Appendix I: Prioritized Investigations & Measurements

Category	Specific Property/ Measurement	Minimum Sample Size	Sample Handling Concern		Minimum Resolution/ Level of Accuracy Required	Measurement/Sampling Frequency Over Drilling Depth Interval			MEPAG Tracibility & Priority								Science Team Prioritization (1-highest, 5-lowest)	
		Regolith	Temperature & Pressue	is Molecular-Level Contamination a Concern? (Y/N)		1 - 5 m (10s of meters mobility & multihole capability desirable)	10 - 20 m	50 - 150 m	Life (I) Ref.	Life (I) Priority	Climate (II) Ref.	Climate (II) Priority	Geology (III) Ref.	Geology (III) Priority	Preparation (IV) Ref.	Preparation (IV) Priority	Distribution of Ratings (#-Rating)	Summary Rating
LITHOLOGY & COMPOSITION																		
	Oxidants	$1cm^3$	Original Ambient	Y	ppb	0-1 m: once @ 5 cm intervals 1-5 m: once @ 50 cm intervals	0-1 m: once @ 5 cm intervals 1-20 m: once @ 50 cm intervals	0-1 m: once @ 5 cm intervals 1-20 m: once @ 50 cm intervals >20 m: once @ 1 m intervals	IA4a	6					IVA2d	2	6-1 3-2	**1.33**
	Mineralogic	$1cm^3$	Original Ambient	N	f sample by wt., element dep	0-1 m: once @ 5 cm intervals 1-5 m: once @ 50 cm intervals	0-1 m: once @ 5 cm intervals 1-5 m: once @ 50 cm intervals >5 m: once @ 1 m intervals	0-1 m: once @ 5 cm intervals 1-5 m: once @ 50 cm intervals >5 m: once @ 1 m intervals	IB1c, 1B2b, 1B3a, IC1a	1, 2, 3, 1	IIA1g, IIB1c	1, 1	IIIA1d, IIIA1e, IIA2c, IIIA2e IIIA4b, IIIA4d, IIIA5c, IIIA6c, IIIA6g, IIIA8b	1, 1, 2, 2. 4, 4, 5, 6, 6, 8			5-1 3-2 1-3	**1.56**
	Lithology	Very Big	N/A	N/A	Camera resolution?	0-5 m:once @ 1 m intervals	0-20 m: once @ 1 m intervals	0-150 m: once @ 1 m intervals	IA5a	1	IIB1c,IIB 2c	1, 2	IIIA2c, IIIA2e, IIIA4b, IIIA4d, IIIA6c, IIIA6g, IIIA8b	2, 2, 4, 4, 6, 6, 8			3-1 3-2 3-3	**2.00**
	Elemental	$1cm^3$	Original Ambient	N	0.5% of sample by wt.	0-1 m: once @ 5 cm intervals 1-5 m: once @ 50 cm intervals	0-1 m: once @ 5 cm intervals 1-5 m: once @ 50 cm intervals >5 m: once @ 1 m intervals	0-1 m: once @ 5 cm intervals 1-5 m: once @ 50 cm intervals >5 m: once @ 1 m intervals	IB1c, IB2b, IC1a	1, 2, 1	IIA1g, IIB1c, IIB2c	1, 1, 2	IIIA1d, IIIA2c, IIIA2e, IIIA4b, IIIA4d, IIIA5c, IIIA6c, IIIA6g, IIIA8b	1, 2, 2, 4, 4, 5, 6, 6, 8	IVA2a, IVA3c, IVA5k	2, 2, 6	3-1 4-2 1-3 1-5	**2.11**
	Inorganic Compounds	$1cm^3$	Original Ambient	?	0.01% of sample by wt.	0-1 m: once @ 5 cm intervals 1-5 m: once @ 50 cm intervals	0-1 m: once @ 5 cm intervals 1-5 m: once @ 50 cm intervals >5 m: once @ 1 m intervals	0-1 m: once @ 5 cm intervals 1-5 m: once @ 50 cm intervals >5 m: once @ 1 m intervals	IA3a	5					IVA3c	2	3-1 3-2 2-3	**2.22**
ORGANICS & POTENTIAL BIOMARKERS																		
	Organic Compounds	$1cm^3$	±50kPa, ±50°C	Y, organic	ppb level	once @ 30 cm intervals	0-5 m: once @ 30 cm intervals 5 - 20 m: once @ 0.5 m intervals	0-5 m: once @ 30 cm intervals 5 - 20 m: once @ 0.5 m intervals >20 m: once @ 1 m intervals	IA2bc,3 a5a,B2b 3a,c1a	1							5-1 4-2	**1.44**
VOLATILE CONTENT (H_2O, CO_2 & CH_4)																		
	Ice	$1cm^3$	Original Ambient ±0.1%	N	10^{-4} g/g, ±10%	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5-3 m: weekly @ 0.5 m intervals >3 m: once @ 1 m intervals	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5-3 m: weekly @ 0.5 m intervals >3 m: once @ 1 m intervals	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5-3 m: weekly @ 0.5 m intervals >3 m: once @ 1 m intervals	IA2a,b; IA5a	3; 7	IIA1c	1	IIIA1d	1	IVA3a,b; IVA6m; IVB5d	?	8-1 1-3	**1.22**
	Adsorbed	$1cm^3$	Original Ambient ±0.1%	N	10^{-4} g/g, ±10%	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5-3 m: weekly @ 0.5 m intervals >3 m: once @ 1 m intervals	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5-3 m: weekly @ 0.5 m intervals >3 m: once @ 1 m intervals	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5-3 m: weekly @ 0.5 m intervals >3 m: once @ 1 m intervals	IA2a,b; IA5a	3; 7	IIA1c	1	IIIA1d	1	IVA3c; IVB5d	?	6-1 2-2 1-3	**1.44**
	Liquid	$1cm^3$	Original Ambient ±0.1%	N	10^{-4} g/g, ±10%	0-3 cm: weekly, 1 PM local time @ 1 cm intervals ≥1 m: once @ 1 m intervals	0-3 cm: weekly, 1 PM local time @ 1 cm intervals ≥1 m: once @ 1 m intervals	0-3 cm: weekly, 1 PM local time @ 1 cm intervals ≥1 m: once @ 1 m intervals	IA2a,b; IA5a	3; 7	IIA1d	1	IIIA1d	1	IVA3c; IVB5d	?	8-1 1-5	**1.44**
	Gas Hydrates	$1cm^3$	Original Ambient ±0.1%	N	10^{-4} g/g, ±10%	N/A	>10 m: once @ 1 m intervals	>10 m: once @ 1 m intervals	IA2a,b,c ; IA5a	3; 7	IIA1c	1	IIIA1d	1	IVA3c; IVB5d	?	4-1 2-2 3-3	**1.89**
	Hydrous Minerals	$1cm^3$	Original Ambient ±0.1%	N	10^{-4} g/g, ±10%	0-10 cm: once @ 1 cm intervals 10-50 cm: once @ 2 cm intervals 0.5-3 m: once @ 0.5 m intervals >3 m: once @ 1 m intervals	0-10 cm: once @ 1 cm intervals 10-50 cm: once @ 2 cm intervals 0.5-3 m: once @ 0.5 m intervals >3 m: once @ 1 m intervals	0-10 cm: once @ 1 cm intervals 10-50 cm: once @ 2 cm intervals 0.5-3 m: once @ 0.5 m intervals >3 m: once @ 1 m intervals	IB1c; IB2b; IB3a	2; 5; 9	IIA1c	1	IIIA1d	1	IVB5f	?	4-1 2-2 3-3	**1.89**
	Vapor Pressure	$1cm^3$	Original Ambient ±0.1%	N	10^{-4} g/g, ±10%	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5-3 m: weekly @ 0.5 m intervals >3 m: once @ 1 m intervals	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5-3 m: weekly @ 0.5 m intervals >3 m: once @ 1 m intervals	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5-3 m: weekly @ 0.5 m intervals >3 m: once @ 1 m intervals	IA2a,b; IA5a	3; 7	IIA1c	1	IIIA1d	1	IVA3a,b; IVA6m; IVB5e	?	2-1 3-2 2-3 2-4	**2.44**
GEOPHYSICAL ENVIRONMENT																		
	Temperature, Heat Flow & Thermal Properties	N/A	N/A	N/A	5 mW/m^2	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals >0.5 m: daily @ 0.5 m intervals	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5 - 5 m: daily @ 0.5 m intervals >5 m: daily @ 1 m intervals	0-10 cm: hourly @ 1 cm intervals 10-50 cm: every 6 hrs @ 2 cm intervals 0.5 - 5 m: daily @ 0.5 m intervals 5-20 m: daily @ 1 m intervals >20 m: daily @ 10 m intervals					IIIB3	3			1-1 4-2 3-3 1-4	**2.44**
	Seismicity & Lithospheric Properties: Passive Seismology in Coordination w/NetLanders	N/A	N/A	N/A		emplace seismometers in multiple holes @ >1 m depth, prefereably in bedrock	N/A	N/A					IIIA6h; IIIA7f	?			2-1 3-2 1-3 2-4 1-5	**2.67**

Appendix I: Prioritized Investigations & Measurements

Category	Specific Property/ Measurement	Minimum Sample Size	Sample Handling Concern		Minimum Resolution/ Level of Accuracy Required	Measurement/Sampling Frequency Over Drilling Depth Interval			MEPAG Tracibility & Priority								Science Team Prioritization (1-highest, 5-lowest)	
									Life (I)		Climate (II)		Geology (III)		Preparation (IV)			
		Regolith	Temperature & Pressue	Is Molecular-Level Contamination a Concern? Y/N		1 - 5 m (10s of meters mobility & multihole - coring/drilling desirable)	10 - 20 m	50 - 150 m	Ref.	Priority	Ref.	Priority	Ref.	Priority	Ref.	Priority	Distribution of Ratings (#-Rating)	Summary Rating
	Electrical & Magnetic Properties	N/A	N/A	N/A		once @ 1 cm once @ 10 cm once @ 1 m >1 m: once at 1 m intervals	once @ 1 cm once @ 10 cm once @ 1 m >1 m: once at 1 m intervals	once @ 1 cm once @ 10 cm once @ 1 m >1 m: once at 1 m intervals							IVA6c,g	6	1-1 2-2 4-3 2-4	**2.78**
	Seismicity & Lithospheric Properties: Active Seismology	N/A	N/A	N/A		6-12 seismometers @ surface	N/A	N/A					IIIA4c; IIIA6d; IIIB1d; IIIB2d; IIIB3d	?			2-1 1-2 2-3 4-4	**2.89**
	Radiation Environment & Shielding Properties	N/A	N/A	N/A											IVA1a; IVA7	1	2-1 1-2 2-3 1-4 2-5	**3.11**
IN-SITU STRESS & STRAIN AND MECHANICAL PROPERTIES																		
	Abrasion Resistance/Hardness																1-1 2-2 2-3 2-4 3-5	**3.56**
	Confining Pressure																1-1 2-3 4-4 2-5	**3.67**
	Shear Strength																1-1 2-3 4-4 2-5	**3.67**
	Compressibility																5-3 1-4 3-5	**3.78**
	In-Situ Stress & Strain																3-3 4-4 2-5	**3.89**
PHYSICAL PROPERTIES																		
	Density	$1cm^3$	Preservation of Original In-Situ P Required ±0.1%	N	±10%	0-10 cm: 1 cm intervals, 1 time only 10-50 cm: 2 cm int., 1 time only 0.5-3 m: 0.5 m int., 1 time only >3 m: 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only			IIA1g	1	IIIA2e; IIIA5c; IIIA6c,d	2; 5; 6			2-1 3-2 3-3 1-4	**2.33**
	Porosity	$1cm^3$	Preservation of Original In-Situ P Required ±0.1%	N	±10%	0-10 cm: 1 cm intervals, 1 time only 10-50 cm: 2 cm int., 1 time only 0.5-3 m: 0.5 m int., 1 time only >3 m: 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only			IIA1g	1	IIIA2e; IIIA5c; IIIA6c,d	2; 5; 6			3-1 2-2 3-3 1-5	**2.33**
	Gaseous Diffusivity	$1cm^3$	Preservation of Original In-Situ P Required ±0.1%	N	±10%	0-10 cm: 1 cm intervals, 1 time only 10-50 cm: 2 cm int., 1 time only 0.5-3 m: 0.5 m int., 1 time only >3 m: 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only			IIA1g	1	IIIA2e; IIIA5c; IIIA6c,d	2; 5; 6			1-1 2-2 5-3 1-4	**2.67**
	Pore Size Distribution	$1cm^3$	Preservation of Original In-Situ P Required ±0.1%	N	±10%	0-10 cm: 1 cm intervals, 1 time only 10-50 cm: 2 cm int., 1 time only 0.5-3 m: 0.5 m int., 1 time only >3 m: 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only			IIA1g	1	IIIA2e; IIIA5c; IIIA6c,d	2; 5; 6			2-1 1-2 4-3 2-4	**2.67**
	Aggregation, Cohesion, Induration	$1cm^3$	Preservation of Original In-Situ P Required ±0.1%	N	±10%	0-10 cm: 1 cm intervals, 1 time only 10-50 cm: 2 cm int., 1 time only 0.5-3 m: 0.5 m int., 1 time only >3 m: 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only			IIA1g	1	IIIA2e; IIIA5c; IIIA6c,d	2; 5; 6	IVA6b	?	3-2 3-3 3-4	**3.00**
	Particle Size Distribution	$1cm^3$	Preservation of Original In-Situ P Required ±0.1%	N	±10%	0-10 cm: 1 cm intervals, 1 time only 10-50 cm: 2 cm int., 1 time only 0.5-3 m: 0.5 m int., 1 time only >3 m: 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only			IIA1g	1	IIIA2e; IIIA5c; IIIA6c,d	2; 5; 6	IVA6h	?	2-1 4-3 2-4 1-5	**3.00**
	Particle Shape Distribution	$1cm^3$	Preservation of Original In-Situ P Required ±0.1%	N	±10%	0-10 cm: 1 cm intervals, 1 time only 10-50 cm: 2 cm int., 1 time only 0.5-3 m: 0.5 m int., 1 time only >3 m: 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only			IIA1g	1	IIIA2e; IIIA5c; IIIA6c,d	2; 5; 6			2-1 2-3 4-4 1-5	**3.22**
	Specific Surface Area	$1cm^3$	Preservation of Original In-Situ P Required ±0.1%	N	±10%	0-10 cm: 1 cm intervals, 1 time only 10-50 cm: 2 cm int., 1 time only 0.5-3 m: 0.5 m int., 1 time only >3 m: 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only			IIA1c, g	1	IIIA2e; IIIA5c; IIIA6c,d	2; 5; 6	IVA3c	?	1-1 1-2 2-3 3-4 2-5	**3.44**

Appendix I: Prioritized Investigations & Measurements

Category	Specific Property/ Measurement	Minimum Sample Size	Sample Handling Concern		Minimum Resolution/ Level of Accuracy Required	Measurement/Sampling Frequency Over Drilling Depth Interval			MEPAG Tracibility & Priority								Science Team Prioritization (1-highest, 5-lowest)	
									Life (I)		Climate (II)		Geology (III)		Preparation (IV)			
		Regolith	Temperature & Pressue	Is Molecular-Level Contamination a Concern? (Y/N)		1 - 5 m (10s of meters mobility & multihole - capability desirable)	10 - 20 m	50 - 150 m	Ref.	Priority	Ref.	Priority	Ref.	Priority	Ref.	Priority	Distribution of Ratings (#-Rating)	Summary Rating
	Hydraulic Permeability	$1cm^3$	Preservation of Original In-Situ P; Required ±0.1%	N	±10%	0-10 cm: 1 cm intervals, 1 time only 10-50 cm: 2 cm int., 1 time only 0.5-3 m: 0.5 m int., 1 time only >3 m: 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only	0 - 5 m, same as previous >5 m 1 m int., 1 time only			IIA1g	1	IIIA2e; IIIA5c; IIIA6c,d	2; 5; 6			2-2 3-3 4-5	**3.67**
AGE																		
	Age																4-1 1-2 1-3 1-4 2-5	**2.56**