



## LHT Lunar Simulant Sample Feedback Form

<b>1. Date Testing Completed</b> 8/20/08	<b>2. Name of Evaluator</b> Susan Batiste	<b>3. Organization</b> UCB - LASP																																										
<b>4. Contact Information</b> Boulder, CO																																												
<b>5. Suggested Use for this material</b>																																												
<b>6. How were the Samples Evaluated (i.e., types of tests, analyses, and methods/protocols etc.)</b> Dry sieve analysis grain size distribution on each of two samples of NU-LHT-1M: S/N 043 (252.6 g), and S/N 134 (230.2 g). Standard sieves were used, hand-shaken in 5-minute increments, verifying that the distribution between the last two 5-minute segments were steady.																																												
<b>7. List Sample Raw Data and Results/Conclusions for each Assessment</b>																																												
<b>7.a Raw Data:</b> Below are the data collected from each of the two samples, indicating sieve sizes used, mass accumulated on each sieve, and calculated percent retained and passing. Each sample had a sample loss during processing of less than 1%, well within acceptable limits (1-2%).																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 35%;">Date:</td> <td>8/20/08</td> </tr> <tr> <td>Project Name:</td> <td>NASA/USGS</td> </tr> <tr> <td>Simulant Type:</td> <td>Lunar Highlands Type</td> </tr> <tr> <td>Grain Size:</td> <td>Medium Grain Size</td> </tr> <tr> <td>Sample Designator:</td> <td>NU-LHT-1M</td> </tr> <tr> <td>Sample Number:</td> <td>043</td> </tr> <tr> <td>Test Method:</td> <td>Dry</td> </tr> <tr> <td>Technician:</td> <td>SNB</td> </tr> <tr> <td>File Name:</td> <td></td> </tr> <tr> <td>Total Sample mass, g:</td> <td>230.2</td> </tr> <tr> <td colspan="2" style="text-align: center;"> </td> </tr> <tr> <td style="width: 15%;">Sieve Number</td> <td style="width: 15%;">Opening, mm</td> <td style="width: 15%;">Sample Mass, g</td> <td style="width: 15%;">Percent Retained</td> <td style="width: 15%;">Percent Passing</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">4.75</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0.0%</td> <td style="text-align: center;">100.0%</td> </tr> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">2</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0%</td> <td style="text-align: center;">100%</td> </tr> <tr> <td style="text-align: center;">20</td> <td style="text-align: center;">0.85</td> <td style="text-align: center;">1.7</td> <td style="text-align: center;">1%</td> <td style="text-align: center;">99%</td> </tr> </table>			Date:	8/20/08	Project Name:	NASA/USGS	Simulant Type:	Lunar Highlands Type	Grain Size:	Medium Grain Size	Sample Designator:	NU-LHT-1M	Sample Number:	043	Test Method:	Dry	Technician:	SNB	File Name:		Total Sample mass, g:	230.2			Sieve Number	Opening, mm	Sample Mass, g	Percent Retained	Percent Passing	4	4.75	0	0.0%	100.0%	10	2	0	0%	100%	20	0.85	1.7	1%	99%
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40	0.425	11.3	5%	94%
50	0.3	16.2	7%	87%
60	0.246	10.9	5%	82%
80	0.177	21.2	9%	73%
100	0.15	32.9	14%	59%
140	0.106	31.5	14%	45%
200	0.075	32.9	14%	31%
pan		70.5	31%	0%
% lost: 0.5%				

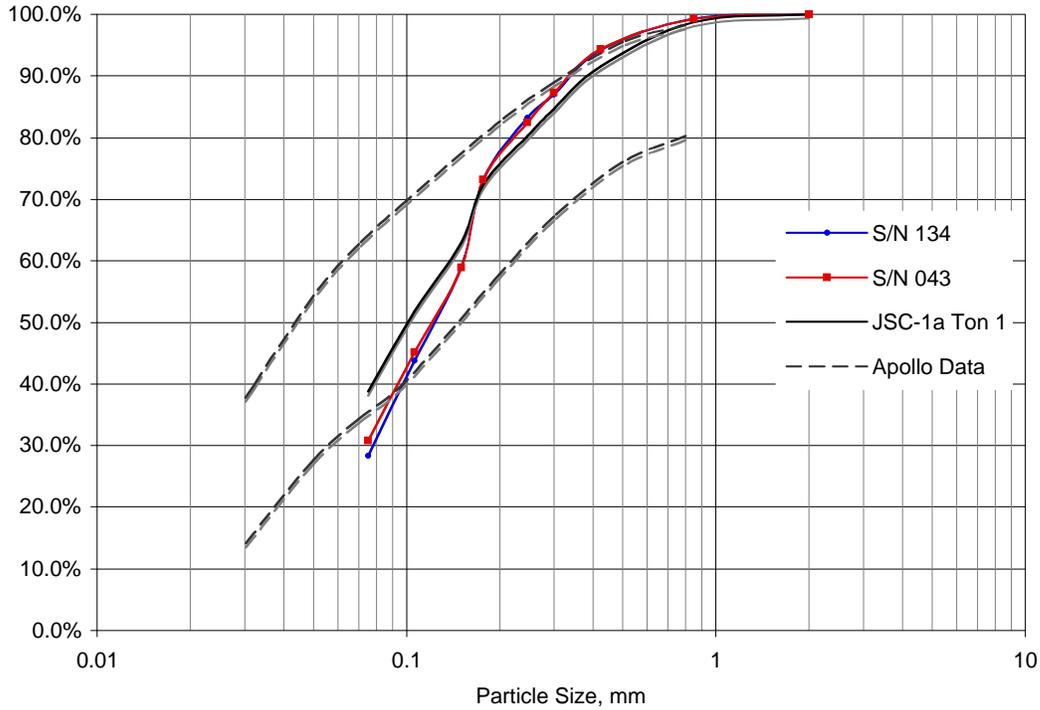
Date:	8/20/08
Project Name:	NASA/USGS
Simulant Type:	Lunar Highlands Type
Grain Size:	Medium Grain Size
Sample Designator:	NU-LHT-1M
Sample Number:	134
Test Method:	Dry
Technician:	SNB
Total Sample mass, g:	252.6

Sieve Number	Opening, mm	Sample Mass, g	Percent Retained	Percent Passing
4	4.75	0	0.0%	100.0%
10	2	0	0.0%	100.0%
20	0.85	1.8	0.7%	99.3%
40	0.425	12.7	5.0%	94.2%
50	0.3	18.3	7.3%	87.0%
60	0.246	9.3	3.7%	83.3%
80	0.177	25.4	10.1%	73.2%
100	0.15	35.8	14.2%	59.0%
140	0.106	38.4	15.2%	43.8%
200	0.075	39.1	15.5%	28.3%
pan	--	71.3	28.3%	0.0%
% lost: 0.2%				

**Results and Conclusions:** Below is a figure showing the grain size distribution of the two samples, compared with a sample of JSC-1a from Ton 1, and the upper and lower bounds of distribution of samples obtained from the Moon.

- The two samples show internal consistency indicating the material was well mixed and if from different batches, that the material processing is consistent.
- The material appears to have fewer fines than both its JSC-1a counterpart and lunar regolith.

### NASA-USGS Lunar Highlands Type Simulant



#### 8. Recommendations and Justifications for Improvement

The sieve analysis indicates that the material below ~0.17 mm is slightly too coarse, and the number of particles finer than 0.15 mm should be increased to fall within bounds of historical lunar data.

It is recommended the sieve analysis data be compared against the distribution measurements made by USGS for consistency before action is taken to verify dry sieving was sufficient to separate the <0.15 mm particles from the larger particle sizes.

#### 9. Other Remarks