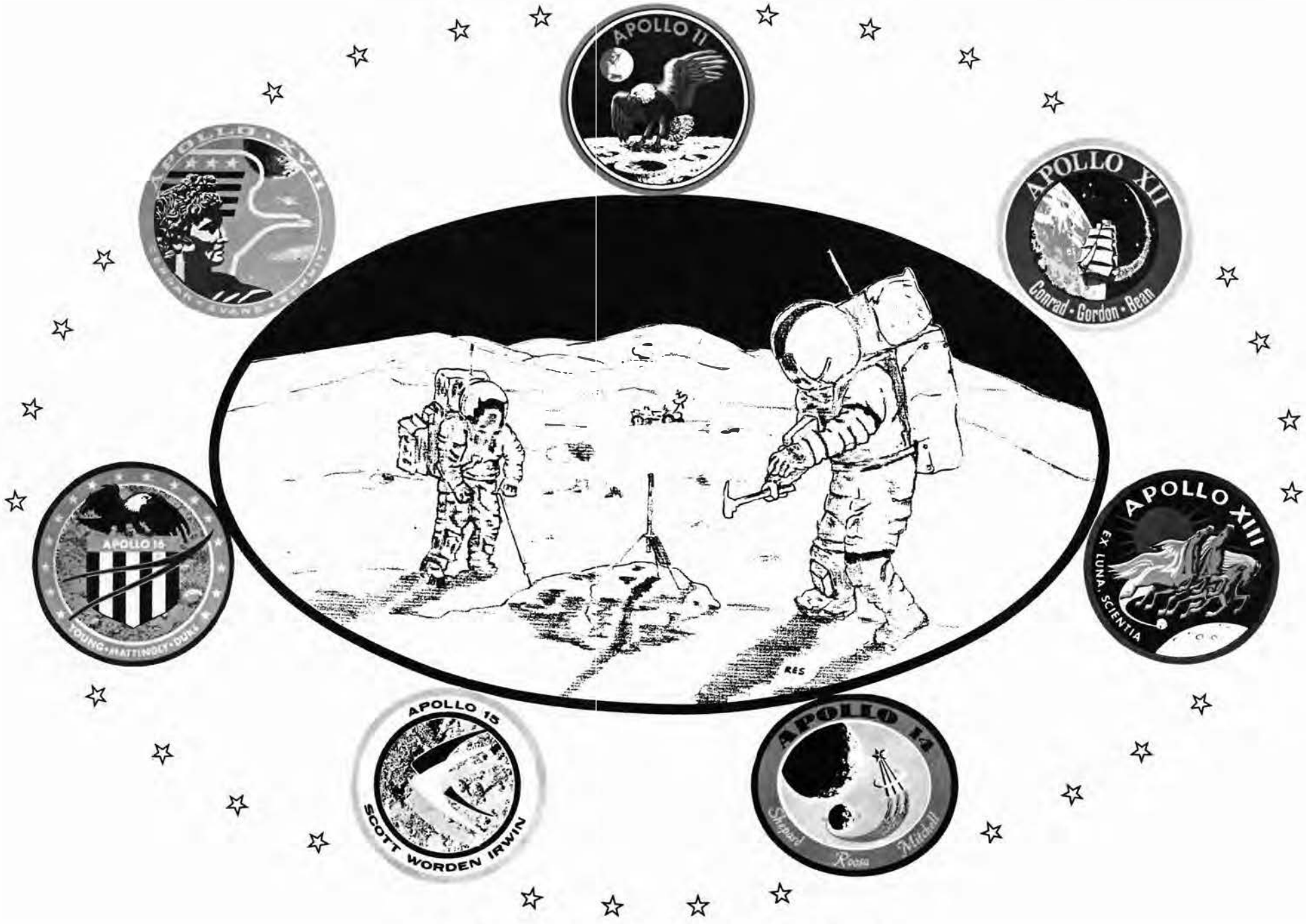

APOLLO 14 VOICE TRANSCRIPT
PERTAINING TO THE GEOLOGY OF THE LANDING SITE

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Pertaining to the geology of the landing site

by

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Branch of Astrogeology
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INTRODUCTION

The third manned lunar landing took place on February 4, 1971 when the Lunar Module Antares landed in the Fra Mauro region of the Moon. The first of the two planned extravehicular activities (EVAs) lasted 4 hours and 49 minutes and the second EVA lasted 4 hours and 20 minutes. This document is an edited record of the commentary between astronauts Alan B. Shepard and Edgar D. Mitchell at Fra Mauro and capsule communicators (capcoms) Bruce McCandless and Fred W. Haise, Jr. in Houston during the descent, landing, and 33-hour lunar stay time. 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 supplemental remarks essential to the continuity of events during the mission. We have deleted the words of mechanical housekeeping and engineering data while attempting not to lose the personal and philosophical aspects of the exploration.

The sources of this verbal transcript are the complete audio tapes recorded during the EVAs and the Technical Air-to-Ground Voice Transcription prepared by NASA. The voice record is listed chronologically with each individual comment preceded by the day, hour, minute and second in Apollo Elapsed Time (AET) when the statement was made. Apollo Elapsed Time is the true mission-elapsed time from time of liftoff from Cape Kennedy which occurred at 4:03:02 p.m. E.S.T. on January 31, 1971.

Figure 1 shows the landing site area that was described, sampled and photographed by the Apollo 14 crewmen.

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The assistance of Apollo 14 astronauts Alan B. Shepard, Jr. and Edgar D. Mitchell and, capcoms Bruce McCandless and Fred W. Haise, Jr. who reviewed their respective portions of the transcript is gratefully acknowledged. R. L. Sutton, U. S. Geological Survey gave valuable assistance with the sample and photo indexing. The cover illustration and figure 1 were prepared by R. E. Sabala, U. S. Geological Survey. Thanks are due to Cyndee Condit and Mary Hopper for their able communication with the WYLBUR text-editing program on the National Institutues of Health Computer System which made possible the efficient editing and reproduction of the transcript. This project was supported by NASA Order No. W13,672.

GLOSSARY OF TERMS, ABBREVIATIONS, ACRONYMS, AND SYMBOLS

APOLLO 14 CREW

CC	Capsule Communicators, Capcom (Bruce McCandless during EVA 1, Fred W. Haise, Jr. during EVA 2, other astronauts during other time periods
CDR	Commander (Alan B. Shepard, Jr.)
CMP	Command Module Pilot (Stuart A. Roosa)
LMP	Lunar Module Pilot (Edgar D. Mitchell)
AET	Apollo Elapsed Time - since launch from earth (days-hrs-mins-secs)
ALSEP	Apollo Lunar Surface Experiments Package
BULK	Bulk Sample - weigh bag filled with soil and rocks from the vicinity of the LM
CCIG	Cold Cathode Ion Gage Experiment (CCGE)
CONT	Contingency Sample - bag of soil and rocks collected early during the first EVA
COMP	Comprehensive Sample - scoop soil and "walnut"-size rock fragments collected from an area approximately 1 meter in area
CORE	Drive tube coring device for collecting soil samples
CPLEE	Charged-Particle Lunar Environment Experiment
CSC	Lunar Close-up Stereo Camera, "Gold Camera"
CSM	Command and Service Module, "Kitty Hawk"
DAC	Data Acquisition Camera
DOC	Documented Sample - soil and/or rocks that are documented by photography before and after sampling
DPS	Descent Propulsion System
EMU	Extravehicular Mobility Unit - lunar surface space suit worn by the astronauts during EVAs
ETB	Equipment Transfer Bag for transport of items between LM hatch and lunar surface

EVA	Extravehicular Activity - activities on the surface
FSR	Football-Sized Rock
Hycon	One of the cameras used in the Command Module
ISA	Interim Stowage Assembly
L and A (display at the Cape)	Landing and Analysis
LEC	Lunar Equipment Conveyor
LM	Lunar Module, "Antares"
LPD	Landing Pad Data
LPM	Lunar Portable Magnetometer
LRRR (LR cubed)	Laser Ranging Retroreflector
Mag/Mags	Magazine/Magazines - photographic
MESA	Modularized Equipment Stowage Assembly - a storage area on the LM that contains science equipment
MET	Modularized Equipment Transporter
MIN	Minimum
MSSC	Magnetic Special Sample Container
PAN	Panorama of 70 mm photographs
PHO	Photographic reference in transcript keywording
PLSS	Portable Life Support System - backpack on EVA space suit
PSE, PSEP	Passive Seismic Experiment

GLOSSARY CONT'D.

RTG	Radioisotope Thermoelectric Generator
SAMP	Sample reference in transcript keywording
SESC	Special Environmental Sample Container
SEQ	Scientific Equipment Bay
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
TDS	Thermal Degradation Sample
TRENCH	Trench Sample - Documented samples obtained from bottom to top of a trench
UHT	Universal Handling Tool
***	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 parantheses to the right of the transcript is to inform the reader of either the phase of the mission (DESCENT, BETWEEN EVAs, etc.) during which the statements were made, or the particular location or station (LM, ALSEP, C' etc.) where the speaker was, or between which locations (LM-ALSEP, C-C' 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 05 12 16 35 -- where the double core sample numbers are 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 PHO 65 9209-15 in the statement made at 04 13 52 40.

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

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

Conventions used in keyword sample and photo numbering:

SAMP CONT 14001-12	- Sample Contingency 14001 through 14012 inclusive
SAMP 14082, 84	- Sample numbers 14082 and 14084
SAMP 14303?	- Tentative identification of the sample mentioned
SAMP?	- Sample possibly collected but still unidentified
PHO 65 9202-08	- Magazine 65, frames 9202 through 9208 inclusive
PHO DAC	- Photographic reference to the Data Acquisition Camera
PHO CSC 77 10357-58	- Photographic reference to the Close-up Stereo Camera - magazine 77, frames 10357 through 10358 inclusive

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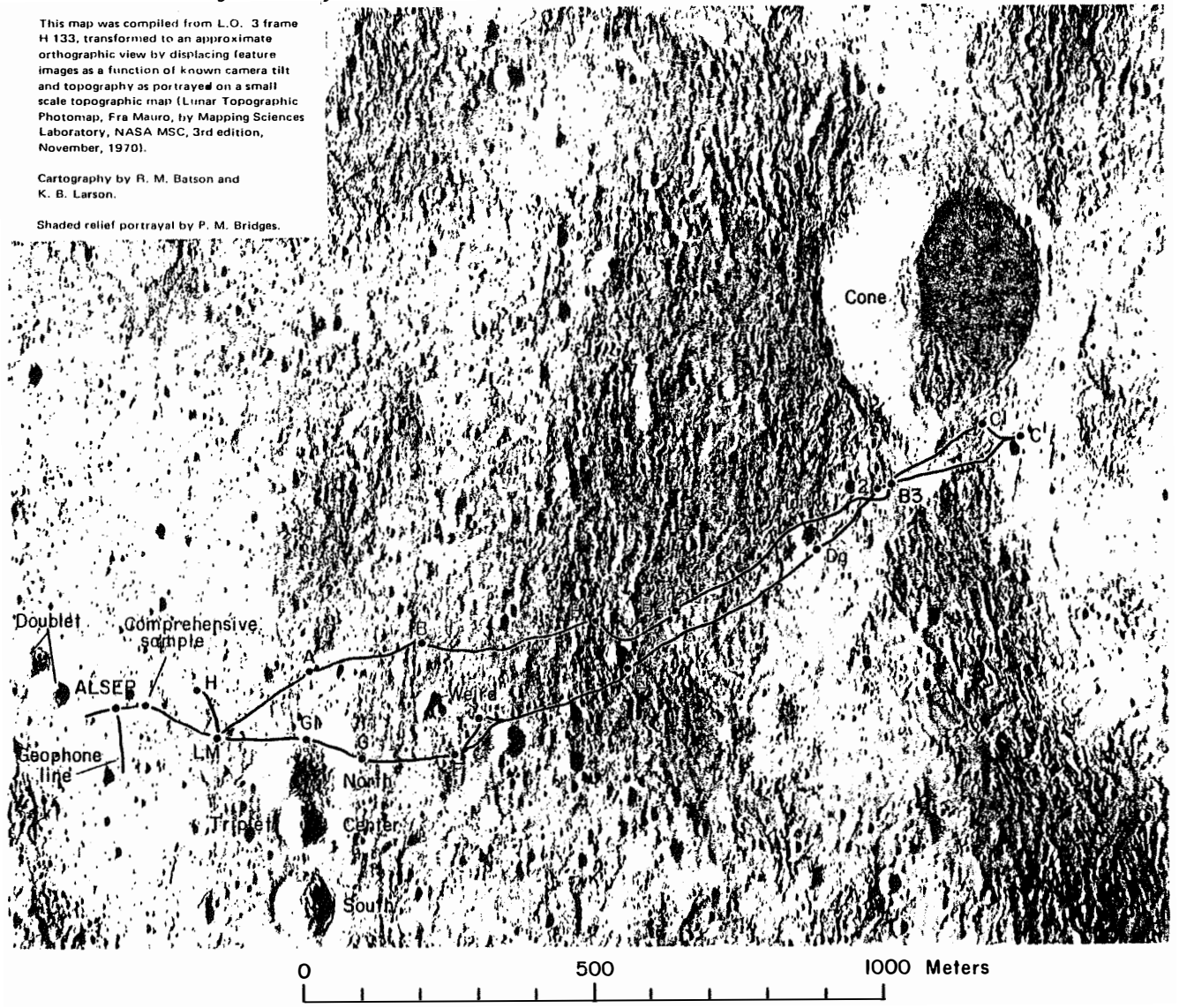

Approximate coordinates of LM:
3.675°S Latitude, 17.467°W Longitude

Figure 1. Apollo 14 landing site showing LM location and area traversed by astronauts during EVAs.

* * * * DESCENT * * * *

04 12 11 13	LMP	Okay, there's pitchover.	(DESCENT)
		- - -	
04 12 11 17	CDR	There's Cone crater.	(DESCENT)
04 12 11 19	CDR	And there it is.	(DESCENT)
04 12 11 20	CDR	Right on the money.	(DESCENT)
04 12 11 21	LMP	That's it. Right on the money.	(DESCENT)
		- - -	
04 12 11 32	LMP	Right out the window just like it ought to be.	(DESCENT)
		- - -	
04 12 11 37	CC	Okay, Antares; Houston, here. Go for landing.	(DESCENT)
		- - -	
04 12 11 46	LMP	Okay, you're out at 3000, Al; 75 feet a second.	(DESCENT)
		- - -	
04 12 11 57	LMP	2,048 feet - - coming down a little fast.	(DESCENT)
		- - -	
04 12 12 23	LMP	Coming through at 1,000 feet - 27 feet, (per second) right on schedule. Right on schedule, now. Went by Cone crater right outside to my right.	(DESCENT)
04 12 12 35	CDR	Okay, the best spot is a little south of track, about halfway between Triplet and Doublet. Little south of track.	(DESCENT)
		- - -	

04 12 14 28 LMP If you could land over here; there's some dust, Al; (DESCENT)
110 feet. Three feet per second down. You're looking great. Six percent; there's good dust. You're on your own.

- - -

04 12 15 11 LMP Contact, Al. (DESCENT)

- - -

04 12 15 18 LMP We're on the surface. (DESCENT)

- - -

04 12 15 27 CDR Okay, we're slightly off. We landed on a slope, but (DESCENT)
other than that, we're in great shape. Right on the landing site.

* * * * LM WINDOW * * * *

04 12 17 51	CDR	There are your noun 43S, Houston. Yes, we are on a little slope, aren't we?	(LM WINDOW)
04 12 18 00	LMP	Yes.	(LM WINDOW)
04 12 18 01	CDR	About the flattest place around here, though.	(LM WINDOW)
04 12 18 03	LMP	Yes. What's that, about 8 degrees of roll we're in? Eight degree slope.	(LM WINDOW)
		- - -	
04 13 45 24	CC	Antares, this is Houston. We're standing by for your description of the lunar surface as viewed from the windows of the LM, and we'd also be interested specifically in hearing whether you feel that the roll in the spacecraft is due primarily to terrain or whether you feel that there is some landing gear stroking also.	(LM WINDOW)
04 13 45 50	CDR	We'll be right with you on the condition of the lunar surface here momentarily; we're configuring one of the cameras at the moment. With respect to the upward roll, it looks as though it's probably due mostly to the terrain. There's not really a good level spot to land on around here, unless we proceeded quite a bit closer to Doublet. So we'll advise you further on that after we start the EVA.	(LM WINDOW)
04 13 46 23	CC	Very good. Sounds like you may have a nice level site over near Doublet for the ALSEP though, doesn't it?	(LM WINDOW)
04 13 46 31	CDR	Well, we'll find one.	(LM WINDOW)
04 13 50 03	CDR	Houston, Antares here. You ready for some words on the surface?	(LM WINDOW)
04 13 50 08	CC	That's affirmative, Antares. Go ahead with your description.	(LM WINDOW)

04 13 50 22	CDR	As you may have heard, after P64 at pitchover, the Cone crater and the landing site were immediately visible. The sun angle was good; we were able to recognize it even easier than we were on the L and A display at the Cape. The LPD input are only one *** and we took over short of Triplet, and I thought at first I was going to land just south of the track, but it's rougher over there than the L and A shows. And so, we came back on track and landed - since we held the track between Triplet and Doublet, and I estimate perhaps just 100 meters short of our target. Okay, with respect to the general terrain, we are in a depression here; we're looking, of course, directly toward Doublet crater, which appears to be above us in elevation by approximately 25 to 30 feet. The terrain slopes gradually upward in that direction; there are some undulations, but generally speaking it slopes gradually upward into the area of Doublet. The Z-axis of the spacecraft is about one-and-a-half degrees to the right of the landing plane, and of course that puts the shadow of the LM off to the left because of the current sun location. Are you reading me, all right?	(LM WINDOW)
04 13 52 32	CC	That's affirmative, Antares; we're copying you four oh.	(LM WINDOW)
04 13 52 40	CDR	While Ed is completing the pictures out of his window, I'll continue to say that generally speaking as I sweep from one horizon to the other, we find that the terrain is a little rougher than I suspected, and we are in a depression here in the landing site with respect to the south and to the north. The (rim of the) depression at the north appears to be fairly close to us, approximately 50 or 60 meters away; to the south, the land gradually slopes up to a ridge, which is perhaps half a mile away. The general area in the left-hand window of the LM is relatively free of large boulders; I see less than ten within my field of view that are - over the size of perhaps eight to ten inches. And now, Ed's ready to take over, and I'll proceed to photograph out the left window and turn it over to him.	(LM WINDOW)(PHO 65 9202-08) (PHO 65 9209-15)

04 13 54 44 LMP Okay, Houston. I'm just trying to get oriented; I think I can see quite a few of the craters that are out my window are here on the map. There are several large enough to be seen on the map, and in addition there's some reasonably large boulders. I will try to get us located first; then I'll describe what I see. (LM WINDOW)

- - -

04 13 55 11 LMP Well, it doesn't look like it's going to be quite as easy as I thought, Houston, to pick out these craters that I see in front of me, and pinpoint them on the map until we get a clear view from the outside. Let me just pick it up with a description. First of all, as Al pointed out, we're very close to the landing site that was proposed - - a bit more toward Triplet than that. Go ahead. (LM WINDOW)

04 13 56 35 LMP Okay, Houston. As Al pointed out, toward Doublet is a rise, and this is the ridge that we had talked about that is beyond Doublet - is very pronounced. It forms our skyline or my near horizon. And we seem to be sitting in a bowl. It slopes toward us from the west; it's rather choppy, I might admit, undulating, but the ridge beyond Doublet is the highest thing I can see in front of me. Looking around to the right, the skyline is quite undulating. There is a large, old depression to our right or that is to the north of us, which forms another bowl very similar to the one that we appear to be sitting in. And I can see several ridges and rolling hills of perhaps 35 to 40 feet in height. Obviously very, very old craters that are almost lost - almost indistinct now between myself and the skyline to the north - the horizon to the north. It just looks like a series of low hills from this vantage point. (LM WINDOW)

04 13 58 16 CDR And the window photography is completed. Magazine Kilo Kilo, exposure 20. (LM WINDOW)(PHO 65 9202-15)

04 13 58 27 LMP Okay, Houston. The undulations are far too complex for me to try to describe them right now, without getting in a better vantage point so I can point them out on your map. I'm sure I can do that as soon as I can get a better handle on our location. (LM WINDOW)

Let me suffice it to say that I think there is more terrain, more relief here, than we anticipated from looking at the maps.

04 13 58 56 CDR There's a hell of a lot of relief inside the cabin, I'll tell you that. (LM WINDOW)

04 13 59 05 LMP And there's a few boulders out my window. They're scattered around falling between here and Doublet. I see at about my 2:30 position, probably 50 yards out, a large boulder that's probably 3 feet across. There - that's the largest one I have in my field of view, or at least, in my near field of view. And, there are two or three others perhaps half that size - or appear to be half that size in that same vicinity, just a little, little beyond, about 2:30 on the clock code and perhaps 50 meters to the largest one and then another 10 or 15 to the other big - boulders. They don't seem to form a pattern that I can see. The color that we're looking at is a kind of a mouse-brown or mouse-gray. And, obviously, it changes with the sun angle. The surface - well, there are numerous craters in my field of view. Some old, very subdued, some overlapped by newer craters. Some that seem to be relatively recent. Most of the surface, however, seems to be fine grained. Incidently, I do see some linear features on the surface. Very small, fine linear features. I do not think that they are erosion patterns; they may be. However, I can see a suggestion of them quite a ways away from the LM, kind of running parallel to those that I can see, and we'll have to talk about it later when we get out - - (LM WINDOW)

04 14 00 57 LMP I think we see lineations that are not - go ahead. (LM WINDOW)

04 14 01 01 CC Roger. Could you give us a little more description on the nearfield craters, that is the ones that are right in close to the LM? (LM WINDOW)

04 14 01 10 LMP We have a small pattern of craters at the 12 o'clock position or maybe about 12:30. I have an old subdued crater with a fresher crater in the middle of it, and two or three grouped around on the north edge of it. That crater is about 50 - 15 feet across. Immediately in front of us, maybe 15 feet, (LM WINDOW)

is about a 6- or 7-foot crater, that's pocked with a few fresher craters on it. At the 1 o'clock position, I have an old crater probably 12 feet in diameter, with a fairly small, relatively fresh crater on the southeast side of it that's maybe a foot in diameter. And as a matter of fact, the larger of those two I just described seemed to form the south pair, the south of a very small triplet. As a matter of fact, the one I described - the first one I described is in line with those three; as a matter of fact, they form a quadruplet, I guess. Now those are the largest craters in my near field, and they are the quadruplet I spoke of. The first one I described is in about the 12:30 position. It's probably 50 feet out. And the fourth one, which is the most northeasterly, it is about the 2:30 position and probably 40 feet out. Any questions?

04 14 02 58 CC All right. Sounds very good, Ed. (LM WINDOW)

04 14 03 03 LMP Beyond those in the 1:00 to 1:30 position, I see two craters that - that the surface is sloping up from me at that point. Two craters that are probably - the closest one is 25 feet across. It's about 60 to 80 feet from us, and that's at the 2:30 position. And about 25 feet beyond that one is a crater which is 15 to 20 feet across. These are both smooth-rimmed craters. They are rimmed craters, but they've been beaten down and have smaller craters on the sides. Those two that I just described are south of the large block - rock block that I spoke of - they're south by about 30 to 40 feet. Let me describe two more craters and then you can have it. I'm getting dry. Almost due north, which would be my 3 o'clock position - let's say the 2:45 position - I want to be discriminating here - 2:45 position at about 85 to 100 feet. Almost in line with the quadruplet is another crater 25 to 30 feet across with a smaller one on it's southwest rim in closer at the 3 o'clock position, just barely in my right-hand window field of view is about 35 to 40 feet out - yes, make it 40 feet out, is a crater about 12 feet across which seems relatively fresh. However, all of these craters have small, very small craters alining them. Okay, Al. Take over. (LM WINDOW)

04 14 05 15 CDR Houston, referring to the surface map on the forward coordinates, Charlie Peter and 64.9 is a crater, a fairly new crater, which I'm looking at almost directly abeam of the LM. So I would say that our landing site is just about on track, and we're perhaps 10 meters or 20 meters short of the landing site. The bright crater on the left wall on Doublet is also very visible to us from this point as it is in the landing surface photographs. (LM WINDOW)

04 14 06 25 CC Antares, Houston. I understand you have this Charlie Peter 64.9 crater at your 9 o'clock position. Is that correct? (LM WINDOW)

04 14 06 37 CDR That's right. (LM WINDOW)

- - -

04 14 07 49 CDR Yes, you could call it the 9:30 position, Houston. (LM WINDOW)

- - -

04 14 22 00 CDR Houston, do you have any questions about the surface comments that we've made so far? (LM WINDOW)

04 14 23 21 CC Antares, Al, this is Houston. The only additional questions that we have generated from your description is a request for details on the lineaments. Specifically we're interested in knowing the direction that they trend, the abundance, and the size. (LM WINDOW)

04 14 23 53 LMP Houston, I'll pick that up for a moment. I'm not going to describe the lineations near In because the ones near In may very well be confused with a descent engine pattern, but I will say that further out to the north, I can see lineations that appear to run roughly east-west, but let's say a little bit north of west, south of east, along that line. And it's very fine grained, almost imperceptible. Except it does have a little bit of shadow effect, almost like sandduning but not quite. And I can't really say much more about it until we get out and look at it. They may disappear when we get out there, but they're certainly visible from this viewpoint. (LM WINDOW)

- - -

04 14 26 11	CC	Antares, this is Houston. Based on your description, we estimate your location to be Charlie Papa 0.9 and 65.3. I say again, Charlie Papa 0.9, 65.3.	(LM WINDOW)
04 14 27 35	LMP	Houston, we are not making an issue of it at the moment. I think the crater at Charlie Romeo 0.2 and 64.5 is right out in front of me, about 150 feet. If that is so and I believe it is, it places our position just a little bit north of where you said we were.	(LM WINDOW)
04 14 28 12	CC	We copy. Understand you would call that crater at your 12 o'clock position?	(LM WINDOW)
04 14 28 23	LMP	It's really about 12:30, and probably 130 to 150 feet out.	(LM WINDOW)
04 14 28 34	LMP	Maybe a bit more. Let's say over 150.	(LM WINDOW)

- - -

04 14 37 45	CC	Antares, this is Houston. Based on Ed's report on the crater Charlie Romeo 2 and 64.5, our new estimate of your position is Charlie Quebec 0.5 - 65.4.	(LM WINDOW)
04 14 38 06	CDR	CQ 0.5, 65.4.	(LM WINDOW)

- - -

04 14 44 40	CC	And we got a question for you. How soon did you recognize Triplet?	(LM WINDOW)
04 14 44 52	LMP	Almost as soon as I picked up Cone, almost immediately.	(LM WINDOW)
04 14 45 02	LMP	I probably looked down right after Al did and saw the whole pattern - the whole pattern was immediately recognizable to me.	(LM WINDOW)

04 14 46 06	CDR	Carrying on with an earlier comment that we've - as the left side is concerned, Houston. I was surprised by the lack of large rocks in the area in front of us. There - just don't appear to be more than a half a dozen within the field of view in this southwest quadrant. On the crater which I mentioned in our 9:30 position earlier, it has no name; but the one which we coordinated for you - now there is a definite ray pattern visible coming from that crater - a ray pattern of smaller rocks with some that are perhaps 10 inches in size at the rim, varying on out to small hand-size pebbles at the edge of the rays. There appears to be rocks inside the rim of the crater, but they're all small rocks, 8 to 10 inches, and I wouldn't - it's not what I would classify as being a blocky crater.	(LM WINDOW)
04 14 47 31	CC	Roger, Al. Sounds like you should have no problem getting your football-sized rocks.	(LM WINDOW)
04 14 47 41	CDR	No, they are not as plentiful as we might expect. We will be able to get at least one on each EVA.	(LM WINDOW)

04 17 46 35 CDR All righty. Starting out the door. (LM)

- - -

04 17 49 43 CDR Houston, while he's working on the LEC, let me comment that it certainly is a stark place here at Fra Mauro. I think it's made all the more stark by the fact that the sky is completely black. (LM)

04 17 50 11 CDR Okay, I have the conveyor now. Have the bag. And it's deployed. And standing by to deploy the MESA. And the MESA has released properly, Houston. (LM)

04 17 50 51 CDR Starting down the ladder. (LM)

04 17 51 10 CC Okay, Al; beautiful. We can see you coming down the ladder right now. It looks like you're about on the bottom step. And on the surface. Not bad for an old man. (LM)

04 17 51 26 CDR Okay, you're right. Al is on the surface. And it's been a long way, but we're here. And I can see the reason we have a tilt is because we landed on the slope. The landing gear struts appear to be about evenly depressed. (LM)

04 17 51 52 CDR I'm moving around, getting familiar with the surface. The surface on which the forward footpad landed is extremely soft. As a matter of fact, it's in a small depression. The soil is so soft that it comes up all the way to the top of the footpad; it even folded over the sides to some degree. The same is true of the plus-Y strut. (LM)

04 17 52 32 CDR Okay, we'll move on over. Take a look at Fra Mauro. Take a look at Cone crater, I should say, which is right where it should be, and is a very impressive sight. You can see the boulders near the rim as - - (LM)(PHO 66 9229-30)

04 17 52 53 CC Antares, this is Houston. You are go for two-man EVA. (LM)

04 17 53 06 CDR And, continuing, we can see the boulders on the rim. It looks as though we have a good traverse route up to the top of Cone. I can see Cone Ridge going on to the north. That's very apparent. (LM)

04 17 53 36 CDR I'm moving over to adjust the MESA. (LM)

04 17 54 04 LMP And, Houston. I'm finishing up my circuit breaker check. Will be ready to go out shortly. (LM)

04 17 54 14 CDR Okay, the MESA is adjusted. Going over to remove the MET blanket. (LM)

04 17 54 37 LMP Okay, Al. I'm starting out. (LM)

04 17 55 44 CC Okay, Ed. We can see you coming down the ladder, now. (LM)

04 17 55 54 LMP And it's very great to be coming down. (LM)

04 17 55 56 CC Roger, watch the bottom step. (LM)

04 17 56 08 LMP That last one is a long one. (LM)

- - -

04 17 56 45 CC Al, this is Houston. Have you released the MET, yet? (LM)

04 17 56 53 LMP He's releasing it now. (LM)

04 17 57 02 CDR Okay, Houston. The MET is finally clear of the MESA. (LM)

- - -

04 17 58 01 CDR Okay, Houston, the MET has been stowed on the plus-Y footpad. (LM)

04 17 58 13 CDR And going back to adjust the MESA. (LM)

04 17 58 25 LMP Mobility is - very great under this crushing one-sixth-g load, Houston. (LM)

04 17 58 46 LMP And looking at Cone crater, where Al was looking a short time ago, it doesn't appear there is going to be any trouble getting the MET up Cone crater. (LM)

- - -

04 17 59 20 CDR The MESA blanket is coming off here. You'll lose - - you'll lose television for a moment. (LM)

- - -

04 18 00 01 LMP Let me give you a hand, and we'll get it done. (LM)

- - -

04 18 00 38 CDR Okay, the lens cap is going on now, Houston. While we set up the tripod - - move the TV to another location. (LM)

- - -

04 18 01 39 LMP Houston. While Al's getting that television, I'll go ahead and get my contingency sample; get it out of the way. (LM)(SAMP CONT 14001-12)

- - -

04 18 02 46 LMP Houston. The contingency sample is being taken about 25 feet in the 1 o'clock position of the LM, adjacent to a - about a 5-foot crater. I'll identify it for you later. (LM)(SAMP CONT 14001-12)

- - -

04 18 03 59 CDR Do you want to watch the cable as I go out, Ed? (LM)

04 18 04 09 CC Al, this is Houston. Would you verify the lens is still capped. (LM)

04 18 04 20 CDR That's affirmative. (LM)

- - -

04 18 04 51 LMP Let me get this contingency sample folded up. (LM)(SAMP CONT 14001-12)

04 18 05 25 CDR Okay, Houston, the lens cap is off. We're aiming for the general area of MESA. (LM)

- - -

04 18 09 26	CDR	And while we're waiting for the television adjustment, the 2:30 position approximately 50 feet where the camera is, is slightly uphill. We see that the LM did, in fact, land on the - sort of a downslope - - it seems to be - almost a basin. Go ahead.	(LM)
04 18 09 48	CC	Roger, Al; this is Houston. We'd like to go back to average and f:44; stop it down all the way, and then leave it there.	(LM)
04 18 09 57	CDR	Okay, this is the last adjustment, f:44. And g going - -	(LM)
04 18 10 04	CC	Roger, and back the zoom out to about 35.	(LM)
04 18 10 07	CDR	- - and going to average. And back the zoom out to 35. And how does that look?	(LM)
04 18 10 19	CC	Beautiful.	(LM)
04 18 10 24	CDR	Okay, pressing on the S band antenna.	(LM)
04 18 10 31	CDR	Again continuing; the soil is very fine here. Very fine grained, and as we mentioned before there are very few samples that - of any size at all. Mostly hand sample size and blocks of generally under 2 inches or less.	(LM)
04 18 11 05	LMP	Roger. Houston, as you can see, the SRC table is deployed. ETB is emptied and I'm putting the LIOH canisters in it now.	(LM)
04 18 11 20	CC	Roger, Ed. And you did leave the contingency sample on the ladder?	(LM)(SAMP CONT 14001-12)
04 18 11 26	LMP	That's affirmative. That's where it is.	(LM)(SAMP CONT 14001-12)
04 18 11 32	CDR	Houston, it looks as though we've landed in a fairly rough place.	(LM)
04 18 11 36	LMP	Yes; indeed it does. Evidenced by the fact that you put your front landing gear into a hole.	(LM)
04 18 12 07	LMP	Okay, Houston. I have the SWC out and setting up to deploy it.	(LM)

04 18 12 22 LMP Am I still in your field of view, Houston? (LM)

04 18 12 24 CC That's affirmative. (LM)

04 18 12 42 CDR Okay, Al's bringing the S band antenna around. (LM)

04 18 12 46 CC Roger, Al; we're watching you. (LM)

04 18 12 47 CDR Positioning. (LM)

04 18 13 41 LMP And, Houston. The SWC's in place. (LM)

04 18 13 44 CC Roger, Ed. That's 114 plus 53 plus 48 GET. SWC. (LM)

- - -

04 18 14 47 LMP And, Houston, the LR cubed is coming off. (LM)

04 18 15 58 CC Al, this is Houston. If you would, give us the commentary on how the legs go into the surface. (LM)

04 18 16 10 CDR Okay, the legs are in the surface approximately 1 inch, I would say. Appear to be - fairly equal all the way around - perhaps the leg to the left (SHEPARD: meant "-Y strut") is in an inch and a half. (LM)

04 18 16 41 CC Roger. We were driving more at force penetration. And did you meet any rocks or anything like that? (LM)

04 18 16 51 CDR I didn't attempt to run any kind of an experiment - - forcing the legs down. I just - - (LM)

04 18 17 19 LMP Here comes the S band antenna cable. (LM)

- - -

04 18 18 33 CDR Okay, if you want to stand clear, we'll deploy the antenna. (LM)

- - -

04 18 23 27 CC And, I guess - contingency sample into the ETB. (LM)(SAMP CONT 14001-12)

04 18 23 34 LMP Okay. (LM)

04 18 24 03	LMP	Hey, Bruce. Is any appreciable dust flying off these boots? I'd like not to take all that dirt in there.	(LM)
04 18 24 10	CC	I didn't notice any on the TV.	(LM)
04 18 24 47	LMP	And, Houston, I'm back in the LM.	(LM)
		- - -	
04 18 25 41	LMP	Okay, Alan. I'm ready for the ETB most anytime.	(LM)
		- - -	
04 18 25 59	CC	And did the contingency sample get in there?	(LM)(SAMP CONT 14001-12)
04 18 26 04	CDR	That's affirmative.	(LM)(SAMP CONT 14001-12)
04 18 26 09	LMP	Wouldn't never do for us to leave that one behind, Bruce.	(LM)(SAMP CONT 14001-12)
		- - -	
04 18 26 27	CDR	While Bruce is loading up the ETB.	(LM)
04 18 26 34	LMP	Who?	(LM)
04 18 26 35	CC	Don't I wish it!	(LM)
04 18 26 36	CDR	While Ed is loading up the ETB, I'll describe the general landing site. We are, in fact, in a low area. There seems to be a general swale or a wide valley between the Triplet craters and the Doublet craters. And we are on the downhill side at this particular point. It levels off at a lower elevation to the west of the LM, approximately 15 feet lower there, and then it starts back up to the rim of Doublet. It's a very uneven landing area here. And, of course, like all of the sections of the Moon, it's pockmarked by a - enormous amount of craters. The surface here, as we pointed out, is mostly fines and I hate to discuss any kind of lineations here in the immediate vicinity of the LM, because I can see very definite indications of the radial dust pattern caused by the descent engine. And *** any other lineal pattern, as such, right here in the area.	(LM)

04 18 28 11 CDR There are perhaps half a dozen very large rocks at the 1 o'clock position from the LM. But perhaps they're ejected from Cone, although they don't seem to have any particular ray pattern. They probably are ejected from Doublet, because they appear to be closer to Doublet than they do Triplet. They are a lighter gray in material - excuse me - the material is lighter gray in color and I'm certain that we'll get some of those samples on the way back from our ALSEP deployment. It's very difficult to assess any kind of stratigraphy in Cone right now, looking back at it, because we're looking into the Sun at a low sun angle, and it's just not the right direction to view that crater when looking for stratigraphy. But there certainly are boulders on it. From here, it looks as though they are at least 20 feet in diameter perhaps, at least the ones we can see here in the western slope. They appear to be grouped fairly close to the rim of the crater and not too many large boulders on down the sides of the slopes, the outside rim. Then again, it looks as though the LM was traveling slowly forward and slowly to the right. As you'll see from the photographs, that's the direction of the landing gear probes, as they are bent. The footpad plus-Y, for example, has a drag pattern of approximately 1 foot in the dust. (LM)

- - -

04 18 31 10 CC Okay, Ed. Before you start transferring, you want to verify contents in the ETB. (LM)

04 18 31 17 LMP Okay, let me give you a call on them, Bruce. I put in one black-and-white camera, a television camera, two Hasselblads, one TDS, two 16-millimeter - mags, and two maps. (LM)

04 18 31 36 CC Roger. Did you get the 16-millimeter camera with mag attached? (LM)

04 18 31 47 LMP No. Thank you. Guess we kind of need that one. (LM)

04 18 31 56 CDR Yes, that's the one that's supposed to photograph you coming down the ladder. (LM)

04 18 32 01	LMP	Oh, oh; all of the contingency - the disposal containers just fell out on the floor. Just a minute. Get the camera.	(LM)
04 18 32 34	CDR	Okay, Houston, with respect to the erosion pattern, directly under the engine bell, there is very little erosion. Most of the erosion occurs about 3 feet to the southeast of the current location of the bell. That's probably where the thrust was when the engine was cut off. And the LM slowly drifted to the northwest from there.	(LM)
04 18 33 30	CDR	As perhaps you can see from your camera Houston, the view off to the south is an undulating hill. And I would estimate that hill back there to the south is, oh, perhaps 100 feet higher than we are.	(LM)
		- - -	
04 18 35 18	LMP	All right. Coming out again.	(LM)
04 18 35 20	CDR	If you want to wait a minute, I'll take a picture of you.	(LM)(PHO DAC)
		- - -	
04 18 37 52	CC	Give me a mark, Al, when you start using film.	(LM)(PHO DAC)
04 18 37 58	CDR	I just started using film now.	(LM)(PHO DAC)
04 18 38 01	CC	Roger. You on 24?	(LM)(PHO DAC)
04 18 38 05	CDR	12.	(LM)(PHO DAC)
04 18 38 12	LMP	Let me close the hatch.	(LM)
		- - -	
04 18 38 44	CDR	You're at the bottom step.	(LM)
		- - -	
04 18 38 59	CDR	Camera stopped, Houston.	(LM)(PHO DAC)
		- - -	

04 18 39 10 CDR Okay, we're right on the timeliner. Right to the minute. (LM)

04 18 39 27 LMP Okay, I'll take the camera while you get the flag set up. I'll go off to the left over there by the SWC. It will be on television. (LM)

04 18 39 43 LMP Okay, f:8. (LM)

04 18 40 16 LMP The camera was on 1/60th. I hope it got bumped there. (LM)

04 18 40 20 CDR No, that's where it's supposed to be for you; 2.8, 1/60th. (LM)

- - -

04 18 40 34 LMP Aim my camera out there at about the right spot. (LM)

04 18 40 37 CDR Okay. Let's see. Up there on the rise? Be okay? (LM)

04 18 40 54 LMP Let's see where you're pointed. (LM)

04 18 40 56 CDR Over there on the rise? (LM)

04 18 40 57 LMP Okay. Let me point a little bit further around that way. (LM)

04 18 41 00 CDR Get out there in the sunlight, I think with *** (LM)

04 18 41 04 LMP Okay. (LM)

04 18 41 18 CC Antares, Houston. The flag is going off the camera to the right. (LM)

- - -

04 18 41 43 CC - - okay. You're coming back in now. (LM)

- - -

04 18 42 17 LMP Put it right here in front of us, Al. (LM)

04 18 42 19 CC Yes, maybe on this - on the TV camera side of the LM shadow. At 1:30, 20 feet. (LM)

- - -

04 18 42 44	LMP	Camera going here.	(LM)
04 18 42 48	CC	Give me a mark.	(LM)
04 18 42 53	LMP	Mark. It's running.	(LM)
04 18 43 08	LMP	How's this, Bruce? Look okay?	(LM)
04 18 43 10	CC	Roger, That's a good site.	(LM)
04 18 43 28	LMP	Going in very easily, but not as deep.	(LM)
		- - -	
04 18 43 55	CDR	Take a picture this way and then we'll swing it around so they can see it in television.	(LM)(PHO 66 9231-32)
		- - -	
04 18 44 59	CC	Okay, and which magazine are you using? On the Hasselblad?	(LM)
04 18 45 01	CDR	Indianapolis, Indiana.	(LM)
		- - -	
04 18 45 44	CDR	Okay. Ready?	(LM)
04 18 45 46	LMP	Ready.	(LM)
04 18 45 50	CDR	Okay. Got it.	(LM)
04 18 45 54	CC	What's the final exposure number?	(LM)
04 18 45 56	LMP	Houston. Give me a good orientation for the flag.	(LM)
04 18 46 00	CC	Okay, Ed. If you just turn it broadside - -	(LM)
04 18 46 03	CDR	25, 25.	(LM)
04 18 46 04	CC	Just turn it broadside to the TV camera with the field to the TV camera right; that is, 180 out from that would be better.	(LM)
04 18 46 16	CDR	There you go. You got 25 on the mag?	(LM)
04 18 46 25	CC	Okay, that's good on the flag.	(LM)

- - -

04 18 46 49 CC You have about 3 minutes remaining on that magazine Claremont, California. (LM)

04 18 46 56 LMP Roger, we won't change it. Okay, I'm going to press on out for the TV pan, Houston. (LM)

04 18 47 08 CDR And, while Ed is doing that, Al is going to proceed with photographing the landing gear - - and general features about the LM. (LM)(PHO 66 9234-9316)

04 18 47 18 CC Roger. Using Indianapolis, Indiana. (LM)

04 18 47 28 LMP Okay, Houston, for my first sector for pan, I'll point a little bit more to the south. (LM)

04 18 47 38 CC We want to go to a zoom of 25 on this. (LM)

04 18 47 59 LMP You're zoom of 25; focus pointing out toward infinity. And how's your picture, Houston? (LM)

- - -

04 18 48 31 LMP Okay, how's your picture now? (LM)

04 18 48 34 CC Roger. It looks good. We can now pick up - - (LM)

04 18 48 37 LMP Can you see the horizon? (LM)

04 18 48 39 CC - - that's affirmative. The horizon is about two thirds of the way up from the bottom of the tube. The flag is over near the left hand corner of the field of view. And that little rise is sort of centered, with the small crater off to the left. (LM)

04 18 48 55 LMP Okay, that's just about where I wanted it. Roger. The far horizon - Bruce, is a ridge that seems to run around this bowl that we're sitting in - there appears to be a ridge. It runs down from what we called "Old Nameless" to the south, and it runs to the west. It seems to be roughly circular but, of course, we could be a little bit deceived, at this point, on that score. The little rise you see in front of us is - - a rise that shown on the map with - the craters are on the map. Since I don't have it handy, it - I'll have to give you the coordinates (LM)

later, but I think you already know them. They are about 150 feet south - - southwest of the LM. Go ahead.

04 18 49 52 CC Roger. If you're going to spend several seconds describing each of these locations here after the camera steadies out, you might just as well zoom out a ways, and we'll pick up some features at random on higher magnification, and zoom back in when you go onto the next 45 degree sector. (LM)

04 18 50 11 LMP All right, I've moved around to the next sector now. And it's looking down over what we used to call Clover Leaf although it's not obvious from here what the Clover Leaf was. There is a fairly significant crater about 250 to 300 yards out. I'll try to come - bring it in for you. (LM)

04 18 50 43 LMP Can you see it out there, Houston? (LM)

04 18 50 45 CC Yes, you're doing fine. Keep zooming, if you've got any left. It's well centered. (LM)

04 18 50 52 LMP Let's zoom all the way. (LM)

04 18 50 56 LMP That crater is - it's kind of in a low spot, but it's not the lowest spot in this dip that we're in. The lowest spot we will pick up in our next sector. (LM)

04 18 51 11 LMP However, I will shoot across it because you won't be able to see it. Now, another sector to the right. (LM)

04 18 51 21 LMP Facing almost down sun. (LM)

04 18 51 24 CC Roger. We got your shadow. (LM)

04 18 51 25 LMP And - okay. It's a very low spot. The deepest part, I guess, of what we were calling Clover Leaf before, although I did not realize how deep that depression was and I still don't quite - - (LM)

04 18 51 47 CC Okay, zoom out while you're talking. (LM)

04 18 51 52 LMP - - can't quite get the relief in my mind, because, (LM)
it is so different than what I expected. Where
you're looking at now, this deep part is to the
south of Doublet, and it's probably 75 to 100 feet
below where we are - -

04 18 52 12 CC Okay, you're aimed up a little high. (LM)

04 18 52 14 LMP - - rising up on the far side to above us. How's (LM)
that now?

- - -

04 18 52 26 LMP I have a little trouble listening to you and talking (LM)
at you, too. Not polite. I'm bringing it back in
and coming around through the west northwest, and
you should be able to see in the distance Doublet
crater. And I've lost it now because of the sun
angle, but it's just about - on the near horizon.
I'm sorry, there are three mounds, three ridges.
The nearside - the nearest one - the ridge that
Doublet is on and then the far horizon. And I'm
bringing them - - bringing it on out for you.
Doublet is on the second hill that you see. Pick it
up out there, Bruce?

04 18 53 21 CC Roger, we can see the ridges, - and I can see a (LM)
crater that probably is Doublet.

04 18 53 26 LMP We'll zoom back in and move on around, and I think (LM)
Al's about to finish up his task over there.

04 18 53 34 CDR Negative. I'm still working at 8 o'clock. (LM)

04 18 53 39 CDR Ed, I just wonder how come McCandless has the (LM)
audacity to presume that we're wrong about Doublet
crater.

04 18 53 48 LMP Very presumptuous. Okay, Bruce, I'm coming around (LM)
one more sector. I'm going to move it just a little
bit more and you should be able to see the large
rock, the four or five rocks I was talking about in
my discussion before we got out of the LM. Now,
I'll zoom in on those if I may.

- - -

04 18 54 18 CC Okay, now point the camera down a degree or two. (LM)

04 18 54 29 CC Beautiful. You might come right a degree or so. I see the small rocks off to the right. What's that object in profile on the horizon? (LM)

04 18 54 43 LMP And I might add - I mentioned a quadruplet chain of craters - - (LM)

04 18 54 51 CC Point it down a little. (LM)

04 18 54 53 LMP Well, they're right here in front of me - okay. The quadruplet chain of craters starts right here in front of me; well, it's halfway between the rocks and myself and moves - - (LM)

04 18 55 06 CC You're getting all sky. (LM)

04 18 55 07 LMP - - across here, now, there's quite a few - let me zoom back in again. (LM)

- - -

04 18 55 31 LMP There's the south quadruplet crater, and then there's the next one and the next one and the largest one. (LM)

04 18 55 43 CC Roger. Okay, we probably better go back to zoom 25 and press on with the panorama. (LM)

04 18 55 52 LMP You can see - okay, I'm at zoom 25. And I'm looking almost due north now. I'll swing back around and pan for my rocks. There's the rocks we were looking at. Panning slowly to the north, you can now see the undulations, the ridges that Al was talking about - - (LM)

04 18 56 15 LMP There's not a level portion out here that's more than a few square meters. And you can see at least three ridges between us and the horizon. Now, I'll zoom in out here once more. Let you see it close - closer-hand what's out there. Another pile of rocks, or ridges. (LM)

- - -

04 18 56 53 LMP You need a gunsight on this thing. (LM)

- - -

04 18 57 05 CDR Okay, Houston. Al is finished with the documentation, counter at 110. (LM)(PHO 66 9234-9316)

04 18 57 28 CC Roger, Al. 110, Indianapolis, Indiana. And Ed, a frame or two ago it looked like one of those rocks was split right down the middle; did you notice that, too? (LM)

04 18 57 47 LMP I don't think it is - it may be - it may look like it from there - we'll go by there later on. (LM)

04 18 58 08 CC We're about 2 minutes behind timeline at this point, Ed. And you're looking at sky again. Bring her down. Okay, Ed, we're recording all this on video tape so that it only takes a relatively brief period of time looking at the scene that we can play it back frame at a time, later on. Back at 25? (LM)

- - -

04 18 59 25 LMP The horizon that you see in this view is the north flank leading up to Cone crater. It's probably - it's over a mile away - a mile and a half away. I'll give a quick zoom in on it. And then I can't go any closer to the Sun right now. I'm at my limit. (LM)

- - -

04 18 59 49 CDR Okay, we're at the time to deploy the MET, Ed, if you want to swing it on back around. (LM)

04 18 59 55 LMP Bruce, what was the zoom setting you wanted - right here for the - for the MET and the MESA? (LM)

04 19 00 02 CC Okay, let's try it at about 45 there; we'd like to get the flag in at the right extremity and the plus-Y if we can, at the left extremity. Hold that. Pan left about 2 degrees. Left 2 degrees. Okay, Ed. Okay. (LM)

04 19 00 29 CC Yes. Back it out about to 40 on zoom. Okay that's good. (LM)

- - -

04 19 00 44	CC	Okay. Al and Ed, if we could get you both in the field of view there for a minute, we've got a message for you.	(LM)
		- - -	
04 19 02 10	LMP	Thank you, Deke. And convey our thanks to the President, please.	(LM)
		- - -	
04 19 02 18	CDR	You ready? Get the wheels first.	(LM)
04 19 02 34	LMP	Wheels out.	(LM)
		- - -	
04 19 03 39	CDR	Houston as you can see the MET is deployed properly.	(LM)
04 19 03 49	CDR	Looks like it's in good shape.	(LM)
04 19 03 53	LMP	I'll get a camera.	(LM)
04 19 04 01	CDR	Okay, if you want to - leave this right here - - I'll move around to put the TV camera on the scientific equipment bay.	(LM)
		- - -	
04 19 04 51	CDR	TV camera is covered, and proceeding to the rear of the LM to observe the deployment of the ALSEP.	(LM)
04 19 06 03	CDR	Okay, Houston. The cover is coming off the lens now.	(LM)
		- - -	
04 19 06 15	CC	Are you all the way back at the 30 foot position there? Six o'clock, 30.	(LM)
04 19 06 22	CDR	Well, - it's about 30 right there, I'd say.	(LM)
04 19 06 32	CC	Our picture is moving around a lot; you're going to have - -	(LM)
04 19 06 34	CDR	It's a little hilly here.	(LM)

04 19 06 35 CC - - to set it down and let it stabilize before we can tell you anything about it. Okay, what zoom are you on? (LM)

04 19 06 43 CDR We have been trying to find a level spot, Bruce. We're in - - (LM)

04 19 06 46 CDR We're on the side of the hill, as you probably have heard. And it may not stay; it may tip over. (LM)

04 19 07 01 CC Can you poke one of the legs into the surface there? That's a pretty clumsy tripod, I realize. (LM)

04 19 07 06 CDR I'll tell you in just a moment. (LM)

04 19 07 17 CDR Do you know, I think it will stay now. (LM)

- - -

04 19 21 55 CDR Where do you think is a good spot for the ALSEP? (LM)

04 19 21 59 LMP Oh, boy. That's going to be tough, Al. I'd just head out toward Doublet out there and let's look. I - right toward Doublet. (LM)

04 19 22 12 CDR I think that's the best way. Aim for the center of Doublet. (LM)

04 19 22 16 LMP Yes, aim for the center of Doublet, and let's go from there. However, I think maybe we better go a little further south, or we're going to violate that CCIG constraint if we go too far north. How about toward the south edge of Doublet? (LM)

04 19 23 04 LMP Hey, why don't you - point it at us, and we'll just pick it up on the way out? (LM)

- - -

04 19 23 13 CDR Well, we're supposed to - okay, right now - you can put it here and watch the MET deployment, if you like. (LM)

04 19 23 34 CDR Okay, Houston. We're about - a 40 foot zoom now, on the area of the MESA and the MET. How does that look? (LM)

04 19 23 58 CC Roger. Let's go to 50. (LM)

- - -

04 19 25 45 LMP Bruce, I've put on two Hasselblads, and I'm going ahead and getting the 16 millimeter on and getting it out of my way right now. (LM)

- - -

04 19 26 53 CC And on magazine Charlie Charlie, I show you still have 3 minutes remaining. (LM)

04 19 27 06 LMP We'll leave it on there, then. (LM)

- - -

04 19 29 30 CDR Okay, Houston. Magazine double Dog and double Easy going on the MET. (LM)

04 19 29 37 CC Roger. Delta Delta and Echo Echo. (LM)

- - -

04 19 34 14 LMP And, Houston, I'm sealing the organic sample at this point. (LM)

- - -

04 19 35 23 LMP Okay, Houston. I have the closeup camera. (LM)

- - -

04 19 35 51 LMP Okay. Houston, it's turned on and; it's reading 300. (LM)

- - -

04 19 38 45 CDR Got the core tube cap assembly, extension handle, two sets of tongs. We have a numbered geophone anchor on the front. We have the tether, the gnomon, the hammer, the scoop. Three core tubes, 35 bag dispenser, Closeup Camera, two SESCs, two 70 millimeter cameras with solar exterior, one 16 millimeter camera and one mag, four weigh bags, two maps, extra number geophone flag, large scoop is on, right. Large scoop is on, and we're taking the trenching tool with us. (LM)

04 19 39 24 CC Okay, and you should have 16 millimeter and two mags. (LM)

04 19 39 30 CDR That's correct; we have a total of, I was just going to say, a total of three mags; one is almost used and the other two are clean - you with us? (LM)

- - -

04 19 40 51 CC And we need to point the TV camera out to the ALSEP site. (LM)

04 19 41 00 CDR Let me zoom on out and get that. I think I'll aim it a little bit to the left of - that bright crater on the side of the west wall of Doublet. (LM)

04 19 41 12 CC Say, Al, if there's any uncertainty as to the deployment area, we'd rather go to a zoom of 100 instead of a zoom of 150; but if you think you've got a good site picked out, now, why we can go to 150. (LM)

04 19 41 27 CDR I think we can find a good site. We may be a little closer to Doublet than the map shows, because of the grade going up there; but I think there's a level site fairly close to the south rim of Doublet, and we'll aim the camera in that general direction and give you 150 zoom. (LM)

04 19 41 46 CDR Focus at infinity. You should be able to see on the right side of your picture when I settle down here. You should be able to - hold on. (LM)

04 19 42 11 LMP Al, you can get quite a ways further out if you want to; you've got a little cable left. (LM)

04 19 42 14 CDR You should be - we're aiming right for the south rim of Doublet now, Doublet or south Doublet; but you'll probably be able to see that bright star crater right in the very edge of your field of view. The f-stop okay? (LM)

04 19 42 29 CC Yes, f-stop's fine. I've got what looks like one - two ridges and then the horizon in the picture, and I see just past the second ridge, I see - look like two craters in line. (LM)

04 19 42 51	CDR	It may be two small boulders.	(LM)
		- - -	
04 19 45 20	CC	Okay, that looks good for elevation; and if you've got us aimed at your proposed deployment site, we're GO.	(LM)
		- - -	
04 19 46 01	LMP	Roger. I'm headed over that way.	(LM-ALSEP)
04 19 47 00	LMP	Can you see - field of view - yet, Bruce?	(LM-ALSEP)
04 19 47 04	CC	Negative, Ed. I believe you're off to our left. Okay, you're coming in, now.	(LM-ALSEP)
		- - -	
04 19 47 14	LMP	I'm going to stop here and rest for a minute, Al. This darn thing is heavier than I expected.	(LM-ALSEP)
04 19 47 23	CC	Okay, Ed. We've got you in the field of view over to the left, now.	(LM-ALSEP)
04 19 47 29	LMP	Al should be coming in right now, too.	(LM-ALSEP)
04 19 47 51	CDR	Looks as if it might be a little secondary impact right here by me.	(LM-ALSEP)
04 19 47 54	LMP	Man, there's so many different types of craters around here, we could spend the whole EVA within a hundred yards of the LM. Okay, lead on and I'll follow and watch the MET for you.	(LM-ALSEP)
04 19 48 24	CDR	Okay, Houston. We're proceeding over a very fine-grained regolith we described before. Undulating surface - - getting more sloped.	(LM-ALSEP)
		- - -	
04 19 48 51	LMP	Say, Houston. This looks like brown talcum powder; it's so fine in most places.	(LM-ALSEP)
04 19 49 01	CC	Roger. The MET's going off to the right.	(LM-ALSEP)

04 19 49 03 CDR I think the sun angle is increasing, now. The MET's trying to find a smooth place to go. (LM-ALSEP)

04 19 49 11 LMP Al, I think you'll have to go around this crater, here, to the left. I think we can find our way down. Good heavens, that's a deep hole. But I guess we can - make it either way. (LM-ALSEP)

- - -

04 19 49 45 CDR See those two over there at 10 o'clock? We can see those are on the map. (LM-ALSEP)

- - -

04 19 49 54 CDR We'll be dropping down out of sight for a while, probably. (LM-ALSEP)

04 19 50 04 CDR Going down in a depression. (LM-ALSEP)

04 19 50 09 LMP A very deep depression, compared to what it looked like. (LM-ALSEP)

04 19 50 29 CDR Well, I don't know. (LM-ALSEP)

04 19 50 32 LMP I don't know either. Let's stop a minute, Al. (LM-ALSEP)

04 19 50 37 CDR I'm not sure but what we've picked just about as good a spot as anywhere. (LM-ALSEP)

04 19 50 44 CDR It looked a little further out here because of being closer to zero phase, perhaps. (LM-ALSEP)

04 19 50 51 LMP I think that's it, but it's not a bit smoother than the other. I'll be darned if I know what to do. (LM-ALSEP)

04 19 51 04 CDR Well, we'll move on a little closer to Doublet. (LM-ALSEP)

- - -

04 19 51 36 LMP Well, I think the first ridge over there about another 75 yards might be our answer. Right beyond this next - these next two craters. (LM-ALSEP)

04 19 51 49 CDR Yes, I think so. It's probably a pretty good spot. About right up there. (LM-ALSEP)

04 19 52 05 CDR Okay, Houston. We're in the general area of the planned ALSEP deployment now - on the chart. It's in a depression, and I think we'll move on a little closer to Doublet to give it a higher elevation. (LM-ALSEP)

04 19 52 18 CC Roger. You're visible from - oh about the armpits up, right now. (LM-ALSEP)

04 19 52 31 LMP Think you ought to press a little - bear a little to the left, Al. (LM-ALSEP)

04 19 52 33 CDR Yes. I guess we'll have to. Nothing like being up to your armpits in lunar dust. (LM-ALSEP)

04 19 52 48 LMP I think just to the left of that rock that's ahead of us, it provides a path through here. (LM-ALSEP)

04 19 53 00 LMP The MET seems to be riding very well, Houston. It's bouncing a little bit, making nice tire marks, but not about to turn over. It jumps about a foot every time it hits a small rise, but very stable. (LM-ALSEP)

04 19 53 20 CC Are you getting any dust thrown up by the tires? (LM-ALSEP)

04 19 53 25 LMP No. There is a little bit, Bruce, but it's not - the dirt feels to be kind of clumpy. (LM-ALSEP)

04 19 53 53 CDR Okay, I guess that ridge is the best place. (LM-ALSEP)

- - -

04 19 54 00 CDR We still on your television, Bruce? (LM-ALSEP)

04 19 54 02 CC Yes, indeed. You're very well centered. And I can see your - (LM-ALSEP)

04 19 54 09 CDR Ought to be coming back in now; we're coming up to - the grade here. (LM-ALSEP)

04 19 54 14 CC Roger. I can see your shadows now, so - in fact, I can see your feet; so, you're well in view. (LM-ALSEP)

04 19 54 23 LMP Okay, about another 30, 40 feet now and I think we're as good as we're going to get. (LM-ALSEP)

04 19 54 35 CDR What we're discussing here, Houston, is - grade going up to south Doublet. It is very consistent, and it's difficult to find a level place. (LM-ALSEP)

04 19 54 52 LMP Let's set it down and look for a minute, Al. (LM-ALSEP)

- - -

04 19 55 09 LMP I don't know but what this rise we're standing on right here - it's about as good as any. (LM-ALSEP)

04 19 55 19 CDR Okay, now, there's a 20-meter crater there. (LM-ALSEP)

04 19 55 37 LMP You got that other map on there, too? (LM-ALSEP)

04 19 55 40 CDR Yes, it's in the pocket. (LM-ALSEP)

04 19 55 42 LMP Now, let's see. Okay, that one right there. Let's see if we can find those. The big one. May I see it a minute? Can we spot that one and those two? (LM-ALSEP)

04 19 56 05 CDR That one's right over there, I believe, isn't it? That's an old rounded one right there. See what I mean? (LM-ALSEP)

04 19 56 13 LMP Yes, that may be. What's this one right here? That one right beside it. Oh, I don't know whether we're that far out or not, Al. (LM-ALSEP)

04 19 56 45 CDR Find that little, looking for that little distance thing. Here we go. (LM-ALSEP)

04 19 57 25 CDR Okay, I'd say we're probably about 400 feet out, almost directly out in front. Plus-X. (LM-ALSEP)

04 19 57 36 CDR I think *** 80 meters along the track. (LM-ALSEP)

04 19 57 39 LMP Yeah, look here. See that crater right in between those two traverse tracks? (LM-ALSEP)

04 19 57 45 LMP Okay, those two craters and that crater that you pointed out. (LM-ALSEP)

04 19 57 48 LMP Okay, I think that one between the traverse tracks is that one right there. (LM-ALSEP)

04 19 57 54	LMP	On the hill, the two - those right over there and the one you pointed out, this one; is that one over there, the big one behind it. Now, I think it's out of sight, unless it's that one over there.	(LM-ALSEP)
04 19 58 10	CDR	Well, where do you think we are?	(LM-ALSEP)
04 19 58 12	LMP	I think that we are to the north - I think we're about BR, and let's see we thought that - we're about CQ 0.8 and 62.5 - 61.5.	(LM-ALSEP)
04 19 58 37	CDR	Did you read that, Houston?	(LM-ALSEP)
04 19 58 38	CC	Roger. Charlie Quebec 0.8 at 61.5.	(LM-ALSEP)
04 19 58 45	CDR	Let's move directly toward that big rock up there, about halfway between here and there. It's about right up in there.	(LM-ALSEP)
04 19 58 56	LMP	Yes, cause I need this clear area down here for that thumper.	(LM-ALSEP)
04 19 58 59	CDR	Okay, let's put it right up in there.	(LM-ALSEP)
04 19 59 01	LMP	Right up there, on that spot?	(LM-ALSEP)
04 19 59 03	CDR	Yes, you got it. Okay, Houston. We're going to move about 10 meters to the west-northwest from those coordinates that Ed gave you.	(LM-ALSEP)
04 19 59 14	LMP	That will be where - - ALSEP Central Station will go. We reserve the right to change our mind as to where we are when we get it up on the hilltop.	(LM-ALSEP)
		- - -	
04 19 59 47	CDR	I'm going to have to pull it over here a little, Ed; there's a crater there.	(LM-ALSEP)
04 19 59 52	LMP	Al, that's right about where we are.	(LM-ALSEP)
04 19 59 55	CC	Okay, we've lost the MET off to the right of our picture.	(LM-ALSEP)
04 20 00 05	LMP	What's wrong with right about here? It would just be a nice clear shot down there with the thumper.	(LM-ALSEP)

04 20 00 11	CDR	Can you still see Ed, Houston?	(LM-ALSEP)
04 20 00 12	CC	Yes, he's at the extreme right-hand edge of our picture, Al; and you're off.	(LM-ALSEP)
04 20 00 19	CDR	We'll turn them back on. This is where we're going to deploy.	(ALSEP)
04 20 00 22	CC	Well, I guess the primary consideration, of course, is to find a good site; and our being able to watch you is secondary.	(ALSEP)
04 20 00 31	CDR	Yes. We understand, but it's all pretty much the same: the upslope is about - 4 or 5 degrees, pockmarked by all types of craters. They're all old craters; but nonetheless, they produce a very uneven surface. And I think we've found a spot here as reasonable as we'll find anywhere.	(ALSEP)
04 20 00 53	LMP	Let's see, Al. But those two craters right there are going to be in the way. I think I'd like to move back here about 5 feet. Better than having to run through those going south or, I can leave a Central Station about where I've got it, I mean, the power generator. Think that'll be all right?	(ALSEP)
04 20 01 22	CDR	Are you done with your thumper geophone line?	(ALSEP)
04 20 01 24	LMP	Yes, I'm through.	(ALSEP)
04 20 01 25	CDR	Your line will put you right through those two craters. That'll give you a good reference.	(ALSEP)
04 20 01 28	LMP	Well, I'm going to have to go this way, so - because I can't fire into that ridge. I've got to put it more north, right up that way. Then I'm going to go right down across through there. Okay, this looks good to me if you're happy with it.	(ALSEP)
04 20 01 45	CDR	Let's see. Southwest is right - the best spot is right through those two craters.	(ALSEP)
04 20 01 49	LMP	I'm going to have to go almost due south of the -	(ALSEP)
04 20 01 52	CDR	I mean, southeast of these.	(ALSEP)
04 20 01 53	LMP	I'm going to have to go almost due south.	(ALSEP)

04 20 01 57	CDR	Okay, you can go by the right edge of that baby.	(ALSEP)
04 20 02 00	CDR	Okay, very good. Okay, we've got a spot, Houston. We will proceed with the deployment.	(ALSEP)
04 20 02 06	LMP	We're not quite as far from those coordinates as we thought we were.	(ALSEP)
04 20 02 19	CDR	Okay, Houston. We will start the 16 millimeter going here and -	(ALSEP)(PHO DAC)
04 20 02 28	CDR	We may have to change magazines.	(ALSEP)(PHO DAC)
		- - -	
04 20 02 44	CC	And if you have a free minute, we would like some commentary on the depth of the MET tracks.	(ALSEP)
04 20 02 54	LMP	Bruce, let us take a picture for it after a while. We can see the MET track clear back to the LM. They're about three-quarters of an inch deep.	(ALSEP)
		- - -	
04 20 03 48	CDR	Can't get any closer without putting it in that crater Ed.	(ALSEP)
		- - -	
04 20 04 17	CDR	Fiftieth, six frames per second.	(ALSEP)(PHO DAC)
		- - -	
04 20 04 45	CC	Has he started it yet, Al?	(ALSEP)(PHO DAC)
04 20 05 03	CDR	Mark. Camera's running six frames per second.	(ALSEP)(PHO DAC)
		- - -	
04 20 05 40	CDR	Okay; Ed is working on the Central Station, and I'm going over for the subpallet.	(ALSEP)
		- - -	
04 20 11 26	CC	Al, this is Houston. For your information, the 16-millimeter camera is out of film at this time.	(ALSEP)(PHO DAC)

- - -

04 20 19 27	CC	Sixteen millimeter's been running about 9 minutes, now, since it ran out of film.	(ALSEP)(PHO DAC)

- - -

04 20 20 44	CDR	Okay. Camera is off.	(ALSEP)(PHO DAC)
04 20 21 06	CDR	Magazine Charlie Charlie is off.	(ALSEP)(PHO DAC)
04 20 21 33	CDR	Magazine Echo Echo will be going on.	(ALSEP)(PHO DAC)

- - -

04 20 22 33	CDR	Okay; f:8, six frames per second, 250th.	(ALSEP)(PHO DAC)

- - -

04 20 22 43	CC	Roger. Give me a hack when you're started.	(ALSEP)(PHO DAC)
04 20 22 59	CDR	Hack, hack.	(ALSEP)(PHO DAC)
04 20 25 07	CC	Al, this is Houston. Could you tell us where you are in the SIDE or PSE sequence?	(ALSEP)
04 20 25 18	CDR	Yes, sir. The legs of the SIDE have been deployed; PSE stool is being placed 10 feet north from the Central Station.	(ALSEP)
04 20 26 32	LMP	Okay, Houston. The thumper is stowed on the MET. I had to get the first geophone out in order to get it there, but we'll take care of that in a few minutes.	(ALSEP)

- - -

04 20 29 07	LMP	Okay, Bruce. The mortar pack is in place.	(ALSEP)
04 20 29 26	CDR	And we've had interim deployment of the PSE.	(ALSEP)

- - -

04 20 30 01	LMP	Okay, the CPLEE's starting to come off now.	(ALSEP)

- - -

04 20 33 33 LMP Houston. The CPLEE is deployed. It is - the ball is in the inner ring. And it is lined up due east. (ALSEP)

04 20 33 49 LMP And we're going for the SIDE now. (ALSEP)

04 20 33 54 CDR And it looks clean and pretty, doesn't it? That little CPLEE all sitting there. (ALSEP)

- - -

04 20 34 56 LMP And I'm heading out with the SIDE and the CCIG at this point. (ALSEP)

04 20 36 47 CDR Okay, Houston. To keep you honest, Al is operating in the Central Station at the moment. (ALSEP)

- - -

04 20 42 45 LMP The SIDE is deployed. (ALSEP)

04 20 42 56 LMP We'll head back and get on to the thumper geophone. (ALSEP)

04 20 43 33 CC Al, this is Houston. I show about 3 to 4 minutes overdue on the magazine on the 16-millimeter camera. (ALSEP)(PHO DAC)

04 20 43 47 LMP I was heading for it over there, now, Al. I'll turn it off. (ALSEP)(PHO DAC)

04 20 43 49 CDR You shut it off, and we'll change the mag later. (ALSEP)(PHO DAC)

- - -

04 20 44 53 LMP And I'm going to take penetrometer measurement, now, Houston. (ALSEP)

04 20 44 56 LMP As I get ready for the thumper. (ALSEP)

04 20 45 13 LMP That new extension handle works well. Hey, Houston, I'm taking these measurements now at a site about 15 - about 25 feet south of the central - not of the Central Station but of the RTG and here goes my first one. One hand. And Houston, I can push it in - well, let's see - it's gone all - nearly all the way in. (ALSEP)

04 20 45 53 CDR Six marks. Six blacks showing. (ALSEP)

04 20 45 55	LMP	Six, 1, 2, 3, - 1, 2, 3, a double one and a black and white. A white, a black, and white below the upper double one. Do you understand?	(ALSEP)
		- - -	
04 20 47 24	CC	Okay, the geophone deployment.	(ALSEP)
		- - -	
04 20 49 10	CDR	Fine, thank you, Honest Abe. I'm in the process of leveling and aligning the antenna.	(ALSEP)
		- - -	
04 20 50 16	CDR	Okay, the antenna is leveled ***	(ALSEP)
04 20 50 34	LMP	Al, you do take a picture down along this line, do you not?	(ALSEP)(PHO 67 9374)
04 20 50 37	CDR	Yes.	(ALSEP)(PHO 67 9374)
04 20 51 37	LMP	And, Houston, I have my first geophone in the ground. And in this soft ground they go in vertically without any problem, and they push right on in.	(ALSEP)
04 20 51 48	CC	Okay, that's the 10-foot one?	(ALSEP)
04 20 51 53	LMP	That's affirm.	(ALSEP)
04 20 51 57	CDR	Okay, Houston, The Central Station antenna is aligned.	(ALSEP)
		- - -	
04 20 52 57	LMP	I'm going to start moving out, Al.	(ALSEP)
		- - -	
04 20 53 51	CDR	Okay, let's press on with the LR cubed.	(ALSEP)
04 20 53 57	CC	Okay, we've also got the PSE final deployment.	(ALSEP)
04 20 54 09	CDR	Okay, and we'll do that now.	(ALSEP)
		- - -	

04 21 03 14	CDR	Okay. The LR cubed is deployed 100 feet, west of the Central Station. It is level, set index is zero. The cover is coming off now.	(ALSEP)
		- - -	
04 21 06 27	CDR	Ed, I'm going to mosey on back and start taking pictures in the meantime.	(ALSEP)(PHO 67 9361-87)
		- - -	
04 21 08 00	CDR	Houston, did you know that - we were filming that last magazine at six frames per second? Did you take that into account?	(ALSEP)(PHO DAC)
04 21 08 09	CC	That's affirmative. Six frames per second was nominal 15 minutes, and we ran for almost 20.	(ALSEP)(PHO DAC)
		- - -	
04 21 09 30	CDR	Okay, Echo Echo is coming off and Delta Delta going on.	(ALSEP)(PHO DAC)
		- - -	
04 21 10 49	CDR	All set for those Juliett Juliett. Starting frame is 6.	(ALSEP)(PHO 67 9361-87)
		- - -	
04 21 14 54	CC	And, Ed and Al, for your information, you've been out three hours and 35 minutes, and you're about 35 minutes behind the nominal timeline with a half-hour extension expected.	(ALSEP)
		- - -	
04 21 19 27	CC	Al, this is Houston. What are you photographing now?	(ALSEP)
04 21 19 37	CDR	Right now, I'm taking the distance shots back to the LM from the RTG.	(ALSEP)(PHO 67 9367-68)
04 21 19 45	CDR	Getting down to photograph the SIDE.	(ALSEP)(PHO 67 9369-73)
		- - -	

04 21 34 17 CDR Okay, Al has completed the photographic coverage of the ALSEP and Juliett Juliett, counter number 34. And would you tell us now how much - counter number 34, Ed - would you tell us now, how much longer we have before we have to be back at the MESA for closeout? (ALSEP)

- - -

04 21 35 29 CC Al and Ed, this is Houston with a one half-hour extension. You have 18 minutes until you have to be back at the MESA. (ALSEP)

- - -

04 21 35 54 CDR Okay, In that case then, we will arm the mortar package at this time before we leave. We'll proceed back along our track getting geology along the way. (ALSEP)

- - -

04 21 36 56 CC Al and Ed, this is Houston, after arming the mortar pack we'd like you to proceed back in the general direction of the LM, and selecting a suitable area en route, collect the comprehensive sample and try to pick up a football-size rock on the way. (ALSEP)

04 21 37 14 CDR Okay, that's our intent, Houston. (ALSEP)

- - -

04 21 39 00 CC Mark, four hours into the EVA. (ALSEP)

04 21 39 10 CC With the half-hour extension, we're working into a 4-hour-and-45-minute EVA duration. (ALSEP)

- - -

04 21 39 52 LMP Okay, Houston, the mortar pack is aligned, with the bubble tangent to the inner ring; and I'm going to arm it now; and it's - pointed almost due north, a little bit to the west of north. I guess Al's photographs will allow you to get that exactly. (ALSEP)

- - -

04 21 41 28	LMP	And I have the extension handle, and I'm starting out after Alan, now.	(ALSEP-LM)
04 21 41 44	LMP	Whee, hey this is sure a different mode of traveling than carrying that barbell.	(ALSEP-LM)
04 21 41 52	CDR	Okay, Houston, on this comprehensive sample we're, about a third of the way back to the LM, I've not found an area exactly what I want, so I have drawn a circle which is approximately 2 meters in radius, and I'm going to pick the surface rocks from that, and a sampling of the surface fines from that area.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 42 26	CDR	And I've documented this location with a locator shot back to the LM and to the ALSEP.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421) (PHO 67 9388-89)
04 21 42 51	LMP	Okay, Al. Need some help there?	(ALSEP-LM)
04 21 42 53	CDR	Yes, I wanted to pick up all the walnut-size rocks in your tongs. And we'll get the surface fines, here.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 43 10	CDR	Why don't you work that side of it, and I'll work this side.	(ALSEP-LM)
04 21 43 31	CDR	You have to be careful you don't put them in the ground. If you make consecutive passes up the whole circle, we can tell.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
		- - -	
04 21 44 01	CDR	For this amount of time, we can really only get the ones that are essentially there.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 44 07	LMP	Yes, let me grab another weigh bag, because you're too far away for me to - -	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 44 10	CDR	An inch in diameter.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
		- - -	
04 21 44 49	LMP	Okay. I'll get one for the fines.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)

04 21 44 51	CDR	Get one for the fines and we'll start - I'd just say, just grab an undisturbed site out of each quadrant, we didn't hit with our feet. Cut it down to about a centimeter level - and fill the bag that way.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 45 15	LMP	Okay. You want the medium-size scoop or the big scoop for this?	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 45 21	CDR	No actually - the trenching tool, now the medium size scoop is the best. All you've got to do is cut the surface to the depth of about a centimeter in an undisturbed area here - where we haven't picked up the rocks. Okay?	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 45 43	CC	Al and Ed this is Houston. We show about eight minutes remaining until you should be at the MESA to start closeout.	(ALSEP-LM)
04 21 45 53	CDR	Okay, we will be able to bring the comprehensive sample at that time.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 46 02	LMP	Hey, here - don't close it, here's one in here for that.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 46 07	LMP	Here's one in here I picked up.	(ALSEP-LM)(SAMP 14303?)
04 21 46 08	CDR	Oh, okay. Dump it in here, then.	(ALSEP-LM)(SAMP 14303?)
04 21 46 37	LMP	Okay, I'll start over here in this undisturbed area.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 46 47	CDR	Yes, just get that area and then right here in this area. And fill up the bag to the line. Now I'll head on back a little farther, get a football-size rock.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 47 46	CDR	Okay. There's some pretty good-sized ones back over in here.	(ALSEP-LM)(SAMP 14304-05)
04 21 48 58	CDR	Okay, that's too big.	(ALSEP-LM)
04 21 49 04	CDR	I'll get one that's a little smaller.	(ALSEP-LM)(SAMP 14304-05)
04 21 49 10	CC	Al and Ed, 5 minutes.	(ALSEP-LM)
04 21 49 14	CDR	Okay. You want to start back now, Ed?	(ALSEP-LM)

04 21 49 21	LMP	All right, let me get about three more scoops, Al. I can get there before long.	(ALSEP-LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
		- - -	
04 21 50 12	CDR	Okay, Houston, you can see the area where the football-sized rock is coming from. It's essentially two-thirds of the way back toward the LM, from the ALSEP site. The rock appears to have been ejected from the crater which Ed was describing earlier, in his 12:30 position. As a matter of fact, it's going to be the small football-sized rock - no it turned out to be two of them.	(ALSEP-LM)(SAMP 14304)(PHO 67 9390-91)
04 21 51 16	CDR	The second small football appearing on the same crater - from near the same crater.	(ALSEP-LM)(SAMP 14305)(PHO 67 9392-93)
04 21 51 45	CDR	And, at first glance, appears to be fairly similar color. It's a large hand sample. It's essentially nonvesicular. Just some very small vesicles. The - what appears to be - -	(ALSEP-LM)(SAMP 14305)
04 21 52 01	CC	Roger. We've got 2 minutes, we'd like to get you on back to the vicinity of the MESA.	(ALSEP-LM)
04 21 52 08	CDR	- - what looks to be a fairly large crystal in that second small football rock and now, starting back toward the MESA, now.	(ALSEP-LM)(SAMP 14305)
04 21 52 17	LMP	And I'm on my way, too.	(ALSEP-LM)
04 21 52 31	CDR	Okay. Away we go.	(ALSEP-LM)
04 21 52 33	LMP	The number of surface rocks, or rocks compared with the number of surface fines is very, very small, Houston. There's a few boulders lying around and there's a few blocks around some of the craters, but by and large, it's a powdery surface. Don't run into that crater, Al.	(ALSEP-LM)
		- - -	
04 21 53 21	LMP	Boy, my sample's packing down. It was more than this when I left the site.	(ALSEP-LM)
04 21 53 38	CDR	Okay, we're coming back down the hill, Houston.	(ALSEP-LM)

04 21 53 42	CC	Roger, Al. We're seeing you moving across the TV camera and it looks like you've gotten back to the MESA here with about 10 or 15 seconds to spare on our mark. We do have plenty of time for the nominal closeout, so we don't want you to rush that. Just go through the procedures, and we'll take the timing as it comes. And, when you have a moment, we'd like to get an EMU status report.	(LM)
04 21 54 15	LMP	And since I'm coming by the camera, Houston, I'll turn you around.	(LM)
04 21 54 19	CC	Roger. And we'll put the zoom on about 40.	(LM)
		- - -	
04 21 54 31	CC	And we go back to average, and f:44.	(LM)
04 21 55 22	LMP	Oh, damn it. There went my sample bags.	(LM)
04 21 55 28	CDR	Put your UHT handle through it.	(LM)
04 21 55 32	LMP	I'll use this handle. Fortunately, I don't think more than a little bit fell out.	(LM)
04 21 56 36	CDR	Okay, we've got it packed down to only half full.	(LM)
04 21 56 58	CDR	Okay, Houston, for your information, those location - documentary location shots of the comprehensive sample taken on JJ and - I'm now showing 40.	(LM)(SAMP COMP 14165-189, 250-289, 298-300, 421) (PHO 67 9388-89)
04 21 57 12	CC	Roger; JJ, 40, for the comprehensive sample area.	(LM)(PHO 67 9388-89)
04 21 57 38	LMP	Take that, can you? That's all right I wanted you to stow that, but your hands are full, too. I'll get it.	(LM)
04 21 57 49	CDR	And on the comprehensive sample, Houston, I feel we have about 15 rocks, and some fines. One weigh bag is going in the SRC.	(LM)(SAMP COMP 14165-189, 250-289, 298-300, 421)
04 21 58 01	CC	Roger. If you take an additional weigh bag, and put material from the immediate vicinity of the LM into it to fill up the SRC, we request that you drop a documented sample bag in it as a tag.	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)

04 21 58 24	CDR	Okay, I guess we've got a little room to do that. I put the football-sized rocks in the ETB.	(LM)(SAMP 14304-05)
04 21 58 29	LMP	Okay. Let's see, you put a 70-millimeter camera in the ETB?	(LM)
		- - -	
04 21 58 45	CC	And, Al, I show that you have a magazine on the 16 millimeter that's totally unused, Dover Delaware.	(LM)
04 21 58 54	CDR	It's on the MET, Bruce. It never made it on the camera.	(LM)
		- - -	
04 21 59 07	CDR	Oh, I'm sorry. I take it back, we did put it on.	(LM)
04 21 59 21	LMP	Why don't you let me help you with the - let's take the shovel, Al; it'll be faster.	(LM)
04 21 59 28	CDR	All right.	(LM)
04 21 59 30	LMP	Trenching tool.	(LM)
04 21 59 31	CDR	Want to hold the bag?	(LM)
04 21 59 32	LMP	Yes.	(LM)
04 21 59 33	CDR	Let's hit that little crater out there. It looks like a secondary.	(LM)
04 21 59 36	LMP	Okay, let's go get it.	(LM)
04 21 59 37	CDR	Right out here.	(LM)
04 21 59 40	LMP	I saw a little crater about this size out here that I'd swear had glass in the bottom of it, but I was too busy thumping to stop and make any comment on it.	(LM)
		- - -	
04 22 00 26	CDR	There's a little different colored layer at the bottom of it there.	(LM)
04 22 00 28	LMP	Yes. Scoop it out. ***	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)

04 22 00 37	CDR	See, there's a different color there, maybe.	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)
04 22 00 45	CDR	Okay, how does that look to you?	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)
04 22 00 47	LMP	I can take another shovelful.	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)
04 22 01 04	CDR	Okay. Houston, that's in a small crater; looks like it might be a secondary impact, just hazarding a guess; it's about 2 feet in diameter, and it's - between 130, 50 feet, 130, 40 feet from the LM.	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)
04 22 01 26	CDR	And we'll put a documented sample bag in there with it.	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)
04 22 01 32	CDR	We'll put a documented sample bag in there with, and that will be bag number 8. Here you go, Ed. Stick it in there.	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)
04 22 01 53	LMP	Okay, put it in.	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)
04 22 01 56	CDR	One November, 1 November.	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)
04 22 02 05	CDR	Okay. *** and that'll fill up this one - this SRC, and that will do it very nicely.	(LM)(SAMP BULK 14160-163, 402, 422, 425-453)
04 22 02 18	LMP	Okay. All right, Houston. I'm getting the two used mags off the MET. They're going in the ETB.	(LM)
04 22 02 54	CC	Roger; prior to terminating the EVA, oh the TV camera; we'll need it set to f:44, peak, and align so that the long axis of the camera is perpendicular to the Sun. We'd also like to move the camera so that in this orientation we're still viewing the LM.	(LM)
04 22 03 15	CDR	Okay. Okay. At f:44, peak, and long direction normal to the sunline.	(LM)
04 22 03 26	LMP	Al, did you get to - put the maps in - no, the maps are right here.	(LM)
04 22 03 32	CDR	No, I haven't done anything yet. I'm just loading the SRC.	(LM)
04 22 03 36	CDR	The 70-millimeter camera in the ETB, and I'm storing - packing the SRC.	(LM)

04 22 03 43	CDR	And, Houston, we were unable to get all of the weigh bags in the SRC. It's full. We're putting the small samples of small rocks from the comprehensive sample in the weigh bag along with the two small football rocks.	(LM) (SAMP 14304-05)
04 22 04 11	CC	Roger. All righty. Understand the football rocks are in one weigh bag, and you're adding another weigh bag containing the small rocks.	(LM)(SAMP 14304-05)
04 22 04 23	CDR	Right, two weigh bags and they're both in the ETB.	(LM)
04 22 04 31	LMP	We're going to have to make another ETB load, Al. I've got another 70-millimeter camera to go.	(LM)
04 22 04 46	CDR	Okay, SRC is closed now.	(LM)
04 22 04 52	CDR	Okay, so SRC, serial 807, Houston, contains, then, the organic control sample, the fines from the comprehensive sample, and the extra fines from that small crater we collected near the LM.	(LM)
04 22 05 19	CC	Roger; we copy those in the SRC.	(LM)
04 22 05 20	CDR	*** 70-millimeter cameras, and three 16 millimeters. Get the good one off there, okay.	(LM)
04 22 05 24	CDR	Okay, and the map should be in there - -	(LM)
04 22 05 26	LMP	I've got the map, already.	(LM)
04 22 05 27	CDR	- - and the lens-scribe-brush assembly.	(LM)
04 22 05 30	LMP	I'll grab it.	(LM)
04 22 05 31	CDR	Okay, I'll boot on out here, take care of - -	(LM)
04 22 05 39	CDR	Okay, 44, peak, normal.	(LM)
04 22 05 47	CC	Roger; and we might as well go to 25 on the zoom, Al.	(LM)
04 22 05 55	CDR	I just zoomed by you.	(LM)
04 22 05 59	CC	We saw you zoom by us.	(LM)

04 22 06 00	CDR	Verify 44, 44 on the zoom; I mean 44 on the f-stop; 25 on the zoom - want - want infinity on the - -	(LM)
		- - -	
04 22 06 17	CDR	- - very good on the focus. We're transmitting and we're in peak and we're long axis normal to the Sun. How is that?	(LM)
04 22 06 39	CDR	You want the lens cap on or off?	(LM)
04 22 06 41	CC	Lens cap off, o-f-f.	(LM)
04 22 06 47	CDR	O-f-f. Okay, ETB contains two medium football rocks and the small rocks from the comprehensive sample, contains two 70-millimeter CAMs, three 16-millimeter mags, map, lens-scribe-brush assembly.	(LM)(SAMP 14304-05)
04 22 07 12	LMP	And the SRC number 2 is on the mat.	(LM)
04 22 07 23	CC	Did I copy SRC number 1, sealed?	(LM)
04 22 07 37	CDR	SRC number 1 is sealed.	(LM)
04 22 07 40	LMP	And verify that closeup camera is off.	(LM)
04 22 09 35	CDR	Hey, Houston. How much time do we have to repress, now?	(LM)
04 22 09 39	CC	All right, we're looking at 14 minutes and 20 seconds to scheduled end of EVA; about 12 minutes and 20 seconds to repress. You've got a half-hour margin in there. A half an hour margin in addition.	(LM)
04 22 15 56	CDR	How's our buddy the redhead doing, Houston?	(LM)
04 22 16 28	CC	Okay. Negative on the Hycon, and he was able to spot the LM last pass.	(LM)
04 22 16 40	LMP	Okay, Houston. I'm at the door, ready for ingress.	(LM)
04 22 16 44	LMP	Getting ready to open the hatch, now.	(LM)
04 22 16 52	LMP	Hatch is open, and I'm ingressing.	(LM)
04 22 19 06	LMP	Houston, Al's starting up the ladder.	(LM)

04 22 19 10	CC	Roger. Did you get everything in the one ETB?	(LM)
04 22 19 16	CDR	Yes.	(LM)
04 22 19 44	LMP	Okay. Al's up at the top of the ladder waiting for the LEC to come up.	(LM)
04 22 20 54	CDR	Okay, are you ready for the sample box?	(LM)
04 22 21 00	LMP	Just push it right on in. I've got it.	(LM)
04 22 21 04	CDR	Okay, the SRC is in the cabin, Houston.	(LM)
04 22 21 09	CDR	And Al will be starting in any moment.	(LM)
04 22 21 55	CDR	Okay, I'm going through the hatch.	(LM)
04 22 23 03	LMP	Okay, Houston. Al is in the cabin, and PLSS feedwater coming off.	(LM)
04 22 23 46	LMP	I'm ready to close the hatch. *** all the way ***	(LM)
04 22 24 34	CDR	Okay. The hatch is closed and locked.	(LM)

* * * * BETWEEN EVAS * * * *

04 23 35 45	LMP	Hello, Gordon. We're about ready to give you some weights on return equipment.	(BETWEEN EVAS)
04 23 36 09	LMP	Okay - we're ready to come up with the first bags - stand by 1.	(BETWEEN EVAS)
04 23 36 49	LMP	Houston, let me tell you what we've done. Remember, Al said that we brought in the small rocks from the comprehensive sample area in one weigh bag.	(BETWEEN EVAS)
04 23 37 08	LMP	We couldn't get them all in the SRC. We got the contingency sample here. And it so happens that the material cracked on the contingency sample bag, and it's leaking. So we're putting it in the weigh bag with these other rocks. And the weight of that total combination is 5 pounds.	(BETWEEN EVAS)
04 23 37 29	CC	Okay Ed, got you. The contingency sample's in that weigh bag - with a total weight of 5 pounds.	(BETWEEN EVAS)
04 23 38 43	LMP	And, Houston, the next bag has two toy-sized football rocks in it. And they weigh 15 pounds total.	(BETWEEN EVAS)(SAMP FSR 14304-05)
04 23 39 07	LMP	And that's going into the left-hand storage compartment.	(BETWEEN EVAS)
04 23 39 11	CC	Okay. Left-hand storage compartment with two little-league footballs, 15 pounds.	(BETWEEN EVAS)(SAMP FSR 14304-05)
04 23 39 40	LMP	Okay, Houston. Both of those rock bags are going to left-hand storage compartment.	(BETWEEN EVAS)
04 23 39 45	CC	Okay, Ed. That's the one with the contingency sample and the comprehensive and the football ones, right?	(BETWEEN EVAS)
04 23 39 55	LMP	That's affirmative.	(BETWEEN EVAS)
04 23 41 34	LMP	Okay. We want you to be discriminating about our samples now. We have the comprehensive rocks in the left-hand storage compartment. The comprehensive fines, however, are in the SRC.	(BETWEEN EVAS)

04 23 43 42	LMP	And mag MM is replacing II.	(BETWEEN EVAS)
04 23 43 58	LMP	Okay. We replaced magazine JJ on the Commander's camera with LL and II on the LMP's camera with MM.	(BETWEEN EVAS)
04 23 44 36	LMP	Houston, Antares. Verify which are the two 16-millimeter mags that have been used?	(BETWEEN EVAS)
04 23 45 52	LMP	Okay. We have three 16-millimeter mags, of which we only used two. Can you tell me which two we used?	(BETWEEN EVAS)
04 23 46 00	CC	I'll have to check back. I'll give you an answer in a minute here?	(BETWEEN EVAS)
04 23 46 44	CC	Our records show that the used magazines are Charlie Charlie and Echo Echo. And the Delta Delta should be the unused one.	(BETWEEN EVAS)
04 23 50 37	LMP	Okay, Houston. We're making a slight deviation to our storage plan in the ETB.	(BETWEEN EVAS)
04 23 50 45	CC	Okay, Ed. Go ahead with it.	(BETWEEN EVAS)
04 23 50 50	LMP	In addition to the three 16-millimeter mags called for, we're also taking back out the one we didn't get used today.	(BETWEEN EVAS)
04 23 51 08	LMP	And in addition to the black and white mag KK, we're taking back out Juliett Juliett. We've only used 40 frames off of that, and we've got very few pictures of the LM and other appropriate-type shots.	(BETWEEN EVAS)
04 23 51 25	CC	Roger. Juliett Juliett, you're also going to take out on the second EVA.	(BETWEEN EVAS)
04 23 54 01	CC	Just following you in the checklist here and looking ahead, it looks to us like you'll probably get to the EVA debriefing at about - in an hour and a half - about 1:22. Does this agree with your estimate? We just wanted to know to be sure to have the right people standing by.	(BETWEEN EVAS)
04 23 54 24	LMP	Well, it's not on this card. How far is it on the Lunar Surface Checklist? Right now, we're weighing SRC.	(BETWEEN EVAS)

04 23 54 42 LMP And we find that it weighs 43 pounds. (BETWEEN EVAS)

04 23 54 44 CC Okay, 43 pounds on the SRC. And if you're just proceeding down the card with no changes to it, well, then we'll figure it out when you get to the debriefing. (BETWEEN EVAS)

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05 01 13 18 CC Roger, Ed. We copy that. I have 10 questions having to do with the EVA. We don't want elaborate answers, because they, of course, cut into your sleep period. (BETWEEN EVAS)

05 01 15 34 CC Question number 1 about EVA 1: How do you feel about your planned second EVA, now that you've done the first, especially in terms of time and terrain. (BETWEEN EVAS)

05 01 15 51 CDR Well, I think that the second EVA will go a little more smoothly with respect to the timeline. It's not as complicated as far as the equipment is concerned. We don't spend as much time moving around with the PLSS - scientific equipment. It's primarily a geological traverse once the thing has gotten by the first few minutes. And we should be able to be on the time line and hang onto that real well. And we, of course, are again counting on a - at least a 30-minute extension to the nominal time, so that's the reason we'd like to start early. (BETWEEN EVAS)

05 01 16 29 CC Roger. Do you feel the terrain will be any problem? (BETWEEN EVAS)

05 01 16 35 CDR No, we don't. We had no difficulty at all in traversing the terrain. As a matter of fact, we were bounding along, even with barbells and the MET. The traversing is extremely easy, although we have a rolling landscape and lots of craters to circumnavigate. I believe from looking at the Cone, we'll be able to get up there with no trouble at all. (BETWEEN EVAS)

05 01 17 00 LMP I completely concur in that the undulating terrain is just a surprise. It's not that much more difficult. (BETWEEN EVAS)

05 01 17 09	CC	Roger, Ed. Second question is, would you please describe the rim of Doublet, especially the blockiness?	(BETWEEN EVAS)
05 01 17 27	CDR	Well, I don't think you'd call Doublet a blocky rim. The craters north and south of Doublet, of course, are both older craters and had subdued rims. There are some blocks of ejecta at and near the vicinity of the rims, but - and there are a few blocks down inside. For example, we can look at the west wall of south Doublet from here and see a few fairly good sized rocks, perhaps 3 or 4 feet at the largest. But I really wouldn't call it a blocky rim. It's a fairly well subdued rim.	(BETWEEN EVAS)
05 01 18 05	LMP	I concur. The biggest blocks we could see on the rim of Doublet correspond to these large ones I pointed out in my pan - TV pan. There are some of that size or maybe a little larger, but the population is miniscule compared with the total rim area of Doublet.	(BETWEEN EVAS)
05 01 18 28	CC	Roger. Third question: how deep is the DPS erosion crater?	(BETWEEN EVAS)
05 01 18 40	CDR	It's not very deep at all. The photographs will show that perhaps it's only 4 inches in maximum depth.	(BETWEEN EVAS)
05 01 18 51	CC	Okay, and can you describe the lineations and how far out they went, their orientation, and direction.	(BETWEEN EVAS)
05 01 19 04	LMP	Are these the lineations that I referred to earlier, or are you talking about lineations from the DPS engine.	(BETWEEN EVAS)
05 01 19 13	CC	The ones that you referred to earlier, Ed.	(BETWEEN EVAS)
05 01 19 19	LMP	Okay, they're there; and I saw evidences of them in directions different than the exhaust would cause, but there just simply was not time to look at them. We'll have to look at them tomorrow.	(BETWEEN EVAS)
05 01 19 35	CC	Next question: on the football samples, were they documented?	(BETWEEN EVAS)(SAMP FSR 14304-05)(PHO 67 9390-93)

05 01 19 47	CDR	That's affirmative. They were documented with a stereopair before, in the case of both samples. And they were taken from the crater which is located at - that'd be - CR.1 and 64.6. They came from the southwest - in the southwest rim of that crater.	(BETWEEN EVAS)(SAMP FSR 14304-05)(PHO 67 9390-93)
05 01 20 21	CC	Roger, Al. Next question: did you notice any variations in soil mechanics characteristics at various locations where legs or poles were pushed in, such as the solar-wind staff, the flagstaff, the geophone anchors, penetrometer, and so forth?	(BETWEEN EVAS)
05 01 20 45	LMP	Yes, there are a few places around, primarily fill - or rather the throwouts from craters, or what are obviously near the rim of craters, have a softer - a softer material around them than there is just in general. However, there are so many craters that you find the soft material quite often, but generally on the fresher ones. Along my traverse - rather along the upper geophone line, there are two or three fairly fresh craters along that line that have some quite soft material around them. And it was a matter of sinking in 2 - 3 or 4 inches instead of a normal one-half to three-fourths that we're sinking in out here.	(BETWEEN EVAS)
05 01 21 36	CC	Roger, Ed. On the surface features of rock marks, well, we'd like a description of the surface features of the rocks. If there are marked variations in rounding, angularity, grain size, size distribution, shape, texture, and color.	(BETWEEN EVAS)
05 01 22 01	LMP	You're getting into stuff that we're going to have to look at tomorrow. We just barely had time to finish the ALSEP and get back. The rocks I see from the cockpit, there are some rounded rocks; I see two or three that are varied, that have some rounding on top. I see some angular rocks. As far as granularity, crystal size, et cetera, et cetera, we didn't have time to look at any of that. We'll have to wait until tomorrow.	(BETWEEN EVAS)

05 01 22 28 CC Okay, Ed, this next question probably falls in the same category. I'll read it in case you have anything to say about it, and that is to describe the regolith, the general nature, fragment distribution, fragment shapes, variations in texture, color, surface patterns, and firmness. (BETWEEN EVAS)

05 01 22 46 LMP Okay, we can give a quick one on that. I think we've already done most of it. The regolith is mostly a mouse brown or sometimes looking gray, a powdery material. Almost like a - chalk, ground up; it's that thin and that fine-grained. There are a few rocks scattered around; the population - less than a percent - ranging in size from 5 to 6 - well, I guess, 2 or 3 centimeters, but the ones that are obvious, that aren't buried, are 5 or 6 centimeters; up to the largest ones that I've seen, are the ones I showed you in the pan, which are 3, or 4 or 5 feet across. The distribution is less than one percent, but you see a few of these blocks sitting all around the landscape as far as you can see, and I guess they're even out over toward Doublet, which we didn't say was blocky, but these smaller ones might not be visible at that distance. And I can look to the north, and I don't see too many on the far edge of the crater over there either; but it could be that that's too far away to be able to see them well. (BETWEEN EVAS)

05 01 24 16 CC Okay, did you notice any variations in color or surface patterns or texture? (BETWEEN EVAS)

05 01 24 28 LMP To me, it looked all about the same, as far as the general regolith here is concerned; but, again, we haven't looked at it that carefully, or I didn't look at it that carefully, just because of the press of time. By and large it is all this very fine-grain material with a few scattered rocks on top of it. Let's see if we can do a better job of describing it tomorrow for you. (BETWEEN EVAS)

05 01 24 53 CC Okay. (BETWEEN EVAS)

05 01 24 54 CDR Yes, I think that's generally true. I - we can see areas, for example, looking normally out the window, that is in the cross-sun direction - in my case to the south - where the rocks - in one ejecta pattern (BETWEEN EVAS)

			of fairly large rocks of 3 or 4 feet - appear to have a very lighter-gray texture to them in comparison to the gray brown which Ed just described, which would be the regolith. And I notice that this crater that sits out here to the 9:30 position of the LM is also a brighter crater. It's a newer crater; it has a raised rim. And it has a different color than, for example, than does the crater directly behind it - about the same distance - which is much older and a darker gray.	
05 01 25 53	CDR	I think generally, we'll find some variations in texture throughout tomorrow's traverse.	(BETWEEN EVAS)	
05 01 26 00	CC	Roger; how abundant was glass?	(BETWEEN EVAS)	
05 01 26 09	LMP	The only place I thought I saw glass - and I didn't have time to confirm it - was in a very small crater along the thumper line. It looked like there was pools - a little pool of glass at the bottom; and this crater was only about 2 foot across and maybe 8 inches deep. It had quite a bit of small chunky material in it, but it had a different color and looked very glassy at the bottom; and I didn't have time to go back and look at it, but I'm sure there's some more of that around.	(BETWEEN EVAS)	
05 01 26 45	CC	Roger. Last question is, how abundant were fillets? Do those by the LM appear to be disturbed by the DPS?	(BETWEEN EVAS)	
05 01 26 58	CDR	I think we find some fillets. I don't know whether the percentage is as high as 50 percent or not - of the surface rocks - but, yes, there is some filleting, and you'll notice in the small football-size rocks, there is a fillet pattern around them. There is filleting here, of course, very close to the LM, and it's hard to tell whether it's natural or whether it's from the LM exhaust.	(BETWEEN EVAS)	(SAMP FSR 14304-05)(PHO 67 9390-93)
05 01 27 28	LMP	I concur completely with that.	(BETWEEN EVAS)	
05 01 27 31	CC	Roger; that's all the prepared questions. I'll check and make sure there's no last minute ones here.	(BETWEEN EVAS)	

05 01 27 41 LMP Okay, I might comment that looking at our footprints - with the MET track and our footprints out to the ALSEP site over to the camera - both looking down-sun and cross-sun, that the fresh dirt we've kicked up and turned over is noticeably darker - browner - than the more mousy-brown, lighter-brown, undisturbed regolith that's on top. (BETWEEN EVAS)

05 01 28 11 CC Roger, Ed. That's interesting. (BETWEEN EVAS)

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05 10 18 33 CC And while we got this little bit of wait time here before you get on the PLSS's all the way, why don't I get you to get your map out and let me give you some changes on the tasks. (BETWEEN EVAS)

05 10 18 52 LMP You want the EVA 2 map out, right? (BETWEEN EVAS)

05 10 18 54 CC That's affirm. (BETWEEN EVAS)

- - -

05 10 19 25 CC I might give you some general comments. I guess the basic change is due to the need to get back out to the ALSEP and verify the antenna orientation. And I'll have some later instructions for you on that one. And in the process of buying that time, we're going to need to be back at the LM at about 45 to 50 minutes rather than the nominal 35 to do that job. We're going to have to change in one case - well, actually change what's documented to grab samples at a couple of places along the way. (BETWEEN EVAS)

05 10 20 08 LMP I thought we were going to try to do the antenna job first, Fredo. (BETWEEN EVAS)

05 10 20 12 CC I guess the rationale, Ed, was that it wasn't really felt that it would save that much time to do it there since y'all had been operating in parallel anyway and it alters our nominal; plus, with respect to the priorities; it's just desired to save that until last in case we have to cut any more. (BETWEEN EVAS)

05 10 20 38 CDR Are you getting any signals at all from the ALSEP now? (BETWEEN EVAS)

05 10 20 42	CC	They are getting signals but they're low signal strength, Al. And the only thing that's going to help is if indeed an antenna lead or something physically jarred the Central Station so the antenna is offset from the way you left it.	(BETWEEN EVAS)
		- - -	
05 10 21 17	LMP	We're ready to entertain the changes for the EVA 2.	(BETWEEN EVAS)
05 10 21 22	CC	At site B, that'll be a grab sample at that stop.	(BETWEEN EVAS)
05 10 21 55	LMP	I've got a grab - hold it. Fredo, we got a grab sample at site B now. Let's get straight on our term "grab sample." You want no photography at all. Is that affirmative? Or do you want some?	(BETWEEN EVAS)
05 10 22 09	CC	The photography there will be the pan, Ed. And that'll be it.	(BETWEEN EVAS)
05 10 22 17	LMP	No documentation of the sample at all.	(BETWEEN EVAS)
05 10 22 21	CC	That's affirm.	(BETWEEN EVAS)
05 10 22 27	CC	Now down to Weird. The same thing there. Grab sample.	(BETWEEN EVAS)
05 10 22 37	LMP	Grab sample at Weird.	(BETWEEN EVAS)
05 10 22 43	CC	And then basically I've written in here - it's actually what should be on your closeout part of the cuff checklist. But at that time the CDR will go to the ALSEP, and I'll have some instructions to follow on that, Al. And at that point, Ed would proceed to the boulder field that's north to take care of the weigh bags with documented samples from that area.	(BETWEEN EVAS)
05 10 23 15	CDR	I get the ALSEP back and Ed gets the boulders.	(BETWEEN EVAS)
05 10 23 22	CC	And that's about it. With respect to the nominal timeline.	(BETWEEN EVAS)
05 10 23 34	LMP	How many of those big boulders do you want, Fred?	(BETWEEN EVAS)
05 10 23 38	CC	How many can you fit into the weigh bags?	(BETWEEN EVAS)

05 10 23 46 CC Don't put more than 10 pounds in that 1-pound bag. (BETWEEN EVAS)

- - -

05 10 24 03 CDR They're not really too bad. They're probably no more than 3 or 4 feet maximum dimension. (BETWEEN EVAS)

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05 10 27 47 CC And, Antares; Houston. We're ready for the comm checks. One other item I did neglect since it wasn't on the map task, at your closeout, we're also deleting the organic sample. (BETWEEN EVAS)

05 10 28 07 LMP You'll have to remind us of that, Fred. It's on our checklist. (BETWEEN EVAS)

* * * * EVA 2 * * * *

05 11 12 32	CDR	Okay, we have both water bags clear. Hatch is coming open.	(LM)
		- - -	
05 11 13 44	CDR	Okay, Houston, Al is on the porch.	(LM)
		- - -	
05 11 17 05	LMP	Al's on the surface.	(LM)
		- - -	
05 11 18 59	LMP	Okay, Houston, I'm about ready to egress.	(LM)
		- - -	
05 11 19 54	LMP	And Houston, Ed's on the porch.	(LM)
05 11 20 03	LMP	Starting down the ladder.	(LM)
		- - -	
05 11 20 40	LMP	Beautiful day for a game of golf.	(LM)
05 11 21 20	CDR	Ed, I started to get a picture of home sweet home right straight up there.	(LM)(PHO 66 9327-32)
		- - -	
05 11 24 36	CDR	Okay, while you're down there, pick up the handle.	(LM)
		- - -	
05 11 26 28	LMP	Little things proceed to eat your timeline up.	(LM)
05 11 27 31	CC	And, Al and Ed, we've got about 10 minutes left now to complete the MET load.	(LM)
		- - -	
05 11 28 02	CDR	In accordance with your desires, we are leaving the organic sample out of SRC number 2. Is that correct?	(LM)

05 11 28 09 LMP No, no. That isn't the sample he referred to, I don't believe. Sample underneath the LM. (LM)

- - -

05 11 28 36 CC Okay, Al, the word is continue as nominal now. (LM)

- - -

05 11 29 51 CDR Let's run over the MET stowage. We have the *** extension handles, and two pairs of tongs. Okay, we have two core tube cap assemblies. We have tether and gnomon. We have a hammer, we have a small scoop, six core tubes, 35 bag dispenser, trenching tool, a 16-millimeter camera, and may I have that last brush again please? (LM)

- - -

05 11 31 22 CDR Can load up a mag right here if we want. (LM)

05 11 31 26 LMP I'll have some mag's in a minute. (LM)

- - -

05 11 32 02 CDR I got it. Houston, on the 16 millimeter, we're putting magazine Hotel Hotel. (LM)(PHO DAC)

- - -

05 11 33 02 LMP Yes, there's some more in there. And, Houston, on the 16-millimeter mags, I put Foxtrot Foxtrot and GG, George George, in the MET stowage. (LM)

05 11 33 22 LMP I'm putting Hasselblad Kilo Kilo on one of the MET storage areas. (LM)

- - -

05 11 34 02 LMP I've got the closeup camera turned on. Is that all the mags? (LM)

05 11 34 09 CDR There's one more Hasselblad back there. (LM)

05 11 34 20 CDR Okay, there's an extra 16 millimeter going in here. (LM)

05 11 34 36 CDR We have 16-millimeter camera, and two and a half magazines, two SESC's and MSSC, two 70-millimeter cameras, and one extra magazine black and white, and we have a partial magazine of color. Closeup camera's turned on, and we need some more weigh bags. (LM)

- - -

05 11 35 11 CDR The polarizing filter is on the end, and the TDS I'll be getting now. (LM)

05 11 35 21 LMP So it looks like the MET stowage is complete. Let me look over my list. 70-millimeter mags. (LM)

- - -

05 11 35 34 CC Roger, Al and Ed. I show you short the weigh bags, MESA brush, and a map. (LM)

05 11 35 40 LMP The MESA brush is there and the map is there. (LM)

- - -

05 11 36 21 LMP TDS sample is on. (LM)

05 11 36 30 LMP And we need two weigh bags on. (LM)

- - -

05 11 36 43 CDR That's all the weigh bags we have there; we have two more in here. (LM)

05 11 36 47 CDR We have a total of four. (LM)

- - -

05 11 37 34 CDR Okay, the METs loaded, Houston. (LM)

- - -

05 11 38 54 CDR Okay, up on the top of the hill. (LM)

05 11 39 24 CDR And it's very level there. (LM)

05 11 43 31 LMP I'll turn on out if you'll turn the camera around. (LM)

05 11 43 35 CDR Yes. I just wanted to give - get a good - direction actually. Our sight to A, directly toward the center of the crater - - (LM)

05 11 43 48 LMP Yes, that's right over that way. (LM)

05 11 43 51 CDR And it's - two - six - about 350 meters, a thousand feet. (LM)

05 11 43 59 LMP We'll start up that direction and take a look around. (LM)

05 11 44 02 CDR Okay, and I'll aim the camera towards Cone. (LM)

05 11 44 10 CDR Okay, Houston. We're going to try to put the TV camera in the shade, and aim it up towards Cone. I'm not sure we're going to be successful in doing that. (LM)

- - -

05 11 44 28 CC - - we're about 2 minutes behind starting out. And, the settings, you can leave them just as they are right now. (LM)

05 11 44 40 CC The settings that are on the TV right now, are good. (LM)

05 11 44 48 CDR You don't want to aim it toward Cone crater? (LM)

05 11 44 51 CC That's affirmative, Al. You can do that task, but we won't worry too much about fineness on aiming it. The settings on the camera right now should be good. (LM)

05 11 45 03 CDR We'll aim it up toward Cone. It's going to be fairly close to the Sun. (LM)

- - -

05 11 45 28 CDR Do you have the image of the Sun, yet? (LM)

05 11 45 42 CC We have a little bit of a glare in there, but we have a picture, Al. (LM)

05 11 45 48 CDR I'm going to bring you a little further to the right. (LM)

05 11 45 49	CC	Roger, Al. I think we can see the slopes - - left flank of Cone coming in.	(LM)
05 11 46 00	CDR	Okay, you're looking at Cone.	(LM)
05 11 46 08	CC	Roger, Al. We have little bit of a glare across the center; but in the background, we can see the crest of Cone.	(LM)
05 11 46 19	CDR	Okay, we will probably be off the camera to the right.	(LM)
05 11 46 44	LMP	Think we ought to check our position right about here, Al. See if we can find out where we are.	(LM)
05 11 47 03	CDR	While you're checking your position, I'll be using the closeup.	(LM)(PHO CSC 77 10357-58)
05 11 47 26	CDR	Taking the picture of the MET tracks, Houston.	(LM)(PHO CSC 77 10357-58)
05 11 47 30	CDR	With the closeup and the sun angle's at 11 o'clock.	(LM)(PHO CSC 77 10357-58)
05 11 48 11	CDR	Okay, three oh, one, and two. Met track's at 11; 303, and 4; footprints, Sun at 10 o'clock.	(LM)(PHO CSC 77 10357-60)
05 11 48 22	CC	Roger, Al. I copied the frame numbers. And we still have you in the picture.	(LM)
05 11 48 30	CDR	Head on out, man.	(LM-A)
		- - -	
05 11 48 33	LMP	I don't know exactly where we are.	(LM-A)
05 11 48 35	CDR	Well, keep the map in your hand - - and keep going. I got this.	(LM-A)
05 11 48 39	LMP	If I can locate a familiar crater.	(LM-A)
05 11 48 46	CDR	Okay, Houston. We're headed just about toward the center of Cone crater.	(LM-A)
05 11 48 52	LMP	Okay, Al. Is this North Triplet right here to our right? It is, isn't it?	(LM-A)
05 11 48 58	CDR	Yes, sir.	(LM-A)

05 11 48 59 LMP This nice big depression over here. (LM-A)

05 11 49 06 CDR Houston, we're again proceeding directly toward the center of the crater, point A. As Ed pointed out, we're passing north of North Triplet. The area over which we are passing again, of course, is pockmarked by craters. However, the land is generally flat right here. We have a - I was going to say mesa but I really don't think it's a mesa. It's more of a ridge, which extends to the southeast, almost normal to our path of travel. I think point A is probably down in that valley. (LM-A)

05 11 49 57 LMP Yes. Look, Al. I've spotted it. See the crater almost directly up front from us, in the valley? Right in the middle valley. (LM-A)

05 11 50 05 LMP I think that - that's Weird - - and if we head to the north of that, we're in business. (LM-A)

05 11 50 09 CDR That means that point A is, in fact, then, in the valley. (LM-A)

05 11 50 21 CDR There seem to be quite a few large rocks as we progress along here. See rocks of up to 2 or 3 feet in size, and one would fairly easily postulate these came directly from Cone crater. Of course, we will - get samples of these a little further along. (LM-A)

05 11 50 50 LMP A little further to the left. Okay. Point A, Al, is right - not quite in the valley. It's right beyond over here. (LM-A)

05 11 51 11 CDR A is a very subdued crater now. (LM-A)

- - -

05 11 51 20 CC Any basic change in the surface texture as you're heading out across toward A, there? (LM-A)

05 11 51 27 LMP No. It looks all the same, Fredo. (LM-A)

04 11 51 30 CC That's what I was afraid of.

05 11 51 32 LMP We're - Fredo, see the crater 60 meters to the west of point A? (LM-A)

05 11 51 45	CC	Roger, Ed.	(LM-A)
05 11 51 46	LMP	The sharp one?	(LM-A)
05 11 51 48	CC	I think I have it on the chart.	(LM-A)
05 11 51 50	LMP	We're coming up on that one right now. It's the sharper one in the east, north-south line of about three craters. And our traverse supposedly, passes right between them. Got it?	(LM-A)
05 11 52 06	CC	We got you right on the map, Ed.	(LM-A)
05 11 52 11	LMP	The kin of doublet crater, supposedly just south of our track at 71 and CT and CT .3. We're passing exactly on the south rim of those two, now.	(LM-A)
05 11 52 37	CDR	Probably A - right here, is it not?	(LM-A)
05 11 52 38	LMP	It's right over here to our left a little bit, Al. I believe. Now, let me see.	(LM-A)
05 11 52 52	CC	And one other question from here. Did the blocks you described as you moved across there, do they appear to be in the form of rays from Cone or are they pretty widely spread?	(LM-A)
05 11 53 09	CDR	No. We don't see any ray pattern, I would say. They're fairly generally scattered.	(LM-A)
05 11 53 14	LMP	They may form a pattern when we get to the top and can look at them in plan view, Fredo.	(LM-A)
05 11 53 22	CDR	Fred, right here in the center of these three are A.	(LM-A)
05 11 53 25	LMP	Okay.	(LM-A)
05 11 53 26	CDR	Buy that?	(LM-A)
05 11 53 34	LMP	Well, it's pretty close. I don't think it's exactly at A, but it's close.	(LM-A)
05 11 53 39	CC	Okay, I'll - clock you at A, right now.	(LM-A)
05 11 53 44	LMP	That large crater to your right, Al, just doesn't show up. Ah ha! It does, too. That's the one. Just beyond that is A.	(LM-A)

05 11 53 56	CDR	That's what I thought. About 20 feet ahead of me, right?	(LM-A)
05 11 53 59	LMP	Yes, Yes.	
05 11 54 00	CDR	Okay, babe. Fred, the surface, here *** about that, is textured. It is, of course, a very fine grain dusty regolith, much the same as we have in the vicinity of the LM. But, there seems to be small pebbles - more small pebbles here on the surface than we had back around the LM area. And the population of larger rocks, perhaps small boulder size, is more prevalent here. Okay, this is probably pretty good.	(A)
05 11 54 32	LMP	Yes, this a good place for A and y'all might also comment, Fredo, that they have an appearance, here, quite often like raindrops a very few raindrops have splattered the surface. It gives you that appearance. Obviously, they haven't; but it's that sort of texture, in places.	(A)
05 11 54 52	CDR	Yes, I think - I was just about to say that there's a relationship between this texture and these small surface pebbles. Okay, point A.	(A)
05 11 55 04	LMP	Okay, at point A, we do a double core, LPM. I'll start with the LPM and a pan.	(A)(PHO 68 9394-9408)
05 11 55 13	CDR	Okay, I'll start with the TDS.	(A)(PHO CSC 77 10361)
		- - -	
05 11 55 36	CDR	The point where we're sampling is - just about in the center of three craters of almost equal size. I would say, perhaps, 20 meters in diameter. The ones to the north and south are more fresh, more sharp; the one to the west is more subdued. I'm pretty sure we're just about where point A is on the map; it fits very close - it fits the description of it.	(A)
05 11 56 39	CDR	In the TDS, Houston; serial number 1002.	(A)(PHO CSC 77 10361)
05 11 57 13	CDR	And the frame counter on the closeup is now 305.	(A)(PHO CSC 77 10361)
05 11 57 28	CDR	And I'm now dusting that sample.	(A)(PHO CSC 77 10362-65)

05 11 57 38	CDR	Remark before I start, that number 3 block on this sample appears to have a smudge on it, before I start - a very light black smudge.	(A)
		- - -	
05 11 57 58	LMP	Okay, Fred. The LPM is in place and level - it's leveled and aligned, and I'm returning to the MET.	(A)
05 11 58 05	CC	Give me a call when you get there, and I'll start the timing.	(A)
05 11 58 14	LMP	I'm here, now.	(A)
05 11 58 16	CC	Starting the clock.	(A)
05 11 58 21	LMP	May I get a Hasselblad?	(A)
05 11 58 23	CDR	Sure. You may have a Hasselblad. What would you like?	(A)
05 11 58 28	LMP	I'll take mine, if you don't mind.	(A)
05 11 58 34	LMP	No, Sun. I want f:8. Thank you.	(A)
05 11 59 07	LMP	And, Houston. The locator shot for the placement of the MET of the LPM is frame 7, magazine MM.	(A)(PHO NO NUMBER - HALF PHOTO)
		- - -	
05 11 59 28	LMP	Yes, I took two shots of that for your locators.	(A)(PHO NO NUMBER - HALF PHOTO)
		- - -	
05 12 01 25	CDR	And, Al verifying the second TDS, serial number 1001.	(A)(PHO CSC 77 10366)
		- - -	
05 12 03 08	LMP	And, I'm back at the MET.	(A)
		- - -	
05 12 03 27	CC	And, while we got a few seconds there, Ed. The raindrop pattern you mentioned, is it pretty general or is it just here and there that you noticed this texture?	(A)

05 12 03 40 LMP It seems to be fairly general, Fred. (A)

05 12 03 54 CDR Okay, Houston, the TDS sampling is complete, and the final counter, closeup, is reading 311. (A)(PHO CSC 77 10367)

- - -

05 12 05 50 CDR Okay, I got closeup shots: 12, 13, and 14; all at 9 o'clock shadow, 12 and 14 are two typical examples of the raindrop picture pattern which Ed - of which he spoke. Now, 13 is a picture of a foot track - - (A)(PHO CSC 77 10368-70)

05 12 06 12 LMP Tread. (A)

05 12 06 13 CDR - - a foot track in the same - - area. (A)(PHO CSC 77 10369)

05 12 06 23 CDR And - I see a fairly large rock here at the north of these three craters. It's embedded right at the rim. It's about two feet long. I can see some crystals in it. It has a good fillet pattern. I'm shooting a closeup of that. And the sun angle again will be 9 o'clock. (A)(PHO CSC 77 10371)

05 12 07 02 CC Okay, and Al, a word from the back room says go at least two crater diameters away from - I guess, the crater you're just describing, when you get ready to take the double core. (A)

05 12 07 17 CDR Okay, we'll try to put it in the center of the three craters to get all three - well, to get whatever stratigraphy we have here, and the last fillets - picture, shadow 9 o'clock, was 18. (A)(PHO CSC 77 10372-74)

05 12 07 46 CDR And since I've already taken a couple of pictures of the MET tracks, I won't do any more of that here, and probably won't again unless we see some difference in these tracks. They're fairly what you might expect because they're smooth, they're well packed, and vary in depth only as a function of the surface tension. (A)

05 12 08 24 LMP Fredo, I've left the LPM, returning to the MET. Had a little trouble with it that time. The bubble is tangent on the east side of the center ring. (A)

- - -

05 12 08 39	LMP	I'm at the MET.	(A)
05 12 08 41	CC	Starting the clock.	(A)
05 12 09 00	CDR	Okay, all set up for the double core here.	(A)(SAMP CORE 14210-11; 14411)
05 12 09 02	LMP	Okay, I'll be with you in a second. I have a pan to take, and I'll be right with you. Be careful with the Velcro on the tongue. You can see it came off, except for one bunch.	(A)(PHO 68 9394-9408)
		- - -	
05 12 09 22	CDR	Also, 16-millimeter mag.	(A)
05 12 09 28	CDR	Core tubes.	(A)(SAMP CORE 14210-11; 14411)
		- - -	
05 12 10 38	CDR	The bottom core tube will be number 2. No tab. Top core tube will be number 3. No tab.	(A)(SAMP CORE 14210-11; 14411)
		- - -	
05 12 12 04	LMP	And a pair of tongs.	(A)
		- - -	
05 12 15 25	CDR	Okay, Houston. A couple of quick stereos in the locator of the core tube as it's about to be driven, and the *** of the LM is in the background.	(A)(SAMP CORE 14210-11; 14411)(PHO 64 9046-48)
		- - -	
05 12 16 24	LMP	Al, you haven't taken a pan, have you?	(A)
05 12 16 28	CDR	No.	(A)
05 12 16 29	LMP	I'm starting with the pan.	(A)(PHO 68 9394-9408)
05 12 16 35	CC	Just in the way of bookkeeping, we need the double core, and the pan, and a sample.	(A)(SAMP CORE 14210-11; 14411)(PHO 68 9394-9408)
05 12 18 16	CDR	Okay, Houston. We got almost two complete - tubes here, about one-and-seven-eighths tubes, I would say.	(A)(SAMP CORE 14210-11; 14411)

05 12 19 16	LMP	Okay, Houston. The pan is completed. I took it from the rim of a - old crater with fresh crater right in the bottom of it, and several small ones around it.	(A)(PHO 68 9394-9408)
05 12 19 30	CDR	Yes. That's a pretty blocky one, that new one. I think if we take samples from right along that rim there, you'd probably get some of that from the bottom.	(A)
		- - -	
05 12 19 50	CDR	And the core bit, just for the fun of it, is going in bag 2 November. If we can get it back.	(A)(SAMP CORE 14411)
05 12 20 00	CC	And Al, they'd like a description of the surface where you drove the core tube.	(A)(SAMP CORE 14210-11; 14411)
05 12 20 31	CDR	Okay, Fred. Nothing, but it's the same textured pattern of which we spoke coming up in this traverse.	(A)(SAMP CORE 14210-11; 14411)
		- - -	
05 12 20 49	LMP	Where's our color chart?	(A)
05 12 21 02	CDR	Here you go. Did you read the core tip?	(A)(SAMP CORE 14411)
05 12 21 09	CC	Roger, Al. We've got that, and for your information, that we're about 5 minutes behind in the total timeline, for departing A.	(A)(SAMP CORE 14411)
05 12 21 31	CDR	Continuing - our description of the surface, it appears to be a scattered population of very small blocks, some of which Ed is going to photograph here, and his documented sample. I believe they came from the crater to the north of the sampling sites. Other than that, that little core-sample site is not unique to the traverse, so far. The first core went in fairly easily. I had some basic difficulty with the last core.	(A)(SAMP 14041-46)(PHO 68 9409-13)
05 12 22 52	LMP	Seven -	(A)
05 12 23 05	CDR	Get that by yourself?	(A)
05 12 23 06	LMP	Yes.	(A)

05 12 23 59 LMP And, Houston, the rock I'm sampling is a - seems to be a fairly typical one of this little crater - multiple crater that we're working around right now near A; and it's going into the bag 3 November. (A)(SAMP 14041-46)

05 12 24 28 LMP Oops. It's breaking apart on me as I pick it up. I'll try to get most of the pieces. (A)(SAMP 14041-46)

05 12 24 35 CC Roger, Ed. And, we need to move on here to B; and before we depart A, we're going to need an EMU check. (A)

- - -

05 12 25 11 LMP Houston, I can't get all of this sample in 3N. Consequently it will go into 3N and the next one. It looked like it was fractured, and when I picked it up, it fractured into about four pieces. (A)(SAMP 14041-46)

- - -

05 12 26 12 CDR Now, head on up the hill to B. (A-B)

- - -

05 12 26 34 CDR Al's heading up with the MET. From A, we go down into a valley. We drop down a fairly consistent slope of approximately 8 to 10 degrees. The texture, here again, is pretty much the same on the surface. The basic regolith, of course, is the fine material which is now, at this particular sun angle, kind of a grayish brown, with the light pebbles on the surface making the raindrop - the small pebbles on the surface making the raindrop pattern. (A-B)

05 12 27 32 LMP And, Houston, I'm treading along behind Al now. I'm starting to catch up with him. As has been described for you before, the MET tracks make a very smooth pattern in the surface, reminiscent of driving a tractor through a plowed field. It smooths it out and makes a very smooth, distinct pattern, and probably, oh, a quarter of an inch deep, no more. (A-B)

05 12 28 10 LMP It leaves gaps every now and then as it bounces. (A-B)

05 12 28 14 CDR Think you've found B? (A-B)

05 12 28 18 LMP Yes. It's this big crater over here, isn't it? (A-B)

05 12 28 20 CDR It's way up the hill. (A-B)

05 12 28 21 LMP Pardon? (A-B)

05 12 28 23 CDR I think it's up the hill. (A-B)

05 12 28 25 LMP Oh, that's right. B is the crater we go - this is the crater we go by on the way to B. (A-B)

05 12 28 47 CDR Okay, Houston. I'm looking for a contact somewhere in here, but it's not apparent at this point. Surface texture seems to be very much the same; *** the standpoint of furrow bearing properties, it's still about the same, softness, and it still has the same raindrop pattern. (A-B)

- - -

05 12 29 39 LMP And continuing the description a little bit, Houston. Trying to think of an adequate description or comparison to something we've already seen, but I don't think there is one. Incidentially, I see a string of craters down to the south - a string of boulders to the south of us that may prove to be a ray pattern from Cone. And I observe, as we get closer to Cone, the number of large boulders is increasing. We're going to go past some here in a couple of minutes - near about a 20 foot wide, fairly fresh crater. The boulders - a - - dozen of them or so - are 4 or 5 feet in diameter. (A-B)

05 12 30 36 LMP Lot of filleting around them. (A-B)

05 12 30 41 CDR Let's see if we can find us - - (A-B)

05 12 30 43 LMP This crater is the one, I think, Al, it's halfway between A and B, isn't it? (A-B)

05 12 30 58 CDR Yes, I think so. This little - - (A-B)

05 12 31 01 LMP Can you see the boulders off to the side there on the map? (A-B)

05 12 31 03 CDR No, they don't show very well. I think - (A-B)

05 12 31 14	LMP	Ah! You should be able to spot that little chain of craters just to the south of it. On the map - if that's where we think we are.	(A-B)
05 12 31 27	CDR	Ed, I don't see any craters right there.	(A-B)
05 12 31 31	LMP	Kind of small.	(A-B)
05 12 31 33	CDR	That will make us right here, huh?	(A-B)
05 12 31 34	LMP	Pardon?	(A-B)
05 12 31 36	CDR	There's no big one to go with it. A sharp one to go with it. That's a (good?) one right up there. How about that?	(A-B)
05 12 31 50	LMP	Yes. Let's take a look.	(A-B)
05 12 31 52	CDR	That's probably Weird right up there. We're probably about even with Weird right now, although you can't see it on the ridge.	(A-B)
05 12 31 59	LMP	That's Weird, that big one right over there, Al.	(A-B)
05 12 32 01	CDR	Yes, that's what I say. I think B is that deep crater right directly ahead of us, Ed.	(A-B)
05 12 32 07	LMP	No, I disagree. I think - see that crater right over there that we came by? To the south, the big one?	(A-B)
05 12 32 15	CDR	Yes.	(A-B)
05 12 32 17	LMP	I think this is the crater that - that's at B. I think this boulder field, we can see it here if we look.	(A-B)
05 12 32 29	CDR	This crater right here?	(A-B)
05 12 32 31	LMP	Yes.	(A-B)
05 12 32 39	LMP	We have to be considerably past Weird.	(A-B)
05 12 32 41	CDR	Not even halfway to the rim of Cone yet.	(A-B)

05 12 32 33	CC	And, Al and Ed. I don't think you have to worry too much about the exact position of site B. If it appears you're getting close to the general area, that should be good enough on B.	(A-B)
05 12 33 10	LMP	I think we're very close to it. I think this crater we just went by is probably it, but it's very hard to tell, Fredo. I don't see anything else that might be it, unless it's the next crater up. Al, I've spotted it. That crater - next crater up is this one right here. (MITCHELL: Comparison between map and terrain).	(A-B)
		- - -	
05 12 33 32	CDR	Where at?	(A-B)
05 12 33 33	LMP	Right behind you. That crater is that crater right up there. That crater is the crater over to the left of it. (MITCHELL: Comparison between map and terrain).	(A-B)
05 12 33 41	CDR	Where do you think B is?	(A-B)
05 12 33 42	LMP	I think B's the one we just passed, back there where we were talking.	(A-B)
05 12 33 47	CDR	All right.	(A-B)
05 12 33 48	LMP	And here's the little - Ah hah, it is! Here's the little double crater right beside it. Look here. See, there's that crater; see, there's the little double crater; it's right there in front of you. (MITCHELL: Comparison between map and terrain).	(A-B)
05 12 34 01	CDR	Okay, let's grab sample B.	(B)(SAMP 14047-48)(PHO 64 9073-74)
05 12 34 02	LMP	Let's sample B.	(B)(SAMP 14047-48)
05 12 34 07	CC	And, Al and Ed, this is a grab sample at B, and we need the panorama. And while somebody's doing that, we can get our site description.	(B)(SAMP 14047-48)(PHO 64 9049-74)
05 12 34 22	CDR	I'll get a pan, Ed.	(B)(PHO 64 9049-72)

05 12 34 23 LMP And while Al takes the pan, I'll go ahead and give you a site description. The area here is in an area of considerably more boulders, a larger boulder field, more numerous boulders than we've seen in the past. We've just come into it as we approached B from A. Now there were boulders to the north of us; we previously talked of boulders to the north, and doggone it, they may turn out to be a ray pattern. It looks suspiciously like one. However, where we are now, we're about on the edge of a general boulder population lining the flank of Cone crater. Now they're not too numerous at this point. They're somewhat patchy. There's a lot of them buried, half buried, a few of the smaller ones sitting on the surface. There are - these boulders are filleted, and we'll have to sample that filleting later. The surface texture - the fine - appears very much the same as what we've been walking on all along. And about the only difference we could see is probably a larger number of smaller craters. I say probably; they're so numerous that unless you really make a population count you can't tell. A large - I'm guessing a larger number of craters - probably secondaries from Cone perhaps - and certainly a larger number of boulders lying around. Now, most of these boulders are rounded; there are a few angular ones; there are a few rocks with angulars but - angularities - but by and large, you can see edges that have been chipped off indicating the beginning of a smoothing process. And some of them are far beyond the beginning of smoothing. They're worn down pretty well. And most of the rough edges are where they have fractured and perhaps turned over. Most of them appear to be along fractures of where other rocks are sitting near them that might have once been a part of that boulder. (B)(PHO 64 9049-72)

05 12 36 47 CC Roger, Ed. And has Al got the grab sample completed now? (B)(SAMP 14047-48)

05 12 36 56 CDR I'm grabbing it now. (B)(SAMP 14047-48)

05 12 37 00 CDR We're going to give you a quick stereo on it. (B)(SAMP 14047-48)(PHO 64 9073-74)

05 12 37 03 CC And we need the fine (frame?) count before departing B; and, right now, we're about 15 minutes behind in the timeline. (B)

05 12 37 17 LMP Okay, Fredo, we expect that we're going to fall behind you; there's no way we can help it. We'll pick it up later. (B)

- - -

05 12 37 35 CDR Grab sample from the west rim of Bravo crater, bag 5 November. (B)(SAMP 14047-48)

05 12 37 43 LMP Now, Fredo, to complete this description. We are standing on a fairly high point - well, not really on a high point, about halfway up the slope. To our north and slightly to the west of us seems to be the low point in this area. It's surrounded by a rim that's reminiscent of a very, very old crater. The topography doesn't show up on the map, but it, indeed, is there. About 500 yards to the north and west is the lowest point that I can see in this area. Okay, you ready to press on? (B)

05 12 38 27 CDR Yes, as soon as I get my handle screwed back on here. (B)

05 12 38 30 LMP Okay, the next stop is the top of Cone. Let's get everything secured for that trip. (B)

05 12 38 37 CC And we'd like the frame count before you depart - - (B)

05 12 38 38 CDR Okay, Houston. Yes, you've got a frame count of 34 from Al. (B)

05 12 38 53 LMP And 29 from Ed. (B)

- - -

05 12 39 10 LMP I've got the MET. (B)

05 12 39 13 CDR You want to go first and I'll follow. (B-Bg)

05 12 39 15 LMP To the top of Cone crater. (B-Bg)

- - -

05 12 39 28 CDR We'll just go almost to the east here, and then on up by Flark. (B-Bg)

05 12 39 32 LMP Yes. East and a little to the - - (B-Bg)

05 12 39 33 CDR See, there's Flank up there. (B-Bg)

05 12 39 36 LMP Yes. I can just barely see the rim of it on the far side of it. (B-Bg)

05 12 39 39 CDR Right, so we probably ought to head directly for Flank and on up from there. (B-Bg)

- - -

05 12 39 59 LMP Houston, as we go across here, this ground is - Al probably previously described it, but it's very undulating. I would suspect that there is not 10 yards at the most between what were once old craters. They are most of them worn down, but the surface is continuously undulating. There's hardly a level spot anywhere. (B-Bg)

05 12 40 35 LMP As we come on up toward Cone, we're getting to see lots more buried rocks, bigger rocks. (B-Bg)

05 12 40 51 CDR We're keeping our eyes open for a contact here. But I guess the sun angle makes it very difficult to see. However, I expect that by the time we get a little closer up to Flank - let me pull it for a while. (B-Bg)

05 12 41 06 LMP I have to shift hands. I'm good. (B-Bg)

05 12 41 08 CDR By the time we get a little closer up to Flank, we might find some kind of a contact. The ridge of Cone crater to the north is very apparent, as we expected that it would be. It stretches off into the distance and meets with the far horizon. (B-Bg)

05 12 41 46 LMP Fredo, I'm trying to find something distinctive to say about some of these craters we're going by, and it's very hard to do so. They're all smooth walled except the very freshest one; and we're coming by a very fresh one now, which is rubbly on the in - Hey! It may even - that has some pretty good chunks of rubble on the insides. This is about the freshest crater this size we've seen, Al. (B-Bg)

05 12 42 16	CDR	That's correct. This is a very fresh crater. It's about *** it's about opposite to the crater at stop E. It's a crater about 20 meters in diameter and about 2 meters deep, and I'll get a quick - - rock from the side.	(Bg)(SAMP 14049-50)
05 12 42 43	LMP	Very soft, too. Al just dropped down on a knee to pick up a rock, and he went in 3 or 4 inches. Need some help, Al?	(Bg)(SAMP 14049-50)
05 12 42 52	CDR	Yes, I think so. I can't get any.	(Bg)
05 12 42 55	LMP	Come on, give me your hand.	(Bg)
		- - -	
05 12 43 08	CDR	That's just a quick hand sample from the side of that crater.	(Bg)(SAMP 14049-50)
05 12 43 11	LMP	Do you think you're following us and know about where we are, Fredo?	(Bg)
05 12 43 17	CC	Well, the board, I think, is reading you just past the position abeam of E, looking about halfway between D and E - -	(Bg)
05 12 43 18	CDR	That's going in bag - -	(Bg)(SAMP 14049-50)
05 12 43 21	CDR	Yes, that's it, and -	(Bg)
05 12 43 32	LMP	Yes. And we're starting uphill now. Climb's fairly gentle at this point but it's definitely uphill.	(Bg-Bl)
		- - -	
05 12 43 45	CDR	Yes. Now that grab sample from the west rim of the crater, which we described as blocky, is in bag 6.	(Bg-Bl)(SAMP 14049-50)
05 12 44 04	CDR	The going is still very smooth as far as the area that we're able to pick out. Of course, we're tracing a kind of sinuous course here, staying out of the craters.	(Bg-Bl)
05 12 44 29	CDR	And, Fredo, to help further locate us, if you can, we're going by two very - well, fairly fresh craters. I don't think quite as fresh as the one we were just talking about. The eastmost one is	(Bg-Bl)

fresher than - the westmost one is the freshest. They're separated about 75 to 100 feet, and they're about 25 to 30 feet across and 5 or 6 feet deep, 5 feet deep, I guess. The westmost one has got small blocks in it. The eastmost one is very smooth.

05 12 45 12 CC Roger, Ed. And, you described the blocks there a couple of times. I think you used the term "rubble," now. By that I assume you implied they were just lying loose - nothing really in place. (Bg-Bl)

05 12 45 26 LMP I'm not sure that's quite true, Fred. Some of it looked like stuff that belonged there, that had not fallen there. (Bg-Bl)

05 12 45 35 CDR There's a lot of glass in that rock, Ed. (Bg-Bl)

05 12 45 36 LMP Yes. Oh, there sure is. It looked like some of that so called rubble looked like it had - might be the residual of an impact just lying in the bottom. And, Houston, we're passing a rock much too big to pick up. There's a whale of a lot of glass in it. (Bg-Bl)

05 12 45 55 CC Roger. About how big is it? (Bg-Bl)

05 12 45 56 COR *** like it was splattered with glass. (Bg-Bl)

05 12 45 57 LMP Yes. It's about foot-and-a-half, 2-footer - yes, about a foot-and-a-half across. (Bg-Bl)

05 12 46 08 CDR That was a glass splatter, Fred. (Bg-Bl)

- - -

05 12 46 34 CC And, Al and Ed, why don't we take a little rest here for a minute, and we'd like another camera count, too. (Bg-Bl)

05 12 46 46 LMP Like a what? We haven't taken any pictures since the last one I don't think. (Bg-Bl)

05 12 46 56 CDR We'll slow down the traverse here. (Bg-Bl)

05 12 47 07 CDR Should be Flank right here, Ed. (Bg-Bl)

05 12 47 13 CDR Should be Flank right over here. (Bg-Bl)

05 12 47 15	LMP	Just out of sight, you mean.	(Bg-Bl)
05 12 47 16	CDR	Right - yes, right there.	(Bg-Bl)
05 12 47 19	LMP	Let's go. Let's go over and see.	(Bg-Bl)
05 12 47 37	CC	Okay, Al and Ed. I assume you're on the move now and heading toward Flank. Is that correct?	(Bg-Bl)
05 12 47 45	CDR	That's correct.	(Bg-Bl)
05 12 47 47	LMP	That's correct. Heading toward where we think Flank is.	(Bg-Bl)
05 12 47 52	LMP	I'll pull for a while, Al.	(Bg-Bl)
05 12 47 53	CDR	That's okay. I got it for a while.	(Bg-Bl)
05 12 48 09	LMP	Why don't we pull up beside this big crater.	(Bg-Bl)
05 12 48 13	LMP	Take a break, get the map, and see if we can find out exactly where we are. Press on from there. This one should be distinctive enough.	(Bl)
05 12 48 19	CC	And, Al and Ed. While you're stopped here, we could use a photo pan.	(Bl)(PHO 64 9075-97)
05 12 48 28	LMP	Yes, going to suggest that. If you'll take the pan, Al, I'll grab the map and get over here and see if we can find -	(Bl)(PHO 64 9075-97)
05 12 48 38	CDR	Let me pull it up on a little more level ground.	(Bl)
05 12 48 40	LMP	Give you a push.	(Bl)
05 12 48 44	CDR	Okay, very good. Level?	(Bl)
05 12 48 48	LMP	That looks good.	(Bl)
		- - -	
05 12 49 41	LMP	That old LM looks like it's got a flat over there, the way it's leaning.	(Bl)
		- - -	
05 12 50 31	CDR	Okay, Houston. The pan is complete on magazine - magazine Lima, Lima. Frame count is 57.	(Bl)(PHO 64 9075-97)

- - -

05 12 51 35	CDR	Start on up toward the rim?	(B1)

- - -

05 12 52 04	LMP	Do you want me to pull awhile, Al?	(B1-B2)
05 12 52 05	CDR	No, that's all right.	(B1-B2)
05 12 52 15	LMP	I can't really spot this crater, but I think I know where we are. We're pretty close to where you said we were.	(B1-B2)

- - -

05 12 52 33	CDR	Is that Flank over there?	(B1-B2)
05 12 52 35	LMP	I think it's dead ahead of you, Al. Oh, wait a minute. This is probably it, right here. Yes.	(B1-B2)
05 12 52 43	CDR	To my right?	(B1-B2)
05 12 52 44	LMP	Yes. Let's just doublecheck and see.	(B1-B2)
05 12 52 49	CDR	It's got a - about a 4-meter-radius crater in the south wall.	(B1-B2)
05 12 53 01	LMP	That has to be it.	(B1-B2)
05 12 53 05	CDR	Okay, Houston. We're going by Flank on the way up. We're passing to the north side of it.	(B1-B2)

- - -

05 12 53 27	LMP	Let me pull awhile, Al. You're having all the fun.	(B1-B2)
05 12 53 37	CDR	Well, we still have a little way to go.	(B1-B2)
05 12 53 38	LMP	Yes. We sure do. Putting the map away.	(B1-B2)

- - -

05 12 54 55	CC	We've been copying you most of the time, and I have you by point now.	(B1-B2)

05 12 55 02	LMP	That's affirmative. And the grade is getting pretty steep.	(B1-B2)
		- - -	
05 12 55 20	LMP	And the soil here is a bit firmer, I think, than we've been on before. Except around what - the mounds in between craters where it's been thrown out. But, by and large, it seems to have a little firmer footing. We're not sinking in as deep.	(B1-B2)
05 12 55 47	CC	That should help you with the climb there.	(B1-B2)
05 12 55 55	LMP	Yes. It helps a little bit. Al's got the back of the MET now, and we're carrying it up. I think it seems easier.	(B1-B2)
		- - -	
05 12 56 25	LMP	It will roll along here, except we just move faster carrying it.	(B1-B2)
05 12 56 33	CDR	You want to rest here by this rock.	(B2)
05 12 56 36	CDR	This is the first big boulder we've seen, Houston. I think it's worthwhile taking a picture of it with the closeup. Go on and keep going.	(B2)(PHO CSC UNEXPOSED FRAMES)
05 12 56 45	LMP	I'll pull on up. We probably ought to take a pan to locate everything here, while you're taking a closeup.	(B2)(PHO 68 9415-29)
05 12 56 54	CC	I understand, Al. You're shooting a closeup shot of a big boulder.	(B2)(PHO CSC UNEXPOSED FRAMES)
05 12 57 03	CC	About what's the size of this one, Al?	(B2)
05 12 57 09	CDR	The shot's been taken on the closeup, counter number 317. Sun angle was 8 o'clock. This particular one is only about 12-feet long by about 4-feet wide. It's about one-third buried. It's old, very weathered. There are some evidences of some crystal shining through some of the fractures.	(B2)(PHO CSC UNEXPOSED FRAMES)
05 12 57 39	LMP	And I'm taking a Hasselblad of the rock and will take a pan now from - at this location. Help document our course going to the top of Cone crater.	(B2)(PHO 68 9414, 15-29)

05 12 58 53	LMP	And I can look right across into the breach in the north rim of Old Nameless. We're about even with it now.	(B2)
05 12 59 08	CC	Okay, and copied, Ed. And was there any noticeable - - dust on the large boulder?	(B2)
05 12 59 19	LMP	Not where I took the picture, but some fillets around the bottom.	(B2)(PHO 68 9414)
05 12 59 30	LMP	And 44, Fred, was my frame count.	(B2)
05 12 59 39	LMP	Now, I'm going to move on out. All's ahead of me here.	(B2)
05 13 00 19	CDR	We're starting up the last flank of the crater now, Houston. The slope is probably about - oh, 18 percent. The surface texture is still pretty much the same as far as the raindrop pattern is concerned. But we seem to find an increasing population of smaller rocks.	(B2-B3)
05 13 00 53	LMP	The small rocks and - smaller, fresher craters, as well. Well - wait a minute, maybe I'm being deceived. With this slope, the sun angle is entirely different than it is on the flat land. The craters look sharper in these shadows.	(B2-B3)
		- - -	
05 13 01 21	CDR	I'd like to stop and rest here for a minute.	(B2-B3)
05 13 01 30	CDR	Boy, I tell you, we're really going to get a panorama. We've got a tremendous one here Houston already. And we're not quite to the rim. Head towards that Old Nameless over there, right along our track, or just south of our track I should say. We made the right approach; we came up through the valley and over the ridge and down into the bowl. Couldn't have planned it better.	(B2-B3)
05 13 02 00	LMP	I thought we were in a low spot with the LM, but it turns out we're really not in the lowest spot around, I don't think.	(B2-B3)
05 13 02 09	CDR	Well, I don't know, no. I tell you it's probably the lowest spot right - -	(B2-B3)

05 13 02 12 LMP Oh, right in that particular local area. (B2-B3)

05 13 02 14 CDR - - In that area. Yes. (B2-B3)

05 13 02 15 LMP But that's the lowest spot over to the right that I was talking about. And there's a low spot - - (B2-B3)

05 13 02 21 CDR Well, there's a crater over there. It's true, yes. (B2-B3)

05 13 02 22 LMP Yes. Doggone, you can sure be deceived by slopes here. The sun angle is very deceiving. (B2-B3)

05 13 02 31 LMP Okay, let me pull a while. You ready to go? (B2-B3)

05 13 02 32 CDR Yes. All set. (B2-B3)

- - -

05 13 02 53 CDR I guess right straight up is the best way to go. (MITCHELL: Heading northeast up the ridge toward the south rim). (B2-B3)

05 13 02 57 LMP Yes, I think so. (B2-B3)

05 13 03 01 CDR Stay away from the rocks. (B2-B3)

05 13 03 04 LMP Get a little momentum going. (B2-B3)

05 13 03 19 CDR Okay, Houston. We're proceeding onward now. (B2-B3)

05 13 03 27 LMP And the boulder fields that Al pointed out - the rocks and boulders are getting more numerous toward the top here. However, it's nothing like the rubble and the large boulders that we saw at the Nevada test site. Now, this is surprising to me. I expected it to be more like that. But it is not, at least not where we're looking now. (MITCHELL: From photos, we expected the boulders on the rim to be VW size - this caused confusion and made us think we were farther down slope than was actually the case). (B2-B3)

05 13 04 01 CDR Well, we haven't reached the rim, yet. (B2-B3)

05 13 04 02 LMP Oh boy, we got fooled on that one. I'm not sure that was Flank we were in a minute ago either. Wait a minute. Yes, it is. The rim's right here. (MITCHELL: Indicating north). That's the east - little shoulder running down from the Cone. (MITCHELL: We came over a ridge here and the "shoulder" appeared to be the highest point - causing us to think we were further away from the rim than expected). That's Flank over there. We're going to hit it on the south side. We'll have to move on around of it. This looks like easy going right here. See, there's the boulder field that shows in the photograph - right up ahead of us. (B2-B3)

05 13 04 54 CDR There's a crater up there, Ed. (B2-B3)

05 13 05 05 CC Okay, Al and Ed. They'd like you to take another stop here. (B2-B3)

05 13 05 16 LMP We're really going up a pretty steep slope here. (B2-B3)

- - -

05 13 05 27 CDR Well, now, that's apparently the "rim" of Cone over there. (MITCHELL: Indicating the "shoulder"). And we're about - almost two hours now. Is that right, Fred? (B2-B3)

05 13 05 48 CC We're showing 1:57 and a half now, Al. (B2-B3)

05 13 05 56 CDR That's at least 30 minutes up there. (B2-B3)

05 13 06 10 CDR I would say we'd probably do better to go up to those boulders there, document that, use that as the turnaround point. (MITCHELL: Indicating the boulders on the south rim, but thinking they were downslope). (B2-B3)

05 13 06 22 LMP Yes. It's going to take longer than we expected. (B2-B3)

05 13 06 25 LMP Our positions are all in doubt now, Fredo. What we were looking at was a flank, but it wasn't really - the top of it wasn't the rim of Cone. (MITCHELL: It really was the ridge leading to the rim, but I also was confused at this point). We've got a ways to go yet. (B2-B3)

05 13 06 38 CDR Well, perhaps you can think with us if you want. I'd say that the rim is at least 30 minutes away. We're approaching the edge of the boulder field here on the "south flank." (MITCHELL: Really on the south rim). (B2-B3)

05 13 06 56 LMP Let's look at that map. (B2-B3)

05 13 06 58 CDR And what I'm proposing is perhaps we use that as the turnaround point. It seems to me that we spend a lot more time in traverse if we don't, and we don't get very many samples. (B2-B3)

05 13 07 10 CC Roger, Al. And, just a couple of questions they have up now. They'd like your note, if you do see any dust, particularly on the top surfaces of boulders in the area. And, any comparisons between the boulders you see distributed around. Are they all the same or do some types appear different? (B2-B3)

05 13 07 38 LMP It's too early to make that darn judgment, but we'll tell you when we get there. We're not really in that boulder territory yet. (B2-B3)

05 13 07 44 CDR I think Fredo, if you'll keep those questions in mind, the best thing for us to do is to get up here and document and sample what I feel is pretty sure Cone ejecta. And then, when we head down-sun, we'll be able to see these subtle variations and rock types a lot better than we are right now. (B2-B3)

05 13 08 10 CDR Well, let's head for these two babies up here. (B2-B3)

- - -

05 13 08 42 LMP No, let's keep going around this crater, but - except you're right here. (B2-B3)

05 13 08 59 CDR Well, maybe. I thought we'd get those boulders up there, Ed. (B2-B3)

05 13 09 04 CDR They undoubtedly came from - - (B2-B3)

05 13 09 05 LMP Yes. Let's head right for that boulder field at the top. (MITCHELL: Indicating to the north). I think we'll be where we want to be. (B2-B3)

- - -

05 13 09 15 CDR I don't think we'll have time to go up there. (B2-B3)
(MITCHELL: Thinking I was indicating to the east).

05 13 09 16 LMP Oh, let's give it a whirl. Gee whiz. We can't stop (B2-B3)
without looking into Cone crater. We've lost
everything if we don't get there.

05 13 09 28 CDR I think we'll waste an awful lot of time traveling (B2-B3)
and not much documenting.

05 13 09 33 LMP Well, the information we're going to find, I think (B2-B3)
is going to be right on top.

05 13 09 43 CDR Okay, Ed. Look at this - you're going through - (B2-B3)
just kicked up a layer of some very light gray fine
underneath the - -

05 13 09 51 LMP Yes. As you look back along your path, there's (B2-B3)
quite a bit of it.

05 13 10 10 LMP Fredo, How far behind timeline are we? (B2-B3)

05 13 10 17 CC Ok. The best I can tell right now - about 25 (B2-B3)
minutes down now.

05 13 10 33 CDR We'll be an hour down by the time we get to the top (B2-B3)
of that thing. You got six samples.

05 13 10 42 LMP Well, I think we're going to find what we're looking (B2-B3)
for "up there." (MITCHELL: Indicating to the
north. In all of this discussion, Al was
interpreting the ridge which slopes down to the
south from the southeast rim of Cone as being the
west rim of Cone, whereas in actuality, we were
directly to the south of the near rim).

05 13 10 51 CC Okay, Al and Ed. In view of your assay of the - (B2-B3)
where your location is and how long it's going to
take to get to Cone, the word from the backroom is
they'd like you to consider where you are the edge
of Cone crater.

05 13 11 13 LMP Think you're finks. (B2-B3)

05 13 11 23	CC	That decision, I guess, was based on Al's estimate of another, at least, 30 minutes and, of course, we cannot see that from here. It's kind of your judgment on that.	(B2-B3)
05 13 11 42	LMP	Well, we're three-quarters there.	(B2-B3)
05 13 11 54	LMP	Why don't we lose our bet, Al, and leave the MET and get on up there? We could make it a lot faster without it.	(B2-B3)
05 13 12 05	CDR	No. I think what we're looking at right here in this boulder field Ed, is the stuff that's ejected from Cone.	(B2-B3)
05 13 12 15	LMP	But not the lowermost part, which is what we're interested in.	(B2-B3)
05 13 12 20	CDR	We'll press on a little further, Houston. And keep your eye on the time.	(B2-B3)
05 13 12 26	CC	And, as of right now, we have a 30-minute extension.	(B2-B3)
		- - -	
05 13 14 02	CDR	Stop at this little rise here and take a panorama.	(B3)(PHO 68 9430-42)
05 13 14 30	LMP	Okay, I'll take a pan from here.	(B3)(PHO 68 9430-42)
05 13 14 40	CDR	Well, I'll tell you, it's a fantastic view from here. As this pan will show.	(B3)(PHO 68 9430-42)
05 13 15 06	CDR	We're approaching the edge of the rugged boulder field to the west rim. It appears as though the best for us to do will be go to the west rim and document from there even though the sun angle may not be quite as good. Well, we're pressing on in that direction.	(B3)
05 13 15 37	CC	You're moving to the west then.	(B3-C')
05 13 15 49	CDR	Al is back to MIN flow, and we're moving again.	(B3-C')
05 13 16 03	CC	And, Al and Ed, Deke says he'll cover the bet if you'll drop the MET.	(B3-C')

05 13 16 14 LMP It's not that hard with the MET. We need those tools. (B3-C')

05 13 16 18 CDR No, the MET's not slowing us down, Houston. It's just a question of time. We'll get there. (B3-C')

- - -

05 13 16 45 LMP You caught a boulder with your wheel as you went around that corner. (B3-C')

- - -

05 13 17 04 LMP Head left. It's right up there. (B3-C')

05 13 17 07 CDR Yes. I'm going there. (B3-C')

05 13 17 57 LMP Bear a little more left. Go right up through there. I'll give you a hand. (B3-C')

05 13 18 15 CDR We're now right in middle of the boulder field on the "west" rim. (MITCHELL: Actually the south). We haven't quite reached the rim yet. (B3-C')

05 13 18 51 CDR Want to rest here a minute? (B3-C')

05 13 18 58 LMP Let's take a look at the map. I think we're closer than that. (B3-C')

05 13 19 09 CDR I'll just go ahead slowly with this. (B3-C')

05 13 19 24 CDR Okay. Find the crater. (B3-C')

05 13 19 29 LMP Yes. The rim's right up here. (B3-C')

05 13 19 40 LMP Let's see if we can spot this one, Al - - on the map. (B3-C')

- - -

05 13 19 56 CDR Yes. Okay. We're resting now. (B3-C')

05 13 19 59 LMP Look. Let me show you something. (B3-C')

05 13 20 05 LMP Here's that crater. We're down here. We got to go there. (B3-C')

05 13 20 11	CDR	What crater?	(B3-C')
05 13 20 13	LMP	That crater right there is that one right there.	(B3-C')
05 13 20 26	CDR	Want to pull for a while?	(B3-C')
05 13 20 28	LMP	Yes.	(B3-C')
05 13 20 31	CDR	We're about the maximum elevation now, Houston. It's leveled out a little bit. And it looks like we'll be approaching the rim here very shortly.	(B3-C')
		- - -	
05 13 21 50	CDR	We better reconnoiter here. I don't see the crater yet.	(B3-C')
05 13 21 57	LMP	I agree. *** rock under my wheels.	(C')
05 13 22 28	CDR	See this boulder pattern and all that we're in here right now? This boulder field and all?	(C')
05 13 22 33	LMP	I thought it was on the south rim.	(C')
05 13 22 37	CC	And, Al and Ed, do you have the rim in sight at this time?	(C')
05 13 22 45	LMP	Oh, yes.	(C')
05 13 22 46	CDR	It's affirmative. It's down in the valley.	(C')
05 13 22 51	CC	I'm sorry. You misunderstood the question. I meant the rim of Cone crater.	(C')
05 13 22 58	CDR	Oh, the rim. That is negative. We haven't found that yet.	(C')
05 13 23 10	LMP	This big boulder right here, Al, which stands out bigger than anything else - ought to be able to see it.	(C')
05 13 23 17	CDR	Well, I don't know what the rim is still - way up there from the looks of things.	(C')

05 13 23 23	CC	And, Ed and Al, we've already eaten in our 30-minute extension and we're past that now. I think we'd better proceed with the sampling and continue with the EVA.	(C')
05 13 23 40	CDR	We'll start with a pan from here. I'll take that.	(C')(PHO 64 9098-9122)
05 13 23 47	LMP	All right, I'll start sampling.	(C')
05 13 24 26	CDR	Okay, Houston. We are in the middle of a fairly large boulder field. It covers perhaps as much as a square mile. And - as the pan will show, I don't believe we have quite reached the rim yet. However, we can't be too far away and I think certainly we'll find that these samples are pretty far down in Cone crater.	(C')(PHO 64 9098-9122)
		- - -	
05 13 25 35	CDR	Okay, you about to start taking documented samples?	(C')
05 13 25 38	LMP	Roger.	(C')
05 13 25 40	CDR	All righty. I would say, Houston, that most of these boulders are the same brownish gray that we've found. But we see one that is definitely almost white in color. A very definite difference in color, which we'll document. We noticed that beneath this dark brown regolith, there is a very light-brown layer. And I think we'll get a core tube right here to show that. As a matter of fact, I think I'll do that right now.	(C')(SAMP CORE LOST)(PHO 64 9123-24)
05 13 26 14	CC	Roger, Al. And for your inforamtion, we won't be doing the polarimetric experiment.	(C')
		- - -	
05 13 27 26	CC	And, Ed, I need an opinion. Do you think you'd be able to deploy and take the second and last LPM reading at this location?	(C')
05 13 27 43	LMP	Yes, we can take it at this location.	(C')

05 13 27 46	CC	What I have on the board here to perform - and I guess we'll call it C prime - is a sample, and I guess you already got a pan - I thought somebody did - and the LPM then.	(C')(PHO 64 9098-9122)
05 13 28 08	CDR	Let me suggest that we take one of these football-sized rocks from here, too, Fredo.	(C')
		- - -	
05 13 28 24	LMP	This area that we're in right now is - we're sampling in - is a pretty darn rugged boulder-strewn area. One of the smaller rocks I've sampled is going into 7 N.	(C')(SAMP 14051-52)(PHO 68 9443-47)
		- - -	
05 13 29 49	LMP	LPM deploy.	(C')
05 13 30 21	CDR	The core tube sample turned out to only be about three-quarters of a tube. The area is apparently very rocky, but I did get down into the second layer of the underlying layer of the regolith, which was white as opposed to being dark brown.	(C')(SAMP CORE LOST)
05 13 30 50	CC	Roger, Al. Understand you got down to another layer that looked white below the dark brown.	(C')
05 13 31 02	CDR	On second thought, forget that core tube. It's too granular and most of the material came out of the tube. I'll just scoop a couple of samples and bag it, of the two top layers.	(C')(SAMP CORE LOST)
		- - -	
05 13 32 02	CC	And, Al. About what sample-bag number are you up to now?	(C')
05 13 32 08	LMP	7 N was the last one I put in.	(C')(SAMP 14051-52)
05 13 32 11	CDR	Okay, Fredo, we're up on 12 here. I don't know whether that's consecutive or not, apparently.	(C')
05 13 32 27	LMP	Fredo, I'm back at the MET having left the LPM; you can start my time.	(C')

05 13 32 41	LMP	The LPM is aligned about 3 degrees to the north of the east-west line.	(C')
		- - -	
05 13 33 02	CC	About what's the size of the largest block y'all have passed, Ed?	(C')
		- - -	
05 13 33 11	LMP	Oh, 25 feet long.	(C')
05 13 33 24	CDR	Hand me the shovel, please, Ed.	(C')
		- - -	
05 13 35 32	CC	And, Al. Did you say you had taken a sample of the white boulder or was that too large to sample?	(C')
05 13 35 48	CDR	No. Right now I'm sampling a layer that is sort of a light gray just under the regolith. That went in bag - number 9, and bag number 10 was a sample of some of the surface rocks - that were right around that area. It looks like kind of a secondary impact that has disrupted the surface regolith and gone on down into the gray area.	(C')(SAMP 14140-44, 14068-72)(PHO 64 9125-27)
05 13 36 21	LMP	Oh, we'll make a grab sample here as well as documenting. Get one that'll ***	(C')(SAMP?)
		- - -	
05 13 37 23	CC	And, Al, did - -	(C')
05 13 37 25	CDR	Do you want the gnomon?	(C')
05 13 37 26	CC	- - did you mention either seeing a white boulder or a brown - a brownish-gray boulder earlier?	(C')
05 13 37 39	CDR	I mentioned there's a boulder definitely whitish in color, Fred. We'll be over there in a minute. Not in our immediate vicinity. But it definitely looks worthwhile sampling.	(C')
05 13 37 52	CC	That's affirm. They concur here and we'd like you to sample from the white boulder; go ahead, Ed.	(C')

- - -

05 13 38 10 LMP Where is it you're headed for, Al? (C')

- - -

05 13 38 15 CDR Well, - - the first thing that we ought to do, if we want to drag the MET with us, is - see that white boulder down there. (C')

05 13 38 23 LMP Yes. I saw it. Let's grab a - - (C')

05 13 38 26 CDR We can sample both types of boulders right down in that area, so let's go on down there. (C')

05 13 38 31 LMP Right. (C')

05 13 38 33 CDR And can you give us a feel, Houston, about when you'd like us to leave the area. (C')

05 13 38 41 CC Estimated time of departure is in about 8 minutes, 7-and-a-half minutes. (C')

05 13 38 51 LMP You want the hammer? I'll grab it. (C')

05 13 38 59 CDR I guess we just - run down there this way, huh? (C'-CI)

05 13 39 08 LMP Yes. (C'-CI)

05 13 39 16 LMP I see - one of these boulders, Fredo, is broken open. They're really brown boulders on the outside, and the innerface that's broken is white, and then another one that most of it is white. They are right in the same area. (C'-CI)

05 13 39 33 CC Okay, Ed. I assume you're going to sample some of those. (C'-CI)

05 13 39 39 LMP That's where we're headed right now. It's about 50 yards away. (C'-CI)

05 13 39 45 CDR Why don't you go on down and start, and let me bring the MET down. (C'-CI)

05 13 39 48 LMP All right. Yes. It's further than it looks. (C'-CI)

05 13 39 53 CDR That's the order of the day. (C'-CI)

05 13 40 24	LMP	Okay, Fredo. I'm right in the midst of a whole pile of very large boulders here. See what I can do to grab a meaningful sample.	(CI)
		- - -	
05 13 40 48	LMP	First of all, let me start my photographing. This whole area.	(CI)(PHO 68 9448-53)
05 13 41 35	LMP	They're all so darn big, that there's hardly anything that I can find. Let's see if I can chip one.	(CI)
		- - -	
05 13 41 57	CC	To get us back on the old timeline here, when you depart C here, we'd like to proceed directly to F, Weird. And we'll pick back up from that point. En route you can make grab samples as you see fit.	(CI)
		- - -	
05 13 42 31	LMP	I've chipped off one of the white rocks. I put it in bag 13 N. I'll photograph it. There don't seem to be any samples of the white rocks lying around that are small enough for me to sample and be sure they're what I'm looking for.	(CI)(SAMP 14082, 84)(PHO 68 9452-53)
05 13 43 12	CDR	And Al is just going around picking up hand-size grab samples from the immediate vicinity of where Ed's operating. I have a couple that are going in bag 16.	(CI)(SAMP 14063-65)
		- - -	
05 13 44 35	CDR	There's a football-size rock, Houston, coming out of this area, which will not be bagged. It appears to be the prevalent rock of the boulders of the area.	(CI)(SAMP 14321)(PHO 64 9128-29)
		- - -	
05 13 44 56	LMP	That can go in one of the Z-bags.	(CI)(SAMP 14321)
05 13 45 00	CDR	Do you have a sample of that white rock?	(CI)(SAMP 14082, 84)
05 13 45 03	LMP	Yes, I got one batch of particles.	(CI)(SAMP 14082, 84)

05 13 45 06	CDR	Okay, put it right in here.	(C1)(SAMP 14321)
05 13 45 09	LMP	I don't think it'll go.	(C1)(SAMP 14321)
05 13 45 10	CDR	Yes. Core tube's out of the way. It'll go.	(C1)(SAMP 14321)
05 13 45 22	CDR	Okay. We'll just try back that way.	(C1)
05 13 45 24	CC	Okay, Al and Ed. We have about 1 more minute here at C.	(C1)
05 13 45 33	CDR	We're moving on down the hill now. Okay. Can you see Weird from here?	(C1)
05 13 45 41	LMP	No.	(C1)
05 13 45 44	CDR	Kind of hard to find.	(C1)
05 13 45 47	LMP	I can't even see Triplet from here.	(C1)
05 13 45 53	LMP	Wait a minute, Al. Let me take one quick look at the map before we move. Waste a minute looking.	(C1)
05 13 45 59	CDR	Why don't you take the map and I'll just head down to the general area of the LM, and you'll probably get enough elevation view from down there so we can see Weird.	(C1)
05 13 46 13	CDR	We're leaving C now Houston.	(C1)
		- - -	
05 13 46 23	CC	Roger, Al. And to rephrase the question earlier, on the way back down, you might integrate any distinction in the lithology on the way back with a better sun angle and you're free to take grab samples en route to Weird.	(C1-C2)
05 13 46 36	LMP	Al, I think that's Weird to the north - I mean just to the left of North Triplet. And North Triplet appears to me to be right behind the LM.	(C1-C2)
		- - -	
05 13 46 51	CDR	It's halfway between those two large boulders and one way down.	(C1-C2)
05 13 46 59	LMP	Yes, I think that's right. Uh-huh, that's the one.	(C1-C2)

05 13 47 11	CDR	These boulders in this field here appear to be very weathered, obviously not by atmosphere, but eroded by some process, because they all show cracks. They show evidences of being broken up either by impact or subsequently. And it looks to me as though these rocks are really pretty old.	(C1-C2)
05 13 47 47	CC	Roger, Al. And do you have anything left on the 16 millimeter or has it been running on the MET?	(C1-C2)
05 13 47 57	CDR	No, it hasn't. We might turn it on now - follow the progress.	(C1-C2)
05 13 48 10	CDR	Is it running now?	(C1-C2)
05 13 48 13	LMP	Yes.	(C1-C2)
05 13 48 15	CDR	Have you checked the setting on it?	(C1-C2)
05 13 48 18	LMP	Yes, I did.	(C1-C2)
05 13 48 22	CC	And, Al. Without taking any extra time, if you come across any boulders large enough, we might fill the comm check on the way down. If you haven't already done that on the way up.	(C1-C2)
05 13 48 38	LMP	I don't think we're going to find any along our path big enough Fredo. The very largest ones are off to the right - south (north?) of us a bit - set up the hill a bit more.	(C1-C2)
05 13 48 49	CDR	Let's go on - are you on the thing back there?	(C1-C2)
		- - -	
05 13 49 50	CDR	All right, here again, Houston. The texture here appears to be - the regolith appears to be a lot of pebbles, approximately a quarter of an inch on down to go along with the fines. And the same texture pattern we spoke of before and photographed is also here.	(C1-C2)
		- - -	
05 13 50 23	CDR	Why don't we stop here to see if we're really going to Weird.	(C1-C2)

05 13 50 30	LMP	Man, the LM doesn't seem like it's getting much closer.	(C1-C2)
05 13 50 34	CDR	Is that Weird right down there, do you think?	(C1-C2)
05 13 50 37	LMP	Huh? No, Weird is - let's see; Weird is almost due east of the LM.	(C1-C2)
		- - -	
05 13 51 06	LMP	Okay, this is Ed. I'm on 3.75; MIN flow, 40 percent, and very comfortable. And there is Weird, Al, you can see the triple crater in it.	(C1-C2)
05 13 51 18	LMP	It's got the white spot.	(C1-C2)
05 13 51 21	CDR	Yes. With the boulder in the near foreground.	(C1-C2)
		- - -	
05 13 51 37	CDR	We're now out of the boulder field, Houston. And proceeding on down to Flank.	(C1-C2)
05 13 51 50	CDR	And, I believe, - just get a shot - let's get a sample of that baby right there. Let's grab some from that one.	(C2)(SAMP 14053-54)(PHO 64 9130-33)
05 13 51 57	CDR	We're just going to get a quick grab here of a rock, and I'll photograph it because it's got some tremendous fillets in it. Don't hit the fillets until I photograph it. Why don't you let me get a quick shot there. Okay, and a quick pan across there. That looks like - yes, we ought to get a piece of that baby.	(C2)(SAMP 14053-54)(PHO 64 9130-33)
05 13 52 35	LMP	No, man; that's hard, hard, hard! Look at that melt in it. (MITCHELL: The hammer was simply pulverizing the outer surface without fracturing the basic rock).	(C2)(SAMP 14053-54)
05 13 52 44	CDR	Yes. Okay, here's a piece of it. Bag?	(C2)(SAMP 14053-54)
05 13 52 57	LMP	Come way on back here.	(C2)
05 13 53 02	CDR	Crystals here, don't lose it.	(C2)(SAMP 14053-54)
		- - -	

05 13 53 15	LMP	Hold it a minute. Hold it! Let me get this bag. This darn bag dispenser is not doing what it's supposed to do.	(C2)
		- - -	
05 13 53 28	LMP	Houston, the rock we're taking is in 14 N.	(C2)(SAMP 14053-54)
05 13 53 34	LMP	Grab sample from a filleted rock. Large filleted rock that Al photographed. Okay, let's go on. Do you want me to pull awhile?	(C2)(SAMP 14053-54)(PHO 64 9130-33)
05 13 53 42	CDR	No, just watch everything. We don't want anything to drop off.	(C2-Dg)
05 13 53 47	LMP	And you want me to hold back a while?	(C2-Dg)
05 13 53 49	CDR	No, no, let's just let it run. Long as we don't lose anything. (MITCHELL: Going downhill like a runaway truck at that point).	(C2-Dg)
05 13 53 55	LMP	No. It's holding in very well. If it doesn't turn over. A little higher c.g. now than we had before with that big rock in there.	(C2-Dg)
05 13 54 18	CDR	Fredo, can you give us an idea at about what time we should arrive at Weird? How much more time?	(C2-Dg)
05 13 54 53	LMP	That 16 millimeter bounces all over every place.	(C2-Dg)
05 13 54 56	CDR	Well, maybe it could -	(C2-Dg)
05 13 55 03	LMP	It's taking photos from every view.	(C2-Dg)
05 13 55 17	CDR	I hate to make a grab here that's not from this crater. It looks like that cuts fairly deep, though.	(C2-Dg)
05 13 55 28	LMP	Yes. Hey, here's a whole batch of them right down here, Al. Let's grab those.	(C2-Dg)
05 13 55 34	CDR	Which way, left or right?	(C2-Dg)
05 13 55 35	LMP	Off to the left and ahead - around that little crater. They're all from this same area.	(C2-Dg)

05 13 55 42	CDR	Houston. Unable to see any stratigraphy in any of these craters. The slumping has been such that its pretty much destroyed - -	(Bg)
05 13 55 56	LMP	I'll grab this one right here.	(Bg)(SAMP 14311)
05 13 55 58	CDR	- - any evidence of stratigraphy.	(Bg)
05 13 56 00	CC	Roger, Al. And I assume positionwise, you're past Flank now. Is that correct? Or at least the D position of Flank?	(Bg)
05 13 56 15	CDR	No, we're not, Fredo. We're - no, we're not - at Flank yet. I'd say we're probably 15 minutes away from Weird. Did you get it on board?	(Bg)
05 13 56 27	LMP	As a matter of fact, I think this is Flank right here.	(Bg)
05 13 56 31	CDR	Get it on board?	(Bg)(SAMP 14311)
05 13 56 32	LMP	Yes, I've got the rock on board.	(Bg)(SAMP 14311)
05 13 56 33	CDR	Okay, let's press.	(Bg)
05 13 56 35	CC	Roger. And one other question that's up there is to check for the stratigraphy reported earlier of the light, gray-white layer below the top, if you see that exposed anywhere?	(Dg-E)
05 13 56 50	CDR	Now, we did not see that until we started approaching the edge of the boulder field. There's no evidence of that at all that we noticed. (MITCHELL: This far down the slope).	(Dg-E)
05 13 57 01	LMP	Not down this far. One thing I did notice - further outside of where we saw the white underneath - but it looked like an impact had either been of the white rock or it was a splatter of white. And it was just outside where Al was reporting that the underlying layer was white. As a matter of fact - no, the sun angle was causing it. Right now, some of the spray that we're kicking up looks white underneath, but I'm convinced it's just the angle *** I looked back the other way, and it's not substantiated.	(Dg-E)

- - -

05 13 58 47 CDR Okay, we're moving along pretty well, Fred, at this point. And I'd say we're still probably about 10 minutes away from Weird. (Dg-E)

05 13 58 55 CC Very good, Al. Looks kind of like you're making a little better time going down than up. (Dg-E)

05 13 59 05 LMP Yes, the slope's a different way, Fredo. In this case, the MET helps. (Dg-E)

05 13 59 22 CDR Okay, don't let me lose that baby. That's it right there with the three - - with the three rocks beyond it. (Dg-E)

05 13 59 29 CDR We're getting down to the place where we ought to see it. (Dg-E)

05 13 59 40 CDR This is probably Flank right here, or is it? (E)

05 13 59 48 LMP I'm not going to say until I get down and look at the exact pattern. It probably is, Al. But if this is really Flank, we should have been at the top of Cone crater where we were. (MITCHELL: it was and we were!!). (E)

05 14 00 01 CDR Yes, I know. (E)

05 14 00 03 LMP I think we've already passed Flank. (E)

05 14 00 12 CC It looks down here, Ed - that maybe what you're looking at there, if you've got another Flank-size crater is the one by E. (E)

05 14 00 24 LMP No, this is a big crater. It's 40, 50 meters across. It has a fairly sharp crater in the south edge of it, which is - - (E)

05 14 00 42 CC Okay, that looks like it may be the one by E. (E)

05 14 00 43 LMP - - 20, 30 feet across. Yes, I think that's it, Fredo. And it's - oh, it's at least 50 or 60 feet deep. (E)

05 14 01 03 CDR Why don't we just grab a couple from right here. (E)(SAMP 14055-62)

05 14 01 21	CDR	That baby came apart. Very soft.	(E)(SAMP 14055-62)
05 14 01 29	LMP	Yes, it's falling apart as you pick it up; very crumbly, isn't it?	(E)(SAMP 14055-62)
05 14 01 32	CDR	You got a bag ready?	(E)(SAMP 14055-62)
05 14 01 35	CDR	Very, very soft rock - rim of that crater, plus another one very close to us with crystal in it. It's flashing now going in the bag.	(E)(SAMP 14055-62)
05 14 01 46	LMP	15 N.	(E)(SAMP 14055-62)
		- - -	
05 14 02 02	CDR	Stay behind me; we don't want to leave anything now.	(E)
05 14 02 05	CDR	Okay that's where we go - right there.	(E)
05 14 02 07	LMP	Yes, we're going right for Weird. Head right for the big boulder. Then Weird's right beyond it.	(E-F)
		- - -	
05 14 03 07	LMP	One of the problems of going down hill here is that you have - essentially diffraction, I guess, around your body, and it creates a halo effect in your shadow, and you just can't see a darn thing right in front of you.	(E-F)
05 14 03 32	LMP	It's completely either blacked out or washed out right - kind of blacked out - kind of washed immediately down-sun of you. We're going predominantly down-sun now.	(E-F)
05 14 04 07	CDR	Okay, Fred, we're still moving, and - that's about 3 minutes away now from Weird.	(E-F)
		- - -	
05 14 04 23	LMP	The crater we are going by now, we're just to the north of it, Fredo, is an old subdued crater.	(E-F)
05 14 04 32	CDR	If you want to, run over behind that boulder over there, and I'll try and talk to you.	(E-F)

05 14 04 36	LMP	You're the one that has to get behind it and try to talk to Houston.	(E-F)
05 14 04 38	CDR	Oh, that's right.	(E-F)
05 14 04 40	LMP	I'll pull the MET. Go ahead.	(E-F)
05 14 04 41	CDR	On second thought, maybe it's not big enough. I'll help.	(E-F)
05 14 04 51	LMP	No, don't think it is.	(E-F)
05 14 04 53	CDR	No, I guess not. Sure is a big old boulder. I'll take a picture of it anyway.	(E-F)(PHO 64 9134-36)
05 14 05 11	CC	Okay, and this big boulder, Al, is - you're just about at Weird now. Is that right?	(E-F)(PHO 64 9134-36)
05 14 05 23	CDR	Oh, probably a couple of hundred meters short of Weird.	(E-F)(PHO 64 9134-36)
05 14 05 42	LMP	This country is so rolling and undulating, Fred, with rises and dips everywhere, that you can be going by a fairly good-sized crater and not even recognize it.	(E-F)
05 14 06 00	CDR	Okay, I'm back with you.	(F)
05 14 06 05	LMP	Okay, I think this is Weird right - to our right here - forward, Al. See that fresh one right there? I think that's the fresh one of the Weird pattern.	(F)
05 14 06 19	CC	Okay, Al and Ed; on the Weird task, we'd like to pan and grab samples at Weird; and we'll pick up most of our tasks that we had bypassed at E - when we get to Triplet.	(F)(SAMP 14066-67)(PHO 64 9137-57)
05 14 06 41	CDR	Okay, I'll get the pan. I think the crater itself is very near now.	(F)(PHO 64 9137-57)
05 14 06 46	LMP	Where are you?	(F)
05 14 06 47	CDR	Behind you, to your left. See right down there?	(F)
05 14 06 54	LMP	No, I didn't think so; I think this is it right here.	(F)

05 14 06 58	CDR	It looks too small, I believe. Well, anyway, yes, we're in the area, Houston.	(F)
05 14 07 04	LMP	We've got a minute to find it. I suppose you probably - well, that's a pretty big one over here.	(F)
05 14 07 10	CC	Okay, Al, I think the pan will fill us in as to the exact position.	(F)(PHO 64 9137-57)
05 14 07 18	CDR	Okay, panning's underway, now.	(F)(PHO 64 9137-57)
05 14 07 48	CDR	Okay, pan is complete.	(F)(PHO 64 9137-57)
05 14 07 53	CDR	Did you get a grab sample, Ed?	(F)(SAMP 14066-67)
05 14 07 56	LMP	I got some right up here, Al.	(F)(SAMP 14066-67)
05 14 08 32	CC	And I guess this is going in bag 16. Is that right, Ed?	(F)(SAMP 14066-67)
05 14 08 40	LMP	This is in bag 17, Fred. Sixteen got used some time back.	(F)(SAMP 14066-67)
05 14 08 50	CDR	Okay; let's press on.	(F)
05 14 08 52	LMP	This darn rig - it's hard to fold up.	(F)
05 14 08 55	CDR	We've got a pan and a grab sample. What else do we want from here, Houston?	(F)(SAMP 14066-67)(PHO 64 9137-57)
05 14 08 58	CC	Okay, that's it, Al. We would like to proceed on to the North Triplet, and I'll give you the tasks when we get there.	(F)
05 14 09 15	CDR	Okay, we'll try to get to North Triplet.	(F)
05 14 09 18	LMP	You ran out from under me just as I was picking it up. (MITCHELL: Pulled the MET away just as I dropped a sample toward it).	(F-G)
		- - -	
05 14 10 08	LMP	There's some blocks over there ***	(F-G)
05 14 10 09	CC	- - for your stop for the E, we'd like that core taken an estimated one-crater diameter short of the crater - North crater.	(F-G)

05 14 10 24	LMP	You want us to stop one-crater diameter short.	(F-G)
05 14 10 26	CC	That's affirm; because some of the items coming up are the core and the trench - triple core.	(F-G)
05 14 10 34	LMP	I think we're seeing the rim of the Triplet series right ahead of us, aren't we, Al?	(F-G)
05 14 10 50	CDR	I would say so, yes. We can say that's the rim of the North right there.	(F-G)
05 14 10 53	LMP	Yes. It's got boulders on it, and that's the only thing big enough to have boulders. We're probably about one diameter out right now.	(F-G)
05 14 11 02	CDR	I'd say we are. Right here.	(F-G)
05 14 11 07	LMP	The way we've been estimating distances today, that rim has to be at least 6 miles from here!	(G)
05 14 11 12	CDR	Okay, Houston; we're about 1 diameter to the east of North Triplet.	(G)
05 14 11 18	LMP	To the west of - yes, east of the Triplets. Excuse me.	(G)
		- - -	
05 14 11 24	CC	The number 1 item is the triple core.	(G)(SAMP CORE 14220; 14414)
05 14 11 32	LMP	Where's the third core tube?	(G)(SAMP CORE 14220; 14414)
05 14 11 34	CDR	Well, why don't you use clean ones?	(G)(SAMP CORE 14220; 14414)
05 14 11 36	LMP	I don't have clean ones.	(G)(SAMP CORE 14220; 14414)
05 14 11 37	CDR	Yes, you do. They're down in this pocket right there. Let me - - get my camera tightened up.	(G)(SAMP CORE 14220; 14414)
05 14 11 43	LMP	This one's been used.	(G)(SAMP CORE 14220; 14414)
05 14 11 44	CDR	No, no, no. In here, Ed.	(G)(SAMP CORE 14220; 14414)
05 14 11 49	CDR	The three tabs should be clean.	(G)(SAMP CORE 14220; 14414)
05 14 11 54	CDR	Okay, we'll pull "it" back together here. (MITCHELL: This is where Al's camera came apart).	(G)

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05 14 12 31	CDR	Okay; we've got the camera back together. Okay, Fredo, for your info, the CDR's Commander is reading 117.	(G)

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05 14 12 57	LMP	Start with this one. We've only got two fresh ones in here. You've got four out that are used; or that look like they're used.	(G)(SAMP CORE 14220; 14414)
05 14 13 07	CDR	The three tabbed ones, we haven't used yet. Let me get them, Ed.	(G)(SAMP CORE 14220; 14414)
05 14 13 37	LMP	I'll take the tabbing off of this one.	(G)(SAMP CORE 14220; 14414)
05 14 13 43	CDR	Yes, I think that's the best way to go. Let's make them 1, 2, 3 for simplicity's sake.	(G)(SAMP CORE 14220; 14414)
05 14 13 52	LMP	I don't have a mat from that one; where did it go?	(G)(SAMP CORE 14220; 14414)
05 14 13 56	CDR	The bottom one will be number 1 tube with a tab, Fredo.	(G)(SAMP CORE 14220; 14414)
05 14 14 06	LMP	Here's your number 3.	(G)(SAMP CORE 14220; 14414)
05 14 14 08	CDR	Hold on to that one. Okay? And the other one will be number 2 with a tab.	(G)(SAMP CORE 14220; 14414)
05 14 14 33	CDR	And the top one will be number 3 with a tab.	(G)(SAMP CORE 14220; 14414)
05 14 14 37	CC	Roger, Al. And we're going to subtract off 15 minutes from that 30-minute extension due to a - PLSS oxygen.	(G)

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05 14 15 03	CC	Okay, this gives us approximately - - 25 minutes at stop G here.	(G)
05 14 15 16	LMP	*** help you. Okay, I got this one. Go ahead; start your trench, if you like.	(G)(SAMP TRENCH)
05 14 15 34	CDR	I'll dig the trench in the far wall of this crater here, Ed.	(G)(SAMP TRENCH)

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05 14 16 46	LMP	Fredo, I've tried to push in the core tubes - triple core tube - I get maybe oh, 3 to 4 inches of pushing in by hand. And it's just surface stuff; a very soft - will not support the weight of the core tubes. Now, I've got it balanced, and I can take a picture of it, perhaps.	(G)(SAMP CORE 14220; 14414)(PHO 68 9454)

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05 14 17 46	LMP	We'll try to drive it.	(G)(SAMP CORE 14220; 14414)
05 14 18 00	CC	And do I understand correctly, Ed; you're taking care of the triple core - on your own there?	(G)(SAMP CORE 14220; 14414)
05 14 18 09	LMP	That's affirm. Al's digging - busy with his trench.	(G)(SAMP CORE 14220; 14414)
05 14 18 25	LMP	I'll go over and help him photograph it in a while. And it's not going in easy, Fred.	(G)(SAMP CORE 14220; 14414)
05 14 19 14	LMP	I'll try driving it a bit more, but I think I'm on solid rock; and, I'm about one core tube down.	(G)(SAMP CORE 14220; 14414)
05 14 19 23	CC	Roger, Ed. Solid rock, about one core tube down.	(G)(SAMP CORE 14220; 14414)
05 14 19 38	CC	The recommendation, Ed, is to pull it up and move - over a bit and try it again.	(G)
05 14 19 50	LMP	The way this one feels, it'll be the same thing.	(G)(SAMP CORE 14220; 14414)(PHO 68 9454)
05 14 20 04	CC	Ed and when you pull it out, they'd like to save the bottom core, and replace it with another one there when you try - before you try again.	(G)(SAMP CORE 14220; 14414)(PHO 68 9454)

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05 14 20 34	CC	How's the trench going, Al? Are you getting down there?	(G)(SAMP TRENCH)
05 14 20 40	CDR	I've got a trench here. It's going fairly easily, but I need the extension-angle handle to get it deeper, so I'll wait until Ed's through with that. I'm cutting into the rim of a crater which is approximately - say, 6 meters in diameter, has a depth of about three-quarters of a meter. And we're back in about one diameter away from the north rim	(G)(SAMP TRENCH)

		of Triplet. The trench is going through at least three layers that I can see. The fine-grain surface, dark browns; then, a layer of what appears to be quite a bit of black; and then, a third layer of some very light material. And, we should be able to sample all three of these.	
05 14 21 34	LMP	Core tube cap. Core tube cap on that sample is in 18 N.	(G)(SAMP CORE 14220; 14414)(PHO 68 9454)
05 14 22 02	CDR	And a very interesting looking rock with really fine-grain crystals in it. It's a grab sample, Houston, from that same crater in which I'm digging. It's too large for a bag; it's dark brown; dark part is fractured. It's fractured face is very light gray with very small crystals.	(G)(SAMP 14310)
05 14 22 28	CC	Roger, Al; and if you can't get any with your samples down in the trench itself that have any rock fragments, you might include those as part of your sample.	(G)(SAMP TRENCH)
		- - -	
05 14 22 45	LMP	Put it in that side bag if you can; these are all full back here.	(G)
		- - -	
05 14 23 03	CDR	Are you about through with the extension handle, or are you going to - -	(G)
05 14 23 06	LMP	Go ahead and take it. I don't really need it to drive.	(G)
05 14 23 12	CDR	I'll go over and cut that baby, and we'll - through here.	(G)(SAMP TRENCH)
05 14 23 40	CDR	Okay, Houston; I know that - we did not mention this white layer - down in this area before - that was so obvious to us just below the surface up near the flank of Cone. But it appears as though it is - quite a bit - well, it's relatively deep, as far as visual observation is concerned. And certainly not any that would be picked up by the footprints or MET tracks or the like. But there appears to be some of that here in this trench.	(G)

05 14 24 20	LMP	Fredo, did you get my report that the core tube tip was in 18 N?	(G)(SAMP CORE 14414)
05 14 24 34	LMP	Okay, and I have taken the bottom core of that one, which was core 1 flag; and it's now by itself - as a single core tube; and I'm going to replace that with - number 1 unflagged, which is one Al started to use earlier but didn't get anywhere with it.	(G)(SAMP CORE 14220)
		- - -	
05 14 25 15	CDR	You know what's happening in this trench; it's the surface fines are so loose that they're just falling down covering the layering that we want to get. I'll tell you, we're not going to get a classic vertical wall here, Houston, in this trench.	(G)(SAMP TRENCH)
05 14 26 20	CC	And, Ed. Are you having any better luck on the triple core this time?	(G)(SAMP CORE 14230)
05 14 26 27	LMP	I've got it in about half a tube. But I'm - getting ready to take a picture of it so you can locate it; and then, we'll go ahead and drive it the rest of the way in.	(G)(SAMP CORE 14230)(PHO 68 9455-58)
05 14 27 00	LMP	Okay, Fredo. There's three frames here, probably 69, 70, 71, that are core tubes. The first one's the aborted one that I couldn't get in. The second picture is this new attempt, and a 15-foot shot that I raised up and took a locator shot on the horizon of it. I think it might go.	(G)(SAMP CORE 14220; 14230)(PHO 68 9454-58)
		- - -	
05 14 27 48	LMP	Okay, I'm getting down low enough; I'm going to have to have an extension handle to finish driving it, I think.	(G)(SAMP CORE 14230)
05 14 27 54	CDR	Okay, I'll give it back to you. I'm really kind of through with this trench.	(G)(SAMP TRENCH)
		- - -	
05 14 29 19	CDR	Okay, Fredo. Bag 19 for the sample of the surface fine - that is, from the surface layer of the trench.	(G)(SAMP TRENCH 14145-48)

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05 14 29 42	CDR	I am unable to take from the walls of the trench - the blocky type of material that I could see when I was digging; so, I'll just get a shovelful of that, and we'll mix the surface with the second layer.	(G)(SAMP TRENCH 14145-48; 14153-56)

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05 14 30 14	CDR	Well, the trench is about a foot and a half deep. I gave up actually not because it was hard digging, but because the walls kept falling in on it; and it was covering all the evidence of stratigraphy.	(G)(SAMP TRENCH)
05 14 30 31	LMP	And, Houston. I'm over 40 feet - 50 feet from where Al is; and on the east side of these craters, I have the triple core in about a tube and a quarter; and it's tightening up again. I just don't think it's going to go the rest of the way.	(G)(SAMP CORE 14230)
05 14 30 53	LMP	I'm maybe driving a millimeter a stroke. I'll hit it a few more licks, and I'll see if we can break through or move it a little more. No, that's as far as it is going, Houston; one and a quarter.	(G)(SAMP CORE 14230)

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05 14 31 33	LMP	I think I could probably beat it for the next 10 minutes, Fred, and not get another inch out of it.	(G)(SAMP CORE 14230)
05 14 31 39	CC	Well, I don't think you need the exercise, you may as well extract it now.	(G)(SAMP CORE 14230)
05 14 31 46	LMP	I agree. I'll take a picture of it, a final picture of it, to show you how far we got with it.	(G)(SAMP CORE 14230)(PHO 68 9454)
05 14 32 10	CDR	Okay, Houston; this is Al. And bag 21 is kind of a collection of the combination of the top two layers. Second layer is a thin layer of small glassy-like pebbles. I was unable to separate them by the trench method, so I gave it to you mixed up in that bag; and the last bag will be pebbles from the bottom layer.	(G)(SAMP TRENCH 14080-81; 14153-56)
05 14 32 40	CC	Okay, Al. And what's the thickness of the intermediate layer there?	(G)(SAMP TRENCH 14080-81; 14153-56)

05 14 32 49	CDR	Well, it's really ephemeral - it's almost - it's very thin; I would say no more than a quarter of an inch thick, and I just noticed it because of the difference of the grain structure as I was digging the trench.	(G)(SAMP TRENCH 14080-81; 14153-56)
05 14 33 13	CDR	And in bag 20, 200, we'll fill a sample of the bottom material; also, mixed up with the - some of the surface material has fallen down in on top of it. And that's about - call it 18 inches below surface.	(G)(SAMP TRENCH 14073-79; 14149-52)
		- - -	
05 14 34 43	LMP	Now, my problem is I can't get the - driving down to that rock, I couldn't get the core cap off; I'll get some help from Al, soon as he puts his handful of samples down, okay, that's great.	(G)(SAMP CORE 14230)
05 14 35 05	CDR	Okay, let me get rid of this trencher.	(G)
05 14 35 09	CC	On the agenda here, we have remaining documented samples, and we need a pan.	(G)(PHO 64 9167-87)
05 14 35 21	LMP	Roger. We'll get "it" for you. (MITCHELL: Dropped the sample bag).	(G)
05 14 35 22	CDR	Oh, God.	(G)
05 14 35 23	LMP	Get another one; skip it; we've got plenty.	(G)
		- - -	
05 14 35 37	CC	And, Al, one question, did you get the SESC sample out of the bottom of the trench?	(G)(SAMP SESC 14240)(PHO 64 9158-66)
05 14 35 49	CDR	Well, I told you the trench was kind of a miserable thing, because the walls kept falling down. And I could get a sample from the bottom, but it wouldn't be the bottom, I'm afraid.	(G)(SAMP SESC 14240)
05 14 36 05	LMP	Okay, Fredo, the bottom - bit on this string was bit - 23? Isn't it, Al? That's the one you did.	(G)(SAMP CORE 14230)
05 14 36 15	CDR	23.	(G)(SAMP CORE 14230)
		- - -	

05 14 36 26	CDR	Okay, we need a pan from here; I can get that.	(G)(PHO 64 9167-87)(PHO 64 9167-87)
05 14 36 44	CC	And, Al, when you get done with the pan, I guess we'd still like the SESC sample from the bottom of the trench, even though it probably isn't the bottom.	(G)(SAMP SESC 14240)
05 14 36 57	CDR	Well, I'll tell you, I'll go back and whack at it a little bit. See what I can do.	(G)(SAMP SESC 14240)
05 14 37 14	CC	And, Al and Ed, we have about 8 minutes left here at Triplet.	(G)
05 14 37 26	CDR	Roger. You're still counting on a quick trip out to the ALSEP antenna?	(G)
05 14 37 35	CC	That's affirm, Al. That's included in this time, and when you start out, we'd like you to make some grab samples as you pass by North Triplet.	(G)
05 14 38 01	LMP	And, Fredo, the triple core tube, the second core didn't have anything in it. As soon as I opened it up, a little bit fell out, and the second core tube is empty.	(G)(SAMP CORE 14230)
05 14 38 17	LMP	Even though it drove down - even though it drove in about 3 inches, it didn't get anything.	(G)(SAMP CORE 14230)
05 14 38 34	LMP	Okay, I'll put a bit back on that one. Save it.	(G)(SAMP CORE 14230)
05 14 38 48	CC	Okay, and when you get done there, Ed, I guess you can proceed with getting some documented samples before we have to depart.	(G)
05 14 39 08	CDR	SESC can: that's over in that pocket, right?	(G)(SAMP SESC 14240)
05 14 39 11	LMP	Yes.	(G)(SAMP SESC 14240)
05 14 39 31	LMP	Documented samples coming up.	(G)(SAMP 14306-07)(PHO 68 9459-64)
05 14 39 48	CDR	This white stuff on the rim here, Ed?	(G)(SAMP 14307)
		- - -	
05 14 39 54	LMP	Yes. Document some of that. Here's a rock right here.	(G)(SAMP 14307)

05 14 40 01	CC	Okay, has Al moved over by the rim of North crater now?	(G)(SAMP 14307)
05 14 40 07	LMP	Oh, no, we're still at the same place.	(G)(SAMP 14307)
05 14 40 11	LMP	That's pretty well disturbed, Al; I'll grab it without much documentation.	(G)(SAMP 14307)
05 14 40 18	CDR	We're digging the bottom of the trench for you, Fredo.	(G)(SAMP SESC 14240)
05 14 40 28	CDR	I'm redigging the trench.	(G)
05 14 40 40	LMP	I'm picking up one of the - so-called whiter rocks, Fredo, near the area where Al is digging. Since it's already disturbed, I'm not going to waste time on much documentation. Kind of a kicked - up rock.	(G)(SAMP 14307)
05 14 41 01	LMP	Man, it's going into 25 Nancy.	(G)(SAMP 14307)
05 14 41 53	CC	We have about 3 and a half minutes left at Triplet.	(G)
05 14 42 01	CDR	Okay, we're packing up now.	(G)
05 14 42 04	LMP	One more documented sample.	(G)(SAMP 14306)(PHO 68 9459-64)
05 14 42 06	CC	Okay, there is a special request. Rather than grab samples at the North crater rim there, they'd like to get a documented sample of a partially buried rock.	(G)(SAMP 14306)
05 14 42 21	LMP	I was going to try to get you one of those right here, but it looks pretty big. I think maybe I can get it anyhow. - - -	(G)(SAMP 14306)
05 14 44 39	CC	Okay, Ed and Al, we're going to have to be departing Triplet here - and that one brief stop at the North rim to pick up one documented sample - and get on back to the LM area if we're going to pick up the remaining tasks, there.	(G)
05 14 45 14	LMP	Fredo, this documented sample that I got of the buried rock, it's too big for regular weigh bags. (MITCHELL: The buried rocks were like buried icebergs - only a little sticking out). See what I	(G)(SAMP 14306)

		can do with it. A regular sample bag - I'm sticking one over it, but it'll never close. Okay, it's going in it. And will probably stay, but it won't close it.	
05 14 45 53	CC	Okay, that'll probably be all right, Ed. We're going to have to move out now.	(G)(SAMP 14306)
05 14 46 02	LMP	It's bag 26 N.	(G)(SAMP 14306)
05 14 46 16	LMP	I'll grab the gnomon. We're on our way.	(G-GI)
05 14 46 53	CDR	Okay, headed for the LM. We're probably about 2 minutes away from the LM, Houston.	(G-GI)
		- - -	
05 14 47 43	LMP	I think we're closing on it.	(G-GI)
05 14 47 45	CDR	Right. Here's the - -	(G-GI)
05 14 47 48	LMP	Triplet right up ahead of us.	(G-GI)
05 14 47 51	LMP	We'll have to do a little bit to the north to get around it, I think.	(G-GI)
05 14 47 58	LMP	We're approaching Triplet from the east, that's North Triplet from the east. There's a little rock field down here - a small boulder field, Al, to get a documented sample from.	(G-GI)(SAMP 14301; 14313)
05 14 48 23	CDR	Looks good. Yes, looks like they might have come from there.	(G-GI)(SAMP 14301; 14313)
		- - -	
05 14 48 44	CDR	Okay, the shiny can is retrieved. Press on. Going to have to mush, Ed, right down the middle and get a documented sample there.	(G-GI)(SAMP 14301; 14313)
05 14 49 02	CDR	Man, that pile of rocks - beautiful, right to your left. Oh, just the right size.	(G-GI)(SAMP 14301; 14313)
05 14 49 11	CDR	Don't walk over them!	(G-GI)(SAMP 14301; 14313)
05 14 49 13	LMP	No, I'm trying to stay away from them.	(G-GI)(SAMP 14301; 14313)

05 14 49 15	LMP	Are these the ones - the ones over here?	(GI)(SAMP 14301; 14313)
05 14 49 17	CDR	Yes.	(GI)(SAMP 14301; 14313)
05 14 49 20	CDR	God damn that thing. (MITCHELL: Equipment bouncing and falling off).	(GI)
05 14 49 29	LMP	Gnomon is in place.	(GI)
05 14 49 38	LMP	I'll get the - go ahead. I'm on this side; I'll get the stereo.	(GI)(SAMP 14301)(PHO 68 9465-66)
05 14 49 47	LMP	Get the locator.	(GI)(SAMP 14301)(PHO 64 9188)
05 14 49 51	CDR	Yes. Can't even see the camera settings.	(GI)(SAMP 14301)(PHO 64 9188)
05 14 49 58	LMP	Yes, that's got so much dirt on them. Okay, 7 foot.	(GI)(SAMP 14301)(PHO 68 9465-66)
05 14 50 02	CC	Okay, Ed and Al, as soon as you wrap this one up, you're going to have to press on back to the LM, or we're going to be really tight on the closeout.	(GI)
		- - -	
05 14 50 32	LMP	Yes. God damn, "it's" bigger than we thought. Al, we'll grab sample that one; I'll get you another one here. (MITCHELL: Again iceberg rocks).	(GI)(SAMP 14301)
05 14 50 39	CDR	Listen, just put it in that thing. And let's press - because we don't have the time.	(GI)(SAMP 14301)
05 14 50 44	LMP	All right. I'll grab it, and let me take - an extra picture here.	(GI)(SAMP 14301)(PHO 68 9467)
05 14 50 48	CDR	All right. I'll grab one right here in the foreground.	(GI)(SAMP 14313)
05 14 50 54	CDR	Okay, bag 27 Nancy.	(GI)(SAMP 14313)
05 14 51 02	LMP	And another documented sample - a larger documented sample than we thought we were getting here, Fredo. Again, it was a buried rock; and it's too big for the sample bag; so, it'll go into the weigh bag.	(GI)(SAMP 14301)
05 14 51 15	CDR	Put it in that one right there. Can you get it?	(GI)(SAMP 14301)

05 14 51 17	LMP	Yes.	(GI)(SAMP 14301)
05 14 51 30	LMP	It has a very definite shape; I think you'll be able to sort it out.	(GI)(SAMP 14313)
05 14 51 36	LMP	Okay, let's mush for the LM.	(GI)
05 14 51 42	CC	Okay, Al and Ed. I guess we can skip the rim of North crater and proceed right on back to the LM area.	(GI-LM)
05 14 51 52	LMP	That's where we are. We're at the rim of North crater.	(GI-LM)
05 14 52 00	LMP	We're on the "west" rim of North crater. (MITCHELL: Meant "east").	(GI-LM)
05 14 52 01	CC	I think you misunderstood the message. We can proceed right on by the rim - we have the buried rock samples now, and head on back to the LM. That is Antares.	(GI-LM)
05 14 52 16	LMP	That's right. That's where we're headed.	(GI-LM)
05 14 52 19	CDR	Okay, that's where we're headed. Hold it.	(GI-LM)
05 14 52 29	LMP	I'll get it; keep going. He lost the core tube. (MITCHELL: Because of the high c.g., the MET was unstable and losing pieces continuously).	(GI-LM)
05 14 52 34	CDR	Got it?	(GI-LM)
05 14 52 36	LMP	I'll have it in a minute. I got it.	(GI-LM)
05 14 53 22	CDR	Everything still hanging on?	(GI-LM)
05 14 53 24	LMP	Yes. Everything is still there.	(GI-LM)
05 14 54 02	CDR	Okay, we're approaching the LM now. Coming in at Fra Mauro Base.	(GI-LM)
05 14 54 14	CC	Roger, Al, and I guess from here, we can split up; and Ed can take the MET and proceed to the cluster of boulders he had reported earlier to the north of the LM; and you can proceed out to the ALSEP.	(GI-LM)

05 14 54 35 CDR I'd suggest - well, you can do it the way you want to - I guess you can do without the "LM." (MITCHELL: Meant "MET"). (LM)

05 14 54 41 LMP Without the MET, yes. (LM)

05 14 54 44 CDR Without the MET, because there's nobody to - If anything falls off, we've lost all those goodies. (LM)

05 14 54 50 LMP I'll just take a couple of rock bags Fredo, my tongs and camera, and go. (LM)

05 14 54 56 CDR Okay, Al's on the way. (LM-ALSEP)

- - -

05 14 55 04 LMP Al's on the way out to the ALSEP. (LM-ALSEP)

05 14 55 17 LMP As a matter of fact, Fredo, I'm just going to take a weigh bag and no sample bag; that way I can get more. The size of these rocks - the sample bags are too small, anyhow. (LM)

05 14 55 32 CC Roger, Ed. Okay, Al, the first thing when you get to the Central Station - is to check the alignment and verify the alignment and leveling. (LM-ALSEP)

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05 14 56 35 LMP Okay, Fredo, my plan: I'm out in the area of the boulder field I'm going to photograph many of the boulders, the rocks, the broken ones, the big ones, what have you - and then, grab as many as the different fragments as I can around these piles of broken boulders. Now that I'm here, I see a large number of inclusions - I can't tell whether they're crystals or not - I think that they are. And I'll grab as many of these - and give you before and after shots as I can - of a whole weigh bag full of rocks. (H)(SAMP 14312, 14-20; 14290-97)(PHO 68 9468-76)

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05 14 59 22 CC Okay, Al. You can proceed back to the vicinity of the LM, and with the time remaining that you had for the ALSEP, shoot a few closeup pictures here. We've got about 4 minutes left. (ALSEP)

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05 14 59 47	CDR	Heading back to the LM.	(ALSEP-LM)
05 15 01 04	CC	Okay, a little change in the priorities; when you get back to the LM, we'd like the TV turned to look at the MESA area, so we can watch the closeout number 1; and then, you can shoot a quick picture of the Solar Wind.	(ALSEP-LM)(PHO 64 9198-9201)
05 15 01 26	CDR	Roger, I'm going for the camera, now.	(LM)
05 15 01 30	CC	And we haven't changed the settings, Al; so, it should be in good shape when you turn her to the MESA.	(LM)

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05 15 02 59	CC	Okay, that's great; and you can go shoot the Solar Wind, now.	(LM)
05 15 03 07	CDR	It's on the side of a hill; that's a problem out here.	(LM)
05 15 03 11	LMP	Okay, Fredo, I'm heading back from the boulder field. I've sampled two of the larger boulders in the area. Rocks broken from them and lying on them; and I've taken a pan; and I have maybe a third of a weigh bag full of small rocks from these boulders.	(H-LM)(SAMP 14312, 14-20; 14290-97)(PHO 68 9477-91)
05 15 03 28	CC	Okay; very good, Ed. We need to proceed now with the regular program.	(H-LM)

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05 15 05 39	CDR	Go ahead.	(LM)
05 15 05 40	CC	They'd like for you to return your camera so you don't have to bother removing the magazine from it. You can just put the whole camera in the ETB.	(LM)
05 15 05 56	CC	Okay, and, I guess, so you don't get confused, that means we'll be bringing back both cameras.	(LM)
05 15 06 06	CDR	Al's camera is in, and magazine Lima Lima has got a hundred and nine.	(LM)

05 15 06 20 LMP Okay, Houston. I understand, now. The contaminated sample under quad 3 is not to be taken. (LM)

05 15 06 34 LMP Okay, I'm putting my camera in the ETB. (LM)

- - -

05 15 07 13 CC I stand corrected. What they really wanted was to bring Al's camera back, instead of yours; so, we'll only be bringing the one camera, the CDR's. (LM)

- - -

05 15 08 03 LMP Right. Right. Fredo, correct me, now; mag Kilo-Kilo has never been used. Is that correct? (LM)

05 15 08 17 CDR Houston, while you're looking that up, you might recognize what I have in my hand as the handle for the contingency sample return; it just so happens to have a genuine six iron on the bottom of it. In my left hand, I have a little white pellet that's familiar to millions of Americans. I drop it down. Unfortunately, the suit is so stiff, I can't do this with two hands, but I'm going to try a little sand trap shot here. (LM)

05 15 08 53 LMP Hey, you got more dirt than ball that time. (LM)

05 15 08 58 CDR Got more dirt than ball. Here we go again. (LM)

05 15 09 01 CC That looked like a slice to me, Al. (LM)

05 15 09 03 CDR Here we go. Straight as a die, one more. (LM)

05 15 09 20 CDR Miles and miles and miles. (LM)

05 15 09 26 CC Very good, Al. And - answer Ed's question earlier there; Kilo Kilo was used for the window shots, Ed; so, you ought to bring it back. (LM)

05 15 09 43 CDR Hey, that's right. We got some of that to start with, didn't we? (LM)

- - -

05 15 10 14 LMP How many films did we take with this - seven huh? (LM)

05 15 10 17 CDR I'd say between 17 and 18. (LM)

- - -

05 15 12 21 CDR Okay, tell me about this tube, Ed. Has this got anything in it? (LM)

05 15 12 26 LMP No, that's one that has nothing in it. Before you throw it, get the number. That's the tube that we didn't get anything from. (LM)

05 15 12 37 CDR Okay. In SRC 2, Fredo, we have the organic control sample, and we have four core tubes. (LM)

- - -

05 15 13 23 CDR We have one SESC. (LM)

- - -

05 15 15 00 CDR Also, in the SRC, we have - - one weigh bag, which is mostly documented samples. (LM)

- - -

05 15 15 38 CDR Pick up the core tubes now, maybe. (LM)

- - -

05 15 17 06 LMP Contaminated samples, scratched, Ed; 30-millimeter camera mag; 16 mag's; closeup camera mags; SWC; TDS; magnetic sample - we didn't get a magnetic sample; map. Say, are you going to have any weigh bags? (LM)

05 15 17 27 CDR Yes, we'll have some weigh bags. These two. (LM)

- - -

05 15 17 52 CDR Houston. That completes SRC 1; then, we have the - organic control sample, 1 SESC container, four core tubes, and one bag of documented samples. (LM)

- - -

05 15 18 23 CDR This rock in this bag if we put it this way. (LM)

05 15 18 28	LMP	I'll give it a try. Wait for me there, just a second ***	(LM)
05 15 18 39	CDR	No, it won't go.	(LM)
05 15 18 41	LMP	All right. We need the plus-Z 27 bag, right?	(LM)
05 15 18 46	CDR	Yes. Either that or else put that in the weigh bag, and take this up with it.	(LM)
05 15 18 56	LMP	Okay, I'm getting you a bag for it.	(LM)
		- - -	
05 15 21 20	CDR	Now, let's see what we got left. There's the greatest javelin throw of the century!	(LM)
05 15 21 33	CDR	Old lefty himself. Outstanding! Right in the middle of the crater. Stayed up.	(LM)
		- - -	
05 15 24 05	CDR	Want to head on up the ladder? I'll hand you the - SRC. I believe if you'll stomp your feet on the way up, it'll be as effective as the brush was yesterday.	(LM)
		- - -	
05 15 24 23	LMP	Did you - I saw you over here. Did you get a picture?	(LM)(PHO 64 9189-97)
05 15 24 26	CDR	I did.	(LM)(PHO 64 9189-97)
05 15 24 28	LMP	With the LM in the foreground?	(LM)(PHO 64 9189-97)
05 15 24 30	CDR	Yes.	(LM)(PHO 64 9189-97)
05 15 24 38	LMP	All right, Fredo, I'm starting up the ladder.	(LM)
		- - -	
05 15 26 37	CDR	Okay, Ed, you can start on up, now.	(LM)
05 15 26 40	LMP	I'm already halfway up.	(LM)
		- - -	

05 15 28 07	CDR	Oh, we have some pictures of the LM in the foreground; so, hope it comes out all right.	(LM)(PHO 64 9189-97)
05 15 28 13	LMP	Pretty small sliver left, isn't it?	(LM)(PHO 64 9189-97)
05 15 28 15	CDR	Yes. Not much.	(LM)(PHO 64 9189-97)
		- - -	
05 15 35 52	CDR	Okay, Houston, crew of Antares is leaving Fra Mauro base.	(LM)
		- - -	
05 15 36 54	CDR	How'd you like one more bag of rocks?	(LM)
		- - -	
05 15 38 43	CDR	- - coming on in.	(LM)
05 15 39 24	LMP	All right, come on in.	(LM)
		- - -	
05 15 40 33	LMP	Now you seem clear. Okay, Houston, the door is closed.	(LM)

* * * * PRE LIFTOFF * * * *

05 17 30 13	CDR	Were you planning on this EVA 2 debriefing? If so, what time?	(PRE LIFTOFF)
05 17 30 20	CC	Okay, I guess whenever you're ready, Al. Do you happen to have any weight check bars on the rocks?	(PRE LIFTOFF)
05 17 30 31	CDR	Affirmative. We gave you the weights of the rocks that we put in the left-hand stowage yesterday. We have some additional rocks that are in the ISA. Total weight of the ISA is 50 pounds. Total weight of the SRC is 29 pounds, and we have a couple of large rocks in the sample bag, that's Z-27 and that weight is 30 pounds.	(PRE LIFTOFF)
05 17 31 18	CC	Okay, Al. Copy that. Looks like a pretty good haul.	(PRE LIFTOFF)
05 17 31 28	CDR	Yes, sure does. And we'll be ready for a debriefing in about another 10 minutes.	(PRE LIFTOFF)
05 17 31 38	CC	Okay, Al, just give us a call. We've got some - some of the questions ready here, any time you're ready.	(PRE LIFTOFF)
		- - -	
05 18 13 01	CC	And, Antares; Houston. We're standing by with the debriefing questions here whenever y'all are both ready to go.	(PRE LIFTOFF)
05 18 13 16	CDR	Yes, we're ready to go right now, Fredo.	(PRE LIFTOFF)
05 18 13 19	CC	Okay, the first question is to describe texture or fracture patterns or any surface characteristics of the large boulders, in the boulder field you were describing at Cone crater.	(PRE LIFTOFF)
05 18 13 54	CDR	You want textures and patterns of the boulders themselves?	(PRE LIFTOFF)
05 18 13 59	CC	That's affirmative, Al.	(PRE LIFTOFF)

05 18 14 18 CDR Well, we made some remarks, as I recall, coming back down about the fact that they looked weather-beaten, the fact that they maybe were fairly soft rocks, because they look very much like rocks that have been weather-beaten due to the atmosphere. I think that was one of the types of textures that we noted. We noted other rocks that were very fine grained crystalline rocks and essentially very smooth on the outside. We have a sample of one of those, football size. These are really the only two textures that I noticed. Did you notice any in addition to that? (PRE LIFTOFF)

05 18 15 07 LMP Well, no. I can't say that I did specifically. It wasn't really a matter of being able to describe what we saw in this particular case; because, at that point, we were so rushed that all we were trying to do was see different things and grab it without really noting how it necessarily differed. The only thing that I recall about these craters - or these boulders was that there were inclusions or variations within the rocks; and I assume that they were crystals within the rock, or some crystalline forming in the rock. I don't know that that's true; they might have been, for example, a breccia with just a conglomerate in them, and I don't know whether that's true or not either. There simply wasn't time to look at them in that detail; so, we just grabbed, photographed, and ran; and I would be kind of at loss to give you an articulate description of really what those rocks are like. (PRE LIFTOFF)

05 18 16 12 CDR I do think we have good samples of two types that we saw on the "west" rim of the crater. (MITCHELL: meant "south"). Ed got a small piece of a light-colored rock, and we actually brought back one that was typical of the other - reddish-brown rocks. (PRE LIFTOFF)(SAMP 14082) (SAMP 14321)

05 18 16 45 CC The second question was, I guess, one that was asked somewhere along the way. And, did you ever notice there being dust on tops of any of the boulders around Cone? (PRE LIFTOFF)

05 18 17 11 LMP Let me make a stab at that, Fredo. I noticed some of the rocks - the smaller boulders that were closer to the ground were covered with dust, but I recall boulders that were not covered with dust; and, for example, the boulders down here closer to the LM, (PRE LIFTOFF)

the last boulder field I went to, did not have any appreciable dust on those rocks. And the white ones I sampled up near Cone crater did not have any appreciable dust on them; however, others did. As a matter of fact, there was one of the boulders in that group of the white boulders that I photographed for you, but it was too big to do anything with. It had brown and white; and I couldn't tell what kind of a contact it was, whether the white part was because it had been broken away or whether it was a contact of two different materials. There just wasn't time to investigate that sort of phenomena; so, we tried to simply sample the two types and photograph it. But, as far as dust is concerned, I think we've seen both; and, among the larger boulders, there are certainly a large number that do not have any dust on them.

05 18 18 33 CDR I think that's generally true that we probably would have been aware of dust, because there certainly was a lot of filleting, and we tried document that for you. But, I'd say, generally speaking, there was no dust on any of them - on the surface of any of rocks that we saw. (PRE LIFTOFF)

05 18 18 52 CC Roger, Al. And the next question. When you were high on the slopes of Cone, could you tell any differences in the surface color tone, when you looked back in the area to the south and to southwest? (PRE LIFTOFF)

05 18 19 20 CDR Well, of course, the obvious difference was in the bright craters. Those are always noticeable, and those were there. Beyond that, I wasn't aware of any marked contrast in color, Joe. (PRE LIFTOFF)

05 18 19 37 LMP Well, I don't know whether it's a figment of my imagination or not. I always noted going up there this morning, or thought I noted, that the area around Old Nameless was - there were some darker patches, but we were so preoccupied with finding our way to the top of Cone crater that I neither observed it or made remarks about that observation, nor really observed it that much more closely. (PRE LIFTOFF)

05 18 20 07	CC	Roger, Ed. Hopefully, maybe the pans will pick that up. Okay, next question on. This is for Ed. When you attempted the second triple core, and I think you really answered this in real time, but just to get it straight, did you think you hit another rock, like you mentioned bedrock on the first attempt, or did it just get progressively harder to drive?	(PRE LIFTOFF)(SAMP CORE 14230)
05 18 20 38	LMP	Well, I wasn't quite sure, Fredo, I thought that I hit rock again; but after I pulled it out, it could very well have been just a compaction type of phenomenon where it just quit driving; and I don't know the answer. It felt like in driving it, that I'd hit something pretty solid, but it wasn't as though I had hit a very sharp line of rock as opposed to soft material. It went down fairly well, and then it tightened up and then it just stopped.	(PRE LIFTOFF)(SAMP CORE 14230)
05 18 21 18	CC	Okay, Ed. To back up a little further in time, we missed when the double core test was done. About how far could you push the tube down before you started hammering?	(PRE LIFTOFF)(SAMP CORE 14210-11)
		- - -	
05 18 22 36	CC	I didn't get the answer there, Ed, on how far that double core got manually pushed in before you started hammering on it.	(PRE LIFTOFF)(SAMP CORE 14210-11)
05 18 22 49	LMP	Al had the rest of that, and I didn't put it in.	(PRE LIFTOFF)(SAMP CORE 14210-11)
05 18 22 55	CDR	Are you talking about the first one, Fred?	(PRE LIFTOFF)(SAMP CORE 14210-11)
05 18 22 59	CC	That's affirm, Al.	(PRE LIFTOFF)(SAMP CORE 14210-11)
05 18 23 04	CDR	The double core that I took in the vicinity of point A - went in about 2 to 2 and a half to 3 inches, no more than 3 inches.	(PRE LIFTOFF)(SAMP CORE 14210-11)
05 18 23 33	LMP	If they went that far, I'd be surprised, going back to it.	(PRE LIFTOFF)(SAMP CORE 14210-11)

05 18 23 38 CC Okay, Ed. The question 5 is kind of the same as the first one, and I assume your answer will probably be the same. But the question is: could you describe and in any more detail, and I guess it's really saying did you think you saw any stratigraphy at all in the way the ejecta was laying around Cone crater? (PRE LIFTOFF)

05 18 24 11 CDR I saw a couple of boulders that I thought had some stratigraphy in them, but - it certainly wasn't - you know - obviously not in the classic sense. There was - well, as a matter of fact, we took a sample from one that looked like it had some stratigraphy in it on the way back down. We grabbed a quick sample from one. Well, it didn't jump out and become obvious, however. (PRE LIFTOFF)

05 18 24 40 LMP Fred, everything here especially seems to be pretty darn subtle. And I am convinced there was stratigraphy there because we saw suggestions of it. Just like I'm convinced I see some lineations out here or some suggestions of them, but they don't jump out and hit you in the face; and we'll probably have to go over the photographs and talk about each one of these samples in detail before we can really bring out the picture on it. I just can't remember a lot of those very subtle things. (PRE LIFTOFF)

05 18 25 17 CC Okay, and I assume, on a little bit larger scale, you couldn't detect anything with respect to the hinge-flap type relation in that boulder field around Cone? (PRE LIFTOFF)

05 18 25 34 LMP No, we sure couldn't see that at all. I'm sure it was there, if we'd just had time, but we couldn't see it. (PRE LIFTOFF)

05 18 25 41 CC And this one is for Al. About how deep were you down with the trench, Al, when the side walls started caving in? (PRE LIFTOFF)(SAMP TRENCH)(SAMP SESC)(PHO 64 9158-66)

05 18 26 01 CDR Well, actually, the first cut I took was down to about 6 inches and there was some caving at that time. The side walls were standing probably about 70 to 80 degrees. The next cut I took made the walls a little more steep, closer to the vertical perhaps 80, 85; and, at that point, they started (PRE LIFTOFF)(SAMP TRENCH)(SAMP SESC)(PHO 64 9158-66)

coming down. Fine-grain regolith, at the top of the cut, just a couple down into the trench.

05 18 26 32	CC	Okay, and I guess I asked you in real time the thickness of the intermediate layer, but they'd also like to know if you have any estimate on the thickness of the very top layer.	(PRE LIFTOFF)(SAMP TRENCH)(SAMP SESC)(PHO 64 9158-66)
05 18 27 00	CDR	No, I sure don't. It wasn't - as I say, stratigraphy in the classic sense, because it all started to crumble after the first couple of strokes. That was the place where you, Ed, put the sample of some white-colored material. It was very close to the surface.	(PRE LIFTOFF)
05 18 27 21	LMP	Is the upper layer that you're talking about, the brown, and the next one, and the white? The brown seemed to be showing the white in some places after an inch or 2 inches. I'm not sure it's another layer. But it had to be. I can't find another explanation for it, but it seemed to be very thin; 1 or 2 inches at the top layer.	(PRE LIFTOFF)(SAMP TRENCH)(SAMP SESC)(PHO 64 9158-66)
05 18 27 49	CDR	I think that's probably a pretty good call. I'd say maybe 2 inches; then, of course, we had that thin layer of very glassy material, which I collected, and then the bottom whiter material which Ed got a sample of, as well as the ones I took.	(PRE LIFTOFF)(SAMP TRENCH)(SAMP SESC)(PHO 64 9158-66)
05 18 28 10	CC	Okay, and you've already answered the next part of this question, which was distinction between layers. You had both color and textural distinctions there that told you you had the layering; and I guess the last part, maybe, you've answered too, question is whether the wall caving you think maybe was a natural event, or do you think it was due to the dragging the trench tool through the cut?	(PRE LIFTOFF)(SAMP TRENCH)(SAMP SESC)(PHO 64 9158-66)
05 18 28 52	CDR	Well, I'm not sure I had an unnatural shovel - and I'm not quite sure what the question is now that I think back about it again. What - you mean that - -	(PRE LIFTOFF)(SAMP TRENCH)(SAMP SESC)(PHO 64 9158-66)
05 18 29 09	CC	Actually, I thought you answered that Al, because you - -	(PRE LIFTOFF)(SAMP TRENCH)(SAMP SESC)(PHO 64 9158-66)

05 18 29 19	CC	Your previous comment indicated that it started caving in with your first stroke; and if that was true, then, it looks like the trenching tool helped bring the walls down.	(PRE LIFTOFF)(SAMP TRENCH)(SAMP SESC)(PHO 64 9158-66)
05 18 29 36	CDR	Well, I'm sure that it did. Actually, it was on about the second stroke where it started to occur because the first strike there was a - the walls were a lot steeper. But, I'm sure the tool had a lot to do with it.	(PRE LIFTOFF)(SAMP TRENCH)(SAMP SESC)(PHO 64 9158-66)
05 18 29 54	CC	Okay, the next question. When we were sort of quickly passing by North Triplet crater on the way back to Antares, you mentioned in passing there coming upon a little boulder field; and the question is: do you think this boulder field was tied in some way to North Triplet, possibly part of a ray?	(PRE LIFTOFF)(SAMP 14301; 14313)(PHO 64 9188; 68 9465-67)
05 18 30 31	CDR	I don't recall that we inferred they were boulders. I think that we thought they were a field of ejecta material from that particular crater, and therefore, we took some samples there. Is that the spot you are referring to?	(PRE LIFTOFF)(SAMP 14301; 14313)(PHO 64 9188; 68 9465-67)
05 18 30 50	CC	Yes. That's it, Al.	(PRE LIFTOFF)(SAMP 14301; 14313)(PHO 64 9188; 68 9465-67)
05 18 30 55	CDR	Yes. If we inferred they were boulders, that was incorrect. They were just hand samples of perhaps up to 8 to 10 inches but all lumped together as though they had been ejected from that crater and right in our path, and we took a couple of samples from those, that area.	(PRE LIFTOFF)(SAMP 14301; 14313)(PHO 64 9188; 68 9465-67)
05 18 31 11	LMP	As a matter of fact, there were boulders which we also thought came out of probably the same area; but there wasn't anything around the boulders that seemed small enough and obvious enough to grab on the run, like we tried to do with this bunch of samples.	(PRE LIFTOFF)(SAMP 14301; 14313)(PHO 64 9188; 68 9465-67)
05 18 31 28	CC	The next question is: did you see any evidence of downslope creep with respect to the Cone crater fillets you saw on the uphill-side rocks?	(PRE LIFTOFF)

05 18 31 51 LMP Yes, I did, and I'm not so sure but what part of the - the lineation that I was talking about would not be found on Cone in a circular - around the crater mouth. I saw these same things up there. I described them before, so I didn't say anything about it again; but my guess is that they go circular around Cone crater. Now, that may be entirely wrong. (PRE LIFTOFF)

05 18 32 30 CC You mean kind of like contour lines, Ed? (PRE LIFTOFF)

05 18 32 32 LMP *** probably for direction. That's what I'm suggesting, but it's merely a suggestion, and I didn't follow them out. I didn't check them that closely to be able to prove it; but where I did see them, they were, indeed, kind of parallel to the slope - I mean parallel to the rim of the crater, in other words, around the crater. (PRE LIFTOFF)

05 18 33 01 CC Very good, Ed. Next question. The difficulty you had at the last there climbing up to Cone rim, was that due primarily to the terrain slope or did the soil conditions change again that caused you to have some greater problems? (PRE LIFTOFF)

05 18 33 32 LMP I think probably both. I think we just entirely under estimated the difficulty in going that far and getting that high, and in such a short period of time. It's a darn hard climb to try to do rapidly, and the soil is a little bit thin and mushy. And the suits are bulky; it's all those problems rolled in, Fred; we just - it was too ambitious, I guess. (PRE LIFTOFF)

05 18 34 02 CDR Let me say that I don't really think that the composition of the soil changed very much. Matter of fact, that was one thing that struck me about the whole area; the consistency of the texture of the regolith outside of soft areas, of course, in crater rims. I think as far as the progress up there, it was due to the grade and the boulders and the rocks that we had to go around; but really, as far as the surface texture is concerned, as far as the bearing strength of the surface, I thought the outside of the crater rim, that it was unusually consistent all the way through. And the thing that surprised me was the raindrop pattern with these very small surface pebbles, which is decidedly different than we had down here in this area where we landed. (PRE LIFTOFF)

05 18 35 03 LMP I think we remarked on the similarity of the surface. I think I remarked, at one spot, that it seemed to be getting a little harder up there, but that seemed to have been isolated. It wasn't true in general; it seemed to be in that one local area. And certainly, as Al pointed out, the softest areas, by and large, are crater rims, fairly fresh crater rims. And when you run in through one of those, you get some fairly soft material; but, otherwise, it's about like you saw here near the LM on television, the way we were pressing into that. (PRE LIFTOFF)

05 18 35 48 CC Roger. The next question is, how abundant and what was the distribution of glass that you saw around on the surface or, I guess, in one case you mentioned it, there draped on the rocks. (PRE LIFTOFF)

05 18 36 10 CDR Yes, we went roaring past one rock; and, well, what looked like glass - I'm pretty sure that it was, and I'm sure there are other samples of that out here, but we did not see them. That was really the only example of glass that I could positively identify - come close to positively identify as being glass per se. There are some crystalline rocks out here, and I'm sure we got some samples for you. (PRE LIFTOFF)

05 18 36 46 LMP I concur with that. I'm surprised that we didn't obviously see more glass. A lot of the smaller rocks that we did pick up that were sample size were so darn dirty that they may have glass in them, but they're just covered with it - this dirt which clings to everything. And why the big rocks, the big boulders that you asked about earlier, are not covered in the same way, I don't know. Maybe some of them are, but it really covers up what the rock is made of and it probably obscured a lot of glass that we just didn't even see. (PRE LIFTOFF)

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05 18 37 53 CC The next question here - did you notice the dust adhering to the MET particuarly and if so, what parts? (PRE LIFTOFF)

05 18 38 21 LMP If you got a direct hit with mud - with this dust, Fred, if it's sprayed on something, it seems to stick. It just covers everything. And, I'm looking (PRE LIFTOFF)

down out the window at the MET; surprisingly enough, it doesn't look too bad. The fenders, the wheels, the lower parts, the legs, yes, they're pretty covered with dirt; and there's quite a bit spread up and spattered around a little bit; but it looks surprisingly good, as a matter of fact. Maybe it just doesn't have enough porous surface.

05 18 39 09 CC Okay, Ed. One more question here. You mentioned seeing blocks around the rim of North Triplet. Did you happen to get a look far enough down there to see if you also saw either blocks or ray patterns from Center Triplet crater? (PRE LIFTOFF)

05 18 39 34 LMP Fredo, it's so darn undulating here, that was part of our problem. We couldn't even see Central Triplet crater. We knew it was there, but you can walk in some of these undulations and get lost from each other, if you're not careful. You just can't find where you are. And, we couldn't even see anything from Central Triplet and know it was from that. (PRE LIFTOFF)

05 18 40 06 CC Okay; and, I guess, one last question here to clear up what ended up in the SESC out of the bottom of the trench. The question - this is for Al. Did you primarily end up with fine-grained or coarse-grained material in the SESC? (PRE LIFTOFF)(SAMP SESC 14240)(PHO 64 9158-66)

05 18 40 32 CDR It's all fine-grained material. Some of it is from the surface, and, unfortunately, when I opened the first canister, the seal came off the canister in the bottom, so I had to go back and regroup and get another one - take another sample. But I think I got mostly from the bottom of the crater - bottom of the trench; however, it is all fine-grained. There's nothing of any greater size. (PRE LIFTOFF)(SAMP SESC 14240)(PHO 64 9158-66)

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05 18 41 46 LMP There were some things that we'd like to have done - yes, I think you're right, Fredo. There are so many things we'd like to have done; so many things to do, so many interesting things to look at here, and we didn't even have the chance to scratch the surface. We hope we've brought back something that you can sort out, as time goes on. (PRE LIFTOFF)

* * * * SEPARATE COMMUNICATIONS BETWEEN CMP AND HOUSTON * * * *

05 18 07 17	CMP	I was just - you know, not only seeing the LM, I saw the Sun glinting off the ALSEP, I'm sure. And I was just wondering if it was deployed out by that crater at about CL 0.8 or 85/65.	(ORBIT)
05 18 07 44	CC	I got a map here. Looks like it was about pretty close to CR and 63, is the ALSEP.	(ORBIT)
05 18 08 01	CC	Charlie Romeo and 63. It's really Charlie Quebec 0.9 and about a 63.2.	(ORBIT)
05 18 08 42	CMP	Well, now, I'm wondering if I got my direction from the LM - you can get the LM because it's by the Triplet.	(ORBIT)
05 18 08 53	CMP	And, I just looked out and saw the bright spot going toward - parked out by another crater. And I'm thinking maybe I got my directions from the LM wrong. Is ALSEP out by that crater called Neighbor on the map?	(ORBIT)
05 18 09 16	CC	Wait a minute; I don't have Neighbor on this particular map I'm looking at. ALSEP is kind of between Doublet and Triplet, if you can see that part of it there. And, it's toward Doublet from the LM.	(ORBIT)
05 18 09 34	CMP	Yes, well that's where I called - that's where I said the first time and it didn't fit in. You told me Charlie Quebec 0.9.	(ORBIT)
05 18 09 45	CC	Wait I, Stu, until I get the right - same map you're looking at.	(ORBIT)
05 18 10 11	CC	I was looking at a smaller map. It's got some more numbers in there. You're right. It's really right there by Neighbor, just south of Neighbor. It's right in a line between the center crater of Triplet and Doublet.	(ORBIT)

05 18 10 53 CMP Well, now, the coordinates that I called the first time just - you know, I didn't compare the map when I was looking through the sextant, but it looked to me like the - just judging on here, the ALSEP would be about CL 0.9 and right at 65, maybe 64.9. And, see, there's a little crater. See that little crater right there at about CL 0.8 and maybe 64 - 64.5, or something like that? (ORBIT)

05 18 11 34 CC Yes, I think that was the ALSEP - - (ORBIT)

05 18 11 36 CMP Yes, I think right there is - yes. I can see the Sun shining off the beauty. (ORBIT)

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TABLE I. APOLLO 14 SAMPLE LISTING CROSS-REFERENCED TO APOLLO ELAPSED TIMES

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIME (AET)
14001-12	FINES, CHIPS, & RESIDUE - CONTINGENCY SAMPLE	04 18 01 39
14041-44	ROCKS, CHIP, & RESIDUE	05 12 21 31
14045-46	ROCK	05 12 21 31
14047-48	ROCK	05 12 34 01
14049-50	ROCK	05 12 42 16
14051-52	ROCK	05 13 28 24
14053-54	ROCK	05 13 51 50
14055-62	ROCK, CHIPS, & RESIDUE	05 14 01 03
14063-65	ROCKS & RESIDUE	05 13 43 12
14066-67	ROCK	05 14 06 19
14068-72	CHIPS	05 13 35 48
14073-79	CHIPS - BOTTOM OF TRENCH	05 14 33 13 05 18 25 41
14080-81	CHIPS - MIDDLE OF TRENCH	05 14 32 10 05 18 25 41
14082-84	ROCK & RESIDUE	05 13 42 31 05 18 16 12
14140-43	FINES	05 13 35 48
14144	FINES - PART OF EARLY BIO SAMPLE	05 13 35 48
14145-48	FINES - SURFACE OF TRENCH	05 14 29 19 05 18 16 12
14149-52	FINES - BOTTOM OF TRENCH	05 14 33 13 05 18 16 12
14153-56	FINES - MIDDLE OF TRENCH	05 14 29 42 05 14 32 10 05 18 16 12
14160-63	FINES - BULK SAMPLE	04 21 58 01 04 22 00 26
14165-89	FINES, CHIPS, & RESIDUE - COMPREHENSIVE SAMPLE	04 21 41 52

TABLE I. CONT'D.

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIME (AET)
14190-204	FINES, CHIPS, & RESIDUE	
14210	BOTTOM DOUBLE CORE TUBE	05 12 09 00 05 18 21 18
14211	TOP DOUBLE CORE TUBE	05 12 09 00 05 18 21 18
14220	FIRST SINGLE CORE TUBE	05 14 11 24 05 14 27 00
14230	SECOND SINGLE CORE TUBE	05 14 26 20 05 14 36 05 05 18 20 07
14240	FINES - SESC	05 14 35 37 05 18 25 41 05 18 40 06
14250-89	FINES, CHIPS, ROCKS, & RESIDUE - COMPREHENSIVE SAMPLE	04 21 41 52
14290-97	FINES, CHIPS, & RESIDUE	05 14 56 35
14298-99	FINES - RESERVE FROM 14259	04 21 41 52
14300	CHIP - COMPREHENSIVE SAMPLE	04 21 41 52
14301	ROCK	05 14 47 58 05 18 29 54
14302	PART OF SAMPLE 14305	
14303	ROCK - COMPREHENSIVE SAMPLE	04 21 46 07
14304	ROCK	04 21 47 46 04 21 58 28 04 22 06 47 04 23 38 43 05 01 19 35 05 01 26 58
14305	ROCK	04 21 47 46 04 21 58 28 04 22 06 47 04 23 38 43 05 01 19 35 05 01 26 58
14306	ROCK	05 14 39 31
14307	ROCK	05 14 39 31
14308	PART OF SAMPLE 14311	
14309	CHIP	
14310	ROCK	

TABLE I. CONT'D.

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIME (AET)
14311	ROCK	05 13 55 56
14312	ROCK	05 14 56 35
14313	CHIP	05 14 48 58 05 18 29 54
14314	ROCK	05 14 56 35
14315	ROCK	05 14 56 35
14316	CHIP	05 14 56 35
14317	CHIP	05 14 56 35
14318	ROCK	05 14 56 35
14319	ROCK	05 14 56 35
14320	ROCK	05 14 56 35
14321	ROCK	05 13 44 35 05 13 45 06 05 18 16 12
14401	RESIDUE FROM ALSRC - EVA 2	
14402	RESIDUE FROM ALSRC - EVA 1	04 21 58 01 04 22 00 26
14411	CORE BIT - DOUBLE CORE	05 12 09 00
14414	CORE BIT - FIRST SINGLE CORE	05 14 11 24
14421	FINES - RESERVE FROM UNSEIVED COMPREHENSIVE SAMPLE	04 21 41 52
14422	FINES - RESERVE FROM 14163 - BULK SAMPLE	04 21 58 01 04 22 00 26
14425-53	CHIPS - BULK SAMPLE	04 21 58 01 04 22 00 26

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