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	PATRICK BUTLER, JR., LUNAR SAMPLE CURATOR CURATORIAL BRANCH, SN2, NASA-JSC HOUSTON, TEXAS 77058 (713)483-3274	

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## ATTACHMENTS

LAPST Membership and Advocate Lists  
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## LAPST AND REQUESTS FOR SAMPLES

The Lunar and Planetary Sample Team (LAPST) met May 17-20, and recommended allocation of 180 samples to 19 Principal Investigators. Their next meetings will be August 16-19 and November 16-19, 1979. Please submit requests for samples at least a week or two in advance of the meeting dates to allow time for assembly of background information. Also, remember to include your schedule for studying the samples so appropriate priorities can be set for their preparation.

## LUNAR HIGHLANDS NEWSLETTER

Volume 1, number 3, was mailed July 16. Let us know if you want to receive a copy but have not as yet.

## CORES

Attached are the post-dissection synopses for double drive tube 15010/15011 and single drive tube 14220. The core schedule as given in Newsletter 19 (April 1978), has been set back by the delay in completion of the Lunar Sample Building. Consequently, the dissection of Apollo 15 drive tubes 15007, 15008, and 15009, the first to be done in the new laboratory, will be 3 to 6 months behind schedule. It should be possible to regain some of this lost time in 1980, however.

## LUNAR SAMPLE BUILDING

Work was completed by the construction contractor several weeks ago. The final clean-up and installation of plumbing and nitrogen cabinets (by curatorial technicians) are underway. Following checkout of all systems and approval of operating procedures, the samples will be moved to the new vault and processing operations will begin in the new laboratories. Transfer of samples should take place in the third or fourth week of August.

On July 20, the tenth anniversary of the Apollo 11 landing, the first floor display area and the second floor viewing room into the new laboratories were opened to the public. Exhibits in the display room describe the samples and their care and study. A recorded explanation of laboratory activities is played for visitors to the laboratory viewing area on the second floor. It is expected that the Lunar Sample Building will have several hundred thousand visitors every year.

#### SAMPLES WITH RESTRICTED ACCESS

It is the function of LAPST to advise not only on allocations of samples for scientific study, but also on protection of the overall integrity of the collection. Since the collection contains many samples with unique or special characteristics that could be degraded or lost through routine handling or allocation, both the Curatorial staff and LAPST must be alert to which samples these are. Various designations on inventory listings and other means have been used to flag these samples, but the flagging systems are not fully effective and inappropriate use of some of these samples has been prevented only by the alertness of individuals familiar with the particular sample.

Now to more fully assure protection of special samples, those samples will be physically separated from the rest of the collection and all stored together in cabinets with access restricted to the Curator. These samples will become a reserve or Restricted Access Material (RAM) collection. Comments in general and suggestions of specific candidate RAM samples are solicited from sample investigators.

Establishment of the RAM collection will require identification by sample number of each such sample and an inclusion document stating specific reasons for selection of this sample for the RAM collection. It is intended that only parts of rocks will be in this collection. Access to a RAM sample for sampling or removal will require a removal justification document that addresses the specific reasons of the inclusion document. Eventually, listings of the RAM materials, along with brief reasons for the inclusion of each, will be published. For the time being, the samples at the Brooks Storage Vault will be considered part of the RAM collection.

#### PADDED BAG SAMPLES

Apollo 16 rocks 67215 and 67235 were collected in special padded bags in order to have samples for study of the outermost surface layer of materials exposed on the Moon. Although to date no studies of these surfaces have been proposed, the rocks have received careful and minimum handling and have not been subdivided or allocated for any other purpose. Now we are considering examination of the rocks as breccias in conjunction with the Highlands studies. Tentative plans are to saw or break the rocks in two, set one part aside for preservation of the surfaces, and study and allocate material from the other part. Since this procedure would entail some handling and would also provide an opportunity for getting a surface sample for study, we are inviting suggestions on handling the rocks and proposals for making surface studies. It should be noted that the rocks are probably dusty all over from the adhering soil collected with the rocks.

#### SIEVING OF SOILS

During the preliminary examination period after receipt of the samples from the Moon, most of the soils were sieved at 10 mm, 4 mm, 2 mm, and 1 mm. In the past two months, to prepare samples for the Lunar Highlands studies, stocks of less than

1 mm size fractions have been sieved for 11 Highlands soils. Eventually, we hope to have stocks of these smaller size fractions for all of the plentiful soil samples, and for core material as well, for rapid filling of allocations. To build these stocks gradually, the curatorial laboratories will do a reasonable amount of sieving in the preparation of allocations. This will conserve sample material (many studies use only certain size fractions), save effort (most time is spent in preparation and cleaning sieves and relatively little extra time is taken in sieving a larger sample), and produce a uniform product (the techniques and equipment used are those used by D. S. McKay).

The sieves are Buckby-Meaers with nickel mesh and stainless steel frames. An epoxy cement is used to seal the mesh in the frame so grains cannot work their way into the inside of the frame. For one set of sieves, a flash coating of rhodium was applied over the nickel mesh. The sieve sizes in microns are 1000, 500, 250, 125, 90, 75, 45, 20, and 10. Fractions with few subdivisions are made for some allocations, as for example 1000-90, 90-20, 20-10 and <10 microns. For making grain mount thin sections, however, the size spread should not be too great or the largest and smallest grains cannot both be given proper representation in a section at a particular thickness.

## LAPST MEMBERSHIP

August 1979

Dr. William V. Boynton  
University of Arizona  
Lunar and Planetary Laboratory  
Department of Lunar Science  
Tucson, AZ 85721

Dr. David S. McKay  
NASA-Johnson Space Center  
SN6/Geology Branch  
Houston, TX 77058  
(713)483-5171 - FTS: 87-525-5171

Dr. Charles Hohenberg  
Laboratory for Space Physics  
Washington University  
St. Louis, MO 63130  
(314)889-6225 - FTS: (OPR 87-279-4110)

Dr. Charles Meyer, Jr.  
NASA-Johnson Space Center  
SN7/Geochemistry Branch  
Houston, TX 77058  
(713)483-4715 - FTS: 87-525-4715

Dr. Robert N. Housley  
Science Center, Rockwell Int'l  
1049 Camino Dos Rios  
Thousand Oaks, CA 91360  
(809)498-4545 - FTS: 87-798-2000

Dr. Carleton B. Moore  
Center for Meteorite Studies  
Arizona State University  
Tempe, AZ 85281  
(602)965-3576 - FTS: 87-766-3576

Mr. Richard S. Johnston, Chairman  
NASA-Johnson Space Center  
SA/Space and Life Sciences Directorate  
Houston, Texas 77058  
(713)483-2251 - FTS: 87-525-2251

Dr. James J. Papike, Vice-Chairman  
State University of New York  
Dept. of Earth & Space Sciences  
Stony Brook, NY 11794  
(516)246-4047 - FTS: 87-264-3311

Dr. Michael E. Lipschutz  
Purdue University  
Department of Chemistry  
Lafayette, IN 47907  
(317)749-2724 - FTS: 87-331-7000

Dr. Lawrence A. Taylor  
University of Tennessee  
Department of Geology  
Knoxville, TN 37916  
(615)974-2366 - FTS: 87-855-2366

Dr. J. Douglas MacDougall  
University of California, San Diego  
Scripps Institution of Oceanography  
Geological Research Division  
P.O. Box 1529  
La Jolla, CA 92037

4/17/79

ADVOCATE LIST

GROUP A

HOUSLEY

Adams  
Brownlee  
Burns  
Buseck  
Butler  
Keil  
Lofgren  
McKay  
Phinney  
Reid  
Sato  
Stoffler

MCKAY

Albee  
Bence  
Drake  
Haggerty  
Hollister  
James  
Papike  
Ringwood  
Sclar  
Taylor, L.  
Takeda  
Wood

TAYLOR

Bell  
El Goresy  
Goldstein  
Hays  
Huebner  
Lovering  
Roedder  
Rutherford  
Smith, J.V.  
Weiblen  
Weill  
Winzer

GROUP B

MOORE

Clayton  
Des Marais  
Epstein  
Gibson  
Heymann  
Kaplan  
Rhodes  
Thode

BOYNTON

Arnold  
Kirsten  
Marti  
Meyer  
Murthy  
Tatsumoto  
Tilton  
Turner  
Wasserburg

LIPSCHUTZ

Anders  
von Gunten  
Haskin  
Laul  
Morgan  
Reed  
Schmitt  
Wanke  
Wasson

HOHENBERG

Blanchard  
Geiss  
Nyquist  
Pepin  
Perkins  
Reynolds  
Schaeffer  
Signer  
Walker

MEYER

Ahrens, L.  
Bhandari\*  
Blanford\*  
Fireman  
Lal\*  
Philpotts  
Pillinger  
Taylor, S.R.  
Tombrello

\*Track requests to Housley

GROUP C

MACDOUGALL

Aronson  
Banerjee-Hoffman  
Burns  
Bussey  
Dollfus  
Fuller  
Gose  
Horai  
Larsen  
Runcorn  
Spetzler  
Strangway

Ahrens  
Brownlee  
Comstock  
Gold  
Hapke  
Hartung  
Hörz  
Housley  
Klein  
Simmons  
Tittman  
Uhlmann

C O R E      S Y N O P S I S

Sample No. 14220, a single, 2 cm diameter drive tube, taken to augment trench samples 14148, 14149 and 14156.

Field relationships: Core 14220 was taken at station G, 6 meters East from the trench, which sampled a surficial dark brown layer, then a thin layer of small, glassy-like pebbles, and a third layer, 18 inches below the surface, of some very light material. Station G was located 100 meters East from 100-m North Triplet Crater, on the Fra Mauro Plains, and was 200 m Southwest from the Fra Mauro Ridge, 1 km Southwest from Cone Crater, and 500 m Southwest from the continuous ejecta blanket of Cone Crater.

Sample history - possible contamination or disturbance: The core tube was driven to a depth of approximately 36 cm, but contained approximately 16 cm of soil, for a 45% sample recovery; the exact quantity and location of missing material is unknown. After opening, soil was found on all sides of the plug, which was supposed to have been at the lunar surface, and there was 0.575 gm of soil above the plug. The pull ring hole at the top of the core was open, and the largest rock fragments in the soil above the plug could have fit through the hole. Hence, it is not certain that the 0.575 gm of soil came through the pull ring hole from outside the core tube, or from the top of the soil column within the core.

Core 14220 was collected on 5 February, 1971, and placed in the Apollo Lunar Sample Return Container (ALSRC) No. 1006, which was sealed on the moon, and maintained a pressure of 60 microns Hg until opened on 12 February, 1971, in the SNAP line of the Lunar Receiving Laboratory. The core was placed in bolt-top container 266-1004, and stored in dry N<sub>2</sub> until 9 May, 1979. Dissection took place between 17 and 24 May, 1979.

Length: 16.0 cm, with sloping bottom, slope of  $\pm 0.1$  cm. Total mass: 80.7 gm. Bulk density: 1.69 gm/cm<sup>3</sup>

Numbering of samples: Dissection took place in one pass, and dissection splits are numbered consecutively downward from the top of the core. About one-third of the diameter of the core was left in the core tube for impregnation with epoxy in order to provide a permanent stratigraphic record of the core, and to provide material for thin sections.

Summary of stratigraphic units identified during dissection:

Unit	Depth/samples	light/dark color	relative grain size	major petrographic components
6	0.0 - 5.5+cm 14220,7 - ,28	dark	fine, with large clasts 9% >1mm	Unit 6 is unusually friable. In the 1mm fines, agglutinates, fragmented glass and soil breccia are abundant throughout the unit, and there are spot concentrations of light-colored annealed-matrix breccia. Rounded, tan to whitish granules and silvery droplets are common in the <1mm fines. Appears comparable to trench soil 14148.
5	5.5+ - 7.5 cm 14220,29 --,36	dark	moderately fine 10% >1mm	Fragmented mineral grains are noticeably commoner in unit 5 than 6, and the coarse fraction shows an abundance of light-matrix breccia. Vesicular glass is concentrated at the bottom of the unit (as well as elsewhere in the core) but the soil is otherwise not comparable to the trench middle, sample 14156.
4	7.5 - 9.0 cm 14220,37 -,42	moderately dark, whitish clasts	coarse 14% >1mm	Large clasts of light-matrix breccia are very conspicuous in this unit, but a variety of annealed-matrix breccia fragments are also common. Fragmented mineral grains predominate in the <1mm fines from here to the base of the core, with tiny whitish granules less common, glass and metallic droplets relatively rare.
3	9.0 - 11.0 cm 14220,43 -,50	moderately dark	fine 5% >1mm	Agglutinates, basalt fragments and dark annealed-matrix breccia particles predominate in the coarse fraction; fines as above.
2	11.0- 12.5 cm 14220,51 -,56	moderately dark	very coarse 26% >1mm	Fragmented vesicular glass and soil breccia are the only common coarse components in this unit; fines as unit 4.
1	12.5- 16.0 cm 14220,57 -,68	moderately dark	moderately fine 8% >1mm	This unit contains a variety of particle types, including agglutinates, fragmented glass, soil breccia, basalt, and dark annealed-matrix breccia. It appears to be very similar to trench bottom sample 14149.

# DRIVE TUBE 14220: LOCATION OF DISSECTION SAMPLES

Stratigraphic Unit	Columnar Section	Depth Below Surface(cm)	Fine (<1mm) Fraction		Coarse (>1mm) Fraction		Special Samples		Sample Type and Position in Core
			Sample No.	Sample Wt.	Sample No.	Sample Wt.	Sample No.	Sample Wt.	
F		0.5	,7	0.965	,8	0.079	,2	0.575	bulk soil from above plug
		1.0	,9	1.183	,10	0.227			
		1.5	,11	1.306	,12	0.067			
		2.0	,13	1.408	,14	0.122			
		2.5	,15	1.478	,16	0.406	,4	0.461	rind*, from 0 - 5 cm
		3.0	,17	1.342	,18	0.092			
		3.5	,19	1.329	,20	0.141			
		4.0	,21	1.609	,22	0.189			
		4.5	,23	1.337	,24	0.071			
		5.0	,25	1.283	,26	0.078			
5		5.5+	,27	1.711	,28	0.066			
		6.0	,29	1.305	,30	0.150			
		6.5	,31	1.624	,32	0.217			
		7.0	,33	1.448	,34	0.100			
4		7.5	,35	1.486	,36	0.194	,5	0.478	rind, from 5 - 10 cm
		8.0	,37	1.484	,38	0.072			
		8.5	,39	1.468	,40	0.102			
		9.0	,41	1.484	,42	0.565			
3		9.5	,43	1.657	,44	0.078			
		10.0	,45	1.544	,46	0.065			
		10.5	,47	1.253	,48	0.088			
		11.0	,49	1.139	,50	0.084			
2		11.5	,51	1.346	,52	0.504			
		12.0	,53	1.577	,54	0.346			
		12.5	,55	1.168	,56	0.626			
		13.0	,57	1.292	,58	0.037	,6	0.445	rind, from 10 - 16 cm
1		13.5	,59	1.394	,60	0.056			
		14.0	,61	1.461	,62	0.182			
		14.5	,63	1.258	,64	0.065			
		15.0	,65	1.236	,66	0.116			
		16.0+	,67	2.079	,68	0.281	,69	0.376	dissection table sweepings
						,3	0.380	bulk soil in bottom cap	

Lithologic symbols in columnar section:

Agglutinates Fragmented vesicular glass Soil Breccia Dark-matrix breccia Basalt   
 Annealed-matrix breccia - dark light

\* The rind is a thin layer of soil immediately adjacent to the core tube wall; this soil has been smeared during the sampling process, and is removed to improve the purity and integrity of material within the core.

## CORE SYNOPSIS

Sample Number: 15011, top half of a double, 4 cm diameter drive tube(T5010/T5011)

Field Relationships: Core 15010/15011 was taken on a mare surface 20 m from the rim of Hadley Rille at station 9A. The tube was driven full depth, but the last 20 - 30 cm were more difficult to penetrate.

Sample History - possible disturbance or contamination: The core was collected August 2, 1971 and placed in an unsealed Sample Collection Bag. This bag, after being exposed to spacecraft cabin and terrestrial atmosphere on the return flight, was sealed in 2 teflon bags and a polyethylene bag on board the recovery ship as quickly as possible after splashdown on August 7, 1971. The sample bag was opened in the Lunar Receiving Laboratory in a nitrogen atmosphere cabinet August 20, 1971. During sampling the top of the tube was tipped downward about 50° from the horizontal before the keeper confined the upper surface of the soil. Loss of soil from the bottom of 15011 was possible as the two tubes were separated by unscrewing. The capacity of the tube was 34.9 cm length of soil. When the keeper was emplaced after separation and capping, the tube contained 29.2 cm of soil. Incomplete filling of tube and compaction of soil may account for some of this difference in length. About 8 g of soil was found inside the tube on top of the keeper (top end of core). In this configuration, this excess soil was not considered part of the core. Whether this soil, which was equivalent to 3 - 4 mm core depth, came from inside the core by leaking through small holes in the keeper or from outside the core through larger holes in the plug is not now known. Grain size data indicated that probably some of the 8 g, but definitely not all of it, came from inside the tube. Between 1971 and 1978 the core was stored horizontally and some settling of soil occurred, especially at the ends of the core. The only unit which was not affected was Unit 7 (14.0 - 20.0 cm). This unit was particularly dense and coherent. Problems arising from mixing of soil due to settling may be minimized by examining soil from the second or third dissection, since the void created by settling of soil was confined to the volume removed in the first dissection. Retention of stratification away from the ends of the core was evident from distinct unit boundaries observed in the 1977 x-radiographs.

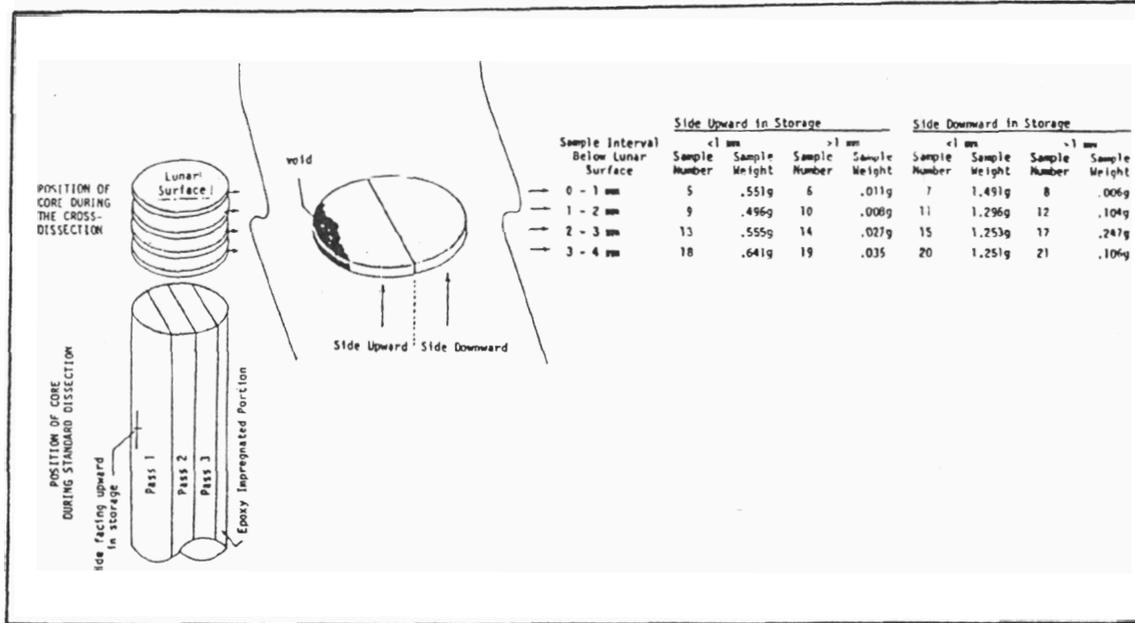
Weight, Length, Density:

	<u>Before opening tube</u>	<u>After extrusion</u>
Weight	660.7 or 651.5* g	647.8 g
Length	29.2 cm	26.4 cm
Density	1.70 or 1.68 g/cm <sup>3</sup>	1.84 g/cm <sup>3</sup>

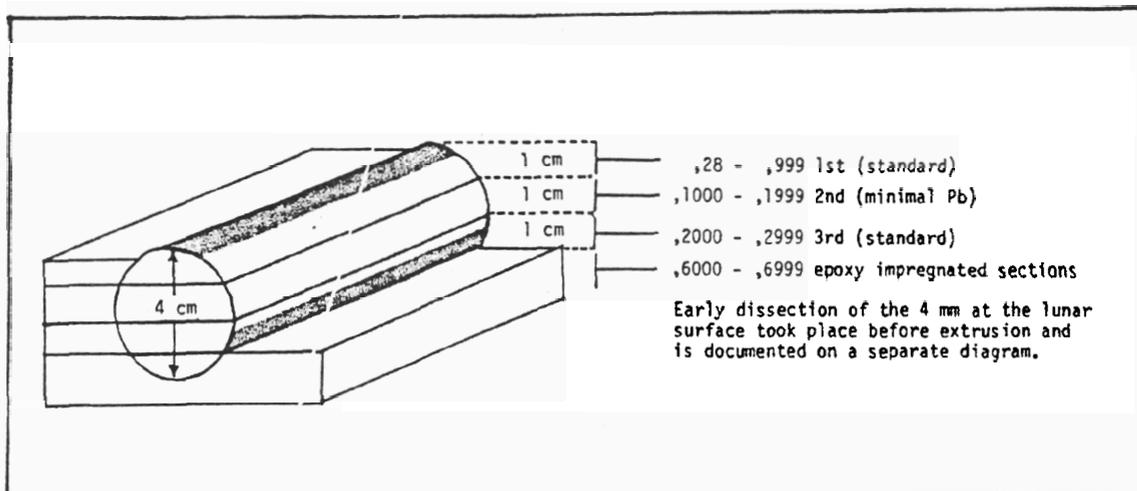
\*calculated only weight of soil confined by keeper, see 8 g referred to in Sample History section

Cross-dissection: In order to characterize lunar surface processes, the uppermost 4 mm of core 15011 were dissected transversly before the core was extruded into the longitudinal dissection receptacle. For the cross-dissection, the core was place upright, and four discs of soil each 1 mm thick, were removed. Normally five 1 mm discs are removed, but the extruder failed to push the sample completely into the 5 mm receptacle, so only the top 4 mm were dissected. For this core each disc of soil was removed in halves. The upward half during storage and the downward half were processed as separate

samples. This was done because settling during storage had caused a void space to form on the side upward, and, therefore, the side downward was believed more stratigraphically preserved. Samples were sieved at 1 mm, and the size fractions were numbered as shown below. Then the core was turned horizontally and extruded into the dissection receptacle, where it was dissected lengthwise in 5 mm increments. Three passes down through the diameter were required to complete the dissection.



**Longitudinal Dissections:** In a standard dissection, samples are sieved at 1 mm under organically uncontaminated (CP-7) conditions. To produce samples with reduced contamination, the material in the second dissection was not sieved, was subject to minimal handling with specially acid washed tools, and should be suitable for Pb analyses. Each dissection is assigned a separate series of split numbers as shown in the diagram below.



Summary of Stratigraphic Units Identified During Dissection: The color of the core was 5Y 3/1 to 4/1 on the Munsell Soil Color Scale, a medium to dark gray. No gradations were noted except a band containing 5 - 10% lighter color mottles from 3 - 6 cm depth. Among rock fragments greater than 1 mm, mare basalt was the dominant lithology in all units. The abundance of glass and anorthositic fragments was enriched in the upper units. Variance in weights of lithic components among units was much less in 15011 than 15010. Because the core appeared uniform in color, grain size, and lithic composition, unit boundaries were mainly determined from texture and densities observed in x-radiographs. Typically, core unit boundaries are not mainly determined by x-ray data. Lithic abundance numbers given below are directly comparable with those for 15010.

Unit	Depth	Sample Numbers	X-ray: Relative Texture, Density	Major Lithologic Components				
				Grain Size	grams soil > 1 mm per gram soil	grams basalt > 1 mm per gram soil	grams soil bx > 1 mm per gram soil	grams glass > 1 mm per gram soil
9	0.4 - 6.0 cm	,28 - ,50 ,1000 - ,1012 ,2000 - ,2023	medium grain size	.087	.051	.020	.012	.005
8	6.0 - 14.0 cm	,51 - ,85 ,1013 - ,1032 ,2024 - ,2057	finer grain size	.056	.031	.013	.007	.004
7	14.0 - 20.0 cm	,86 - ,111 ,1033 - ,1045 ,2058 - ,2082	finer grain size, more dense	.094	.063	.020	.008	.002
6	20.0 - 26.4 cm	,111 - ,138 ,1046 - ,1059 ,2083 - ,2107	medium grain size	.101	.080	.014	.009	.002

DRIVE TUBE 15011  
LOCATION OF SAMPLES, SECOND DISSECTION (MINIMAL P/B)

Interval Samples    Special Samples

Stratigraphic Unit	Cm Depth	Columnar Section	On Depth Below Lunar Surface*	Sample No.	Sample Wt. (g)	Sample No.	Sample Wt. (g)	Sample Type	Sample Interval
			0.4	See special section on top 4 mm					
9			1.0	,1000	3.554				
			1.5	,1001	3.015				
			2.0	,1002	2.777				
			2.5	,1003	2.601				
			3.0	,1004	2.371	,1005	0.703	Basalt	2.1 - 3.2 cm
			3.5	,1006	2.992				
			4.0	,1007	2.600				
			4.5	,1008	2.905				
		5.0		5.0	,1009	2.510			
				5.5	,1010	3.071			
8			6.0	,1011	2.917	,1012	0.313	Basalt	5.4 - 6.0 cm
			6.5	,1013	2.321	,1014	0.579	Basalt	5.8 - 6.5 cm
			7.0	,1015	2.955	,1016	0.127	Glass	6.6 - 7.0 cm
			7.5	,1017	2.937				
			8.1	,1018	2.452	,1019	0.260	Red light soil	7.6 - 8.1 cm
			8.5	,1020	2.346				
			9.0	,1021	3.329				
			9.5	,1022	2.597				
		10.0		10.0	,1023	3.027			
				10.5	,1024	3.063			
7			11.0	,1025	2.618				
			11.5	,1026	3.249				
			12.0	,1027	2.938				
			12.5	,1028	2.569				
			13.0	,1029	3.203				
			13.5	,1030	2.789				
			14.0	,1031	2.930	,1032	0.134	Basalt	13.6 - 14.0 cm
			14.5	,1033	2.893				
		15.0		15.0	,1034	2.865			
				15.5	,1035	3.255			
6			16.0	,1036	3.544				
			16.5	,1037	3.349				
			17.0	,1038	2.620				
			17.5	,1040	2.990	,1039	0.290	Red light soil	17.2 - 17.5 cm
			18.0	,1041	2.863				
			18.5	,1042	3.147				
			19.0	,1043	3.329				
			19.5	,1044	2.987				
		20.0		20.0	,1045	3.340			
				20.5	,1046	3.110			
			21.0	,1047	3.312				
			21.5	,1048	3.211				
			22.0	,1049	2.934				
			22.5	,1050	3.355				
			23.0	,1051	3.373				
			23.5	,1052	3.167				
			24.0	,1053	3.328				
			24.5	,1054	3.095				
		25.0		25.0	,1055	2.827			
				25.5	,1056	2.530			
			26.0	,1057	1.906	,1058	3.071	3 frags	24.9 - 26.3 cm
			26.4	,1059	1.701				

LITHOLOGIC SYMBOLS



Basalt



Soil Breccia



Glass



Anorthositic Breccia

\*Measured after extrusion

DPIPE TUBE 15011

LOCATION OF SAMPLES, FIRST DISSECTION (STANDARD)

Stratigraphic Unit	Cm Depth	Columnar Section	Cm Depth Below Lunar Surface*	Interval Samples		Interval Samples		Special Samples			
				Fine (< 1 mm) Fraction		Coarse (> 1 mm) Fraction		Sample No.	Sample Wt.	Sample Type	Sample Interval
				Sample No.	Sample Wt.	Sample No.	Sample Wt.	Sample No.	Sample Wt.	Sample Type	Sample Interval
			0.4	See Special Section on Top 4 mm							
			0.9	,28	1.897	,29	.119				
			1.4	,30	1.820	,31	.154				
			1.9	,32	2.367	,33	.212				
9			2.4	,34	1.956	,35	.075				
			2.9	,36	2.324	,37	.153	,38	.047	AnBx	2.4-2.9 cm
			3.4	,39	2.540	,40	.086				
			3.9	,41	2.160	,42	.143				
			4.4	,43	2.189	,44	.206				
		5.0		4.9	,45	2.233	,46	.281	,47	.032	AnBx
			5.4	,48	2.012	,49	.178				
			5.9	,50	2.167	,51	.151				
			6.4	,52	2.117	,53	.357				
			6.9	,54	2.094	,55	.208				
			7.4	,56	2.704	,57	.123				
			7.9	,58	2.096	,59	.139				
			8.4	,60	2.231	,61	.158				
			8.9	,62	2.487	,63	.153				
8			9.4	,64	1.952	,65	.094				
			9.9	,66	2.351	,67	.124	,68	.302	Clod	9.3-10.0 cm
			10.4	,69	2.290	,70	.119				
			10.9	,71	2.307	,72	.135				
			11.4	,73	2.556	,74	.096				
				11.9	,75	2.314	,76	.080			
			12.4	,78	2.420	,79	.069				
			12.9	,80	2.560	,81	.207				
			13.4	,82	2.559	,83	.109				
			13.9	,84	2.314	,85	.138				
			14.4	,86	2.148	,87	.089				
	15.0		14.9	,88	2.478	,89	.114	,90	.096	Clod	14.5-14.9 cm
			15.4	,91	2.598	,92	.162				
			15.9	,93	2.338	,94	.128				
7			16.4	,95	2.520	,96	.057				
			16.9	,97	2.584	,98	.112				
			17.4	,99	2.411	,100	.095				
			17.9	,101	2.630	,102	.223				
			18.4	,103	2.314	,104	.103				
			18.9	,105	2.655	,107	.284				
			19.4	,108	2.196	,109	.049				
			19.9	,110	2.305	,111	.138				
			20.4	,112	2.376	,113	.248				
			20.9	,114	2.190	,115	.292	,120	.588	Basalt	19.9-20.9 cm
			21.4	,116	2.542	,117	.132				
			21.9	,118	2.124	,119	.369				
			22.4	,121	2.208	,122	.220				
6			22.9	,123	2.506	,124	.264				
			23.4	,125	2.244	,126	.269				
			23.9	,127	2.720	,128	.187				
			24.4	,129	2.549	,130	.254				
			24.9	,131	2.178	,132	.174				
		25.0		25.4	,133	2.341	,134	.449			
			25.9	,135	2.166	,136	.075				
			26.4	,137	2.015	,138	.233				

Lithologic Symbols



Basalt



Soil Breccia



Glass



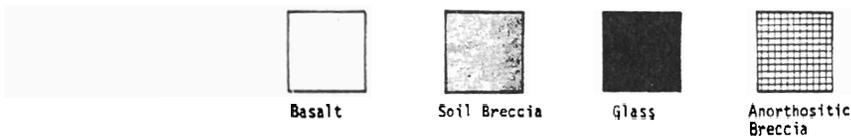
Anorthositic Breccia

\*Measured after extrusion

DRIVE TUBE 15011  
LOCATION OF SAMPLES, THIRD DISSECTION (STANDARD)

Stratigraphic Unit	Cm Depth	Columnar Section	Cm Depth Below Lunar Surface*	Interval Samples Fine (< 1 mm) Fraction		Interval Samples Coarse (> 1 mm) Fraction		Special Samples				
				Sample No.	Sample Wt. (g)	Sample No.	Sample Wt. (g)	Sample No.	Sample Wt. (g)	Sample Type	Sample Interval	
			0.4	See special section on top 4 mm								
			1.0	,2000	3.935	,2001	0.259					
			1.5	,2002	2.654	,2003	0.601					
			2.0	,2004	3.090	,2005	0.196					
			2.5	,2006	3.070	,2007	0.523					
			3.0	,2008	2.745	,2009	0.169					
			3.5	,2010	2.837	,2011	0.655	,2012	0.282	dark soil	3.0 - 4.1 cm	
			4.0	,2013	2.479	,2014	0.183					
			4.5	,2015	3.289	,2016	0.157	,2017	0.067	light soil	4.0 - 4.7 cm	
	5.0		5.0	,2018	3.008	,2019	0.184					
			5.5	,2020	3.206	,2021	0.322					
			6.0	,2022	2.918	,2023	0.236					
			6.5	,2024	2.829	,2025	0.112					
			7.0	,2026	2.955	,2027	0.267					
			7.5	,2028	3.222	,2029	0.229					
			8.0	,2030	3.152	,2031	0.127					
			8.5	,2032	2.874	,2033	0.090					
			9.0	,2034	3.092	,2035	0.139					
8	10.0		9.5	,2036	2.994	,2037	0.105	,2038	0.136	AnBx	8.7 - 9.4 cm	
			10.0	,2039	3.201	,2040	0.257					
			10.5	,2041	2.676	,2042	0.211					
			10.5	,2043	3.205	,2044	0.050					
			11.0	,2045	3.031	,2046	0.180	,2047	0.174	Clod	11.2 - 11.7 cm	
			11.5	,2048	2.626	,2049	0.254					
			12.0	,2050	2.867	,2051	0.096					
			12.5	,2052	3.050	,2053	0.404					
			13.0	,2054	2.646	,2055	0.118					
			13.5	,2056	3.380	,2057	0.094					
			14.0	,2058	2.935	,2059	0.055					
	15.0		14.5	,2060	2.842	,2061	0.080					
			15.0	,2062	3.571	,2063	0.220					
			15.5	,2064	3.029	,2065	0.414					
			16.0	,2066	2.563	,2067	0.546					
			16.5	,2068	3.030	,2069	0.129					
7			17.0	,2070	3.563	,2071	0.191					
			17.5	,2072	2.888	,2073	0.074	,2074	2.287	Basalt	17.3 - 19.0 cm	
			18.0	,2075	2.954	,2076	0.130					
			18.5	,2077	2.809	,2078	0.159					
			19.0	,2079	3.008	,2080	0.370					
	20.0		19.5	,2081	3.361	,2082	0.197					
			20.0	,2083	3.163	,2084	0.238					
			20.5	,2085	3.010	,2086	0.248					
			21.0	,2087	3.420	,2088	0.158					
			21.5	,2089	3.034	,2090	0.160					
			22.0	,2091	3.207	,2092	0.457					
			22.5	,2093	2.798	,2094	0.227					
			23.0	,2095	3.305	,2096	0.333					
			23.5	,2097	3.145	,2098	0.366	,2099	0.095	Basalt	23.8 - 24.5 cm	
			24.0	,2100	2.856	,2101	0.144					
			24.5	,2102	3.273	,2103	0.220					
	25.0		25.0	,2104	3.275	,2105	0.390					
			25.5									
			26.0	,2106	4.740	,2107	1.685					
			26.4									

Lithologic Symbols



\*Measured after extrusion

## CORE SYNOPSIS

Sample Number: 15010, bottom half of a double, 4 cm diameter drive tube (15010/15011)

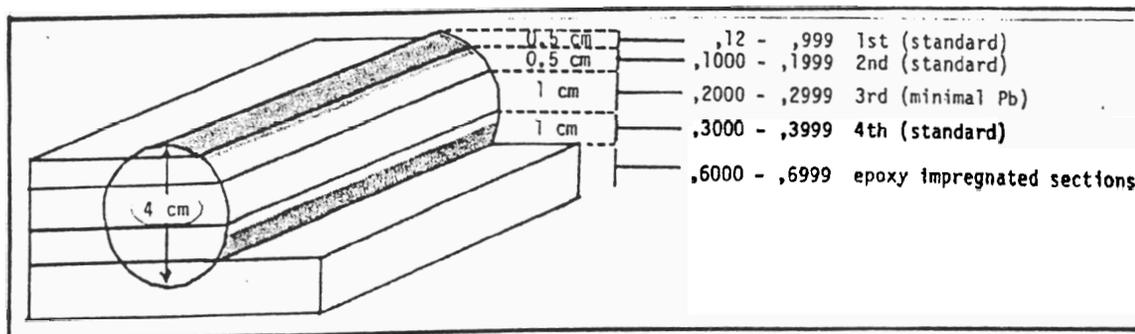
Field Relationships: Core 15010/15011 was taken on a mare surface 20 m from the rim of Hadley Rille at station 9A. The tube was driven full depth, but the last 20 - 30 cm were more difficult to penetrate.

Sample History - possible disturbance or contamination: The core was collected August 2, 1971 and placed in an unsealed Sample Collection Bag. This bag, after being exposed to spacecraft cabin and terrestrial atmosphere on the return flight, was sealed in 2 teflon bags and a polyethylene bag on board the recovery ship as quickly as possible after splashdown on August 7, 1971. The sample bag was opened in the Lunar Receiving Laboratory in a nitrogen atmosphere cabinet August 20, 1971. After the keeper was replaced by the astronaut, the tube contained only 32.9 cm of soil (it should have contained the maximum capacity of 34.9 cm). **Compaction** may account for some of the difference in length. Lunar soil may have been lost from the top of 15010 when the two tubes were separated by unscrewing and from the bottom of the tube before it was capped. Astronaut Scott had some difficulty with screwing the plug in the top end of the core. Some mixing of soil in the bottom 6 cm may have occurred when the large 5 cm-long rock entered the 4 cm diameter drive tube. 1977 x-radiographs revealed that some settling of soil occurred near the ends of the core while the core was stored horizontally. **Void areas created** by settling were confined to the ends of the tube and to the volume of soil removed in the first dissection.

<u>Weight, Length, Density:</u>	<u>Before opening tube</u>	<u>After extrusion</u>
Weight	740.4 g	733.8 g
Length	32.9 cm	28.9 cm*
Density	1.69 g/cm <sup>3</sup>	1.91 g/cm <sup>3</sup>

\*approximately 1 cm of soil was removed from the bottom of 15010 before extrusion (sample no. 3)

Longitudinal Dissections: In a standard dissection, samples are sieved at 1 mm under organically uncontaminated (CP-7) conditions. To produce samples with reduced contamination, the material in the third dissection was not sieved and was subject to minimal handling with specially acid washed tools. **These samples should be suitable for Pb analyses. Each dissection was assigned a separate series of split numbers as shown below.**



Summary of Stratigraphic Units Identified During Dissection: The color of the core was 5Y 2/1 to 4/1 on the Munsell Soil Color Scale, a medium to dark gray. Soil in 15010 appeared darker at the top than at the bottom. A diffuse lighter color band occurred at 36 - 38 cm. Below a vague, marbled boundary at 46 cm, the core appeared lighter in color. Among rock fragments >1 mm, mare basalt was the dominant lithology in all units. The units in 15010 were more coarse and showed more variability in grain size and lithology of the >1 mm fragments than units in 15011, the upper part of the core. Lithic abundance numbers given below are directly comparable with those for 15011. The term "relative abundance" used in the diagram means weight ratio of a component compared to basalt. A 40 g basalt rock was found in the bottom of the core. Because this rock completely dominates compositional data, figures are given both with and without the large rock included in the calculations.

Unit	Depth	Sample Numbers	Grain Size	Major Lithic Components					
5	0.0 - 8.5 cm	.12 - .47 .1000 - .1035 .2000 - .2018 .3000 - .3035	.075	.042	.014	.006	.003	Similar in grain size and absolute lithic abundance to average for all of 15011	
4	8.5 - 17.0 cm	.48 - .84 .1036 - .1072 .2019 - .2041 .3036 - .3080	.207	.144	.049	.007	.002	Coarsest unit if large rock is excluded. Abundance of glass & anorth. bx are depleted.	
3	17.0 - 22.0 cm	.85 - .105 .1073 - .1093 .2040 - .2054 .3081 - .3104	.138 (.127) <sup>a</sup>	.098 (.085)	.017 (.017)	.012 (.012)	.004 (.004)	Least coarse of lower 4 units. Relative abundance of glass slightly enriched.	
2	22.0 - 25.0 cm	.107 - .118 .1100 - .1105 .2055 - .2058 .3105 - .3119	.578 (.126)	.552 (.072)	.010 (.021)	.005 (.011)	.007 (.014)	Large rock excluded: unit is similar to unit 3 but higher in anorthositic components.	
1	25.0 - 28.9 cm	.119 - .134 .1106 - .1122 .2059 - .2071 .3120 - .3145	.392 (.185)	.315 (.083)	.054 (.072)	.010 (.014)	.005 (.007) <sub>b</sub> (.033) <sub>b</sub>	Large rock excluded: unit is coarse; soil bx & anorth. bx very abundant. Glass is enriched.	

grams soil > 1 mm per gram soil	grams basalt > 1 mm per gram soil	grams soil bx > 1 mm per gram soil	grams glass > 1 mm per gram soil	grams anorth bx > 1 per gram soil
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<sup>a</sup> numbers in parentheses exclude large basalt fragment  
<sup>b</sup> number in bracket excludes large basalt fragment and includes the part of an anorthositic fragment that occupied the volume of core covered by these lithic abundance calculations, but was removed in a minimal Pb dissection

DRIVE TUBE 1501G  
LOCATION OF SAMPLES, FIRST DISSECTION (STANDARD)

Stratigraphic Unit	Columnar Section	Cm Depth Below Lunar Surface	Fine (< 1mm) Fraction		Coarse (> 1mm) Fraction		Sample No.	Special Samples		
			Sample No.	Sample Wt.	Sample No.	Sample Wt.		Sample Wt.	Sample Type	Sample Interval
		26.9	,12	0.130	,13	0.010				
		27.4	,14	0.477	,15	0.086				
		27.9	,16	0.677	,17	0.073				
		28.4	,18	0.681	,19	0.061				
		28.9	,20	0.723	,21	0.070				
		29.4	,22	0.813	,23	0.026	,24	0.105	Clod	29.2 - 29.5
		29.9	,25	0.682	,26	0.040				
5		30.4	,27	0.974	,28	0.043				
		30.9	,29	0.920	,30	0.071				
		31.4	,31	0.804	,32	0.022	,33	0.148	Basalt	31.2 - 31.7
		31.9	,34	0.864	,35	0.052				
		32.4	,36	0.935	,37	0.064				
		32.9	,38	1.129	,39	0.086				
		33.4	,40	1.017	,41	0.050				
		33.9	,42	1.025	,43	0.123				
		34.4	,44	1.146	,45	0.070				
		34.9	,46	1.080	,47	0.090				
		35.4	,48	1.154	,49	0.047				
		35.9	,50	0.848	,51	0.173	,54	0.250	SoBx	35.4 - 36.4
		36.4	,52	1.012	,53	0.078	,55	0.047	Soil	36.4 - 37.5
		36.9	,56	0.889	,57	0.496				
		37.4	,58	0.696	,59	0.075				
		37.9	,60	0.995	,61	0.309				
		38.4	,62	0.949	,63	0.174				
4		38.9	,64	0.801	,65	0.721				
		39.4	,66	1.010	,67	0.054				
		39.9	,68	1.102	,69	0.094				
		40.4	,70	0.933	,71	0.100				
		40.9	,72	1.054	,73	0.053	,74	0.258	Basalt	40.4 - 41.4
		41.4	,75	0.976	,76	0.098				
		41.9	,77	1.117	,78	0.060				
		42.4	,79	1.085	,80	0.358				
		42.9	,81	0.968	,82	0.137				
		43.4	,83	1.082	,84	0.082				
		43.9	,85	1.163	,86	0.062				
		44.4	,87	1.188	,88	0.120				
		44.9	,89	1.079	,90	0.195				
3		45.4	,91	1.099	,92	0.226				
		45.9	,93	1.045	,94	0.156				
		46.4	,95	1.176	,96	0.199				
		46.9	,97	1.089	,98	0.116				
		47.4	,99	1.057	,100	0.314				
		47.9	,101	1.001	,102	0.106	,103	0.232	Basalt	47.2 - 48.0
		48.4	,104	1.094	,105	0.181				
		48.9	,106	1.064	,107	0.156				
		49.4	,108	0.935	,109	0.061				
		49.9	,110	0.805	,111	0.088				
		50.4	,112	0.694	,113	0.278				
		50.9	,114	0.767	,115	0.117				
		51.4	,116	0.727	,117	0.158				
		51.9	,118	0.850	,119	0.208				
		52.4	,120	0.723	,121	0.095				
		52.9	,122	1.088	,123	0.251				
		53.4	,124	0.951	,125	0.266	,126	0.015	AnBx	53.2 - 53.4
		53.9	,127	0.894	,128	0.188				
		54.4	,129	1.146	,130	0.271				
		54.9	,131	0.963	,132	0.215				
		55.3	,133	0.745	,134	0.103				

,3 3.212 unsieved, approximately 1 cm of soil removed from bottom of core before extrusion

LITHOLOGIC SYMBOLS



\*measured after extrusion

DRIVE TUBE 15010  
LOCATION OF SAMPLES, SECOND DISSECTION (STANDARD)

Stratigraphic Unit	Cm Depth Below Lunar Surface	Columnar Section	Cm Depth Below Lunar Surface*	Interval Samples Fine (<1 mm) Fraction		Interval Samples Coarse (>1 mm) Fraction		Special Samples		
				Sample No.	Sample Wt.	Sample No.	Sample Wt.	Sample No.	Sample Wt.	Sample Type
	26.9		26.9	,1000	1.081	,1001	0.171			
	27.4		27.4	,1002	0.900	,1003	0.046			
	27.9		27.9	,1004	1.072	,1005	0.094			
	28.4		28.4	,1006	1.183	,1007	0.072			
	28.9		28.9	,1008	1.222	,1009	0.068			
	29.4		29.4	,1010	1.222	,1011	0.109			
	29.9		29.9	,1012	1.086	,1013	0.090	,1014	0.030	SoBx 29.5 - 29.9
	30.4		30.4	,1015	1.236	,1016	0.065			
	30.9		30.9	,1017	1.207	,1018	0.277			
	31.4		31.4	,1019	1.153	,1020	0.028			
	31.9		31.9	,1021	1.331	,1022	0.069			
	32.4		32.4	,1023	1.213	,1024	0.034			
	32.9		32.9	,1025	1.311	,1026	0.114			
	33.4		33.4	,1027	1.288	,1028	0.112	,1029	0.023	SoBx 32.0 - 33.2
	33.9		33.9	,1030	1.149	,1031	0.077			
	34.4		34.4	,1032	1.132	,1033	0.201			
	34.9		34.9	,1034	1.040	,1035	0.083			
	35.4		35.4	,1036	1.302	,1037	0.160			
	35.9		35.9	,1038	1.118	,1039	0.045			
	36.4		36.4	,1040	1.182	,1041	0.108			
	36.9		36.9	,1042	1.267	,1043	0.642			
	37.4		37.4	,1044	0.935	,1045	0.113	,1046	0.042	SoBx 37.0 - 37.4
	37.9		37.9	,1047	1.159	,1048	0.113			
	38.4		38.4	,1049	1.290	,1050	0.569			
	38.9		38.9	,1051	1.078	,1052	0.054			
	39.4		39.4	,1053	1.227	,1054	0.108			
	39.9		39.9	,1055	1.37	,1056	0.103			
	40.4		40.4	,1057	1.246	,1058	0.091			
	40.9		40.9	,1059	1.283	,1060	0.047	,1061	0.102	Basalt 40.7 - 41.2
	41.4		41.4	,1062	1.151	,1063	0.111			
	41.9		41.9	,1064	1.070	,1065	0.055			
	42.4		42.4	,1066	1.445	,1067	0.148			
	42.9		42.9	,1068	1.169	,1069	0.191			
	43.4		43.4	,1070	1.280	,1071	0.151			
	43.9		43.9	,1072	1.145	,1073	0.325			
	44.4		44.4	,1074	1.234	,1075	0.043			
	44.9		44.9	,1076	1.422	,1077	0.177	,1078	0.217	Basalt 44.5 - 45.2
	45.4		45.4	,1079	1.336	,1080	0.126			
	45.9		45.9	,1081	1.275	,1082	0.042			
	46.4		46.4	,1083	1.251	,1084	0.158			
	46.9		46.9	,1085	1.163	,1086	0.128	,1087	0.097	Soil 46.5 - 47.4
	47.4		47.4	,1088	1.232	,1089	0.191			
	47.9		47.9	,1090	1.302	,1091	0.067			
	48.4		48.4	,1092	1.367	,1093	0.143			
	48.9		48.9	,1094	1.045	,1095	0.061			
	49.4		49.4	,1096	0.651	,1097	0.047			
	49.9		49.9	,1098	0.453	,1099	0.045			
	50.4		50.4	,1100	0.486	,1101	0.035			
	50.9		50.9	,1102	0.669	,1103	0.086			
	51.4		51.4	,1104	0.539	,1105	0.052			
	51.9		51.9	,1106	0.704	,1107	0.008			
	52.4		52.4	,1108	0.955	,1109	0.127			
	52.9		52.9	,1110	0.842	,1111	0.083			
	53.4		53.4	,1112	0.813	,1113	0.132	,1114	0.029	Soil 53.0 - 53.5
	53.9		53.9	,1115	0.889	,1116	0.085			
	54.4		54.4	,1117	1.055	,1118	0.289			
	54.9		54.9	,1119	1.178	,1120	0.169			
	55.0		55.0	,1121	0.891	,1122	0.071			

Lithologic Symbols



Basalt



Soil Breccia



Glass



Anorthostic  
Breccia

\*Measured after extrusion

DRIVE TUBE 15010  
LOCATION OF SAMPLES, THIRD DISSECTION (MINIMAL PB)

Stratigraphic Unit	Cm Depth Below Lunar Surface	Columnar Section	Cm Depth Below Lunar Surface*	Interval Samples		Sample No.	Sample Wt.	Sample Type	Sample Interval
				Sample No.	Sample Wt.				
			26.9	,2000	2.526				
			27.4	,2001	2.128	,2002	0.089	frag	27.0 - 27.4
			27.9	,2003	3.626				
			28.4	,2004	2.940				
			28.9	,2005	2.953				
			29.4	,2006	2.647				
			29.9	,2007	3.120				
			30.4	,2008	3.157				
5	30.0		30.9	,2009	2.104	,2010	1.821	frag	30.1 - 31.2
			31.4	,2011	2.676				
			31.9	,2012	3.515				
			32.4	,2013	3.069	,2014	0.380	RL	32.2 - 32.5
			32.9	,2015	3.170				
			33.4	,2016	3.436				
			33.9	,2017	3.563				
			34.4	,2018	3.200				
			34.9	,2019	2.902				
			35.0						
			35.4	,2020	3.227				
			35.9	,2021	2.696				
			36.4	,2022	2.934				
			36.9	,2023	3.297				
			37.4	,2024	2.839				
			37.9	,2025	2.723				
			38.4	,2026	2.643	,2027	0.210	frags	37.8 - 38.4
4			38.9	,2028	2.306	,2029	0.336	frag	38.4 - 38.9
			39.4	,2030	2.836				
			39.9	,2031	2.291	,2032	0.410	RL	39.6 - 40.0
			40.0						
			40.4	,2033	3.270	,2034	0.078	clod	40.2 - 40.7
			40.9	,2035	2.579	,2036	0.464	clod	40.4 - 41.0
			41.4	,2037	2.461				
			41.9	,2038	2.861				
			42.4	,2039	2.954				
			42.9	,2040	2.819				
			43.4	,2041	3.139	,2042	0.645	frag	42.6 - 43.4
			43.9	,2043	2.826				
			44.4	,2044	2.810				
			44.9	,2045	2.768				
			45.0						
			45.4	,2046	2.938				
			45.9	,2047	2.441				
3			46.4	,2048	2.947				
			46.9	,2049	3.141	,2050	0.166	lt. soi'	46.6 - 47.2
			47.4	,2051	2.841				
			47.9	,2052	3.350	,2053	0.188	frag	47.7 - 48.1
			48.4	,2054	3.109				
			48.9			,2055	3.169	left	48.4 - 49.9
			49.4			,2056	1.910	right	48.4 - 49.9
2			49.9						
			50.4			,2057	2.880	left	49.9 - 51.4
			50.9			,2058	0.974	right	49.9 - 51.4
			51.4			,2059	0.247	frag	50.3 - 51.0
			51.9	,2060	1.908				
			52.4	,2061	2.471				
			52.9	,2062	2.962				
			53.4	,2063	2.762	,2064	1.361	frag	52.4 - 53.5
			53.9	,2065	2.230				
			54.4	,2066	2.996	,2067	2.463	frag	53.0 - 54.4
1			54.9			,2069	0.324	frag	54.6 - 55.0
			55.0			,2070	0.092	frag	54.8 - 55.2
			55.3						

RL = soil sample taken in red light

Lithologic Symbols



Basalt



Soil Breccia



Glass



Anorthositic Breccia

\*measured after extrusion

DRIVE TUBE 15010  
LOCATION OF SAMPLES, FOURTH DISSECTION (STANDARD)

Stratigraphic Unit	Cm Depth	Columnar Section	Cm Depth Below Lunar Surface*	Interval Samples		Interval Samples		Special Samples				
				Fine (< 1 mm) Fraction		Coarse (> 1 mm) Fraction		Sample No.	Sample Wt.	Sample Type	Sample Interval	
				Sample No.	Sample Wt.	Sample No.	Sample Wt.					
			26.9	,3000	3.029	,3001	0.206					
			27.4	,3002	2.844	,3003	0.134	,3004	0.209	Basalt	26.9 - 27.4	
			27.9	,3005	2.997	,3006	0.523					
			28.4	,3007	2.716	,3008	0.182					
			28.9	,3009	3.444	,3010	0.178					
			29.4	,3011	2.509	,3012	0.255					
			29.9	,3013	2.623	,3014	0.080					
			30.4	,3015	2.837	,3016	0.174					
			30.9	,3017	2.973	,3018	0.151					
			31.4	,3019	2.956	,3020	0.140					
			31.9	,3021	3.307	,3022	0.370	,3023	0.018	soil	31.5 - 31.7	
			32.4	,3024	2.790	,3025	0.142					
			32.9	,3026	2.757	,3027	0.187					
			33.4	,3028	2.748	,3029	0.306					
			33.9	,3030	2.580	,3031	0.141					
			34.4	,3032	2.947	,3033	0.109					
			34.9	,3034	2.403	,3035	0.172					
			35.4	,3036	2.944	,3037	0.140	,3038	0.224	soil	34.9 - 36.4	
			35.9	,3040	1.995	,3041	0.175	,3039	2.622	Basalt	34.9 - 36.4	
			36.4	,3042	2.605	,3043	0.204	,3044	0.013	soil	36.1 - 36.4	
			36.9	,3046	2.863	,3047	0.170	,3045	0.152	soil	35.9 - 36.9	
			37.4	,3048	2.754	,3049	0.279					
			37.9	,3050	2.712	,3051	0.577	,3052	0.526	Basalt	37.0 - 37.8	
			38.4	,3053	2.030	,3054	0.275					
			38.9	,3055	3.203	,3056	0.252	,3057	1.758	SoBx	37.4 - 39.1	
			39.4	,3058	2.771	,3059	0.412	,3060	0.552	Basalt	38.5 - 39.7	
			39.9	,3061	2.312	,3062	0.230					
			40.4	,3063	2.776	,3064	0.458					
			40.9	,3065	3.138	,3066	0.172					
			41.4	,3069	2.453	,3070	0.516					
			41.9	,3071	2.948	,3072	0.234					
			42.4	,3073	2.706	,3074	0.410	,3077	1.841	Basalt	41.7 - 43.1	
			42.9	,3075	2.887	,3076	0.082	,3080	0.246	soil	42.9 - 43.4	
			43.4	,3078	2.741	,3079	0.346	,3089	0.864	Basalt	44.8 - 46.1	
			43.9	,3081	3.121	,3082	0.326					
			44.4	,3083	3.162	,3084	0.440	,3090	0.128	YSoil	41.0 - 41.8	
			44.9	,3085	3.294	,3086	0.386	,3091	0.038	GSoil	41.0 - 41.8	
			45.4	,3087	3.287	,3088	0.479	,3092	0.038	YSoil	41.0 - 41.8	
			45.9	,3093	3.254	,3094	0.153	,3137	0.066	Soil	41.0 - 41.8	
			46.4	,3095	2.991	,3096	0.280	,3138	0.144	soil	41.0 - 41.8	
			46.9	,3097	2.735	,3098	0.440	,3139	0.087	YFrag	41.0 - 41.8	
			47.4	,3099	2.903	,3100	0.275	,3140	0.234	YFrag	41.0 - 41.8	
			47.9	,3101	3.213	,3102	0.314	,3142	0.034	GFrag	41.0 - 41.8	
			48.4	,3103	2.932	,3104	0.466	,3143	0.039	GFrag	41.0 - 41.8	
			48.9	,3105	2.780	,3106	0.523	,3144	0.003	YFrag	41.0 - 41.8	
			49.4	,3107	2.353	,3108	0.200					
			49.9	,3109	1.984	,3110	0.090	,3111	0.364	Basalt	42.9 - 50.0	
			50.4	,3112	1.494	,3113	0.378	,3114	1.216	Soil	48.3 - 52.1	
			50.9	,3116	1.958	,3117	0.328	,3115	44.050	Basalt	48.3 - 53.1	
			51.4	,3118	2.303	,3119	0.194					
			51.9	,3120	2.135	,3121	0.344					
			52.4	,3122	3.479	,3123	0.546	,3124	0.878	SoBx	51.5 - 52.3	
			52.9	,3125	3.304	,3126	0.415	,3127	0.530	SoBx	51.7 - 52.6	
			53.4	,3129	2.930	,3130	0.399	,3128	0.739	SoBx	52.5 - 53.7	
			53.9	,3131	3.143	,3132	0.644					
			54.4	,3133	2.661	,3134	0.693					
			54.9									
			55.3	,3135	4.615	,3136	0.732					

Lithologic Symbols



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\*Measured after extrusion