

TABLE 5.—Cross-reference of lunar samples with locations, lunar-surface photographs, status of determining sample location and orientation, megascopic sample description, and comments by the astronaut crew during sample collection—Continued

Sample Number	Weight (g)	Lunar-surface Photographs: ^{1,2}	Location Status	Orien-tation ³	Sample description ⁴	Crew comments ⁵
EVA 1—Station: LM Area Toward ALSEP Site: Continued						
14303	898.4	With comprehensive sample. Not identified in lunar-surface photographs.	Approx.	From surface pitting only	A blocky, subrounded rock with zap pits on all but one side and having only a few poorly developed, irregular fractures. The sample is a very friable fine-grained clastic rock having less than 1 percent subrounded light-colored clasts in a medium-gray matrix.	<p>CDR: Put your UHT [Universal Hand Tool] handles for it.</p> <p>LMP: I'll use this handle. Fortunately, I don't think more than a little bit fell out.</p> <p>CDR: Okay, we've got it packed down to only half full. ***</p> <p>CDR: Okay, Houston, for your information, documentary location shots of the comprehensive sample taken on [film roll] JJ and I'm now showing 40. ***</p> <p>CDR: And on the comprehensive sample, Houston, I feel we have about 15 rocks, and some fines. One weigh bag [No. 1039] is going in the SRC. ***</p> <p>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.</p> <p>CDR: Now I'll head on back a little farther, get a football-size rock.</p> <p>CDR: There's some pretty good-sized ones back over in here. Okay, that's too big. I'll get one that's a little smaller. ***</p>
14304	2498.9	67-9390 XSB 67-9391 XSB	Approx.	Known	A blocky, subangular rock cut by a few poorly developed, irregular fractures. Zap pits are not prominent, and all surfaces appear immature. The rock is a coherent breccia with a moderate percentage of angular to subrounded, blocky to slabby dark clasts in a very light gray matrix. A very small percentage of light clasts is present.	<p>CDR: Okay, Houston, you can see the area where the football-sized rock [14304] 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 a small football-sized rock—no, it turned out to be two of them.</p>
14305	2497.5	67-9392 XSB 67-9393 XSB	Approx.	Known	A blocky, subangular rock with a poorly developed set of planar fractures. Two nearly planar faces of the rock appear to be controlled by splitting along planar fractures. Zap pits are inconspicuous, and all surfaces appear immature. The rock is a coherent breccia with a moderate proportion of subrounded dark clasts and subordinate light clasts in a very light gray matrix.	<p>CDR: The second small football [14305] is from near the same crater. 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.</p> <p>CDR: There looks to be a fairly large crystal in that second small football rock and now starting back toward the MESA. ***</p> <p>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. ***</p> <p>CDR: 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. [Weigh bag 1027] ***</p> <p>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. [1027] We couldn't get them all in the SRC. We got in 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 [1039] with these other rocks. And the weight of that total combination is 5 pounds. ***</p> <p>LMP: And, Houston, the next bag [1027] has two toy-sized football rocks in it. And they weigh 15 pounds total. ***</p> <p>LMP: And that's going into the left-hand storage compartment. ***</p> <p>LMP: Okay, Houston. Both of those rock bags [1027, 1028] are going to left-hand storage compartment.</p> <p>CC: Okay, Ed. That's the one with the contingency sample and the comprehensive and the football ones, right?</p> <p>LMP: That's affirmative. [Note: The contingency sample went into SRC-1 along with weigh bag 1039.] ***</p> <p>CC: Okay. Next question: on the football samples, were they documented?</p> <p>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 CR.1 and 64.6. They came from the southwest rim of that crater.</p>

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Sample Number	Weight (g) ¹	Lunar-surface Photographs: ^{1,2}	Location Status	Ori-entation ³	Sample description ⁴	Crew comments ⁵
EAV I—Station: LM Area Toward ALSEP Site: Continued						
14160	196.5	Probably in LM window photographs but not identified	Unknown	NA	Bulk sample, weigh bag 1028	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.
14161	197.1				4-10 mm fines	LMP: Which one, the big one? Why don't you let me help you with the—let's take the shovel, Al; it'll be faster.
14162	288.7				2-4 mm fines	CDR: Okay, where's that tin scoop?
14163	7129.8				1-2 mm fines	LMP: Which one, the big one? Why don't you let me help you with the—let's take the shovel, Al; it'll be faster.
14422	251.0				<1 mm fines	CDR: All right.
14425	9.79				reserve from 14163	LMP: Trenching tool.
14426	1.59				rock chip	CDR: Want to hold the bag?
14427	4.47				rock chip	LMP: Yes.
14428	1.47				rock chip	CDR: Let's hit that little crater out there. It looks like a secondary.
14429	3.03				rock chip	LMP: Okay, let's go get it.
14430	4.81				rock chip	CDR: Right out here.
14431	1.70				rock chip	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.
14432	1.81				rock chip	LMP: There's a little different-colored layer at the bottom of it there.
14433	1.23				rock chip	CDR: Yes. Scoop it out.
14434	1.68				rock chip	LMP: See, there's a different color there, maybe.
14435	0.92				rock chip	CDR: Okay, how does that look to you?
14436	3.76				rock chip	LMP: I can take another shovelful. That's good.
14437	2.65				rock chip	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.
14438	3.35				rock chip	CDR: We'll put a documented sample bag in there with it, and that will be bag number 1. Here you go, Ed.
14439	1.00				rock chip	LMP: Okay, put it in.
14440	1.50	rock chip	CDR: One November. [Weigh Bag 1028]			
14441	0.23	rock chip				
14442	3.52	rock chip				
14443	2.54	rock chip				
14444	1.56	rock chip				
14445	9.22	rock chip				
14446	0.82	rock chip				
14447	0.91	rock chip				
14448	1.06	rock chip				
14449	1.70	rock chip				
14450	1.27	rock chip				
14451	2.10	rock chip				
14452	1.77	rock chip				
14453	6.03	residue from EVA 1 ALSRC				
14402	0.20	[Apollo Lunar Sample Return Container]				
EVA 2—Station: A						
14211	39.5	64-9046 XSD	Known	NA	Double drive tube (upper) (lower)	CDR: Fred, the surface, here 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 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 [for Station A].
14210	169.7	64-9047 XSD 64-9048 LOC				LMP: Yes, this is a good place for A and we 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.
						CDR: Yes, I think that there's a relationship between the texture and these small surface pebbles. Okay, point A.
						LMP: Okay, at point A, we do a double core [drive tube].
						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 metres in diameter. The ones to the north are more fresh, more sharp; the one to the left is more subdued. I'm pretty sure we're just about where point A is on the map; it fits the description of it.
						CC: Okay, and Al, a word from the back room says go at least two crater diameters away from the crater you're just describing, when you get ready to take the double core.
						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.
						CDR: Okay, all set up for the double core here.
						CDR: The bottom core tube will be number 2, no tab. [14210] Top core tube will be number 3, no tab. [14211]
						CDR: Okay, Houston. A couple of quick stereos and the locator of the core tube as it's about to be driven, and the LM is in the background.
						CDR: Okay, Houston. We got almost two complete tubes here, about one and seven-eighths tubes. I would say.

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EVA 2—Station: A—Continued						
14411	5.5				Core bit, double drive tube	CDR: And the core bit [14411] just for the fun of it, is going in bag 2 November. If we can get it back. CC: And Al, they'd like a description of the surface where you drove the core tube.
14041	166.27	68-9409 DSB	Known	Unknown	A blocky, angular rock with a small percentage of its surface coated by vesicular glass. The rock is cut by widely spaced, irregular fractures intersecting at high angles; the rock breaks readily along these fractures. Some surfaces are lightly covered by glass-lined zap pits. The rock is mostly a friable, fine-grained clastic rock with less than 5 percent of subrounded light-colored clasts in a medium gray matrix. A piece of this rock (14043) has a considerably higher proportion of clasts, but is otherwise similar.	CDR: Okay, Fred. Nothing, but it's the same textured pattern of which we spoke coming up in this traverse.
14042	103.19	68-9410 XSB				
14043	5.94	68-9411 XSB 68-9412 XSA 68-9413 LOC				
14044	4.68				Residue from bag 3N	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 site. Other than that, the pebble core ⁹²⁷⁷ sample site is not unique to the traverse, so far. The first core went in fairly easily. I had some difficulty with the last core.
14045	65.24	Same as for 14041-14044			A blocky, subangular rock with a rough, hackly surface. Glass-lined zap pits occur on all but one surface. There are very poorly developed irregular internal fractures, but one face of the sample has broad, parallel steps suggestive of fracture control. The sample is a friable fine-grained clastic rock with very sparse subangular light-colored clasts in a medium-gray matrix.	LMP: And, Houston, the rock I'm sampling seems to be a fairly typical one of this multiple crater that we're working around right now near A, and it's going into the bag 3 November. LMP: It's breaking apart on me as I pick it up. I'll try to get most of the pieces. LMP: Houston, I can't get all of this sample in 3-N. That's going to be able to go in 3-N [14041-14044] and the next one [4-N, 14045-14046]. It looked like it was fractured, and when I picked it up, it fractured into about four pieces.
14046	1.21				Residue from bag 4N	
EVA 2—Station: B						
						CC: 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. LMP: Okay. 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, Fuede. I don't see anything else that might be it, unless it's the next crater up. Al, I've spotted it. That next crater up is this one right here. ⁹²⁸² CDR: Where do you think B is? LMP: I think B's the one we just passed, back there where we were talking. CDR: All right. LMP: And here's the little double crater right beside it. Look here [On the map]. See, there's the little double crater; it's right there in front of you. CDR: Okay, let's grab sample B. ⁹²⁸³ CDR: I'll get a pan, Ed. LMP: Okay. And while Al takes the pan, I'll go ahead and give you a site description. The area here is in an area with 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 approach B from A. Now there are boulders to the north of us; we previously talked of boulders to the north, and doggone if 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. These boulders are filleted, and we'll have to sample that filleting later. The surface texture—the fine is 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. 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 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.
14047	242.01	64-9073 XSB 64-9074 XSB	Known	Known	A blocky, subangular rock with about 10 percent of its surface coated by vesicular glass. Irregular, slightly rounded surfaces are lightly covered by glass-lined zap pits. One nearly planar bounding face of the rock has well-developed slickensides. Multiple sets of irregular fractures occur at one end of the specimen. The sample is a friable fine-grained clastic rock having a small percentage of subangular light clasts in a medium-gray matrix.	
14048	16.17				Residue from bag 5N	

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EVA 2—Station: B—Continued						
						CC: Roger, Ed. And has Al got the grab sample completed and up? CDR: I'm grabbing it now. CDR: We're going to give you a quick stereo of it [64-9073, 9074]. CDR: Okay. Grab sample from the west rim of Bravo Crater, bag 5 November [14047, 14048].
EVA 2—Station: Bg						
14049	200.13	No photographs	Approx.	Unknown	A blocky, subrounded rock lacking zap pits and having only a few very poorly developed, irregular fractures. The sample is a very friable fine-grained clastic rock having less than 1 percent of subrounded light-colored clasts in a medium-gray matrix.	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 has some pretty good chunks of rubble on the insides. This is about the freshest crater this size we've seen, Al. CDR: That's correct. This is a very fresh crater. It's about opposite to the crater at stop E. It's a crater about 20 metres in diameter and about 2 metres deep, and I'll get a quick rock from the side. LMP: Al just dropped down on a knee to pick up a rock, and he went in 3 or 4 inches. ***
14050	6.91				Residue from bag 6N	CDR: That's just a quick hand sample from the side of that crater. *** LMP: We're starting uphill now. Climb's fairly gentle at this point but it's definitely uphill. CDR: Okay, that sample from the west rim, of the crater, which we described as blocky, is in bag 6.
EVA 2—Station: C' (Prime)						
14051	191.31	68-9443 XSB 68-9444 XSB 68-9445 DSB 68-9446 XSA 68-9447 LOC	Known	Known	A blocky, subrounded rock with all surfaces lightly covered by zap pits with or without glass linings. Spall-like fractures occur locally. Irregular to rounded cavities 1-3 mm across may be clast molds. The sample is a friable, fine-grained clastic rock having a small percentage of subrounded light and subordinate dark clasts in a medium-gray matrix.	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 [of Cone Crater] 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. *** CDR: I would say, Houston, that most of the boulders are the same brownish gray that we've found. But we see one that is definitely almost white in color. 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. LMP: This area that 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 [14051-14052]. *** CDR: Okay. 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. *** CDR: On second thought, forget that core tube. It's too granular and most of the material came out of the tube. *** CDR: Hand me the shovel, please, Ed. CDR: Right now I'm sampling a layer that is sort of a light gray just under the regolith. That went in bag number 9 [14140-14143] and bag number 10 [14068-14072, 14144] was a sample of some of the surface rocks that were right around that area. It looks like a secondary impact that has disrupted the surface regolith and gone on down into the gray area. *** CDR: The first thing that we ought to do, if we want to drag the MET with us, is—see that white boulder down there. LMP: Yes. I saw it. Let's grab a— CDR: We can sample both types of boulders right down in that area, so let's go on down there. *** CDR: Okay. I guess we just run down there this way, huh?
14052	2.89				Residue from bag 7N	
14068	35.47	64-9125 XSB	Known	Tentative for rocks	All rocks are blocky, angular to subrounded with very rough surfaces. 14068 appears to be shattered on one side, but otherwise the rocks are unfractured. All lack zap pits, but irregular vugs are moderately developed. The samples are fine-grained crystalline rocks with sparsely scattered large (to 1 mm) white grains.	
14069	24.87	64-9126 XSB				
14070	36.56	64-9127 XSA				
14071	2.16					
14072	45.06					
14140	12.57				4-10 mm fines	
14141	28.50				<1 mm fines	
14142	5.35				1-2 mm fines	
14143	6.73				2-4 mm fines	
14144	4.77				unsorted fines	

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EVA 2—Station: C' (Prime)—Continued						
						LMP: Yes. CDR: Okay. One of these boulders, Fredo, is broken open. They're really brown boulders on the outside, and the interface that's broken is white, and then another one that most of it is white. They are right in the same area. CC: Okay, Ed. I assume you're going to sample some of those. LMP: That's where we're headed right now. It's about 50 yards away. CDR: Why don't you go on down and start, and let me bring the MET down. LMP: All right. Yes. It's further than it looks.
EVA 2—Station: C1						
14082	62.63	68-9452 XSA 68-9453 XSA (After chipping but before bagging? Rock may be seen on fillet in 68-9452.)	Known	From surface pitting only	A blocky to slightly slabby, angular rock with a very rough surface. Glass-lined zap pits are very sparsely distributed over one surface. There are no fractures. The sample is a very friable, fine-grained clastic rock with a few percent of subrounded dark clasts in a very light gray matrix. Clasts are locally concentrated in a thin layer at one end of the specimen (14083). Residue from bag 13N	LMP: Okay. Fredo. I'm right in the midst of a whole pile of very large boulders here. (I'll) see what I can do to grab a meaningful sample. First of all, let me start photographing this whole area. LMP: They're awful darn big, but there's hardly anything that I can find. Let's see if I can chip one. *** LMP: I've chipped off one of the white rocks I put it in bag 13-N. [14082-14084]. I'll photograph it. There doesn'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.
14084	0.83	No photographs	Approx.	Unknown	Blocky, subangular to subrounded rocks with a light to moderate density of glass-lined zap pits. Irregular fractures are poorly developed. A number of subrounded clast molds occur in both rocks. The samples are friable breccias having about 40 percent of subangular to subrounded clasts in a very light-gray fine-grained matrix. Dark clasts are subordinate to light clasts. Residue from bag 16N	CDR: (I am) just going around picking up hand-size grab samples from the immediate vicinity of where Ed is operating. I have a couple that are going in bag 16 [14063-14065].
14063	135.45					
14064	107.53					
14065	7.72					
14321	8998.0	64-9128 XSB 64-9129 XSB	Approx.	Known	A blocky, subrounded rock with a moderately dense covering of glass-lined zap pits on all surfaces. Multiple irregular fractures are well developed along one edge of the sample. The rock is a coherent breccia with about 40 percent of blocky, angular to well-rounded clasts of which the great majority are dark. The matrix is very light gray.	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. *** CDR: Put it right in here. LMP: I don't think it'll go. CDR: Yes. Core tube's out of the way. *** CDR: These boulders in this field 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.
EVA 2—Station: C2						
14053	251.32	64-9130 XSB 64-9131 XSB 64-9132 XSB 64-9133 XSB (Sample not identified)	Known	From surface pitting only	A blocky, subrounded rock with glass-lined zap pits on only one side. Vugs lined with a light colored mineral are present. The sample is an equigranular, fine-grained crystalline rock.	CDR: Okay. We're now out of the boulder field, Houston. And proceeding on down the flank. And, I believe—just get a shot—let's get a sample of that baby right there. Let's grab some from that one. LMP: Okay. CDR: We're just going to get a quick grab here of a rock. I'll photograph it because it's got some tremendous fillets on it. Don't hit the fillets until I photograph it, and 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. LMP: No, man; that's hard, hard, hard! Look at that *** in it. CDR: Yes. Okay, here's a piece of it. Bag? LMP: *** crystals here, don't lose it. LMP: Houston, the rock we're taking is in 14-N [14053-14054]. LMP: *** large filleted rock that Al photographed. Okay, let's go on.
14054	0.52				Residue from bag 14N	

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EVA 2—Station: Dg						
14311	3204.4	No photographs	Approx.	From surface pitting only	A blocky, subrounded rock broken into four pieces along irregular fractures. Irregular vugs are sparsely distributed through the rock. The sample is a coherent clastic rock with a few percent of subangular clasts, mostly light-colored, in a fine-grained crystalline groundmass.	CDR: Okay. I hate to make a grab here that's not from this crater. It looks like that cuts fairly deep, though. [Plank crater?] LMP: Yes. Here's a whole batch of them right down here. Al. Let's grab those. CDR: Which way, left or right? LMP: Off to the left ahead, around that little crater. They're all from this same area. CDR: Houston. Unable to see any stratigraphy in any of these craters. The slumping has been such that it's pretty much destroyed. LMP: I'll grab this one right here [14311?] LMP: As a matter of fact, I think this is Plank right here. CDR: Get it on board? LMP: Yes. I've got the rock on board [14311?]
EVA 2—Station: E						
14055	110.99	No photographs	Approx.	Unknown, or from surface pitting only	14055, 14058 are blocky, subangular to subrounded rocks lightly covered with glass-lined zap pits. A few poorly developed irregular fractures occur. 14055 has about 15 to 20 percent of its surface coated by vesicular glass. The samples are friable, fine-grained clastic rocks with 5 to 15 percent of subrounded light-colored clasts in a medium-gray matrix.	LMP: This is a big crater. It's 40, 50 metres across. It has a fairly sharp crater in the south edge of it, which is— CC: Okay, that looks like it may be the one by E. LMP: —20, 30 feet across. Yes, I think that's it. Fredo. And it's—no, it's at least 50 or 60 feet deep. CDR: Why don't we just grab a couple from right here. LMP: Yes. Okay. CDR: That baby came apart. Very soft. LMP: Yes, it's falling apart as you pick it up, very crumbly, isn't it? CDR: Very, very soft rock—rim of that crater, plus another one very close to us with crystal in it, now going into bag— LMP: 15-N.
14056	6.38					
14057	5.51					
14058	4.53					
14059	8.68					
14060	2.50					
14061	3.11				14056, 14057, 14059, 14060, 14061 are blocky, subrounded rocks mostly lacking zap pits and fractures. The samples are very friable, fine-grained clastic rocks with less than 5 percent subrounded light-colored clasts in a medium gray to brownish-gray matrix.	
14062	27.50				Residue from bag 15N	
EVA 2—Station: F						
14066	509.8	64-9137 Pan B may include sample	Approx.	Unknown	A blocky, subrounded rock whose rounded faces are heavily covered by glass-lined zap pits. The rock is very blocky at one end and has a few other irregular fractures. The sample is a moderately friable breccia having 15 to 20 percent of subangular dark clasts and a few light clasts in a fine-grained light-gray matrix.	LMP: Okay, I think this is Weird [crater] to our right here—forward, Al. See that fresh one right there? I think that's the fresh one of the Weird pattern. CDR: It looks too small, I believe. Well anyway, yes, we're in the area, Houston. We've got a minute to find it. CC: Okay, Al, I think the pan will fill us in as to the exact position. CDR: Okay. panning's underway, now. CDR: Did you get a grab sample, Ed? LMP: I just got some right up here, Al. LMP: This is in bag 17. Fredo.
14067	7.66				Residue from bag 17N	
EVA 2—Station: G						
14220	80.70	68-9454 XSD	Approx.	NA	First attempt at triple drive tube. Recovery only in the bottom section.	LMP: I think we're seeing the rim of the Triplet series right ahead of us, aren't we, Al? CDR: I would say so, yes. We can say that's the rim of the North [Triplet] right there. 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. CDR: I'd say we are. Right here. CC: The number one item is the triple core [drive tube]. CDR: Okay. CDR: The three tabbed ones, we haven't used yet. Let me get them. Ed. CDR: Yes, I think that's the best way to go. Let's make them 1, 2, 3 for simplicity's sake. CDR: The bottom one will be number 1 tube with a tab [14220]. Fredo, the other one will be number 2 with a tab. And the top one will be number 3 with a tab.
14414	5.50				Core bit.	LMP: Fredo, I've tried to push in the triple core tube. I get maybe 3 to 4 inches of pushing in by hand.

TABLE 5.—Cross-reference of lunar samples with locations, lunar-surface photographs, status of determining sample location and orientation, megascopic sample description, and comments by the astronaut crew during sample collection—Continued

Sample Number	Weight (g)	Lunar-surface Photographs: ^{1,2}	Location Status	Orien-tation ³	Sample description ⁴	Crew comments ⁵
EVA 2—Station: G—Continued						
14230	76.7	68-9453 XSD 68-9456 XSD 68-9457 XSD 68-9458 XSD	Approx.	NA	Second attempt at triple drive tube. Recovery only in the bottom section.	<p>And it's just surface stuff; a very soft—it will not support the weight of the core tubes. Now, I've got it balanced, and I can take a picture of it, perhaps.</p> <p>LMP: Okay. We'll try to drive it.</p> <p>***</p> <p>CC: And do I understand correctly, Ed; you're taking care of the triple core on your own there?</p> <p>LMP: That's affirm. Al's digging his trench. I'll go over and help him photograph it in a while. And it's not going in easy, Fred.</p> <p>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.</p> <p>***</p> <p>CC: Okay. The recommendation, Ed, is to pull it up and move over a bit and try it again.</p> <p>LMP: The way this one feels, it'll be the same thing.</p> <p>CC: Okay. Ed; and when you pull it out, they'd like to save the bottom core [14220], and replace it with another one there before you try again.</p> <p>***</p> <p>LMP: Core tube cap on that sample is in 18-N [14414].</p> <p>***</p> <p>LMP: Okay, and I have taken the bottom core of that one, which was core 1 flag; and it's now by itself [14220] as a single core tube; and I'm going to replace that with number 1 unflagged, which is the one Al started to use earlier but didn't get anywhere with it.</p> <p>CC: Okay. Number 1, unflagged, on the bottom.</p> <p>***</p> <p>CC: Are you having any better luck on the triple core this time?</p> <p>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.</p> <p>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.</p> <p>LMP: Okay, I'm getting down low enough; I'm going to have to have an extension handle to finish driving it, I think.</p> <p>CDR: Okay, I'll give it back to you. I'm really kind of through with this trench.</p> <p>***</p> <p>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. I'm maybe driving a millimetre 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. [14230].</p> <p>CC: Okay, Ed. We'll just take your judgment on that; when you don't think you can get it in any further, you can stop there.</p> <p>***</p> <p>LMP: I'll take a final picture of it, to show you how far we got with it.</p> <p>***</p> <p>LMP: Okay, Fredo, the bottom bit on this was 23? Isn't it, Al? That's the one you did.</p> <p>CDR: Twenty-three [Not returned].</p> <p>***</p> <p>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.</p> <p>***</p> <p>LMP: Even though it drove in about 3 inches it didn't get anything.</p> <p>CDR: I've got a trench here. It's going easily, but I need the extension handle to get it deeper. I'm cutting into the rim of a crater which is approximately 6 metres in diameter, has a depth of about three-quarters of a metre. And we're back in about one diameter away from the north—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.</p> <p>***</p> <p>CDR: 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 relatively deep, as far as visual observation is concerned. And</p>
14145	0.92	64-9158 XSB	Known	NA	4-10 mm fines, top of trench.	<p>CDR: I've got a trench here. It's going easily, but I need the extension handle to get it deeper. I'm cutting into the rim of a crater which is approximately 6 metres in diameter, has a depth of about three-quarters of a metre. And we're back in about one diameter away from the north—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.</p> <p>***</p> <p>CDR: 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 relatively deep, as far as visual observation is concerned. And</p>
14146	2.82	64-9159 XSB			1-2 mm fines, top of trench.	
14147	1.67	64-9160 XSA			2-4 mm fines, top of trench.	
14148	71.65	64-9161 XSA			<1 mm fines, top of trench.	
		64-9162 XSA				

TABLE 5.—Cross-reference of lunar samples with locations, lunar-surface photographs, status of determining sample location and orientation, megascopic sample description, and comments by the astronaut crew during sample collection—Continued

Sample Number	Weight (g)	Lunar-surface Photographs: ^{1,2}	Location Status	Orien-tation ³	Sample description ⁴	Crew comments ⁵
EVA 2—Station: G—Continued						
						certainly not any would be picked up by foot-prints, or tracks or the like. But there appears to be some of that here in this trench. ***
						CDR: You know what's happening in this trench; 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, on this trench. ***
						CDR: Okay, Fred. Bag 19 for the sample of the fine—that is, from the surface layer of the trench. [14145-14148] ***
14080	1.94				Rock chips from middle of trench; extremely irregular, angular rocks with very sparse zap pits. The rocks are not fractured, but some surfaces have slickensides. The samples are composed of fragments of fine-grained clastic rocks with sparse light-colored clasts loosely bonded by highly vesicular glass.	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 bag full of that, and we'll mix the surface with the second layer.
14081	0.84					CC: Roger, Al. How deep did you finally end up getting down? 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.
14153	3.91				2-4 mm fines, middle of trench.	CDR: *** and bag 21 [14080-14081; 14153-14156] 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. CC: Okay, Al. What's the thickness of the intermediate layer there? CDR: Well, it's really ephemeral!*** 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. *** CDR: And in bag 20, we'll fill a sample of the bottom material; also, mixed up with some of the surface material (that) has fallen down in on top of it. And that's about 18 inches below surface. [14073-14079; 14149-14152].
14154	5.49				1-2 mm fines, middle of trench.	
14155	3.69				4-10 mm fines, middle of trench.	
14156	137.98				<1 mm fines, middle of trench.	
14073	10.35				Bottom/trench 14073, 14074, 14078, 14079.	CC: Okay, Al. What's the thickness of the intermediate layer there? CDR: Well, it's really ephemeral!*** 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. *** CDR: And in bag 20, we'll fill a sample of the bottom material; also, mixed up with some of the surface material (that) has fallen down in on top of it. And that's about 18 inches below surface. [14073-14079; 14149-14152].
14074	5.16				Blocky, subangular to subrounded rocks lacking fractures and pits. The samples are light gray, equigranular fine-grained crystalline rocks.	
14075	4.66				14076. A blocky subangular, smooth-surfaced rock lacking zap pits. One set of fractures cuts the rock parallel to its long axis. The sample is a coherent heterogeneous clastic rock, one end being a gray matrix, and the other end is a fine-grained clastic rock with sparse dark clasts in a light gray matrix. The contact between the two lithologies is sharp but irregular.	
14076	2.00				14077. A blocky, subrounded rock with a moderately rough surface. Fractures or zap pits occur. Irregular vugs are sparsely distributed over the surface. The sample is a light gray, fine-grained inequigranular crystalline rock with sparse large white grains.	
14077	2.77				<1 mm fines, bottom of trench.	
14078	8.30				4-10 mm fines, bottom of trench.	
14079	3.17				1-2 mm fines, bottom of trench.	
					2-4 mm fines, bottom of trench.	
14149	88.15				Fines from bottom of trench.	
14150	11.08					CC: Okay. And, Al, one question, did you get the SESC [Special Environmental Sample Container] sample out of the bottom of the trench? CDR: Well, I told you the trench was kind 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. *** CC: I guess we'd still like the SESC sample from the bottom of the trench, even though it probably isn't the bottom. CDR: Well, I'll tell you, I'll go back and whack at it a little bit. See what I can do. *** CDR: We're digging the bottom of the trench for you, Fredo. CDR: I'm redigging the trench. *** CDR: I can't believe it. LMP: What's the matter, Al? CDR: Oh, that [vacuum] seal came off that thing. ***
14240 (SESC)	168.0	Trench Documentation 64-9158 XSB 64-9159 XSB 64-9160 XSA 64-9161 XSA 64-9162 XSA 64-9163 XSA 64-9164 XSA 64-9165 XSA 64-9166 DSA	Known	NA		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. Its fracture face is very light gray with very small crystals. [14310] LMP: Okay. Documented samples coming up. CDR: These white rocks on the rim here? LMP: Yes. Document some of that. Here's a rock right here. CC: Okay, has Al moved over by the rim of North Crater now? LMP: Oh, no, we're still at the same place [station G]. That's pretty well disturbed, Al; I'll grab it without much documentation. ***
14310	3439.0	No photographs	Approx.	From surface pitting only	A blocky rock with two rounded surfaces heavily covered by zap pits and the remaining faces free of zap pits and joining along sharply angular edges. Irregular vugs are sparsely distributed through the rock. The sample is a fine-grained, medium gray equigranular crystalline rock.	

TABLE 5.—Cross-reference of lunar samples with locations, lunar-surface photographs, status of determining sample location and orientation, megascopic sample description, and comments by the astronaut crew during sample collection—Continued

Sample Number	Weight (g)	Lunar-surface Photographs: ^{1,2}	Location Status	Orien-tation ³	Sample description ⁴	Crew comments ⁵
EVA 2—Station: G—Continued						
14307	155.0	No photographs	Approx.	From surface pitting only	A blocky, slightly slabby, angular rock cut by multiple irregular fractures. The sample is a moderately coherent breccia with about 20 percent of subangular to subrounded light clasts in a fine-grained medium gray matrix. Seriate size distribution of light clasts is apparent. There appears to be a weak foliation of clasts approximately parallel to the flat side of the rock.	LMP: I'm picking up one of the smaller, whiter rocks, Fredo, near the area where Al is digging. Since it's already disturbed, I'm not going to waste time on much like this one [14307]. LMP: It's going into 25 Nancy.
14306	584.5	68-9459 DSB 68-9460 XSB 68-9461 XSB 68-9462 XSA 68-9463 XSA 68-9464 LOC	Known	Known	A blocky, subangular rock with one flat face lightly covered by glass-lined zap pits and remaining rounded faces more densely covered by pits. A prominent planar fracture, lined by vesicular glass, makes an angle of about 20 degrees with the long axis of the sample. The rock split along this fracture exposing part of the fracture surface and its glass coating. A poorly developed set of planar fractures at an angle of 65 degrees to the prominent fracture. The rock is a coherent breccia having 25 or more percent of irregular, blocky to slabby, angular to subrounded light clasts in a medium gray matrix. The glass-lined fracture appears to cut matrix and clasts alike.	LMP: One more documented sample. CC: Okay, there is a special request that they grab samples at the North Crater. In there, they'd like to get a documented sample of a partially buried rock. LMP: Okay. I was going to try to get a rock of these right here, but it looks pretty good. I think maybe I can get it anyhow. LMP: This documented sample, since part of the buried rock, it's too big for the standard bags. See what I can do with it. I'll put it in a sample bag—I'm sticking one over it, so it'll never close. Okay, it's going in. I think it probably stay, but it won't close. LMP: It's bag 26-N [14306].
EVA 2—Station: G1						
						CC: Ed and Al, we're going to be heading out starting Triplet [Station G] here with the bag. Brief stop at the North rim to grab one documented sample [Station G1]. LMP: We're approaching Triplet from the east, that's North Triplet from the east. There's a little rock field down here—small boulder field. Al. Want to get a documented sample from it? CDR: Okay. LMP: Looks good. Yes, looks like they might have come from there. CDR: Man, that pile of rocks right by your left. Oh, just the right size. LMP: Okay. LMP: Are these the ones over here? LMP: Gnomon is in place. LMP: I'm on this side; I'll get the bag. LMP: Get the locator. CDR: Okay. CDR: All covered with--- LMP: Yes. It's bigger than we thought. Al, we'll grab sample that one [14301]; I'll grab another one here. CDR: Okay. Listen, just put it in that bag. And let's press—because we don't have the time. LMP: All right, I'll grab it, and let's take an extra picture here.
14301	1360.6	64-9188 DSLOC,B 68-9466 XSB 68-9467 XSA	Known	Known	A blocky, subrounded rock with a moderately dense cover of glass-lined zap pits. Several irregular fractures cut the rock and spalling along two intersecting fractures left a V-shaped protuberance on one side of the rock. The sample is a coherent medium gray clastic rock with sparse subangular light clasts and less abundant dark clasts in a fine-grained matrix.	CDR: All right, I'll grab one right next to the foreground [14313]. CDR: Okay, bag 27 Nancy. LMP: And another documented sample, a larger documented sample than we thought we were getting here, Fredo. Again, it has a buried rock; and it's too big for the sample bags so it'll go into the weigh bag [14306]. LMP: It has a very definite shape, so I think I could be able to sort it out [14313]. CC: Okay, Al and Ed, I guess we can go on the rim of North Crater and proceed right over back to the LM area. LMP: Okay. That's where we are. Let's get at the rim of North Crater.
14313	144.0	64-9188 DSLOC,B 68-9465 XSB 68-9466 XSB 68-9467 XSA	Known	Known	A blocky, subangular rock with a prominent notch produced by spalling along two sets of fractures intersecting at an angle of 105 degrees. All surfaces have a light to moderate density of glass-lined zap pits. The rock is a coherent breccia having about 10 percent of well-rounded to subangular clasts in a medium gray matrix. Both light and dark clasts occur, but there are fewer dark clasts.	CDR: Okay, we're approaching the LM now. Coming in at Fra Mauro Base. CC: Roger, Al, and I guess from here we can split up; and Ed can take the MF P and proceed to the cluster of boulders he had reported earlier
EVA 2—Station: H						

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Sample Number	Weight (g)	Lunar-surface Photographs: ^{1,2}	Location Status	Ori-entation ³	Sample description ⁴	Crew comments ⁵
EVA 2—Station: H—Continued						
						to the north of the LM; and you can proceed out to the ALSEP. ***
						LMP: I'll just take a couple of rock bags, put on my tongs and camera, and go. ***
						LMP: As a matter of fact, Fredo, I'm just going to take a weigh bag [1038] and no sample bag; that way I can get more. The size of these rocks—the sample bags are too small, anyhow. ***
14312	299.0	68-9472 XSB 68-9473 XSB 68-9474 XSB 68-9475 XSB 68-9476 XSA 68-9478 Pan A 68-9479 Pan A	Known	Known	(Eastern rock from top of Turtle Rock) A blocky, angular rock cut by irregular fractures parallel to the long axis of the rock. Glass-lined zap pits are moderately dense on all surfaces. The rock is a coherent breccia with a moderate percentage of angular dark clasts which tend to blend with the light gray matrix. A very few light clasts are present.	LMP: Okay, Fredo, my plan: I'm out in the area of the boulder field; I'm going to photograph many of the big ones, what have you, and then, grab as many of 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. ***
14314	115.7	68-9472 XSB 68-9473 XSB 68-9474 XSB 68-9475 XSB 68-9476 XSA	Tentative	Unknown	(Rock taken from fillet below Turtle Rock) A slabby, angular rock with no apparent zap pits. All surfaces appear immature. Several irregular fractures are parallel to the flat surface of the slab. The slabby shape of the rock appears to be controlled by fractures. The rock is a coherent breccia with a medium gray matrix and a moderate percentage of light and dark clasts. Light clasts appear to be predominate.	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.
14315	115.0	68-9468 XSB 68-9469 XSB 68-9470 XSA 68-9471 XSA	Known	Tentative from lab model	A domical, blocky rock with one nearly flat non-pitted side and the rest rounded and heavily pitted. A set of closely spaced fractures makes angles of 10 to 15 degrees with the flat surface of the rock. The rock is a coherent breccia in which light clasts are dominant. The estimated percentage of clasts is 40 percent. The matrix is medium gray.	
14316	38.2	Not identified in North Boulder field photographs	Tentative	Unknown	A subslabby, subangular rock with one flat surface free of pits and the rest rounded and irregular with numerous glass-lined pits. Planar to subplanar glass-lined fractures are parallel to the flat surface of the rock and the rock has broken along one of these. The rock is a coherent breccia with an estimated 20 percent of blocky subangular to rounded clasts in a medium gray matrix. The clasts are dominantly light. One medium gray clast itself contains white clasts, probably clastic feldspar. One light clast contains lighter clasts.	
14317	16.1	Not identified in North Boulder field photographs	Tentative	Unknown	A slabby, angular rock with no apparent zap pits. All surfaces appear immature. A few irregular fractures are parallel to the flat surface of the slab. The rock is a coherent breccia with a small percentage of light clasts up to 3 mm across. The matrix is fine-grained and gray.	
14318	600.2	68-9468 XSB 68-9469 XSB 68-9470 XSA 68-9471 XSA	Known	Known	A blocky, angular rock, heavily pitted on all sides. A series of well developed, parallel fractures is parallel to one surface of the rock and the long axis. The rock has broken along one of these fractures and no pits are present on the broken vesicular glass. The glass-lined fractures appear to cut clasts and matrix alike. The rock is a tightly coherent breccia with an estimated 50 percent clasts. Of these 60 percent are judged to be light and 40 percent dark or mesocratic. One light clast has a dark clast within it and several dark clasts contain light clasts.	
14319	211.6	68-9472 XSB 68-9473 XSB 68-9474 XSB 68-9475 XSB 68-9476 XSA 68-9478 Pan A 68-9479 Pan A	Known	Known	(Western rock from top of Turtle Rock) A blocky, angular rock with a highly irregular surface. There is a low density of glass-lined zap pits on 3 faces of the rock which are somewhat rounded. The rest of the surface has no pits. One face is extremely fresh. Several irregular fractures cut the rock at a variety of angles. The rock is a coherent breccia that is broken apart along fractures. Clasts make up 30 percent of the rock and dark clasts are by far the dominant type. Some of these have white clasts within them.	
14320	64.9	Not identified in North Boulder Field photographs	Tentative	Unknown	A slabby, angular rock. One side appears fresher than the rest but sides have about the same high density of glass-lined pits. Several irregular fractures occur at odd angles to the long axis. The rock is a coherent breccia with a moderate percentage of clasts. Most of the clasts are dark;	