity, did you photograph the LM with the big camera?	(6)(PHO 84 11324-25)
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 jammed in that camera, too. That's a problem.	(6)(PHO DAC)
06 00 53 28	CC		Roger. Copy, the film was jammed in the DAC. And change out that magazine, please. Install a new one, and start it running at 1 frame per second for 10 seconds.	(6)(PHO DAC)
			- - -	
06 00 54 14	LMP		Okay; 1 frame per second, Joe. Here we go - 10 seconds.	(6)(PHO DAC)
			- - -	

06 00 55 05	CC	Jim, while you're there, can you look over and get a frame count off of Dave's camera, please?	(6)
		- - -	
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 run it at that speed? You want me to turn it on at that speed now, Joe, and see if it'll work?	(6)(PHO DAC)
		- - -	
06 00 56 36	LMP	I think it might be - this one might be working, Joe - - because we're at the full mark on the mag.	(6)(PHO DAC)
06 00 56 49	CC	Roger, Dave. And Jim, turn off the DAC until we start driving and then we'll get some - moving.	(6)(PHO DAC)
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 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.	(6)
		- - -	
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 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?	(6-6A)
06 00 58 49	CDR	Oh, I think that's a good idea. I don't think we're 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.	(6-6A)
		- - -	

06 00 59 19	CDR	Okay. Now here's a little fresh crater, Jim - with white albedo, but I think that's probably a secondary. I don't think that's excavated or anything, do you?	(6-6A)
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 over the ridge, I guess.	(6-6A)
06 00 59 36	CDR	Yes. Yes, we'll take it sort of slow here going down-sun.	(6-6A)
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 know, looking upslope, look how much more hummocky it is. It's just a - different terrain.	(6-6A)(PHO DAC)
06 01 00 13	CDR	It sure is. It sure is. Pretty hummocky and driving is much sportier.	(6-6A)
		- - -	
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 that's probably Spur down there, the large one, Dave.	(6A)
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 can drive down to it.	(6A)

		- - -	
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 - - 100, 80, 90, and motor temps are lower limit.	(6A)
		- - -	
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 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.	(6A)
06 01 03 45	CC	Negative, Dave. We agree with you exactly. We're in good shape. Just proceed carefully on - - the soft powder.	(6A)
06 01 03 56	CDR	Yes, we're going to do that because it really is. But you can't say that we didn't sample the Apennine Front.	(6A)
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 hammer?	(6A)
06 01 04 29	CC	Hey, troops, I'm not sure you should go downslope very far, if at all, from the Rover.	(6A)
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 don't you stay there, Jim?	(6A)
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 carry some of those tools?	(6A)
		- - -	
06 01 05 26	CDR	The footing is all right, except that you have to 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.	(6A)
06 01 05 47	CDR	Hold on, Jim. Wait a minute, Jim. Don't go yet. Let me drive the Rover down there.	(6A)
		- - -	
06 01 06 02	CDR	Oh, Joe. I can see where the Earth is in general. 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.	(6A)
06 01 06 18	LMP	And there's a beautiful little rock track here in - it went in a circular arc.	(6A)
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, it curved into the hill.	(6A)(PHO?)
06 01 06 37	LMP	Yes. A little angular fragment, Joe, about 2 inches long.	(6A)
06 01 06 48	LMP	Came down slope - - curved into the hill and stopped.	(6A)
		- - -	

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 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.	(6A)
		- - -	
06 01 13 58	CDR	No, we're okay. It's just that this slope's pretty steep, and I just cannot take too much time - here.	(6A)
06 01 14 03	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 see it. It looks like a light-green layer, not necessarily a thick layer. Light green.	(6A)(SAMP 15400-05)
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 86 11658-59)
06 01 15 24	LMP	Be great if we'd get some of that - - green material.	(6A)(SAMP 15400-05)
06 01 15 30	CDR	I'll get it. I think I can get it with my tongs all right.	(6A)(SAMP 15400-05)
		- - -	
06 01 15 59	CDR	It seems to be a - surface material or else it's a very frangible clast in this big piece of breccia. Dig my tongs into it.	(6A)(SAMP 15400-05)
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 from the rock, you kicked up the surface and there's some more green there.	(6A)(SAMP 15400-05)
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 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.	(6A)(SAMP 15400-05)
06 01 17 36	LMP	And on the side to the southeast is again the breccia. Isn't that right, Dave?	(6A)(SAMP 15400-05)
06 01 17 43	CDR	Yes. And I got a little frag. Don't drop it. There. And I got some green, and I got a frag out of the breccia.	(6A)(SAMP 15400-05)
06 01 18 03	CDR	It's fairly loose - breccia, as breccias go. Oh, and there's a great big white clast on the inside, but - man, like an inch or so.	(6A)(SAMP 15400-05)
		- - -	
06 01 18 55	CDR	168, Joe. Got a little bit of the green, and I got a chunk about 3 inches of the rock itself.	(6A)(SAMP 15400-05)
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 towards Spur - -	(6A)
		- - -	
06 01 19 25	LMP	Yes. It's going to take us a while to work downslope.	(6A)
		- - -	
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. Trouble is, if I get on first, I'm not sure you're going to have a seatbelt.	(6A)
		- - -	
06 01 20 52	CDR	Tell you what might be better, Jim. Let me ease on down the hill here to a flatter spot for you to get on. Okay?	(6A)
06 01 21 03	CDR	You see right at 1 o'clock there, it levels out in that little depression.	(6A)
		- - -	
06 01 21 29	LMP	Yes. In fact, I'd just as soon meet you down where it's level.	(6A)
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 for you to get on.	(6A)
		- - -	
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 all right; should be able to go down all right.	(6A-7)
		- - -	
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 to hit the upper rim or the lower rim of Spur?	(6A-7)
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 rim, right?	(6A-7)

06 01 24 25	LMP	Yes, if we're going to - - sample any blocks there on the rim, that'd be the place to do it.	(6A-7)
06 01 24 31	CC	Sounds good to us. And, Dave, we'd like for you - - 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.	(6A-7)
06 01 24 47	CDR	Okay. We're in good shape, Joe. That one wall there has quite a bit of debris, doesn't it?	(6A-7)
06 01 24 59	LMP	Yes, and it looks like it's - again has a linear pattern running north and south.	(6A-7)
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 north wall - of Spur. And the slope here at Spur is - oh, 8 to 10 degrees.	(6A-7)
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 to park.	(6A-7)
		- - -	
06 01 26 25	CDR	Yes. Yes, I think we're just about level, right there.	(6A-7)
		- - -	
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 heading is 290, 349, 7.3, 4.7, 095, 100, 82, 90; motor temps are both lower limit.	(7)
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. Difference in the gray in the albedo. At least, that would be my guess.	(7)
06 01 32 25	LMP	On, it might be the EV visor that makes it look green. But, it's worth sampling. Notice that large rock on the northwest side, just on the inner edge there.	(7)
06 01 32 56	LMP	Clearly a breccia. Look at the clasts; you can see the clasts from here.	(7)
06 01 33 01	LMP	And, it looks like it's a different color rock. Well, it's a dark -	(7)
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 almost looks like a white vein on top of the other rock.	(7)(SAMP 15410-19)
		- - -	
06 01 33 53	CDR	Yes. It's a breccia. It's a dark-gray rock that 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	(7)(SAMP 15410-19)

		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, let me take a picture, and why don't you pick up that little piece of glass and put it in the bag, too.	(7)(SAMP 15410-19)(PHO 86 11662-63)
		- - -	
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 the next order of business is that neat one there.	(7)(SAMP 15421-27)(PHO 86 11664-69; 90 12225-26)
06 01 37 10	LMP	Okay, well, there, too - just to the west of you, Dave, is some of that - what we've been calling green material - clearly visible? See what I mean?	(7)(SAMP 15421-27)
		- - -	
06 01 37 31	LMP	Okay. I'd call it light gray but, we'll check it when we get home.	(7)(SAMP 15421-27)
06 01 37 38	CDR	Well, it's definitely different from the next rock, or the one we just picked up.	(7)(SAMP 15421-27)
		- - -	
06 01 37 46	CDR	Okay. Sure is. That's awful big, but I think we ought to sample here anyway, all those little frags.	(7)(SAMP 15421-27)
06 01 38 06	CDR	I've got to admit it really looks green to me, too, Jim, but I can't believe it's green.	(7)(SAMP 15421-27)
		- - -	
06 01 38 51	CDR	Man, that looks almost - now it's gray. The visor makes it green, Jim.	(7)(SAMP 15421-27)
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 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.	(7)(SAMP 15421-27)
06 01 39 53	CDR	With the visor on, Joe, I was about ready to call it 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.	(7)(SAMP 15421-27)
06 01 40 15	LMP	Okay, why don't you get a sample - let me take a picture, and you get a sample of the soil, okay. Why don't you just scoop in between them.	(7)(SAMP 15421-27)(PHO 90 12225)
06 01 40 30	CDR	Yes. I think this is a big frag here, but, it - - broke when it hit. All these pieces are roughly the same.	(7)(SAMP 15421-27)
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 sampling on the ejecta blanket of Spur crater, now?	(7)(SAMP 15421-27)
06 01 40 48	CDR	Yes, sir; probably from the deepest part, because we're right on the rim.	(7)(SAMP 15421-27)
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. 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.	(7)(SAMP 15415)(PHO 86 11670-72; 90 12227-28)
06 01 41 34	CC	Okay, Dave. Get as many of those as you can, and you might be watching for a place where you think the rake might help you.	(7)(SAMP 15415)

- - -

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 154.0)(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, boy. Okay, let's get some of the other - maybe - 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?	(7)(SAMP 15415) (SAMP 15431-35)(PHO 86 11670-74; 90 12227-28)
06 01 44 10	LMP	I think I can just - I think it's just a clod. Don't you?	(7)(SAMP 15431-35)
06 01 44 12	CDR	I don't know. Try it. Put your scoop there in the middle and break off a chip.	(7)(SAMP 15431-35)
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 picture first, so you know which one we got. Okay. Go ahead. Number 170.	(7)(SAMP 15431-35)
		- - -	
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 are you - - over the lip right now?	(7)(SAMP 15431-35)
06 01 44 55	CDR	Oh, just a tad over the lip on a little bench, but it's -	(7)(SAMP 15431-35)
06 01 45 00	LMP	I don't know whether it'll fit in the bag or not. Got it?	(7)(SAMP 15431-35)
06 01 45 03	CDR	No. It dropped. See if you can pick it up again. I think it'll fit in the bag, Joe - Jim.	(7)(SAMP 15431-35)
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 wi[illegible] tongs. Here.	(7)(SAMP 15431-35)

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 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.	(7)
06 01 52 20	LMP	It seems a shame. We got to go over and sample that big one there.	(7)
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 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.	(7)(SAMP 15445)(PHO 86 11682-94)
		- - -	
06 01 54 02	CC	Dave and Jim, the science input now is that we want 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.	(7)(SAMP 15310-92)(PHO 90 12231-34)
		- - -	
06 01 55 02	CDR	I'll get the gnomon. And while you're putting the rake on I'll photograph this thing, anyway.	(7)(SAMP 15445)(PHO 86 11682-94)
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 that has some - a linear pattern in it, that you might want to look at while I'm raking.	(7)(SAMP 15459)
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 off any small frags?	(7)
		- - -	
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 see that rock over at your - just a little south of you?	(7)(SAMP 15459)
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 change film mags while you rake, Jim.	(7)
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, though you must have taken a lot of pictures over there.	(7)(PHO 90 12231-34)
		- - -	
06 01 58 45	CDR	All right, Joe. And, mark bag 171 for a frag off of 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.	(7)(SAMP 15445)
		- - -	
06 01 59 17	CDR	And I think I'll brush off the camera for you, and I can brush off my camera before I change the film.	(7)
		- - -	

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 17 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; 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 - -	(7)(SAMP 15310-92)
06 02 02 53	LMP	Yes, you know, because we're moving farther - - a little farther from the rim - - you get less and less each swath.	(7)(SAMP 15310-92)
06 02 02 59	LMP	This one ought to be a more fruitful one. Either that or my arm is getting tired.	(7)(SAMP 15310-92)
		- - -	
06 02 03 14	CDR	How about a double core here, Joe? Got any ideas on that one?	(7)
06 02 03 19	CC	Dave, we're coming up on the departure time about 10 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.	(7)(SAMP 15310-92)
		- - -	
06 02 03 37	CDR	We got a whole bagful of those in the comp. And that's in 172.	(7)(SAMP 15310-92)
06 02 03 43	CC	Roger; copy 172. I guess all we need is a soil sample from this area and perhaps even larger rocks, if there's some grapefruit- to football-size rocks there.	(7)(SAMP 15300-08)(PHO 90 12231-34)
06 02 03 54	CDR	Yes. Yes, we'll just finish off Jim's collection bag here. I want to stow it anyway. Oh, look at that glass - spherule down there. See that big one?	(7)(SAMP 15300-08) (SAMP 15307)
06 02 04 08	CDR	Why don't you back off and document the area. Let me get my tongs and pick that up.	(7)(SAMP 15307)
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 a picture of that. I'll get a bag; then you can get the soil.	(7)(SAMP 15300-08) (PHO?)
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 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.	(7)(SAMP 15307)
		- - -	
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. The - -	(7)(SAMP 15300-08)
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 there; that's good. I'll get it.	(7)(SAMP 15300-08)
06 02 06 49	CDR	I'm going to get a couple of big rocks, Jim. Then we'll just fill your bag and - call it a day - here.	(7)

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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, 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.	(7)
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)
2 10 42	CDR	Yes, one, Joe. That's - we're about out of time, here.	(7)(SAMP 15459)
06 02 10 49	CC	We think you should be climbing - - aboard now. Looks like you really put some weight on our suspension system when you loaded it there.	(7)
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 it.	(7)
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 shoot some film.	(7)
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 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.	(7)
06 02 15 47	LMP	Okay; give me a heading. I can see it over there, Dave.	(7)

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, or rampart, on the eastern side.	(7-4)
06 02 18 57	LMP	So probably any place on the southern rim would be 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.	(7-4)
06 02 20 07	LMP	And we're intersecting our tracks here, as we go downslope.	(7-4)

- - -

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 range is 4.3.	(7-4)

- - -

06 02 21 02	CDR	Yes, we're about down out of it, now. What a beautiful sight man! Well, we didn't get to 500 in stereo up there, but you got a pan, didn't you?	(7-4)(PHO 90 12179-98)
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 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.	(7-4)
06 02 26 33	LMP	But you'd still like the station - to be on the - southern rim, I would think.	(7-4)
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 be a good sampling station.	(7-4)
06 02 27 02	LMP	Okay, we're heading off now at 025. Heading directly toward the southern rim of Dune.	(7-4)
		- - -	
06 02 27 28	CC	Roger. The mag's run out on your camera, Jim. You 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.	(7-4)
06 02 27 48	CDR	Roger, Joe. We'll do that. We're just on the rim of Dune right now.	(7-4)
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 still have - about 40 - 45 percent left.	(7-4)
		- - -	
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, let me get this off.	(7-4)

06 02 28 43	CC	Standing by for your mark when you stop. And either Dave or Jim, we're going to need you - for camera and LCRU and the camera lens brushed off before you continue.	(7-4)
06 02 28 59	LMP	Okay; we've stopped, Joe.	(4)
06 02 29 01	LMP	We're reading - 292, 2.2, 347, 8.9, 3.4, 94100, 89, 90; motor temps, both - low.	(4)
		- - -	
06 02 30 09	LMP	For a 10-minute stop, Dave, I don't think the rake is very good.	(4)
06 02 30 19	CC	Just depending on however you read the fragment distribution.	(4)
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 sample. Jim's out of film, or his camera stopped, and I can take the pictures.	(4)
		- - -	
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 stopped working.	(4)(PHO 90 12237-48)
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 bag out.	(4)
		- - -	
06 02 34 41	CDR	Get a bag and you get some soil here. Watch that big one. I want to get that one, too.	(4)(SAMP 15470-78)(PHO 87 11759-64) (SAMP 15495)(PHO 87 11759-64)
06 02 35 00	CDR	Okay; good. Why don't you zip the bag. And let me get that other big rock, that -	(4)(SAMP 15470-78)
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. 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.	(4)(SAMP 15470-78)
06 02 36 51	LMP	The large gray one on your right with large vesicles on it.	(4)(SAMP 15499)(PHO 87 11767-68, 79)
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 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.	(4)(SAMP 15499)
		- - -	
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 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.	(4)
06 02 39 40	CDR	Put that in my pack; will you, Jim? Okay; this is a large corner of a vesicular rock that's the big boulder sitting here.	(4)(SAMP 15499)
06 02 30 53	LMP	Just about all we're going to be able to put in your bag.	(4)(SAMP 15499)
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 from the center. Give me - - those tongs. You can get out a bag.	(4)(SAMP 15485-87)(PHO 87 11765-70)
		- - -	
06 02 40 12	CDR	Okay. Head them up and point them out. 204. Better let me get the other one. Two frags from the center of the - -	(4)(SAMP 15485-87)
		- - -	
06 02 40 36	CDR	204 for the two frags in the center of the boulder. And the big chip off the top that's got the vesicles in it is in my pack, solo.	(4)(SAMP 15485-87) (SAMP 15499)
06 02 40 50	CDR	And that's not much for Dune, but I think it's representative.	(4)

06 02 40 58	CDR	I hope it's representative because it - okay. Put that in my bag, Jim?	(4)(SAMP 15485-87)
		- - -	
06 02 41 46	CDR	Boy, underneath that one is another one with larger vesicles in it.	(4)
		- - -	
06 02 43 18	CC	Jim, when you get settled, you can check the camera on 12 frames per second and turn it on again, please.	(4)
06 02 43 29	LMP	Yes. I don't know why it didn't come on last time, Joe.	(4)
		- - -	
06 02 44 08	CDR	Uh, no, I didn't put a bag on you, did I? Yes, that's right. We're okay.	(4)
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 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.	(4)
		- - -	
06 02 44 51	LMP	Okay, it looks like the camera is working, Joe. It's just hard to press that in all the way.	(4)
		- - -	
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. Too bad we can't spend some more time.	(4-LM)
		- - -	
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. And we're in a little boulder field. And about a foot, at the biggest, down to about 6 inches.	(4-LM)
06 02 47 10	LMP	Yes, it looks like from a crater that hit on the rim of Dune.	(4-LM)
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 we saw a boulder distribution that looked like it was linear, like it was a ray pattern.	(4-LM)
06 02 48 08	LMP	But we never did get a chance to really sample any 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.	(4-LM)
06 02 48 24	LMP	We could probably save some time going back by not following the tracks, you know, because we can see the LM.	(4-LM)
06 02 48 30	CDR	Yes, you're right. I think we ought to head right straight on. We can see home.	(4-LM)
06 02 48 33	LMP	The only big one over there - only big crater over that way would probably be Earthlight.	(4-LM)
06 02 48 40	LMP	I think that's probably Earthlight that we see at 12 o'clock.	(4-LM)

06 02 48 48	LMP	If we stay - west of Earthlight, we ought to save a little distance.	(4-LM)
06 02 48 52	CDR	Yes. Lets get out of this little boulder field 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 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?	(4-LM) (SAMP 15487-87; 15495, 98-99)
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 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 near one of the vesicles.	(4-LM) (SAMP 15499) (SAMP 15485-86)
06 02 50 57	CC	Roger, Dave. Beautiful description. And, Jim, you might - stop the camera now. It's probably run through the film load, and we'd like clicks and amps reading please.	(4-LM)
06 02 51 15	LMP	Okay, we're doing - wpll, that can wait - okay, the camera is empty, Joe, and we got some coverage there.	(4-LM)

06 02 51 38	LMP	And we're going at about 10 clicks; amps reads about 10.	(4-LM)
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 of it, huh?	(4-LM)
		- - -	
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 morning. I guess we looked over at Earthlight, didn't we?	(4-LM)
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. See the old LM sitting out there? Start making out detail on it. Range, 2.4. I think we're closer than that.	(4-LM)
		- - -	
06 02 53 37	CC	Roger. For both of you now: Dave, we want you to 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?	(4-LM)
		- - -	

06 02 54 53	LMP	As far as Dave's bag, Joe, - I forget the number on 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?	(4-LM)
		- - -	
06 02 55 32	LMP	Okay. And I [illegible] - think you can get through there, Dave?	(4-LM)
06 02 55 39	CDR	No. I'm going to go around to the right. Miss this boulder here. There's a directional set of ejecta in it.	(4-LM)
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 would be a good place to take a radial sample. That thing came in from - let's see - we'll be going - -	(4-LM)
06 02 55 58	CDR	Yes, we're going north and the ejecta pattern is spread out due west about 20 meters across and i must go out a good 150 meters or so.	(4-LM)
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 that point.	(4-LM)
		- - -	
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 up the rumble of the Rover rolling across the plains.	(4-LM)
		- - -	
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 0[illegible]	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 going 12 clicks.	(4-LM)
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 much as I thought it would.	(4-LM)
		- - -	
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 went over.	(4-LM)
		- - -	
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 sight of the small crater you saw outbound, which you described as having bedrock in the bottom?	(4-LM)
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 odometer reading, and we're going to measure how far away that is from the LM.	(4-LM)
		- - -	
06 03 02 24	LMP	Looks like November has a lot of blocks, too, but I can't see any *** I thought the crater that looked like it had bedrock was off to the east of our tracks.	(4-LM)
06 03 02 34	CDR	It is. Over here to our 11 o'clock. I mean. No, 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.	(4-LM)
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. I know we've talked about it but I don't know whether there was any bedrock.	(4-LM)
		- - -	
06 03 04 13	CDR	Yes, I think this is the one we called. Isn't it, Jim.	(4-LM)
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 albedo. It's relatively fresh. I think this is the one, isn't it?	(4-LM)
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 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.	(4-LM)
06 03 05 04	LMP	Yes, you'd better - I just didn't see that crater that I - that wasn't the one, Dave.	(4-LM)
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 and I looked out and saw a layer of bedrock about a quarter of the way up on the wall.	(4-LM)
		- - -	
06 03 05 49	LMP	We're almost back to the LM. The freshest one was the one that that Dave just gave you the coordinates. On.	(4-LM)
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 freeway.	(4-LM)
		- - -	
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 worry about, especially with regard to kicking dirt, the Solar Wind composition experiment, and the LRV which is pretty far away.	(4-LM)
		- - -	
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 gear as if you were out at the ALSEP site, with regard to transferring cores, et cetera. And we marked - - your stop.	(LM)
		- - -	
06 03 08 51	CC	And, Jim, standing by for your LRV readouts, if you're still there.	(LM)
06 03 08 57	LMP	Yes, I am Joe. I'm reading 004, 018, 12.5, 002, 91, 98, 92, 98, and motor temps are low.	(LM)
		- - -	
06 03 10 07	CC	Dave, basically, you just want to unload the 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.	(LM)
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 want to trade that out for number 3 going under the seat.	(LM)
		- - -	
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 out there?	(LM)
06 03 11 46	CDR	No, why don't you take mine. Mine happens to have Kilo on it.	(LM)
		- - -	
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 well.	(LM)
06 03 12 12	LMP	Joe, what - we know - let's see you want 2 and 5 on the hand tool carrier, and the rest under the seat, is that correct?	(LM)
		- - -	
06 03 12 41	CDR	Okay. I'd like to take this little cargo here, and take it right over to the MESA.	(LM)
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 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.	(LM)
06 03 13 28	LMP	Dave, when you take your camera off, just leave it on my seat.	(LM)

06 03 13 31	CC	Dave, the only problem is, if we're able to get the 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.	(LM)
06 03 13 51	CDR	Just a minute, Jim. Just a minute. Now, Joe, you 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.	(LM)
06 03 14 08	LMP	Yes, that's the first time anybody said anything about that. That's bag 5, Dave.	(LM)
		- - -	
06 03 14 20	LMP	If you get the cores, bring them back, and we'll put it in there. I just won't load it in the SRC.	(LM)
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 here, on the MESA, huh?	(LM)
		- - -	
06 03 14 47	CDR	Yes, let me read the numbers on it first. Of course, it's not on all the way, but it's reading 89.	(LM)
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 put those in bags - well, that bag that's under there before you drive off.	(LM)
06 03 16 51	CDR	No, there isn't any bag under there now. I got it right here. It's 7.	(LM)

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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)

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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 - - pictures of the descent engine and Solar Wind 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.	(LM)(PHO 87 11785-840) (PHO 87 11841-42; 87 11731-84)

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06 03 19 17	LMP	Okay, Joe, back at the - on the MESA, I have bags 5, 6, - 3, 5, and 6.	(LM)

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06 03 19 36	CC	Okay, Dave. We want you to park east of the ALSEP 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.	(LM)
06 03 19 57	CDR	Okay. Park east heading west. And, I'll just get it fairly close to the Central Station and avoid the dust. How does that sound?	(LM)
06 03 20 10	CC	Roger. Just don't drive too far west. Keep it east, if you could, please.	(LM)
06 03 20 19	CDR	Okay. Incidentally, at the Rover, our bearing was 018 and range .2. That's pretty good for a trip like that.	(LM)
		- - -	
06 03 21 15	CDR	Okay, I'm going to park right here. And if you get 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.	(ALSEP)
		- - -	
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 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.	(LM)(PHO 87 11781-842)
		- - -	
06 03 28 04	CC	Jim, I don't - - know how to break this news to you, but we are going to do Station 8 out at the ALSEP site, or nearby. Saving it especially for you.	(LM)
		- - -	

06 03 32 21	CC	Okay, Jim. When you get out to the ALSEP site, once 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.	(LM)(PHO 87 11843-58)
		- - -	
06 03 33 49	LMP	Dave - Dave, I hope we get a chance to pick that rock up before we go back.	(LM-ALSEP)(SAMP 15059)
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 site?	(LM-ALSEP)(PHO 87 11843-58)
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 out and photo the heat flow.	(ALSEP)(PHO 87 11843-58) (PHO 87 11860; 92 12406-09)
		- - -	
06 03 41 08	LMP	Okay, Joe, this mag ran out. I'm going to go back and change.	(ALSEP)
		- - -	
06 03 42 16	LMP	I don't think we have another color mag out here, do we, Joe? We'll have to use black and white - -	(ALSEP)
		- - -	

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 on your Station 8 trench, if you would, please.	(ALSEP)
		- - -	
06 03 53 9	LMP	Oh, I picked up a pink rock and a black rock. And they're documented. I'm just resting up for Station 8.	(ALSEP)(SAMP 15058-59)(PHO 92 12410-15)
		- - -	
06 03 54 51	CDR	Hey, Joe, if Jim took a picture of the heat flow box, the one he took probably isn't representative of the proper alignment, which it now has.	(ALSEP)
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 had a lot of the plagioclase glass in it.	(ALSEP)(SAMP 15058)(PHO 92 12413-15)
		- - -	
06 03 58 01	CC	Roger, get Jim started on the ditching experiment, 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.	(ALSEP)
		- - -	
06 03 58 38	LMP	Well, the thing is, do we want to do the whole Station 8 activity - the comprehensive sample?	(ALSEP)
06 03 58 44	CDR	Sure. I guess if they want to do Station 8, they want to do Station 8.	(ALSEP)

06 03 59 28	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)
04 10 40	CDR	Okay, we need an SESC.	(8)(SAMP TRENCH SESC 15013)
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 *** 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. No. I didn't figure I'd get it. Yes, I'm going to toss this one in there - -	(8)
		- - -	
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 12417-1[illegible], 33-[illegible] 68 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 going to sample the top over here.	(8)(SAMP 15040-44)(PHO 92 12417-19, 30-43; 88 11872-73)
		- - -	
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 mag, if you're back at the Rover now - see if it's run out, and I'm talking about the DAC - -	(8)(PHO DAC)
06 04 21 56	CDR	No, it wouldn't have gone - run out by now, Joe. 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.	(8-LM)
		- - -	
06 04 27 15	LMP	Okay, I ought to be collapsing the trench sides - I hope.	(8)
06 04 27 47	LMP	Okay, I'm about 4 inches out from the side of the trench.	(8)
06 04 28 05	LMP	And I'm pushing. It's bottomed out - - with a slight amount of collapse.	(8)
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 locations of all those.	(8)(PHO 92 12443)
		- - -	
06 04 30 31	CC	And, Jim, we want to end your tasks here, and we want you on the Rover, too, please.	(8)

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 camera with a mag on it.	(LM)
06 04 47 12	CDR	Mag Lima is in the ETB; mag November, mag Delta, mag Echo.	(LM)
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 the ETB. Get everything you needed out of the - your seat pan?	(LM)
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 deploy the American flag, please.	(LM)
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, though.	(LM)
		- - -	
06 04 55 33	CDR	Okay. Okay. Okay. I've backed up here so I get all of that in there. There, that's good. Good. Got the mountain, got the LM. Great.	(LM)(PHO 92 12444-47)
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 the DAC and from the 500-millimeter camera.	(LM)
		- - -	
06 04 59 54	CDR	No, they're both in here, Joe. And I called them both out. Both tucked away in ETB.	(LM)
		- - -	
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. It's a lot easier.	(LM)
			- - -	
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 which - it has VV and WW, add Roger Roger.	(BETWEEN EVAS)
06 07 32 43	CC	Okay, Dave. You're down quite a bit. Scratch the 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.	(BETWEEN EVAS)
06 07 33 12	CDR	Okay. So far I've added Roger, scratched Mike, and added Golf and Hotel in the 16.	(BETWEEN EVAS)
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 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.	(BETWEEN EVAS)
		- - -	
06 16 26 31	CC	And, Dave and Jim, basically the EVA is going to 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.	(BETWEEN EVAS)
		- - -	

06 17 36 49	LMP	Okay, Joe. Our inventory shows that we do not have any more color mags available. Can you check your inventory down there?	(BETWEEN EVAS)
06 17 37 33	CC	Hadley base, this is Houston. We think, Jim, that mag Tango Tango is on your camera in the ETB now, and Tango Tango is color. Over.	(BETWEEN EVAS)
		- - -	
06 17 38 46	LMP	Joe, this is Jim. We confirm. We do have color on my camera.	(BETWEEN EVAS)
		- - -	
06 18 48 45	CC	Okay. Roger, Hadley base. Taking it from the top, 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.	(BETWEEN EVAS)
06 18 50 07	CDR	Okay. I guess we'll proceed on to Station 10 and take a look at it there. I'd sort of - would like to get up to the North Complex if we can.	(BETWEEN EVAS)
		- - -	

* * * * EVA 3 * * * *

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 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.		(LM)
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 Union.		(LM)
06 19 36 00	CDR	And we got a little bit on November, so we brought that along. Organized here.		(LM)
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 500.		(LM)
		- - -		
06 19 39 16	CDR	Okay. Understand, Joe. And into the ETB go 16-millimeter Hotel, Juliet, and Golf.		(LM)
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 on.		(LM)

06 19 41 05	CC	Dave, a reminder to pick up the polarimetric filter when you're at the MESA.	(LM)
		- - -	
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 your convenience. You'll want to change the exposure time to 1 over 125, and you might call out the filter position.	(LM)
		- - -	
06 19 46 09	LMP	Joe, we have bag 7 on the lefthand side of the tool carrier and bag 2 on the right side.	(LM)
		- - -	
06 19 46 22	CC	- - if it's easy to do just keep bag 2 under the seat and follow your checklist normally. Bag 2 is just an extra bag for us.	(LM)
06 19 46 46	LMP	We still have some tools in bag 2, Dave. I'll just leave that bag there and put bag - our last collection bag under my seat.	(LM)
		- - -	
06 19 47 36	CC	Jim this - - is Houston. We prefer bag 2 under your seat shelf and bag 7 on the handtool carrier, instead.	(LM)
06 19 47 47	LMP	Well, bag 7 is Dave's bag. It's on the left side. It's just a question of which one you want on the right side. In other words, which one do you want on me?	(LM)
06 19 47 57	CC	Jim, bag 8 on the right side, please. And that's a new bag.	(LM)
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 checklist exactly from here on in.	(LM)

06 19 48 24	LMP	So bag 2 is under my seat. Some of Dave's equipment. I'm putting bag 8 on the right side of the tool carrier.	(LM)
06 19 49 02	LMP	Got a lot of sample bags, Dave. I'm going to put the extra ones under my seat.	(LM)
		- - -	
06 19 54 18	LMP	Give me bag number 8. I'm just closing the top on this one.	(LM)
		- - -	
06 19 57 32	CC	Dave, while you're getting buttoned up there, when 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.	(LM)
		- - -	
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 probably exposed.	(LM)(PHO 88 11864-66)
		- - -	
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. I'll work on that.	(LM)
06 20 01 28	CDR	Okay. Too bad, because it just won't go on. It's - such a tight tolerance on that thing anyway.	(LM)
06 20 01 43	CC	Your judgment, Dave. It's not going on, give it a toss.	(LM)

06 20 01 49	CDR	Well, I think maybe it's so sticky I can - when we get to where we need to do it, why, maybe I can just stick it on there, because it's sticking pretty good.	(LM)
		- - -	
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 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.	(LM-8)
		- - -	
06 20 19 02	CC	Jim, we need pictures of your beautiful trench there and the collapsed wall. And we'd like, I guess, a photo pan around this remarkable core hole.	(LM-8)(PHO 88 11867-77)
		- - -	
06 20 21 44	LMP	Okay. I'm going to take these pictures that Joe requested. And if you need any help, just holler, and I'll be right back.	(LM-8)(PHO 88 11867-77)
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, 78-8)
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 you wanted a pan from this location, Joe?	(8)(PHO 88 11872-77) (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 Charlie.	(8)(SAMP CORE 15001-06)
		- - -	

06 20 24 43	LMP	I grabbed your camera, Dave.	(3)(PHC 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 stems to go in?	(8)
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 keep that in mind.	(8)
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)(PHC 88 11878-81; 82 11047-64)
06 20 27 02	CDR	I think I'll take advantage of the time and put a black and white on my camera.	(8)
06 20 27 12	CDR	You have a new mag on there today, Jim. It couldn't have been the one that failed yesterday.	(8)
06 20 27 17	LMP	No, I had the color mag on there, TT. That's the one that was on there yesterday.	(8)
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 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.	(8)(SAMP CORE 15001-06)
		- - -	
06 20 33 05	CDR	Take that and the end of your right hand should come through, while I work on the rest of them here. Okay. Foxtrot on the next section.	(8)(SAMP CORE 15001-06)

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06 20 35 43	CC	Dave and Jim, put that section on the ground, if you would, please. We'll pick it up on the way back. And we want you to continue on with the Grand Prix.	(8)(SAMP CORE 15001-06)

- - -

06 20 36 08	CDR	Yes, I think probably so. I don't know where we're 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.	(8)

- - -

06 20 36 59	CDR	Got a good mag? Why don't you check it out and see if it runs.	(8)(PHO DAC)
06 20 37 01	LMP	I did. I checked it out at 1 foot per second earlier.	(8)(PHO DAC)
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 press on towards Station 9. Let's take a good clean comfortable look at that Rille.	(8)

- - -

06 20 45 52	LMP	I'll get those to you, Joe. Starting with heading 72.	(8)

- - -

06 20 47 36	LMP	Okay. Rover read-outs, Joe: 72 on bearing; distance, .2; range, 0; amp-hours, 90, 95, 100, 105; and motor temps are still off-scale, low.	(8)

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06 20 48 06	LMP	Give me a heading - head west, man. We're heading toward Station 9. Head about - -	(8)
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 it.	(8)
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 there was some neat bumps there.	(8-9)
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 - so.	(8-9)
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 - swinging around more to the west. We're heading 270. Range, .1.	(8-9)
06 20 49 17	CC	And shortly you'll be passing the Quark triplet 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.	(8-9)
06 20 49 36	LMP	I see them and they look rather fresh. There's a lot of angular light-colored blocks - fragments on the rim, Joe. So, mark our position here; we're bearing - 110 and range, .2.	(8-9)

06 20 50 38	LMP	We dropped into a shallow depression there, and that was the Dark triplet there on the northwest side of that shallow depression.	(8-9)
06 20 50 17	CDR	Goo, but look at this nice, little, new fres one.	(8-9)
06 20 50 20	LMP	Yes. But there're not too many fragments on the rim.	(8-9)
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 there, Jim.	(8-9)
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 north of it.	(8-9)
		- - -	
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 is, but at the very shallowest - or the deepest portion of it, it looks like there's a crater.	(8-9)
06 20 51 01	CDR	I get the idea that it's - it looks collapsed north to south, doesn't it? Sort of looks elongate.	(8-9)
06 02 51 25	LMP	Let's see, we're going about 8 clicks. And we're 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.	(8-9)

06 02 52 11	LMP	Yes. Now, we're swinging around to the west, heading, 270. Heading right towards Bennett Hill. Dave, I'm going to call that big crater, Wolverine.	(8-9)
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 that rock over there.	(8-9)
06 20 52 53	LMP	Sitting right on the surface - - a black angular frag on the northwest - side about one-quarter of the way down - - into the crater. But, a very subdued crater. That block is - -	(8-9)
06 20 53 09	CDR	Isn't that something? We're going to drive right by it, anyway.	(8-9)
06 20 53 15	CC	And, Jim, don't hestiate to fire off pictures right and left here. We've got lots of film.	(8-9)
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 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.	(8-9)
06 20 54 32	LMP	Dave, we've got another shallow depression here up ahead. And I don't know whether - I'd say, we'd be better off staying to the north, wouldn't you?	(8-9)

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 a lot of angular, light-colored blocks on its rim. Yes - - we're going through there huh?	(8-9)
		- - -	
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 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.	(8-9)
06 20 55 17	CDR	That shiny one here?	(8-9)
06 20 55 18	LMP	Yes. Another glassy fragment, angular - about 3 inches long, sitting right on the surface.	(8-9)
06 20 55 31	CDR	And, you know, it's really - the surface is smooth, 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.	(8-9)
06 20 55 47	LMP	Up and down. Yes. It was great going uphill. 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.	(8-9)
		- - -	
06 20 56 05	CC	Roger Jim - - pretty description. And you're looking for MAV readings of 1.8 clicks at 088, when you're at Station 9.	(8-9)
06 20 56 15	LMP	Okay, we're now on range. Bearing 101. And now there's another very large shallow depression. And, Dave, they're all about the same size.	(8-9)

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 depressions, they're very subdued craters we've seen. And there are just three in a line that run east-west.	(8-9)
06 20 56 40	CDR	Yes, I'd say, they're probably about 100 meters across and maybe - what, 25 - 10, 15 meters deep?	(8-9)
06 20 56 48	LMP	Yes.	(8-9)
		- - -	
06 20 56 56	LMP	Well, I thought we'd whip right over to the Rille. I didn't think we'd have this type of terrain.	(8-9)
06 20 57 11	LMP	Look at that rock over at - oh, 1 o'clock. It's right - well it was on the horizon; like kind of a pedestal.	(8-9)
06 20 57 18	LMP	You can see a lot of them right on the horizon. Okay. We probably want to - when you can, Dave, swing around to the west; we're going a little too far south here.	(8-9)
		- - -	
06 20 57 45	CDR	Roger. We're doing good. We're 092, now; heading slightly south.	(8-9)
		- - -	
06 20 58 02	LMP	I was thinking, you know, just a good sample point - - along the rim. And, we can - minimize the distance.	(8-9)
		- - -	
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 smoother.	(8-9)

05 20 58 54	CDR	It's a steep slope, isn't it? Yes, I think we can make it. No, it's another fresh crater.	(8-9)	
06 20 58 59	LMP	Yes, fresh crater. And, you do kind of get the impression there's a rille - or a rim here.	(8-9)	
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 another one of those shallow depressions off on at 1 o'clock. Right now our bearing is 89, range 1.4.	(8-9)	
06 20 59 29	CDR	Look at this one, Jim. It must be - holy cow. This 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.	(8-9)	
06 20 59 45	LMP	Okay, we're heading down into another depression. 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.	(8-9)	
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, 2 - oh, about 250. Range, 1.5. Boy, look at the fresh blocks ahead of us.	(8-9)	(PHO 82 11065)
		- - -		
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 you going to do, go on the north side of it?	(8-9)	

06 21 00 44	CDR	I want to take a look and see if that's it. Yes. 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?	(8-9)
06 21 01 09	LMP	I would, because we can definitely see the far side of - - the Rille now.	(8-9)
		- - -	
06 21 01 44	LMP	And we can definitely see the west side of the Rille from here.	(8-9)
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, 108, and motor temps are still low.	(9)
		- - -	
06 21 04 00	CC	And, Jim - - do you want some help on that 70-millimeter camera malprocedures?	(9)
06 21 04 09	LMP	Well, I'm holding the trigger depressed and 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.	(9)
06 21 04 26	CC	Jim, before you do that, could - try rotating the lens in front. It may be hung up between detents.	(9)
06 21 04 38	LMP	Okay, I'll try that. You mean the locking device on the lens itself?	(9)
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 here to let me change the mag?	(9)
		- - -	
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 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.	(9)(PHO 82 11066-92)
06 21 06 38	CC	Jim, you might try cycling that camera without a mag in it, if we've caught you in time here.	(9)

- - -

06 21 07 06	LMP	Yes, I think the camera's working, Joe. I'm going to put mag Romeo on.	(9)

- - -

06 21 07 51	CDR	There's a little bench in the bottom of Scarp 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.	(9)(PHO 82 11095-97)
06 21 08 13	CDR	Okay, I'm going to get a couple of samples from the 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.	(9)(SAMP 15510-15)(PHO 82 11093-94, 98-100)
06 21 08 42	LMP	I'll come over there, Dave. I put on the other mag; it doesn't work. I think the shutter's working on the camera, but the drive is not.	(9)

- - -

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 do all the documentation pictures.	(9)
06 21 09 30	CDR	No, I can do it just as well. Look at that, there's slickensides on that one. Okay. Get some on the rim.	(9)(PHO 82 11101-04)
06 21 09 43	LMP	Boy, this is - well, you've probably commented - sure is a unique crater. Unique - that we've seen so far.	(9)
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, let's take a couple of steps out the rim here. I got one on the rim.	(9)
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 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.	(9)(SAMP 15500-08)(PHO 82 11105-09)
06 21 10 56	LMP	You know, this has the appearance of those small ones that we sampled, with the exception, there's no concentration of glass in the very center, except every fragment has glass on it.	(9)(SAMP 15500-08)
06 21 11 06	CDR	That's right. Well, not every fragment, many of 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.	(9)(SAMP 15500-08)
06 21 11 54	CC	Dave and Jim, this is Houston. When you finish this, we suggest you move over closer towards the rim of the Rille.	(9)
06 21 12 07	CDR	Roger, Joe. Bag number 255. Covered with dirt, but it looks just like a big piece of glass.	(9)(SAMP 15500-08)
06 21 12 16	LMP	You want me to put some fines in w 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 sure see layering - over at 1 o'clock.	(9-9A)
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 ridge line, don't you?	(9-9A)
06 21 17 49	LMP	I think the - *** one of the Twins was 30. There's a fresh one. That little boulder's *** good blocks down there.	(9-9A)
		- - -	
06 21 18 12	LMP	Good places all along here to sample - large blocks on this side of the Rille.	(9-9A)
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 there, almost in position.	(9-9A)
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 on a fairly level contour. We don't want to - go down.	(9-9A)
		- - -	
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 with this task here.	(9A)(PHO 89 12015-96)
		- - -	
06 21 21 02	CC	Okay - - and, Jim, you may want to use Dave's camera to record this on film, while Da used - - the 500-millimeter camera.	(9A)
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, 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.	(9A)
		- - -	
06 21 22 50	CDR	I can see from up at the top of the Rille down, 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.	(9A)
06 21 24 14	CDR	As I go down the Rille, below this - okay - below 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	(9A)

		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	..d down about - on, 20 feet from where Dave's 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.	(9A) (PHO 82 11130-..2,
06 21 29 16	CDR	Oh, and there's a - looks like a crater in the far 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.	(9A)(PHO 82 11130-32)
06 21 29 51	CDR	Horizontal strip across it. Horizontal strip above it, which should take in the upper 10 percent. Vertical strip through it.	(9A)(PHO 82 11130-32)
		- - -	
06 21 30 14	LMP	You are looking to the south along the rim, along this side of the kille. Dave, could you comment on that horizontal bedding that's probably - oh, at least 1 kilometer south us? And higher elevation.	(9A)
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 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.	(9A)

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06 21 31 44	LMP	You know, I'm really surprised - - that the bedding is as obvious.	(9A)
06 21 31 50	CDR	Yes, it is. Yes. Okay, let's summarize your - oh, frame number, yes; 76.	(9A)(PHO 89 12015-96)
06 21 32 01	CDR	I guess that'll do it for here. To summarize here, 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.	(9A)

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06 21 32 43	LMP	Yes, very soft there.	(9A)
06 21 32 51	CDR	I - stumbled over that rock. Okay. Ease that up for me?	(9A)
06 21 33 30	CC	Okay, Dave - - you might check the lens; and, if it looks reasonably clean, see if you could get the bit of outcrop on the near side to the south.	(9A)

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06 21 34 04	LMP	Joe, I'm documenting another rock - here that looks fairly - representative of what's - on the surface here.	(9A)(SAMP FS' 15556)(PHO 8[illegible] 111 7-18, 33-35)

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06 21 34 1	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	[illegible]	I see a horizontal bedding.	(9A)
06 21 34 49	CDR	Oh, yes. I see what you're saying. Somewhat - looks like it might be dipping very slightly to the east.	(9A)

06 21 34 57	LMP	Yes. Right. You can see the exposed upper surface of that layer.	(9A)
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 get some more rocks there.	(9A)
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 downslope - - to the large block.	(9A)
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 some silly rock. 86, Joe.	(9A)(PHO 89 12015-96)
		- - -	
06 21 36 09	LMP	Why don't you head down, I'll be right behind you. I've got one more here I want to gather.	(9A)(SAMP FSR 15557)(PHO 82 11110, 36-37)
06 21 36 14	CDR	Okay. Except I don't have a camera, so I can't do anything. I'll go look - go look.	(9A)
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 here in front of us. Good solid firm ground here, Joe. Good footing. As you could probably see.	(9A)
06 21 36 45	CDR	And I'll see how it is going back up. Yes. No problem coming back up.	(9A)
06 21 37 00	CDR	Ease back down. Oh, did you - oh, yes, you looked at the big one there that has the - -	(9A)
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 alignment - the orientation - of the vesicles.	(9A)
		- - -	

06 21 37 17	CDR	Oh, I can almost see - *** looks like little pits in the dirt.	(9A)
06 21 37 31	CC	Dave - - is that a reasonable area for a rake sample, do you think?	(9A)
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 them.	(9A)
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. 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.	(9A)(SAMP 15530-38)(PHO 82 11126, 38-41)
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 on the surface here?	(9A)(SAMP 15530-38)
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 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.	(9A)
		- - -	
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 frag went?	(9A)(SAMP 15530-38)
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 bedrock?	(9A)
06 21 40 39	CDR	Apparently not.	(9A)
		- - -	
06 21 41 05	CDR	Joe, this is - it's a tan, fine-grained crystalline rock. I've got to say that, because it's got - up to 2-millimeter laths of plag 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	(9A)(SAMP 15530-38)

		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 mare 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 - about 50 meters from where I guess we'd say we see real outcrops.	(9A)(SAMP 15545-48)
06 21 44 12	CC	Roger Dave, how far back from the lip of the Rille do you think you are probably standing?	(9A)(SAMP 15545-48)
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 a precipice on TV; that's why we're asking.	(9A)
06 21 44 29	CDR	Oh, oh. Oh, gosh, no, Joe. It slopes right on down here. The same slope. It's just a little inflection here. Jim, get your after pictures, too.	(9A)(SAMP 15545-48)(PHO 82 11141)
06 21 44 46	CDR	Get a little closer, so you get that big chip out of there. A little closer, Jim. Yes, that's right. Ok. Let's go down and get a chunk of the bedrock here.	(9A)(SAMP 15545-48)(PHO 11141) (SAMP 15595-98)(PHO 82 11126, 42-46)
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 north.	(9A)
06 21 45 13	CDR	Well, he said go get the bedrock, and I think we 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.	(9A)
06 21 45 31	LMP	Yes, but the thing that bothers me, Dave, is look to the north there.	(9A)
06 21 45 35	LMP	And there's a flat area there, it looks like it might be the top of the bedrock.	(9A)
06 21 45 39	LMP	And those blocks are - seem to be slightly different.	(9A)
06 21 45 43	CDR	A little darker.	(9A)

06 21 45 44	LMP	Almost have columnar jointing. Look to the north there.	(9A)
06 21 45 47	CDR	Yes, I see what you are talking about. Come on down here and let's get a frag off of one of these boulders and then we'll head on back to the Rover.	(9A)(SAMP 15595-98)
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 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.	(9A)(SAMP 15595-98)
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 bag -	(9A)(SAMP 15595-98)
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, 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	(9A)(SAMP 15595-98)

		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 picture, Jim.	(9A)(SAMP 15595-96) (SAMP 15597-98) (PHO 82 11145-46)
		- - -	
06 21 50 29	LMP	I just wonder if that rock to the north - - up there is the same.	(9A)
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 stereo pan.	(9A)
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 the Rover - - and the soil sample with that - - and a double core, please.	(9A)
06 21 50 47	CDR	Did you want to take a position shot of that *** sample.	(9A)(PHO 82 11145-46)
06 21 50 49	CDR	Take a locater shot down there - - and then that way, okay?	(9A)(PHO 82 11145-46)
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 another one up here - another 15 or 20 meters or so. Get a good stereo down to the south.	(9A)(PHO 82 11145-46)

		- - -	
06 21 51 31	CDR	Oooh! Ooh! You can see a boulder exposed to the surface here, which has got layering within it. 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. Would you get a picture of that where I stopped, Jim, just a quicky cross-sun? See where that thing is exposed there?	(9A) (PHO 82 11148-50)
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. Take it easy on yourself. Just a minute, let me get the down-sun here. ***	(9A)(SAMP RAKE 15612-89)(PHO 82 1[illegible]53)
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 ther., 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-[illegible]
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, [illegible]
06 21 58 54	CDR	Ok. Get one more load.	(9A)(SAMP COMP 15600-10)
06 21 59 01	[illegible]	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 11164 [illegible]
		- - -	
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-[illegible]

06 22 00 51	CDR	About a meter each. But you know, I don't know, a double core - we may find ourselves driving into bedrock if we're not careful.	(9A)(SAMP CORE 15010-11)
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 hit the rim of that crater.	(9A)(SAMP CORE 15010-11)
06 22 01 26	CDR	Cut the rim of the crater, Jim. I bet we can do a good one right there.	(9A)(SAMP CORE 15010-11)
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 prefer it away from the rim.	(9A)(SAMP CORE 15010-11)
		- - -	
06 22 01 41	CDR	And there's light-colored albedo *** by the lower side of the - -	(9A)(SAMP CORE 15010-11)
		- - -	
06 22 01 52	LMP	*** grab the core while you take the pictures.	(9A)(SAMP CORE 15010-11)(PHO 82 111 [illegible]-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 I'll get you.	(9A)(SAMP CORE 15010-11)(PHO 82 111[illegible]
		- - -	
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 occurs on the lower rim or the downhill rim.	(9A)
06 22 02 48	CDR	Yes. Go ahead, Jim. Get the other core. You're right.	(9A)(SAMP CORE 15010-11)
		- - -	

06 22 03 37	CDR	Okay. I have the picture.	(9A)(SAMP CORE 15010-11)(PHO [illegible]
06 22 03 39	LMP	Pushing.	(9A)(SAMP CORE 15010-11)(PHO [illegible]
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 [illegible]
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 [illegible]
		- - -	
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 matter 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 and 60 was the upper.	(9A)(SAMP CORE 15010-11)
		- - -	
06 22 03 11	CC	Dave, while your getting loaded up there - - our next request is two undocumented 6-inch blocks, and then we'll want you on the Rover driving north.	(9A)(SAMP FSR 15555-56?)(PHO 82 11164)
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 one.	(9A)(SAMP 15555)
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 too selective here if we're supposed to move on.	(9A)(SAMP 15556?)
		- - -	
06 22 09 44	CDR	A little bigger than 6 inches, but it was neat looking.	(9A)(SAMP FSR 15555-56?)
		- - -	
06 22 10 26	CC	Dave and Jim - - we want you to climb aboard now and head north about .3 or .4 clicks by the easiest route, and we'll pick up the stereo pan with the big camera.	(9A)
06 22 10 46	CC	And, Davy, we suggest you take those big camera pictures of the same items you photographed before, and, Jim, you can get the pan.	(9A)
06 22 10 56	CDR	Ok. Fine, Joe. Here, let me just give you my camera now, Jim. Let's see how we're doing. 120 on the frames on my camera, Sierra.	(9A)

- - -

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 want gou tied in.	(9A)

- - -

06 22 13 41	CDR	Okay. I'm strapped in. You're strapped in. Soon 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 - -	(9A)
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 click, didn't you?	(9A)
06 22 13 59	LMP	Yes.	(9A)

- - -

06 22 14 15	LMP	Tell you when you get to 2.8, Dave - distance - I'll let you know.	(9A)

- - -

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, do you?	(9A-10)
06 22 15 02	LMP	Please, not.	(9A-10)
06 22 15 18	LMP	About another 2/10ths to go; I'm reading - - 027 - oh, another click, Dave. Maybe up by that large block at 12:00 o'clock.	(9A-10)

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, 029, 020, 90. 92, 102, and 110.	(10)

06 22 17 17	CC	Ok, Jimmy. Thank you. And thinking downstream, here, all we need is photography from this stop, and we're looking towards arriving back at the LM in about 45 minutes.	(10)
		- - -	
06 22 17 49	CDR	Hey, Jim, up on the rim. Right over here on the rim.	(10)(PHO 82 11165-84)
		- - -	
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 you can get - all over the place. Then I can take the 500 from up there, too.	(10)(PHO 82 11165-84) (PHO 89 12097-171)
06 22 18 56	CDR	Ok, Joe. The crater is very uniform. It has debris 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.	(10)
		- - -	
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	L	Well, there's a large block there just to the north of that, Dave. It looks like it might have a contact in it - between a dark, very vesicular basalt and that light-colored - tan.	(10)

06 22 20 51	CC	Thank you, sir. And, Dave, are you firing off the big camera?	(10)(PHO 89 12097-171)
06 22 21 00	CDR	Yes.	(10)(PHO 89 12097-171)
06 22 21 16	LMP	I've got an angular fragment here - subangular, 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 - -	(10)
06 22 21 42	CC	Leave it there - - enough, Jim. The Rover's not stressed for it.	(10)
06 22 21 45	LMP	Oh, I'd love to bring it back. I guess I'll just take some closeups here.	(10)(PHO 82 11185-87, 90)
		- - -	
06 22 23 05	LMP	Just to the north of this - the large one. I just mentioned, there're two other large fragments. And there's a fracture, right between them, and they also have the large vesicle pattern.	(10)(PHO 82 11188-90)
06 22 23 22	LMP	I've already sampled this one. And the material that has the the large vesicles has long laths of probably plagioclase.	(10)
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 to, we're going to have to get you aboard the Rover, heading back across the mare towards the east, please.	(10)
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 site, but fairly near the LM.	(10)
		- - -	
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 more to the left, here, Dave.	(10-LM)
06 22 29 22	CDR	Yes. Let me go around to the right of this - sure we can get between those two craters ahead of us there. Yes, think I'll come this way.	(10-LM)
		- - -	
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 up the slope - "Big Rock" mountain where there're outcrops exposed.	(10-LM)
06 22 33 05	LMP	One about a quarter of the way up directly east from us - that was "Big Rock" mountain.	(10-LM)
		- - -	
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 - think we're probably still a little north of them.	(10-LM)
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 right's going to help us some.	(10-LM)
		- - -	
06 22 36 20	LMP	Yes. This is a better route than we used coming out.	(10-LM)
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 changing the mag out, you might try the one-frame-per-second trick at the beginning. It worked before.	(10-LM)(PHO DAC)
06 22 37 25	LMP	Yes, I did that this morning, Joe, on the mag. It - - didn't work; I'll try it again, though.	(10-LM)(PHO DAC)
		- - -	
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 you to bring them back, and we'll troubleshoot them.	(10-LM)
06 22 38 50	CDR	You know, so far in the past, our NAV system has 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 -	(10-LM)
06 22 39 22	LMP	See our tracks now - running to the east there - 12 o'clock position. Just over that next ridge, we should see the LM.	(10-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 about straight back. And the bearing - - says 096. And I'm - -	(10-LM)
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 think we've been there before.	(10-LM)
		- - -	
06 22 42 19	CDR	Jim, I'll go around the north here and - avoid the dust. Our trusty ALSEP.	(10-LM)
06 22 42 37	CDR	Hey, that's a pretty nice picture right there, Jim. Let me point you - -	(10-LM)
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 mag, buddy. Ok, there you go right there.	(10-LM)
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, and motor temps are still low.	(LM)
		- - -	
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 the upper part of the three-stemmed section.	(LM)

- - -

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 millimeter working. You guys have almost lost control on this camera, haven't you?	(LM)

- - -

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, and we're 5 minutes from closeout. All we need is a few grab samples.	(LM)

- - -

06 22 56 37	LMP	Joe, it sounds like it's running already at one frame per second.	(LM)

- - -

06 22 56 51	CC	Roger, Jim, I'm sorry, I cut you out. Asking that the undocumented samples go into the BSLSS bag.	(LM)

- - -

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 seconds and then stops.	(LM)

- - -

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 picture of the Rover saddle which hung up on original deployment. Do you have one of those already?	(LM)(PHO?)
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 that you're going to put in it, right? In this bag here?	(LM)
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 wanted to get the right bag.	(LM)
		- - -	
06 23 00 13	LMP	Well, we've got a SESC in here - that has not been used - of course, there're remaining caps.	(LM)
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, 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.	(LM)
06 23 01 07	LMP	Hey, Joe, I got your picture of the saddle - a couple of them.	(LM)
		- - -	
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 be a heavy bag. I think I'll wait and put that in the - BSLSS bag.	(LM)
		- - -	
06 23 03 35	LMP	Yes, I'm ready to *** - - yes, well, we ought to get the descent engine sample first.	(LM)(SAMP 15014)

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 her up manually.	(LM)
		- - -	
06 23 10 22	CDR	Ok, Joe, Whiskey, Sierra, Victor - do you want any of the 16 millimeters to stay out, or are we through with those?	(LM)
06 23 10 36	CC	Dave, you might save one for the drive-away. Put the rest in the ETB, please.	(LM)
06 23 10 46	CDR	Ok. Union, and I'll save Item - this would be a good item for the drive-away.	(LM)
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 contents of both those bags into one.	(LM)
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 and you can consolidate. I guess those undocumented ones we want to put in the BSLSS bag.	(LM)
		- - -	
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 just never had a chance to get it up to put in there.	(LM)
06 23 14 58	LMP	Dave, rather than waste time out here, I'm just going to leave these all like they are. I think we can stow them just as well that way.	(LM)
		- - -	
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 mail home an ounce of rocks, please.	(LM)
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 camera right there. I'll be right back. There's something I think you'll find rather interesting. It'll only take a minute.	(LM)
06 23 21 29	LMP	I'll put this penetrometer drum in the E B, 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, 16 millimeter.	(LM)
		- - -	
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 Wind, penetrometer drum. ETB.	(LM)
		- - -	
06 23 24 32	CC	And in particular, Dave, we're looking for mags Tango and Romeo.	(LM)

06 23 24 40	CDR	Oh, I'm pretty sure I got them in, Joe. I was reading all the - that stuff out to you. I hope - got a chance to copy it all.	(LM)
		- - -	
06 23 25 32	LC	Jim, a word on that core stem. When one of you takes it in - into the LM, you can stow it on the floor against the mid-step, the Z-27 bulkhead.	(LM)
		- - -	
06 23 27 17	CDR	Ok. Oh, Jim. Oh, ho, ho. How about the 16-millimeter mag, Jim?	(LM)
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. We'd better bring it back.	(LM)
		- - -	
06 23 28 38	CDR	Here's mag Hotel in your camera, and I can't get 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?	(LM)
		- - -	
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 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?	(LM)
		- - -	

06 23 35 24	CDR	Okay, I think I've got a good place for you. Right up on a rise. We're about 300 feet away. I think you'll like this.	(LM)
		- - -	
06 23 41 56	LMP	Oh, fine, Joe. Transferred a few bags up to the porch.	(LM)
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 98 11895-925)
		- - -	
06 23 49 12	CDR	Ok. One last comment on the mountain that's south 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 - -	(LM)
		- - -	
06 23 51 07	CC	Dave and Jim, we're ready for you to move the baggage up into Falcon and climb in.	(LM)
		- - -	
06 23 53 39	CC	Jim, while you're dusting there, how many suitcases have you carried up?	(LM)
06 23 53 41	LMP	What's this? Oh, I only have - two up there. There are two more down here plus the ETB - - and the core stem up there on the porch - -	(LM)
		- - -	
06 23 54 27	LMP	Let's take that along and - oh, here's another mag. Stick this in your pocket. That's a broken one. I'll put it in for you.	(LM)
		- - -	

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 be careful.	(LM)
		- - -	
07 00 00 37	CDR	Okay; coming in.	(LM)
		- - -	
07 00 01 26	CC	- - we're hoping you've got four sample - four collection bags and an ETB - - in the cabin with you now.	(LM)
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 on the face of the professor. I think you very well may have passed your final exam.	(LM)

08 00 47 01 CC I think the superfine job is the two of you; it was just most remarkable. Everybody down here is s ill floating so hign, they're having a hard time getting down to all that da.. 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. (ORBIT)

08 00 47 38 CDR Well, it's because you've got the real professional 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. (ORBIT)

- - -

08 20 48 29 CC Fifteen, this is Houston with just a passing comment 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? (ORBIT)

08 20 48 54 CDR Well, it shouldn't take more than about a couple of 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. (ORBIT)

08 20 49 21 CC Okay. It's my understanding that they didn't - you - 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 - - (ORBIT)

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.	(ORBI
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 confortable 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)

11 06 24 45	CC	Question number 2. Near Spur crater, you found what may be "Genesis" rock, the oldest yet collected on the Moon. Tell us more about it.	(TRANSEARTH COAST)(PRESS CONFERENCE)
11 06 25 59	CDR	Well, I think the one you're referring to was what we felt was lmost 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.	(TRANSEARTH COAST)(PRESS CONFERENCE)
11 06 26 48	CC	Question number 3. Apollo 15 is already being 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?	(TRANSEARTH COAST)(PRESS CONFERENCE)
11 06 27 06	LMP	I guess, immediately, I think of the orientation 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.	(TRANSLARTH COAST)(PRESS CONFERENCE)
11 06 27 45	CC	Question number 4. This is the toughest landing area we have attempted to - to reach on the Moon. Describe what it was like, flying into it.	(TRANSEARTH COAST)(PRESS CONFERENCE)

11 06 27 59	CDR	Well, I think, to begin with, we had every confidence that we could get to the landing site. 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 becuase 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.	(TRANSEARTH COAST)(PRESS CONFERENCE)
		- - -	
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 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.	(TRANSEARTH COAST)(PRESS CONFERENCE)
01 06 10 55	CC	Question number 12 for Dave and Jim. You - you 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? - - -	(TRANSEARTH COAST)(PRESS CONFERENCE)

01 06 41 15	CDR	Well, I'll start out and - and throw an answer 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?	(TRANSEARTH COAST)(PRESS CONFERENCE)
11 06 42 19	LMP	No, I agree with everything you said. It was just 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.	(TRANSEARTH COAST)(PRESS CONFERENCE)

* * * * END OF TRANSCRIPT * * * *

TABLE 1. APOLLO 15 SAMPLE LISTING CROSS-REFERENCED TO APOLLO ELAPSED TIMES

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
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 0 02 31 05 09 17 06
15016	ROCK - PORPHYRITIC VESICULAR BASALT	05 03 42 41 05 05 49 23 05 09 06
15017-19	GLASS SHELL, GLASS OBJECT, & GLASSY MICROBRECCIA	04 12 30 36 05 22 56 53 06 22 55 42
15020-26	FINES & ROCKS - CONTINGENCY SAMPLE	05 00 03 39

TABLE 1. CONT'D.

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIME (AET)
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 35 05 09 05 51
15080-89	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 1 51

TABLE 1. CONT'D.

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIME (AET)
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.

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIME (AET)	
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	
15526	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.

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIME (AET)
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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