Antarctic Meteorite Newsletter

Volume 34, Number 2 Sept. 2011

Curator's Comments

Kevin Righter
NASA-JSC

This newsletter reports 543 new meteorites from the 2008, 2009, and 2010 ANSMET seasons from the Miller Range (MIL), Dominion Range (DOM), Buckley Island (BUC), LaPaz Icefield (LAP), and Patuxent Range (PAT). The new samples include 46 new carbonaceous chondrites (33 CO, 8 CV, 2 CK, and 3 CM), 2 R chondrites (likely paired with the unusual hornblende-bearing R chondrite LAP 04840), one L3.8 chondrite, 1 EL6 chondrite, and an Enstatite chondrite impact melt. Among the new achondrites are 3 pallasites, 2 ureilites, and 12 HED meteorites. The HED meteorites are welcome additions to the collection and come on the heels of the Dawn Mission arrival at asteroid 4 Vesta – the probable home of many of the HEDs.

The publication of this newsletter completes the classification of the 2008 season meteorites. The 2008 season yielded 11 carbonaceous chondrites, several chondritic impact melts, 5 eucrites and 2 ureilites. Among these samples were a 1.3 kg eucrite (DOM 08001) and two sizable and paired CO3 chondrites – DOM 08004 and DOM 08006 – with a paired mass close to 1 kg.

The meteorite collection received 56 requests for the Spring MWG meeting, and although all of the sample chips have been prepared and sent out, there are a few thin sections that still are being prepared.

HED compendium goes online

In anticipation of the Dawn Mission spacecraft arrival at asteroid 4 Vesta in August 2011, Kevin Righter and Josh Garber (now UC Davis graduate student) initiated an HED (Howardite-Eucrite-Diogenite) meteorite compendium. As part of the compendium we feature some samples that have been in the collection for some time and analyzed more extensively than others. For example the paired howardites EET 87503 and EET 87513 were slabbed and studied extensively. The photos have not been available online, but the compendium summary includes as much information as possible. This compendium cannot summarize all HED samples as there are close to 1000. However, we will try to add sample summaries to the compendium as time and interest allows.

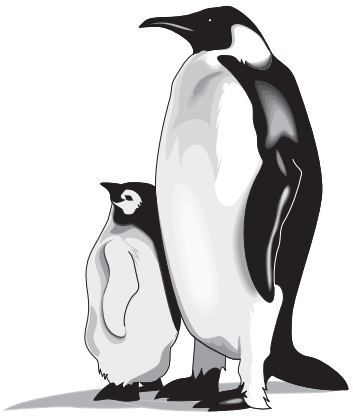
Correction: Reclassification of MacAlpine Hills 02453 (LL6): Please see p. 25 of this newsletter for description.

continued on p.2

A periodical issued by the Meteorite Working Group to inform scientists of the basic characteristics of specimens recovered in the Antarctic.

Edited by Cecilia Satterwhite and Kevin Righter, NASA Johnson Space Center, Houston, Texas 77058

Inside this Issue



Sample Request Deadline
September 16, 2011

MWG Meets
Sept. 22-23, 2011

Free publication available at: **http://curator.jsc.nasa.gov/antmet/amn/amn.cfm**

Report on the 2008-2009 ANSMET Field Season

Ralph Harvey, ANSMET

For the 2011-2012 field season ANSMET will be returning to the Miller Range Icefields, nestled among and against the western (icesheet) side of theTransantarctic mountains, about half-way between McMurdo and South Pole Stations. Our visits to this location have followed a very typical trajectory from reconnaissance to systematic recovery. First came a helicopter-supported day trip in 1985 that yielded one meteorite and suggested the site had at least some potential; but not enough to raise it above the Lewis Cliff Ice Tongue and other nearby sites on our priority list. It was almost 15 years later (in 1999) that we returned to the Miller Range, sending a two-person team for a 3-day visit that yielded 30 meteorites, most in the first few hours. Getting more serious, in 2003 we sent our newly-minted four-person reconnaissance team to the site. They wandered across the breadth of the Miller Range icefields, recovering over 100 specimens (including a new nakhlite). With ample evidence that a full-scale recovery effort would not be wasted, we've sent an 8-person systematic searching team to the Miller Range every other year, recovering well over 2000 meteorites.

2011-2012 continues that trend, and while some of you might think it has gotten boring, the opposite is true. First, from a geographical perspective it is incredibly diverse, a place where the East Antarctic icesheet deviates from monolithic eastward motion into glaciers of all scales, dodging spectacular metamorphic ridges and granitic domes on the way to the Ross Ice Shelf. This diversity in ice flow is mirrored by the presence of blue ice in a wide variety of settings, and meteorites seem to show up on virtually every scrap of blue ice no matter how improbably located. During the upcoming season, we'll be visiting some of these extremes. We'll start the season at the north end of the Miller Range, exploring some small icefields perched along the edges of the massive Nimrod Glacier. We'll also explore some broad sections of the Ascent and Argosy glaciers where a few meteorites have been found mixed in with terrestrial rocks by the millions. Ahem. We'll spend the remainder of the season conducting the first systematic searches of the massive Southern Miller Range icefields. Truthfully we don't know if we'll bring back a thousand meteorites or a dozen; but there's no doubt we expect to be surprised.

Report from the Smithsonian

Cari Corrigan, Geologist (Dept. of Mineral Sci.)

This newsletter announces the classification of 543 meteorites and closes out the classification of the 2008-2009 season (Dominion Range, DOM, '08's). Since the last newsletter, our thin section preparator, Jonathan Cooper, moved to the Geology Department at Carleton College in Minnesota. Thankfully, our contractor, Nicole Lunning (MSc, UC Davis, 2009), has stepped in to keep the process moving along. She has done a fantastic job learning the thin section making process and has produced some very nice sections. A posting for a new thin section preparator/microbeam technician is currently listed on USA Jobs. We have also brought Dr. Andrew Beck on board as a postdoctoral fellow working with Tim McCoy on the Dawn mission. Andrew is a recent graduate of the University of Tennessee and he is interested in the process of meteorite classification.

An important piece of news that affects requests: The new curation facility at our offsite support center, reported in the Spring 2011 newsletter, is still not operational due to delays in its final stages of assembly and the recent earthquake (August 23, 2011). We are still unable to access meteorites currently stored in this facility. While our specific facility fared well during the earthquake, other portions of the Support Center did not, and we expect attention to be focused on those repairs. For those who wish to request meteorites that are stored there, please accept our apologies for the delays to the process; we will do our best to suggest material from other, accessible, meteorites that would be suitable for your project. We expect this facility to be completed and fully operational by the end of 2011, so please bear with us!

Curation Facility - Smithsonian Institution

New Meteorites

2008 thru 2010 Collections

Pages contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 34(1), March 2011. Specimens of special petrologic type (carbonaceous chondrite, unequilibrated ordinary chondrite, achondrite, etc.) are represented by separate descriptions unless they are paired with previously described meteorites. However, some specimens of non-special petrologic type are listed only as single line entries in Table 1. For convenience, new specimens of special petrological type are also recast in Table 2.

Macroscopic descriptions of stony meteorites were performed at NASA/JSC. These descriptions summarize hand-specimen features observed during initial examination. Classification is based on microscopic petrography and reconnaissance-level electron microprobe analyses using polished sections prepared from a small chip of each meteorite. For each stony meteorite the sample number assigned to the preliminary examination section is included. In some cases, however, a single microscopic description was based on thin sections of several specimens believed to be members of a single fall.

Meteorite descriptions contained in this issue were contributed by the following individuals:

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Houston, Texas

Cari Corrigan, Nicole Lunning, Linda Welzenbach, Emma Bullock,
Tim McCoy, and Andrew Beck
Department of Mineral Sciences
U.S. Natl. Museum of Natural History
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Washington, D.C.

Antarctic Meteorite Locations

ALH — Allan Hills
BEC — Beckett Nunatak
BOW — Bowden Neve
BTN — Bates Nunataks
BUC — Buckley Island
CMS — Cumulus Hills
CRA — Mt.Cranfield Ice Field
CRE — Mt. Crean
DAV — David Glacier
DEW — Mt. DeWitt
DNG — D'Angelo Bluff
DOM — Dominion Range
DRP — Derrick Peak
EET — Elephant Moraine
FIN — Finger Ridge
GDR — Gardner Ridge
GEO — Geologists Range
GRA — Graves Nunataks
GRO — Grosvenor Mountains
HOW — Mt. Howe
ILD — Inland Forts
KLE — Klein Ice Field
LAP — LaPaz Ice Field
LAR — Larkman Nunatak
LEW — Lewis Cliff
LON — Lonewolf Nunataks
MAC — MacAlpine Hills
MBR — Mount Baldr
MCY — MacKay Glacier
MET — Meteorite Hills
MIL — Miller Range
ODE — Odell Glacier
OTT — Outpost Nunatak
PAT — Patuxent Range
PCA — Pecora Escarpment
PGP — Purgatory Peak
PRA — Mt. Pratt
PRE — Mt. Prestrud
QUE — Queen Alexandra Range
RBT — Roberts Massif
RKP — Reckling Peak
SAN — Sandford Cliffs
SCO — Scott Glacier
STE — Stewart Hills
TEN — Tentacle Ridge
TIL — Thiel Mountains
TYR — Taylor Glacier
WIS — Wisconsin Range
WSG — Mt. Wisting

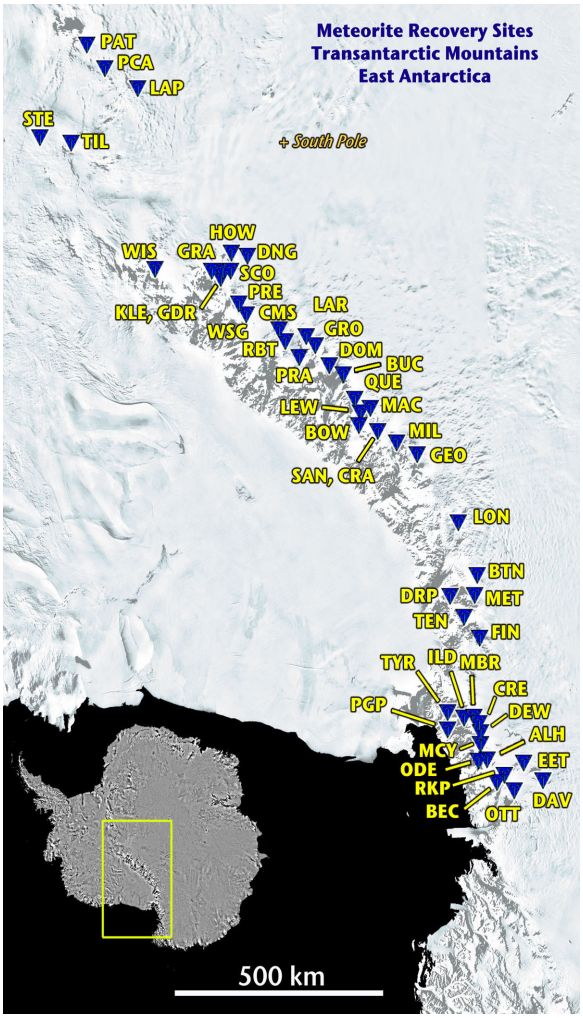

Table 1

List of Newly Classified Antarctic Meteorites **

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 08021	~	1009.1	LL5 CHONDRITE	C	C		
DOM 08023	~	834.1	LL6 CHONDRITE	B/C	A/B		
DOM 08024	~	912.3	LL6 CHONDRITE	B/C	B/C		
DOM 08027	~	240.6	LL6 CHONDRITE	A/BE	B		
DOM 08028	~	281.7	L5 CHONDRITE	B/C	A/B		
DOM 08029	~	227.0	LL5 CHONDRITE	A/B	A/BE		
DOM 08030	~	255.3	L5 CHONDRITE	B/C	A		
DOM 08031	~	325.9	LL6 CHONDRITE	B	A		
DOM 08036	~	153.1	LL6 CHONDRITE	A/B	A		
DOM 08060	~	49.4	LL6 CHONDRITE	C	B		
DOM 08063	~	58.7	LL6 CHONDRITE	B	A/B		
DOM 08065	~	56.3	LL6 CHONDRITE	B	A/B		
DOM 08067	~	28.9	LL6 CHONDRITE	B	B		
DOM 08068	~	19.1	LL6 CHONDRITE	C	B		
DOM 08069	~	34.0	LL6 CHONDRITE	B	B		
DOM 08070	~	35.1	LL6 CHONDRITE	C	B		
DOM 08071	~	23.0	L6 CHONDRITE	C	B		
DOM 08072	~	28.4	LL6 CHONDRITE	B/C	B		
DOM 08073	~	25.0	LL6 CHONDRITE	B/C	B		
DOM 08074	~	38.7	LL6 CHONDRITE	B	B		
DOM 08075	~	20.9	LL6 CHONDRITE	B	B		
DOM 08076	~	16.5	LL6 CHONDRITE	B	B		
DOM 08078	~	16.8	LL6 CHONDRITE	B/C	B		
DOM 08079	~	12.5	LL6 CHONDRITE	B/C	B		
DOM 08085	~	10.3	LL6 CHONDRITE	B/C	B		
DOM 08086	~	28.8	LL5 CHONDRITE	C	B		
DOM 08088	~	34.1	L5 CHONDRITE	B/C	B		
DOM 08091	~	31.8	L6 CHONDRITE	C	B		
DOM 08092	~	47.8	LL6 CHONDRITE	B/C	B		
DOM 08093	~	24.4	LL5 CHONDRITE	B/C	B/C		
DOM 08094	~	55.8	L5 CHONDRITE	C	A/B		
DOM 08095	~	18.0	L5 CHONDRITE	C	B		
DOM 08098	~	21.3	LL5 CHONDRITE	B	B		
DOM 08099	~	21.2	L6 CHONDRITE	C	B/C		
DOM 08100	~	15.4	LL6 CHONDRITE	B	A/B		
DOM 08101	~	22.7	LL6 CHONDRITE	B	A/B		
DOM 08102	~	18.9	LL6 CHONDRITE	B/C	B		
DOM 08105	~	13.7	LL6 CHONDRITE	B/C	B		
DOM 08106	~	16.2	LL6 CHONDRITE	B	B		
DOM 08107	~	16.9	LL6 CHONDRITE	B	B		
DOM 08108	~	14.9	LL6 CHONDRITE	B/C	B		
DOM 08109	~	23.3	LL5 CHONDRITE	B/C	B		
DOM 08120	~	7.2	LL6 CHONDRITE	B	B		
DOM 08121	~	6.5	LL6 CHONDRITE	B/C	A/B		
DOM 08122	~	11.3	L6 CHONDRITE	C	A/B		
DOM 08123	~	20.3	LL6 CHONDRITE	B/C	A/B		
DOM 08124	~	18.2	LL6 CHONDRITE	B	A/B		
DOM 08125	~	20.9	L6 CHONDRITE	C	A/B		
DOM 08126	~	13.5	L5 CHONDRITE	C	A/B		
DOM 08127	~	15.0	L5 CHONDRITE	C	B		

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 08128	~	18.3	LL6 CHONDRITE	B/C	B		
DOM 08129	~	14.2	LL6 CHONDRITE	B/C	A/B		
DOM 08130	~	17.2	H5 CHONDRITE	C	B/C		
DOM 08131	~	9.5	H5 CHONDRITE	C	A/B		
DOM 08132	~	14.5	LL6 CHONDRITE	B/C	A/B		
DOM 08133	~	9.3	L5 CHONDRITE	C	B		
DOM 08134	~	14.9	L5 CHONDRITE	C	B		
DOM 08135	~	12.8	L5 CHONDRITE	C	B		
DOM 08136	~	18.8	H5 CHONDRITE	C	B		
DOM 08137	~	13.7	LL6 CHONDRITE	C	B		
DOM 08138	~	8.4	L6 CHONDRITE	C	B		
DOM 08139		21.8	CO3 CHONDRITE	A/B	A	0-60	
DOM 08140	~	39.1	LL6 CHONDRITE	B	A		
DOM 08141	~	20.4	LL6 CHONDRITE	B	A/B		
DOM 08142	~	21.1	L5 CHONDRITE	C	B		
DOM 08143	~	13.9	L6 CHONDRITE	C	C		
DOM 08144	~	35.3	L5 CHONDRITE	C	B		
DOM 08145	~	20.4	L5 CHONDRITE	B/C	A/B		
DOM 08146	~	30.0	LL5 CHONDRITE	B	A/B		
DOM 08147	~	44.1	LL6 CHONDRITE	A/B	B		
DOM 08148	~	34.0	LL6 CHONDRITE	B	B		
DOM 08149	~	43.4	H6 CHONDRITE	C	B		
DOM 08150	~	12.2	LL6 CHONDRITE	B/C	A		
DOM 08151	~	18.5	LL6 CHONDRITE	A/B	A		
DOM 08152	~	17.0	H5 CHONDRITE	B/C	A		
DOM 08153	~	9.3	LL6 CHONDRITE	B/C	A		
DOM 08154	~	10.4	L5 CHONDRITE	B/C	A		
DOM 08155	~	22.2	LL6 CHONDRITE	B/C	A/B		
DOM 08156	~	14.4	LL6 CHONDRITE	B/C	A		
DOM 08157	~	19.1	LL6 CHONDRITE	B/C	A		
DOM 08158	~	6.9	L6 CHONDRITE	B/C	A		
DOM 08159	~	13.8	L5 CHONDRITE	B/C	A		
DOM 08160	~	35.6	LL6 CHONDRITE	B/C	A/B		
DOM 08161	~	18.8	LL6 CHONDRITE	B/C	A		
DOM 08162	~	31.2	H4 CHONDRITE	B/C	A		
DOM 08163	~	19.9	L6 CHONDRITE	B/C	A/B		
DOM 08164	~	60.7	L5 CHONDRITE	B/C	A		
DOM 08165	~	50.0	LL6 CHONDRITE	A/B	A		
DOM 08166	~	38.2	L6 CHONDRITE	B/C	A		
DOM 08167	~	37.3	H5 CHONDRITE	B/C	A/B		
DOM 08168	~	20.4	L5 CHONDRITE	A/B	A/B		
DOM 08169	~	38.5	L6 CHONDRITE	B/C	A/B		
DOM 08170	~	11.0	LL6 CHONDRITE	B/C	B		
DOM 08171	~	17.4	LL6 CHONDRITE	B/C	B		
DOM 08172	~	38.0	H6 CHONDRITE	CE	C		
DOM 08173	~	15.4	LL6 CHONDRITE	B/C	B		
DOM 08174	~	28.4	LL6 CHONDRITE	B	A/B		
DOM 08175	~	15.6	LL6 CHONDRITE	B/C	B		
DOM 08176	~	8.4	LL6 CHONDRITE	C	B/C		
DOM 08177	~	31.0	LL6 CHONDRITE	B/C	B		
DOM 08178	~	22.5	LL6 CHONDRITE	B/C	B		
DOM 08179	~	29.8	LL6 CHONDRITE	B/C	B		
DOM 08180	~	22.7	LL5 CHONDRITE	A/B	B		
DOM 08181	~	35.2	LL6 CHONDRITE	B	B		
DOM 08182	~	42.7	LL5 CHONDRITE	B/C	B		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 08183 ~	28.3	L6 CHONDRITE	B/C	B		
DOM 08184 ~	32.8	LL6 CHONDRITE	B/C	B/C		
DOM 08185 ~	49.3	LL6 CHONDRITE	B/C	B/C		
DOM 08186 ~	74.4	LL6 CHONDRITE	B	B		
DOM 08187 ~	27.9	LL6 CHONDRITE	C	B/C		
DOM 08188 ~	77.5	L6 CHONDRITE	C	C		
DOM 08189 ~	30.8	LL6 CHONDRITE	B	B		
DOM 08190 ~	15.5	LL6 CHONDRITE	C	A/B		
DOM 08191 ~	19.2	LL6 CHONDRITE	C	B		
DOM 08192 ~	23.3	LL6 CHONDRITE	B	A/B		
DOM 08193 ~	20.2	LL6 CHONDRITE	B	A/B		
DOM 08194 ~	14.4	LL6 CHONDRITE	C	A/B		
DOM 08195 ~	40.7	LL6 CHONDRITE	B/C	A/B		
DOM 08196 ~	28.3	L6 CHONDRITE	B/C	B		
DOM 08197 ~	22.6	LL6 CHONDRITE	B	A/B		
DOM 08198 ~	13.9	LL6 CHONDRITE	B/C	A/B		
DOM 08199 ~	21.6	L5 CHONDRITE	C	B		
DOM 08220 ~	9.6	L5 CHONDRITE	C	B		
DOM 08221 ~	41.2	LL6 CHONDRITE	B	B		
DOM 08222 ~	16.6	LL6 CHONDRITE	B/C	B		
DOM 08223 ~	21.3	LL6 CHONDRITE	B	B		
DOM 08224 ~	31.6	L6 CHONDRITE	C	A/B		
DOM 08225 ~	21.7	LL6 CHONDRITE	B/C	B		
DOM 08226 ~	21.2	LL6 CHONDRITE	B/C	A/B		
DOM 08227 ~	20.4	L6 CHONDRITE	C	B		
DOM 08228 ~	18.1	LL6 CHONDRITE	B	B		
DOM 08229 ~	11.2	LL6 CHONDRITE	B/C	B		
DOM 08250 ~	22.9	L6 CHONDRITE	C	C		
DOM 08251 ~	20.0	LL6 CHONDRITE	B	B		
DOM 08252 ~	28.8	LL6 CHONDRITE	B	B		
DOM 08253 ~	37.9	LL6 CHONDRITE	B	B		
DOM 08254 ~	25.5	LL6 CHONDRITE	B	B		
DOM 08255 ~	29.3	LL6 CHONDRITE	B	B		
DOM 08256 ~	78.5	LL5 CHONDRITE	B/C	A/B		
DOM 08257 ~	19.8	L5 CHONDRITE	C	B		
DOM 08258 ~	48.4	LL6 CHONDRITE	B/C	A/B		
DOM 08259 ~	64.2	LL6 CHONDRITE	B/C	B		
DOM 08260 ~	9.0	LL6 CHONDRITE	B	B		
DOM 08261 ~	22.6	L6 CHONDRITE	C	B/C		
DOM 08262 ~	15.0	LL6 CHONDRITE	B/C	B		
DOM 08263 ~	12.4	L5 CHONDRITE	C	B		
DOM 08264 ~	8.4	L5 CHONDRITE	C	B		
DOM 08265 ~	6.2	L6 CHONDRITE	B	B		
DOM 08266 ~	30.1	LL6 CHONDRITE	B	B		
DOM 08267 ~	19.8	LL6 CHONDRITE	B/C	B		
DOM 08268 ~	30.0	LL6 CHONDRITE	B	B		
DOM 08269 ~	29.3	LL6 CHONDRITE	C	B		
DOM 08270 ~	29.5	LL6 CHONDRITE	B/C	B		
DOM 08271 ~	65.0	L6 CHONDRITE	C	C		
DOM 08272 ~	52.7	LL6 CHONDRITE	B/C	B		
DOM 08273 ~	56.6	LL6 CHONDRITE	B/C	B		
DOM 08274 ~	33.2	LL6 CHONDRITE	B	A/B		
DOM 08275 ~	60.9	LL6 CHONDRITE	B	B		
DOM 08276 ~	36.8	LL6 CHONDRITE	B/C	B		
DOM 08277 ~	21.0	LL6 CHONDRITE	B	B		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 08278 ~	83.6	LL6 CHONDRITE	A/B	A/B		
DOM 08279 ~	30.9	LL6 CHONDRITE	B	B		
DOM 08280 ~	24.0	L6 CHONDRITE	B/C	B		
DOM 08281 ~	15.3	LL6 CHONDRITE	B	B		
DOM 08282 ~	20.8	LL6 CHONDRITE	A/B	B		
DOM 08283 ~	8.9	L6 CHONDRITE	C	B		
DOM 08285 ~	25.0	LL6 CHONDRITE	B	B		
DOM 08286 ~	9.5	LL6 CHONDRITE	B	B		
DOM 08287 ~	12.6	LL6 CHONDRITE	B	B		
DOM 08288 ~	14.0	L6 CHONDRITE	B/C	B		
DOM 08289 ~	6.4	LL6 CHONDRITE	B	A/B		
DOM 08290 ~	24.8	LL6 CHONDRITE	C	B		
DOM 08291 ~	28.7	LL6 CHONDRITE	B/C	B		
DOM 08292 ~	29.2	LL5 CHONDRITE	B/C	B		
DOM 08293 ~	20.8	LL6 CHONDRITE	B	A/B		
DOM 08294 ~	28.7	L6 CHONDRITE	C	C		
DOM 08295 ~	28.5	H5 CHONDRITE	C	C		
DOM 08296 ~	23.7	L6 CHONDRITE	C	B		
DOM 08297 ~	57.1	LL6 CHONDRITE	C	B		
DOM 08298 ~	23.9	LL6 CHONDRITE	C	B		
DOM 08299 ~	22.2	LL6 CHONDRITE	B	B		
DOM 08300 ~	9.7	LL6 CHONDRITE	B	B		
DOM 08302 ~	15.6	L6 CHONDRITE	C	B		
DOM 08303 ~	11.1	L6 CHONDRITE	C	B		
DOM 08304 ~	5.4	L5 CHONDRITE	C	C		
DOM 08305 ~	5.6	L5 CHONDRITE	C	C		
DOM 08307 ~	9.6	L5 CHONDRITE	C	A/B		
DOM 08308 ~	2.8	L6 CHONDRITE	C	B		
DOM 08309 ~	9.2	LL6 CHONDRITE	B	A/B		
DOM 08310 ~	4.9	LL6 CHONDRITE	B/C	B		
DOM 08311 ~	3.4	L6 CHONDRITE	C	A/B		
DOM 08313 ~	18.5	L5 CHONDRITE	C	C		
DOM 08314 ~	12.9	L6 CHONDRITE	C	B		
DOM 08315 ~	7.3	L6 CHONDRITE	C	B		
DOM 08317 ~	28.2	L6 CHONDRITE	C	C		
DOM 08318 ~	7.1	L5 CHONDRITE	C	B		
DOM 08320 ~	7.1	L6 CHONDRITE	C	A/B		
DOM 08322 ~	3.0	LL6 CHONDRITE	B/C	B		
DOM 08323 ~	15.9	L5 CHONDRITE	C	B		
DOM 08324 ~	12.4	LL6 CHONDRITE	B	B		
DOM 08329 ~	8.3	L5 CHONDRITE	C	B		
DOM 08340 ~	4.0	L5 CHONDRITE	B/C	A		
DOM 08341 ~	3.4	LL6 CHONDRITE	B/C	A/B		
DOM 08342 ~	2.2	L6 CHONDRITE	C	B		
DOM 08360 ~	14.6	L6 CHONDRITE	C	C		
DOM 08361 ~	38.7	LL6 CHONDRITE	B/C	B		
DOM 08362 ~	19.8	LL6 CHONDRITE	B/C	B		
DOM 08363 ~	24.3	LL6 CHONDRITE	B	A/B		
DOM 08364 ~	21.0	LL5 CHONDRITE	B/C	B		
DOM 08365 ~	19.0	L6 CHONDRITE	C	B		
DOM 08366 ~	48.7	L6 CHONDRITE	C	B		
DOM 08367 ~	20.9	H6 CHONDRITE	C	B		
DOM 08368 ~	28.5	LL6 CHONDRITE	B	B		
DOM 08369 ~	18.0	LL6 CHONDRITE	C	B		
DOM 08380 ~	2.8	H6 CHONDRITE	C	B		

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 08381	~	3.2	H6 CHONDRITE	C	B		
DOM 08382	~	2.3	H6 CHONDRITE	C	B		
DOM 08383	~	2.1	H6 CHONDRITE	C	B		
DOM 08384	~	2.6	LL6 CHONDRITE	C	B		
DOM 08385		2.5	L3.8 CHONDRITE	C	B	9-29	2-14
DOM 08386		4.9	LL6 CHONDRITE	C	B		
DOM 08388	~	6.1	L6 CHONDRITE	C	A/B		
DOM 08389	~	2.5	L6 CHONDRITE	C	B		
DOM 08400	~	49.9	L6 CHONDRITE	C	B		
DOM 08401	~	97.9	L5 CHONDRITE	C	B		
DOM 08402	~	55.8	L5 CHONDRITE	B	B		
DOM 08403	~	78.7	L5 CHONDRITE	B/C	B		
DOM 08404	~	70.3	L6 CHONDRITE	C	B		
DOM 08405	~	92.8	L5 CHONDRITE	C	B		
DOM 08406	~	45.9	L5 CHONDRITE	C	B		
DOM 08407	~	115.6	L6 CHONDRITE	B/C	B		
DOM 08408	~	71.3	LL6 CHONDRITE	A/B	A/B		
DOM 08409	~	76.5	LL5 CHONDRITE	A/B	A/B		
DOM 08410	~	29.3	L6 CHONDRITE	B	A/B		
DOM 08420	~	54.8	LL6 CHONDRITE	B	A/B		
DOM 08421	~	49.1	LL6 CHONDRITE	B	A/B		
DOM 08422	~	17.9	LL6 CHONDRITE	B/C	B		
DOM 08423	~	24.9	LL5 CHONDRITE	C	B		
DOM 08424	~	53.1	LL6 CHONDRITE	B	A/B		
DOM 08425	~	31.4	LL6 CHONDRITE	B	A/B		
DOM 08426	~	24.8	LL6 CHONDRITE	B/C	B		
DOM 08427	~	45.0	LL6 CHONDRITE	B	A/B		
DOM 08428	~	19.7	LL6 CHONDRITE	B/C	B		
DOM 08429	~	23.3	LL6 CHONDRITE	B	A/B		
MIL 090002		3971.0	PALLASITE	B	A	12-13	
MIL 090019		793.8	CO3 CHONDRITE	B	B	0-42	
MIL 090023		898.6	LL5 CHONDRITE	B	B		
MIL 090029		356.4	PALLASITE	B	A	12-13	
MIL 090140	~	1.8	L6 CHONDRITE	C	B		
MIL 090141	~	1.0	LL6 CHONDRITE	A/B	A/B		
MIL 090142	~	0.9	LL5 CHONDRITE	C	C		
MIL 090143	~	3.9	L6 CHONDRITE	C	B		
MIL 090144	~	0.7	L6 CHONDRITE	C	B		
MIL 090145	~	1.9	LL5 CHONDRITE	C	B		
MIL 090146	~	1.7	LL6 CHONDRITE	B/C	B		
MIL 090147	~	2.2	LL6 CHONDRITE	B/C	B		
MIL 090148	~	2.5	LL6 CHONDRITE	B/C	B		
MIL 090149	~	1.3	LL6 CHONDRITE	B/C	B		
MIL 090152		40.4	CO3 CHONDRITE	A	A	0-56	7
MIL 090153		97.5	HOWARDITE	A/B	A		23-59
MIL 090154		16.3	LL5 CHONDRITE	B	B	31-32	
MIL 090159		45.5	DIOGENITE	B	A/B		12-35
MIL 090169		4.2	L4 CHONDRITE	B/C	B	8-24	14-20
MIL 090170		2.5	CV3 CHONDRITE	B	B	0-11	
MIL 090171		10.4	CV3 CHONDRITE	B	B	0-11	
MIL 090173		2.1	CV3 CHONDRITE	B	B	0-11	1
MIL 090179		1.2	CV3 CHONDRITE	B	B	0-35	
MIL 090206		17.0	UREILITE	B	A	26-28	26
MIL 090220		28.0	DIOGENITE	A/B	A		32-34

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MIL 090221		34.0	DIOGENITE	B	A/B		32-37
MIL 090227		62.8	CO3 CHONDRITE	B	A/B	0-52	
MIL 090240	~	25.6	LL6 CHONDRITE	A/B	A		
MIL 090241	~	11.1	H6 CHONDRITE	C	A/B		
MIL 090242	~	11.3	LL5 CHONDRITE	B/C	A/B		
MIL 090243	~	25.0	L5 CHONDRITE	A/B	A/B		
MIL 090244	~	29.7	LL5 CHONDRITE	B	A/B		
MIL 090245	~	18.0	LL6 CHONDRITE	B/C	A/B		
MIL 090246	~	13.4	L5 CHONDRITE	C	B/C		
MIL 090247	~	8.2	LL6 CHONDRITE	C	B		
MIL 090248	~	15.3	H5 CHONDRITE	C	B/C		
MIL 090249	~	14.6	H6 CHONDRITE	C	A		
MIL 090250	~	14.8	H6 CHONDRITE	C	B/C		
MIL 090251	~	4.5	LL6 CHONDRITE	B	A/B		
MIL 090252	~	5.9	LL6 CHONDRITE	C	A/B		
MIL 090253	~	5.1	L5 CHONDRITE	C	B		
MIL 090254	~	4.9	L5 CHONDRITE	C	A/B		
MIL 090255	~	2.5	H6 CHONDRITE	C	B		
MIL 090256	~	2.2	L6 CHONDRITE	B	A		
MIL 090257	~	4.0	LL6 CHONDRITE	B	A		
MIL 090258	~	0.8	L5 CHONDRITE	C	B		
MIL 090260	~	1.7	L5 CHONDRITE	C	B		
MIL 090261	~	7.6	H6 CHONDRITE	C	B		
MIL 090262	~	0.3	LL6 CHONDRITE	B	A		
MIL 090263	~	7.9	H6 CHONDRITE	C	A/B		
MIL 090264		0.5	CO3 CHONDRITE	B	A	0-39	
MIL 090265	~	3.5	L5 CHONDRITE	C	B/CE		
MIL 090266	~	13.0	L5 CHONDRITE	C	B/C		
MIL 090267	~	5.5	H6 CHONDRITE	C	B		
MIL 090268	~	4.3	LL6 CHONDRITE	A	A		
MIL 090269	~	5.0	L5 CHONDRITE	C	B		
MIL 090270	~	42.6	L5 CHONDRITE	CE	B/C		
MIL 090271	~	39.8	LL6 CHONDRITE	A	A/B		
MIL 090272	~	19.7	LL6 CHONDRITE	B/C	B		
MIL 090273	~	31.0	L6 CHONDRITE	C	B		
MIL 090274	~	49.5	LL6 CHONDRITE	C	A/B		
MIL 090275	~	14.4	LL6 CHONDRITE	A	A/B		
MIL 090276	~	7.9	LL6 CHONDRITE	A	A/B		
MIL 090277	~	5.0	LL5 CHONDRITE	B	B		
MIL 090278	~	21.0	L6 CHONDRITE	B/C	A/B		
MIL 090279	~	57.6	L5 CHONDRITE	C	A/B		
MIL 090335		4.5	LL5 CHONDRITE	B	B	31	25
MIL 090342		2.8	CO3 CHONDRITE	B	A	0-36	
MIL 090354		0.8	CV3 CHONDRITE	B	B	0-36	1-5
MIL 090360	~	2.4	L6 CHONDRITE	C	B		
MIL 090361	~	7.4	LL6 CHONDRITE	A/B	A/B		
MIL 090362	~	2.7	L6 CHONDRITE	C	B		
MIL 090363	~	2.4	H6 CHONDRITE	C	A/B		
MIL 090364	~	6.6	H5 CHONDRITE	C	B		
MIL 090365	~	3.1	L6 CHONDRITE	C	B/C		
MIL 090366	~	2.7	L6 CHONDRITE	C	B		
MIL 090367	~	9.0	L6 CHONDRITE	C	B		
MIL 090368	~	6.1	L5 CHONDRITE	C	B		
MIL 090369		1.3	CO3 CHONDRITE	C	B	1-54	1
MIL 090370	~	0.7	L6 CHONDRITE	B/C	B		

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MIL 090371	~	0.9	L6 CHONDRITE	B/C	B		
MIL 090372	~	0.9	LL5 CHONDRITE	B	B		
MIL 090373	~	0.9	L6 CHONDRITE	B/C	B		
MIL 090374	~	1.1	L6 CHONDRITE	B/C	B		
MIL 090375	~	1.0	L6 CHONDRITE	B/C	B		
MIL 090376	~	1.8	H6 CHONDRITE	B/C	A		
MIL 090377	~	4.8	L6 CHONDRITE	C	A/B		
MIL 090378	~	1.7	L6 CHONDRITE	C	B		
MIL 090379	~	2.1	L5 CHONDRITE	C	B		
MIL 090380	~	1.2	LL5 CHONDRITE	C	B		
MIL 090381	~	4.0	L5 CHONDRITE	C	B		
MIL 090382	~	1.3	H5 CHONDRITE	C	A/B		
MIL 090383	~	1.8	L5 CHONDRITE	C	B/C		
MIL 090384	~	2.9	L6 CHONDRITE	C	B		
MIL 090385	~	3.8	H6 CHONDRITE	C	B		
MIL 090386	~	4.3	H6 CHONDRITE	C	B		
MIL 090387	~	1.5	L6 CHONDRITE	C	B		
MIL 090388	~	1.8	L6 CHONDRITE	C	C		
MIL 090389	~	2.9	L6 CHONDRITE	C	B		
MIL 090390	~	18.6	LL6 CHONDRITE	A/B	A/B		
MIL 090391	~	11.2	LL6 CHONDRITE	B/C	A/B		
MIL 090392		8.3	CO3 CHONDRITE	A/B	A	0-50	4
MIL 090393	~	1.2	L5 CHONDRITE	C	B		
MIL 090394	~	0.8	L6 CHONDRITE	B	B		
MIL 090395	~	2.3	LL6 CHONDRITE	B	A/B		
MIL 090396	~	1.7	L6 CHONDRITE	C	A/B		
MIL 090397	~	0.6	L6 CHONDRITE	B	B		
MIL 090398	~	1.6	L6 CHONDRITE	C	B		
MIL 090399	~	1.0	L6 CHONDRITE	B	B		
MIL 090420	~	0.9	L6 CHONDRITE	B	B		
MIL 090421	~	1.3	LL5 CHONDRITE	B	B		
MIL 090422	~	0.4	L6 CHONDRITE	C	B		
MIL 090423	~	1.5	L5 CHONDRITE	C	C		
MIL 090424	~	1.9	LL6 CHONDRITE	C	B		
MIL 090425	~	0.9	L6 CHONDRITE	C	B		
MIL 090426	~	1.6	L6 CHONDRITE	C	A/B		
MIL 090427		2.2	CO3 CHONDRITE	B	A	0-56	1-2
MIL 090428		2.0	CO3 CHONDRITE	B	A/B	1-47	
MIL 090429	~	1.7	L6 CHONDRITE	C	B		
MIL 090430	~	10.9	LL6 CHONDRITE	B/C	B		
MIL 090431	~	1.3	H5 CHONDRITE	C	B		
MIL 090432	~	3.9	L5 CHONDRITE	C	B		
MIL 090433	~	5.6	L5 CHONDRITE	C	B		
MIL 090434	~	4.1	LL6 CHONDRITE	C	B/C		
MIL 090435	~	7.7	H6 CHONDRITE	C	C		
MIL 090436	~	3.2	L6 CHONDRITE	C	B		
MIL 090437		4.3	CO3 CHONDRITE	B	A/B	1-47	
MIL 090438	~	7.4	H6 CHONDRITE	C	B		
MIL 090439		2.5	CO3 CHONDRITE	C	A/B	1-33	1-3
MIL 090440		0.9	CM1-2 CHONDRITE	B/C	A/B	0-43	
MIL 090442	~	21.1	L5 CHONDRITE	B	A/B		
MIL 090443		7.9	CM2 CHONDRITE	BE	B	0-34	
MIL 090444		1.1	CV3 CHONDRITE	B	B	1-35	
MIL 090445	~	1.1	L5 CHONDRITE	B/C	A/B		
MIL 090446		8.6	CO3 CHONDRITE	B	A/B	0-40	

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MIL 090447	~	19.6	L5 CHONDRITE	B	B		
MIL 090448	~	5.2	L6 CHONDRITE	C	B		
MIL 090449	~	25.3	LL6 CHONDRITE	B	A/B		
MIL 090483		15.9	CO3 CHONDRITE	B	B	0-45	1
MIL 090486		5.9	CO3 CHONDRITE	B	B	0-40	
MIL 090487		2.1	CM1-2 CHONDRITE	C	B	0-1	
MIL 090488		2.1	CO3 CHONDRITE	B	B	1-51	1-32
MIL 090510	~	0.6	H6 CHONDRITE	B	B		
MIL 090511	~	0.5	H6 CHONDRITE	B	B		
MIL 090512	~	0.7	H6 CHONDRITE	C	C		
MIL 090513	~	1.2	L6 CHONDRITE	C	B		
MIL 090514		0.9	CO3 CHONDRITE	B	B	0-40	
MIL 090515	~	1.4	L6 CHONDRITE	C	B		
MIL 090516	~	0.6	H6 CHONDRITE	B	B		
MIL 090517	~	3.9	L6 CHONDRITE	C	B		
MIL 090518	~	0.9	H6 CHONDRITE	B/C	B/C		
MIL 090519	~	2.3	H6 CHONDRITE	C	B		
MIL 090701	~	12.1	LL6 CHONDRITE	A/B	B		
MIL 090702	~	5.2	LL6 CHONDRITE	B/C	B		
MIL 090703	~	21.8	L6 CHONDRITE	C	B		
MIL 090704	~	11.7	L6 CHONDRITE	C	A/B		
MIL 090706	~	10.0	L6 CHONDRITE	C	B		
MIL 090707	~	13.5	L5 CHONDRITE	B/C	B		
MIL 090708		2.6	CO3 CHONDRITE	B	B	1-43	
MIL 090709	~	2.8	L5 CHONDRITE	C	B		
MIL 090710		0.7	CO3 CHONDRITE	B	B	0-48	2
MIL 090711	~	1.5	LL6 CHONDRITE	C	B		
MIL 090712		1.1	CO3 CHONDRITE	B	B	1-51	
MIL 090713	~	1.3	LL5 CHONDRITE	C	B		
MIL 090714		1.9	CO3 CHONDRITE	B	A	0-49	
MIL 090715	~	0.5	L6 CHONDRITE	C	B		
MIL 090716		0.8	CO3 CHONDRITE	B	B	1-33	1
MIL 090717		2.5	CO3 CHONDRITE	BE	A/B	1-43	1
MIL 090718	~	1.3	LL6 CHONDRITE	B	A/B		
MIL 090719	~	2.4	L5 CHONDRITE	C	B		
MIL 090720	~	0.7	H5 CHONDRITE	C	A		
MIL 090721	~	0.8	H5 CHONDRITE	C	B/C		
MIL 090722		1.3	CO3 CHONDRITE	A/B	A	1-49	
MIL 090723		0.6	CO3 CHONDRITE	B	B	0-55	
MIL 090724	~	0.6	H6 CHONDRITE	C	B		
MIL 090725	~	2.5	L6 CHONDRITE	C	B		
MIL 090726	~	1.8	LL5 CHONDRITE	B	B		
MIL 090727		0.6	CO3 CHONDRITE	C	B	0-65	
MIL 090728	~	0.4	H6 CHONDRITE	C	B		
MIL 090729	~	0.6	L6 CHONDRITE	C	C		
MIL 090730		1.9	CO3 CHONDRITE	B	A/B	0-31	1
MIL 090731	~	10.9	L6 CHONDRITE	C	B		
MIL 090732	~	7.1	L5 CHONDRITE	C	B/C		
MIL 090733	~	8.3	LL6 CHONDRITE	B/C	B		
MIL 090734	~	3.7	LL6 CHONDRITE	B/C	B		
MIL 090735	~	3.7	L6 CHONDRITE	C	B		
MIL 090736	~	2.3	LL6 CHONDRITE	C	B		
MIL 090737	~	2.9	L5 CHONDRITE	C	B		
MIL 090738	~	1.7	L6 CHONDRITE	C	B		
MIL 090739	~	2.6	L6 CHONDRITE	C	B		

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MIL 090750	~	6.1	H5 CHONDRITE	C	A/B		
MIL 090751	~	3.7	LL6 CHONDRITE	B	B		
MIL 090752	~	8.3	H5 CHONDRITE	C	B		
MIL 090753	~	6.7	L6 CHONDRITE	C	B		
MIL 090754	~	3.5	L6 CHONDRITE	CE	B		
MIL 090755	~	2.0	H6 CHONDRITE	B	B		
MIL 090756	~	2.5	H6 CHONDRITE	C	B		
MIL 090757	~	5.3	H6 CHONDRITE	C	C		
MIL 090758	~	24.9	H5 CHONDRITE	C	A/B		
MIL 090759	~	16.9	L6 CHONDRITE	C	B/C		
MIL 090770	~	2.2	L5 CHONDRITE	C	B		
MIL 090771	~	6.4	H6 CHONDRITE	B/C	A		
MIL 090772	~	6.1	LL5 CHONDRITE	C	B		
MIL 090773	~	10.2	L5 CHONDRITE	B/C	A/B		
MIL 090774	~	5.3	L5 CHONDRITE	B/C	B		
MIL 090775	~	8.6	L5 CHONDRITE	C	B		
MIL 090776	~	2.3	L5 CHONDRITE	B/C	B		
MIL 090778	~	35.1	L6 CHONDRITE	C	A/B		
MIL 090779	~	2.5	LL6 CHONDRITE	A	B		
MIL 090780		145.1	EL6 CHONDRITE	CE	C		0-3
MIL 090800	~	5.1	LL6 CHONDRITE	B	B		
MIL 090801	~	4.5	H6 CHONDRITE	C	B		
MIL 090802	~	10.9	H5 CHONDRITE	C	B		
MIL 090803	~	14.6	H5 CHONDRITE	C	B		
MIL 090804	~	17.8	L6 CHONDRITE	C	B/C		
MIL 090805		4.9	UREILITE	C	B	26-28	
MIL 090806	~	3.8	LL5 CHONDRITE	B/C	B		
MIL 090807		9.1	E CHONDRITE (IMPACT MELT)	C	B		0.1-0.3
MIL 090808	~	4.1	LL6 CHONDRITE	B	B		
MIL 090809	~	4.7	LL6 CHONDRITE	A	A		
MIL 090810	~	3.2	H6 CHONDRITE	B/C	B		
MIL 090811	~	2.4	L6 CHONDRITE	C	B		
MIL 090812	~	0.9	H6 CHONDRITE	C	B		
MIL 090813	~	5.0	L6 CHONDRITE	C	B		
MIL 090814	~	2.4	H6 CHONDRITE	C	B		
MIL 090815	~	1.7	H6 CHONDRITE	C	B		
MIL 090816	~	3.6	L6 CHONDRITE	C	B		
MIL 090817		2.7	PALLASITE	B	A		
MIL 090818	~	1.4	LL6 CHONDRITE	C	B/C		
MIL 090819	~	1.0	LL6 CHONDRITE	B	B		
MIL 090820	~	1.5	L6 CHONDRITE	C	B		
MIL 090822	~	1.8	H6 CHONDRITE	C	B		
MIL 090823	~	0.9	H6 CHONDRITE	C	B		
MIL 090824	~	0.6	H6 CHONDRITE	C	B		
MIL 090825	~	2.0	L6 CHONDRITE	CE	B		
MIL 090826	~	4.3	L5 CHONDRITE	C	B		
MIL 090827	~	1.9	LL5 CHONDRITE	B/C	B		
MIL 090828	~	3.7	L6 CHONDRITE	C	B/C		
MIL 090829	~	1.9	L6 CHONDRITE	C	B/C		
MIL 090830	~	33.1	LL6 CHONDRITE	A	A/B		
MIL 090832	~	9.0	L6 CHONDRITE	C	B		
MIL 090833	~	48.0	H6 CHONDRITE	C	B		
MIL 090834	~	54.0	L6 CHONDRITE	C	B		
MIL 090835	~	12.8	LL5 CHONDRITE	A/B	A/B		
MIL 090836	~	13.1	H5 CHONDRITE	C	B		

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MIL 090837	~	7.4	LL5 CHONDRITE	C	B		
MIL 090839	~	1.3	H5 CHONDRITE	C	B		
MIL 090841	~	1.9	L6 CHONDRITE	C	B		
MIL 090842	~	6.4	H5 CHONDRITE	C	A/B		
MIL 090843	~	4.5	L6 CHONDRITE	C	B/C		
MIL 090844	~	2.4	H5 CHONDRITE	C	A/B		
MIL 090845	~	2.3	L6 CHONDRITE	C	B		
MIL 090847	~	2.8	LL6 CHONDRITE	A/B	A/B		
MIL 090848	~	8.5	L5 CHONDRITE	B	B		
MIL 090849	~	6.1	L5 CHONDRITE	B/C	B		
MIL 090892	~	6.3	LL5 CHONDRITE	B	B/C		
MIL 090893	~	4.2	LL6 CHONDRITE	B/C	B		
MIL 090894	~	1.8	LL6 CHONDRITE	C	C		
MIL 090895	~	5.3	H5 CHONDRITE	B	B		
MIL 090896	~	0.7	L5 CHONDRITE	B	B		
MIL 090898	~	0.6	L6 CHONDRITE	B	B		
MIL 090899	~	2.3	H6 CHONDRITE	C	C		
MIL 090940	~	11.8	L6 CHONDRITE	C	B		
MIL 090941	~	26.4	H5 CHONDRITE	B	A/B		
MIL 090942	~	8.6	L6 CHONDRITE	C	C		
MIL 090943	~	9.0	LL6 CHONDRITE	B	A/B		
MIL 090944	~	4.8	LL5 CHONDRITE	B	B		
MIL 090945	~	6.7	LL6 CHONDRITE	A	A/B		
MIL 090946	~	3.2	LL6 CHONDRITE	B	A/B		
MIL 090947	~	6.4	LL5 CHONDRITE	B/C	A/B		
MIL 090949	~	3.8	LL5 CHONDRITE	B	B		
BUC 10943		27.8	CO3 CHONDRITE	B	A/B	0-39	
BUC 10944		39.7	CK4 CHONDRITE	A/B	A	33-34	15-29
BUC 10958	~	0.1	LL6 CHONDRITE	B	B		
BUC 10959	~	0.3	H6 CHONDRITE	B/C	B		
DOM 10100		426.0	HOWARDITE	A/B	A/B		23-58
DOM 10102		61.1	CV3 CHONDRITE	B	B/C	1-32	1
DOM 10103		73.6	EUCRITE(BRECCIATED)	B/C	C		27-62
DOM 10104		201.0	CO3 CHONDRITE	A/B	A/B	0-53	
DOM 10105		40.9	HOWARDITE	A/B	B		22-65
DOM 10120		65.7	HOWARDITE	A/B	B		2-63
DOM 10121		16.2	CO3 CHONDRITE	A	A/B	1-39	
DOM 10299		14.8	CO3 CHONDRITE	A/B	B/C	1-66	
DOM 10350		27.3	DIOGENITE	B/C	B		24-30
DOM 10351		38.4	CV3 CHONDRITE	A/B	B	0-13	
DOM 10363	~	2.5	LL6 CHONDRITE	B/C	A		
DOM 10837		471.4	HOWARDITE	A/B	A/B		26-55
DOM 10838		31.9	HOWARDITE	A/B	A/B	12	22-62
DOM 10839		58.7	HOWARDITE	A/B	A/B		25-61
DOM 10900		26.1	CO3 CHONDRITE	A/B	A/B	1-45	
LAP 10030		50.8	CK5 CHONDRITE	A/B	A/B	35	
LAP 10031		12.3	R6 CHONDRITE	A/B	A	39	32
LAP 10032		1.5	CO3 CHONDRITE	A/B	A/B	1-42	
LAP 10033		16.9	R6 CHONDRITE	A/B	A	38-39	30
PAT 10326	~	0.7	L6 CHONDRITE	B	B		
PAT 10327	~	0.9	L5 CHONDRITE	B	B		

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
PAT 10328	~	1.0	L6 CHONDRITE	B	B		
PAT 10329	~	1.0	L6 CHONDRITE	B	B		
PAT 10330	~	0.6	L6 CHONDRITE	B	B		

Table 2

Newly Classified Specimens Listed By Type

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
Achondrites						
MIL 090159	45.5	DIOGENITE	B	A/B		12-35
MIL 090220	28.0	DIOGENITE	A/B	A		32-34
MIL 090221	34.0	DIOGENITE	B	A/B		32-37
DOM 10350	27.3	DIOGENITE	B/C	B		24-30
DOM 10103	73.6	EUCRITE (BRECCIATED)	B/C	C		27-62
MIL 090153	97.5	HOWARDITE	A/B	A		23-59
DOM 10100	426.0	HOWARDITE	A/B	A/B		23-58
DOM 10105	40.9	HOWARDITE	A/B	B		22-65
DOM 10120	65.7	HOWARDITE	A/B	B		2-63
DOM 10837	471.4	HOWARDITE	A/B	A/B		26-55
DOM 10838	31.9	HOWARDITE	A/B	A/B	12	22-62
DOM 10839	58.7	HOWARDITE	A/B	A/B		25-61
MIL 090206	17.0	UREILITE	B	A	26-28	26
MIL 090805	4.9	UREILITE	C	B	26-28	
Carbonaceous Chondrites						
BUC 10944	39.7	CK4 CHONDRITE	A/B	A	33-34	15-29
LAP 10030	50.8	CK5 CHONDRITE	A/B	A/B	35	
MIL 090440	0.9	CM1-2 CHONDRITE	B/C	A/B	0-43	
MIL 090487	2.1	CM1-2 CHONDRITE	C	B	0-1	
MIL 090443	7.9	CM2 CHONDRITE	BE	B	0-34	
DOM 08139	21.8	CO3 CHONDRITE	A/B	A	0-60	
MIL 090019	793.8	CO3 CHONDRITE	B	B	0-42	
MIL 090152	40.4	CO3 CHONDRITE	A	A	0-56	7
MIL 090227	62.8	CO3 CHONDRITE	B	A/B	0-52	
MIL 090264	0.5	CO3 CHONDRITE	B	A	0-39	
MIL 090342	2.8	CO3 CHONDRITE	B	A	0-36	
MIL 090369	1.3	CO3 CHONDRITE	C	B	1-54	1
MIL 090392	8.3	CO3 CHONDRITE	A/B	A	0-50	4
MIL 090427	2.2	CO3 CHONDRITE	B	A	0-56	1-2
MIL 090428	2.0	CO3 CHONDRITE	B	A/B	1-47	
MIL 090437	4.3	CO3 CHONDRITE	B	A/B	1-47	

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MIL 090439	2.5	CO3 CHONDRITE	C	A/B	1-33	1-3
MIL 090446	8.6	CO3 CHONDRITE	B	A/B	0-40	
MIL 090483	15.9	CO3 CHONDRITE	B	B	0-45	1
MIL 090486	5.9	CO3 CHONDRITE	B	B	0-40	
MIL 090488	2.1	CO3 CHONDRITE	B	B	1-51	1-32
MIL 090514	0.9	CO3 CHONDRITE	B	B	0-40	
MIL 090708	2.6	CO3 CHONDRITE	B	B	1-43	
MIL 090710	0.7	CO3 CHONDRITE	B	B	0-48	2
MIL 090712	1.1	CO3 CHONDRITE	B	B	1-51	
MIL 090714	1.9	CO3 CHONDRITE	B	A	0-49	
MIL 090716	0.8	CO3 CHONDRITE	B	B	1-33	1
MIL 090717	2.5	CO3 CHONDRITE	BE	A/B	1-43	1
MIL 090722	1.3	CO3 CHONDRITE	A/B	A	1-49	
MIL 090723	0.6	CO3 CHONDRITE	B	B	0-55	
MIL 090727	0.6	CO3 CHONDRITE	C	B	0-65	
MIL 090730	1.9	CO3 CHONDRITE	B	A/B	0-31	1
BUC 10943	27.8	CO3 CHONDRITE	B	A/B	0-39	
DOM 10104	201.0	CO3 CHONDRITE	A/B	A/B	0-53	
DOM 10121	16.2	CO3 CHONDRITE	A	A/B	1-39	
DOM 10299	14.8	CO3 CHONDRITE	A/B	B/C	1-66	
DOM 10900	26.1	CO3 CHONDRITE	A/B	A/B	1-45	
LAP 10032	1.5	CO3 CHONDRITE	A/B	A/B	1-42	
MIL 090170	2.5	CV3 CHONDRITE	B	B	0-11	
MIL 090171	10.4	CV3 CHONDRITE	B	B	0-11	
MIL 090173	2.1	CV3 CHONDRITE	B	B	0-11	1
MIL 090179	1.2	CV3 CHONDRITE	B	B	0-35	
MIL 090354	0.8	CV3 CHONDRITE	B	B	0-36	1-5
MIL 090444	1.1	CV3 CHONDRITE	B	B	1-35	
DOM 10102	61.1	CV3 CHONDRITE	B	B/C	1-32	1
DOM 10351	38.4	CV3 CHONDRITE	A/B	B	0-13	
Chondrites - Type 3						
DOM 08385	2.5	L3.8 CHONDRITE	C	B	9-29	2-14
E Chondrites						
MIL 090807	9.1	E CHONDRITE (IMPACT MELT)	C	B	0.1-0.3	
MIL 090780	145.1	EL6 CHONDRITE	CE	C	0-3	
R Chondrites						
LAP 10031	12.3	R6 CHONDRITE	A/B	A	39	32
LAP 10033	16.9	R6 CHONDRITE	A/B	A	38-39	30
Stony Irons						
MIL 090002	3971.0	PALLASITE	B	A	12-13	
MIL 090029	356.4	PALLASITE	B	A	12-13	
MIL 090817	2.7	PALLASITE	B	A		

**Notes to Tables 1 and 2:

"Weathering" Categories:

A: Minor rustiness; rust haloes on metal particles and rust stains along fractures are minor.
B: Moderate rustiness; large rust haloes occur on metal particles and rust stains on internal fractures are extensive.
C: Severe rustiness; metal particles have been mostly stained by rust throughout.
E: Evaporite minerals visible to the naked eye.

"Fracturing" Categories:

A: Minor cracks; few or no cracks are conspicuous to the naked eye and no cracks penetrate the entire specimen.
B: Moderate cracks; several cracks extend across exterior surfaces and the specimen can be readily broken along the cracks.
C: Severe cracks; specimen readily crumbles along cracks that are both extensive and abundant.

The ~ indicates classification by optical methods. This can include macroscopic assignment to one of several well-characterized, large pairing groups (e.g., the QUE LL5 chondrites), as well as classification based on oil immersion of several olivine grains to determine the approximate index of refraction for grouping into H, L or LL chondrites. Petrologic types in this method are determined by the distinctiveness of chondrules boundaries on broken surfaces of a 1-3 g chip. While this technique is suitable for general characterization and delineation of equilibrated ordinary chondrites, those undertaking detailed study of any meteorite classified by optical methods alone should use caution. It is recommended that a polished thin section be requested to accompany any chip and appropriate steps for a more detailed characterization should be undertaken by the user. (Tim McCoy, Smithsonian Institution)

Table 3

Tentative Pairings for New Meteorites

Table 3 summarizes possible pairings of the new specimens with each other and with previously classified specimens based on descriptive data in this newsletter issue. Readers who desire a more comprehensive review of the meteorite pairings in the U.S. Antarctic collection should refer to the compilation provided by Dr. E.R. D. Scott, as published in the Antarctic Meteorite Newsletter vol. 9 (no. 2) (June 1986). Possible pairings were updated in Meteoritical Bulletins 76, 79, 82 through 100, which are available online from the Meteoritical Society webpage:

http://meteoriticalsociety.org/simple_template.cfm?code=pub_bulletin

CO3 CHONDRITE

DOM 08139, DOM 10104, DOM 10299 and DOM 10900 with DOM 80004

MIL 090019, MIL 090152, MIL 090227, MIL 090264, MIL 0090342, MIL 090392, MIL 090427, MIL 090428, MIL 090437, MIL 090439, MIL 090446, MIL 090483, MIL 090486, MIL 090488, MIL 090514, MIL 090708, MIL 090710, MIL 090712, MIL 090714, MIL 090716, MIL 090717, MIL 090722, MIL 090723, MIL 090727 and MIL 090730 with MIL 07099

CV3 CHONDRITE

MIL 090170, MIL 090171, MIL 090173, MIL 090179, MIL 090354 and MIL 090444 with MIL 07590

DIOGENITE

MIL 090220 and MIL 090221 with MIL 090159

HOWARDITE

DOM 10105, DOM 10120, DOM 10837, DOM 10838 and DOM 10839 with DOM 10100

PALLASITE

MIL 090029 and MIL 090817 with MIL 090002

R CHONDRITE

LAP 10031 and LAP 10033 with LAP 04840

Petrographic Descriptions

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 08139	Dominion Range	18288	2.5 x 2.5 x 1.5	21.760	CO3 Chondrite
DOM 10104		21926	9.0 x 4.0 x 3.0	200.952	
DOM 10299		18421	2.8 x 2.0 x 1.5	14.808	
DOM 10900		21888	4.5 x 2.6 x 2.1	26.092	

Macroscopic Description: Kathleen McBride and Cecilia Satterwhite
Black fractured fusion crust with evaporites and some oxidation is visible to varying degrees on these paired carbonaceous chondrites. The interiors are dark gray to black in color with white inclusions/chondrules some stained with oxidation and rust. These meteorites contain some metal and are moderately weathered.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
These meteorites are so similar that a single description suffices. The sections consist of abundant small (up to 1 mm) chondrules, chondrule fragments and mineral grains in a dark matrix. Metal and sulfide occur within and rimming the chondrules. Glass within chondrules appears to be very clear/fresh. CAIs are abundant (mostly Type A), and range in size up to 1 mm. AOAs up to 1 mm are present, as well. Olivine ranges in composition from Fa_{0-66}. These meteorites exhibit mild terrestrial alteration. These are CO3 chondrites (likely type 3.0-3.2), and are paired with the DOM 08004.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 08385	Dominion Range	18417	2.5 X 1.0 X 0.75	2.45	L3.8 Chondrite

Macroscopic Description: Kathleen McBride
25% of the exterior surface is covered with brown/black fusion crust with oxidation haloes. The interior is rusty with metal.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
The section exhibits numerous small, well-defined chondrules (up to 2 mm) in a black matrix of fine-grained silicates, metal and troilite. Weak shock effects are present. Polysynthetically twinned pyroxene is abundant. The meteorite exhibits light terrestrial weathering. Silicates are unequilibrated; olivines range from Fa_{9-29}, with most grains Fa_{18}, and pyroxenes range from $Fs_{2-14}Wo_{0-1}$. This meteorite is an L3 chondrite (estimated subtype 3.8).

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090002	Miller Range	18831	10.0 x 16.0 x 13.0	3970.98	Pallasite
MIL 090029		20272	9.5 x 5.5 x 3.5	356.35	
MIL 090817		20652	2.0 x 1.0 x 0.75	2.7	

Macroscopic Description: Cari Corrigan, Tim McCoy, Nicole Lunning and Linda Welzenbach
These meteorites are pallasites with common exterior morphology and weathering. They all exhibit a very weathered, rusty exterior with extensive removal of olivine, leaving voids that range in size from a few millimeters to many centimeters. The larger cavities probably resulted from extensive olivine removal during physical and chemical weathering and weathering of any residual metallic matrix. Sections were made from the two largest stones, and since all were found proximal, the smallest was not sectioned.

Thin Section (,2) Description: Cari Corrigan, Tim McCoy, Nicole Lunning and Linda Welzenbach
These meteorites are similar enough to share a description. These slices exhibit fragmental, angular olivine grains ranging in size from 100 microns to 5 cm. Olivine grains exhibit minimal iron oxide staining. Interstitial to these olivine grains are euhedral and irregular chromites, as well as troilite and schreibersite. Olivine is Fa_{12-13}. The meteorites are pallasites, probably members of the main group.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090019	Miller Range	20776	11.0 x 8.5 x 5.3	793.80	CO3 Chondrite
MIL 090152		20327	3.0 x 2.5 x 2.5	40.360	
MIL 090227		20781	3.5 x 3.5 x 3.0	62.810	
MIL 090264		2075	0.75 x 0.75 x 0.5	0.490	
MIL 090342		20577	1.5 x 1.0 x 0.75	2.781	
MIL 090392		20535	2.0 x 1.25 x 1.25	8.3	
MIL 090427		20967	1.25 x 1.25 x 1.0	2.15	
MIL 090428		20992	1.25 x 1.0 x 1.0	2.02	
MIL 090437		20276	2.0 x 1.25 x 1.0	4.25	
MIL 090439		20286	1.5 x 1.25 x 0.75	2.46	
MIL 090446		20269	2.0 x 1.5 x 1.75	8.63	
MIL 090483		20077	2.75 x 1.75 x 2.0	15.852	
MIL 090486		20069	2.0 x 1.5 x 1.0	5.902	
MIL 090488		20087	1.5 x 1.0 x 0.75	2.116	
MIL 090514		20744	1.0 x 0.75 x 0.5	0.85	
MIL 090708		20260	1.75 x 1.0 x 1.25	2.64	
MIL 090710		20263	0.75 x 0.75 x 0.5	0.67	
MIL 090712		20266	0.75 x 0.75 x 1.0	1.12	
MIL 090714		20278	1.0 x 0.75 x 0.75	1.88	
MIL 090716		20258	1.0 x 0.75 x0.75	0.75	
MIL 090717		20252	1.5 x 1.0 x 0.75	2.45	
MIL 090722		20287	1.0 x 1.0 x 0.75	1.32	
MIL 090723		20295	0.75 x 0.75 x 0.5	0.63	
MIL 090727		20247	0.75 x 0.75 x 0.75	0.63	
MIL 090730		20273	1.5 x 1.25 x 0.5	1.86	

Macroscopic Description: Kathleen McBride and William Satterwhite

The exteriors of these carbonaceous chondrites all have black/brown fusion crust exhibiting various forms of fracturing. Some of these meteorites have polygonal fractures, while others have penetrating cracks. All have areas of rusty brown oxidation. The interiors consist of uniform fine grained, black matrix with oxidation and light specks of white irregular inclusions/chondrules.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning

These meteorites are so similar that a single description suffices. The sections consist of abundant small (up to 1 mm) chondrules, chondrule fragments, and mineral grains in a dark matrix. Metal and sulfide occur within and rimming the chondrules. Glass within chondrules appears to be very clear/fresh. CAIs are abundant in many sections (mostly Type A), and range in size up to 1 mm, many containing blue hibonite grains. At least one compound CAI was found. AOAs up to 1 mm are present, as well. Olivine ranges in composition from Fa_{0-65}. Pyroxene analyses range from Fs_{1-32} (most from Fs_{1-7}) $Wo_{0.5-4}$. These meteorites are somewhat terrestrially altered. These are CO3 chondrites (likely type 3.0-3.2) and are probably members of the MIL 07099 pairing group.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090153	Miller Range	20345	5.5 x 4.5 x 2.25	97.480	Howardite

Macroscopic Description: Kathleen McBride

The exterior surface consists of ~80% shiny black fusion crust with a wrinkled appearance. The interior matrix is medium to dark gray in color with angular tan, white and black clasts.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning

This section shows a groundmass of comminuted pyroxene and plagioclase (up to 0.5 mm) with fine- to coarse-grained basaltic clasts ranging up to 5 mm. Basaltic material occurs as the host rock and as clasts within this meteorite. Most of the pyroxene has compositions ranging from $Fs_{23-59}Wo_{2-23}$ with plagioclase $An_{86-90}Or_{0-1}$. The meteorite is a howardite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090159	Miller Range	20844	3.0 x 3.0 x 2.0	45.500	Diogenite
MIL 090220		20834	3.0 x 3.0 x 2.0	28.040	
MIL 090221		20801	4.0 x 3.0 x 1.5	33.980	

Macroscopic Description: Kathleen McBride
These achondrites are covered with brown/black fusion crust (50-85%), shiny in areas and have some areas with polygonal fractures. The interior matrices are tan with small mm sized white, tan and black inclusions. 0221 has dendritic looking dark veins that surround some clasts.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach, Andrew Beck and Nicole Lunning
These meteorites are similar enough that one description is sufficient. Thin sections of each show a groundmass of coarse (up to 1.5 mm) comminuted pyroxene, with minor plagioclase and SiO_2. Orthopyroxene has a composition of $Fs_{32-36}Wo_{2-4}$, augites are $Fs_{12-15}Wo_{40-43}$ and plagioclase is $An_{84-89}Or_{0-1}$. The Fe/Mn ratio of the pyroxene is 26-30. These meteorites are diogenites.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090170	Miller Range	20338	2.0 x 1.5 x 0.75	2.500	CV3 Chondrite
MIL 090171		20348	3.5 x 2.0 x 1.0	10.400	
MIL 090173		20312	1.5 x 1.5 x 1.0	2.050	
MIL 090179		20349	1.5 x 0.5 x 1.25	1.200	
MIL 090354		20523	1.5 x 0.75 x 0.75	0.781	
MIL 090444		20973	1.25 x 0.75 x 0.75	1.060	

Macroscopic Description: Kathleen McBride
Most of these carbonaceous chondrites have some brown/black fusion crust with polygonal fractures. The interior matrices are black with various colored chondrules and show moderate weathering.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
These meteorites are so similar that a single description suffices. The sections exhibit large chondrules (up to 3 mm) and CAIs in a dark matrix. Olivines range from Fa_{0-36} and low-Ca pyroxene is Fs_{1-5}. The meteorites are unequilibrated carbonaceous chondrites, probably reduced CV3. These are likely paired with the MIL 07590 pairing group previously reported.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090206	Miller Range	20809	3.3 x 2.3 x 1.8	16.994	Ureilite

Macroscopic Description: William Satterwhite
40% of the exterior has dark, shiny, rusty brown fusion crust. The interior has abundant metal in a brown/black rusty matrix.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
This section consists of an aggregate of equigranular (up to 1-2 mm) grains. Individual olivine grains are rimmed by carbon-rich material containing grains of metal. Weathering is pervasive. Olivine has cores of Fa_{26-28}. Pyroxene grains are up to 1 mm and have compositions of $Fs_{26}Wo_2$. This meteorite is a ureilite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090369	Miller Range	20595	1.25 x 1.5 x 1.0	1.330	CO3 Chondrite

Macroscopic Description: Kathleen McBride
The weathered brown exterior has no fusion crust. The interior is a weathered black matrix with an oxidation rind and one visible chondrule ~1 mm in size.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
The section consists of a few small (up to 1 mm) chondrules and mineral fragments and larger chondrules and CAIs in a dark, somewhat altered matrix. AOAs range up to 2mm. Metal and sulfide are less common and occur within the chondrules. At least one compound CAI was found. Olivine ranges in composition from Fa_{1-54}. Pyroxene analyses are Fs_1Wo_5. This is a CO3 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090440	Miller Range	20958	1.0 x 1.0 x 0.75	0.890	CM1-2 Chondrite

Macroscopic Description: Kathleen McBride
Brown/black fusion crust with polygonal fractures covers 50% of the exterior of this carbonaceous chondrite. The exposed exterior is dark brown with no inclusions visible to the naked eye.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
This meteorite section consists of numerous, small, highly-altered chondrules and matrix with rare carbonates and few unaltered mafic silicates. Chondrule outlines are distinct, despite the extensive alteration. Olivine analyses are Fa_{0-43}. No pyroxenes were available to measure. The meteorite is a CM1-2 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090443	Miller Range	20969	2.5 x 1.5 x 1.5	7.860	CM2 Chondrite

Macroscopic Description: Kathleen McBride
Smooth black fusion crust with polygonal fractures covers 90% of the exterior of this carbonaceous chondrite. The interior matrix is black with slightly lighter multicolored clasts and chondrules. Some evaporites are present.

Thin Section (,2) Description: Cari Corrigan, Tim McCoy and Linda Welzenbach
The section consist of a few small chondrules (up to 0.5 mm), mineral grains and CAIs set in a black matrix; no metal or sulfide grains are present. Olivine compositions are Fa_{0-34}. Aqueous alteration of the matrix is minimal, and the chondrules are only modestly altered. This meteorite is a CM2 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090487	Miller Range	20092	1.75 x 1.25 x 1.25	2.057	CM1-2 Chondrite

Macroscopic Description: Kathleen McBride
Half of the exterior of this meteorite is covered with rough black fusion crust with polygonal fractures. The interior is dark with a few lighter, yellowish stained inclusions.

Thin Section (,6) Description: Cari Corrigan, Linda Welzenbach and Tim McCoy
This meteorite consists of highly-altered chondrules and matrix with rare carbonates and rare unaltered mafic silicates. Chondrule outlines are only distinct on the largest chondrules. Olivine analyses are Fa_1. No pyroxenes were available to measure. The meteorite is a CM1-2 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090780	Miller Range	20556	5.5 x 4.0 x 3.5	145.070	EL6 Chondrite

Macroscopic Description: Kathleen McBride
<5% of the surface is covered with small black patches of fusion crust with evaporites. The black fine grained interior has tan to white weathering products along the exterior edge. There is rusting in some areas and green alteration zones along fractures. The meteorite is very hard and dense.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
The section shows an aggregate of chondrules (up to 1 mm), chondrule fragments, and pyroxene grains in a matrix of about 30% metal and sulfide. Weathering is moderate, with staining of some enstatite grains and minor alteration of metal and sulfides. Microprobe analyses show pyroxenes of composition $Fs_{0-3}Wo_{0-1}$ and 1.8 wt% Si in the metal. The meteorite is an enstatite chondrite, EL6.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090805	Miller Range	20670	2.0 x 1.75 x 1.0	4.910	Ureilite

Macroscopic Description: Kathleen McBride
Thin patches of fusion crust are visible on the exterior. The interior is rusty in color with a crystalline texture and has a high metal concentration.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
This section consists of an aggregate of equigranular (up to 1 mm) olivine grains. Individual olivine grains are rimmed by carbon-rich material containing grains of metal. Olivine has cores of Fa_{26-28}. This meteorite is a ureilite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 090807	Miller Range	20675	2.0 x 1.75 x 1.0	9.070	E Chondrite (Impact Melt)

Macroscopic Description: Kathleen McBride
The exterior has brown crust with large rust haloes. The interior is rusty and fine-grained with high metal content. It exhibits a dull and powdery texture and is hard. Light colored clasts/chondrules stained with rust are visible within the matrix.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
This meteorite section consists of equigranular crystals (up to 0.5 mm) of polysynthetically twinned enstatite, feldspar, iron-nickel metal, sulfides, daubreelite, niningerite, and alabandite. Texturally, this meteorite is similar to, though much less weathered than, Happy Canyon. This meteorite is an enstatite chondrite impact melt.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
BUC 10943	Buckley Island	21415	4.4 x 3.2 x 3.0	27.752	CO3 Chondrite

Macroscopic Description: Cecilia Satterwhite
This carbonaceous chondrite has 40% of its exterior covered with fractured black fusion crust, frothy in some areas. Areas without fusion crust are gray to black with some brown weathered areas. Some evaporites and small light colored/weathered inclusions/chondrules are visible. The interior matrix is dark gray to black with abundant mm sized white to light gray inclusions. Matrix around the rim is weathered brown.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
The section consists of abundant, small (up to 1 mm) chondrules, chondrule fragments and mineral grains in a dark matrix. Metal and sulfide occur within and rimming the chondrules. Glass within chondrules appears to be very clear/fresh. CAIs are abundant (mostly Type A), and range in size up to 1 mm. AOAs up to 1 mm are present, as well. Olivine ranges in composition from Fa_{0-39}. This is a CO3 chondrite (likely type 3.0-3.2).

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
BUC 10944	Buckley Island	21408	4.0 x 3.0 x 2.8	39.689	CK4 Chondrite

Macroscopic Description: Cecilia Satterwhite
80% of the exterior of this carbonaceous chondrite is covered with fusion crust, that is shiny and frothy in some areas. Areas without fusion crust reveal a gray fine grained matrix, with minor oxidation. The interior is a gray fine grained matrix with small dark inclusions, some are rusty.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
The section consists of large (up to 2 mm), well-defined chondrules in a matrix of light colored finer-grained silicates, sulfides and abundant magnetite. The meteorite is slightly weathered. Olivines are Fa_{33-34} and orthopyroxenes range from Fs_{15-29}. The meteorite is a CK4 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10100	Dominion Range	21171	6.5 x 7.0 x 5.0	425.950	Howardite
DOM 10105		21956	4.0 x 3.5 x 2.25	40.880	
DOM 10120		21965	5.0 x 3.0 x 3.0	65.720	
DOM 10837		21241	7.5 x 6.0 x 5.0	471.380	
DOM 10838		21231	2.75 x 3.0 x 2.5	31.890	
DOM 10839		21670	4.0 x 3.75 x 2.5	58.650	

Macroscopic Description: Kathleen McBride
Brown/black to black fusion crust with shiny black patches covers the exterior of these rocks. The crust exhibits polygonal fractures and areas of ropy, rough textured patches. These meteorites have gray matrix with numerous inclusions and angular clasts in a wide range of sizes (mm to cm) and colors (dark gray, black, white, cream and green).

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach, Andrew Beck and Nicole Lunning
These meteorites show a groundmass of comminuted pyroxene and plagioclase (up to 0.5 mm) with fine- to coarse-grained basaltic clasts ranging up to 5 mm. Basaltic material occurs as the host rock and as clasts within these meteorites. Half of DOM 10105 is dominated by a 1 cm diogenitic clast. More than half of DOM 10837 is comprised of an impact melt clast. Most pyroxene is orthopyroxene with compositions ranging from $Fs_{21-52}Wo_{1-4}$ (most Fs_{20-30}). Some augite of $Fs_{12-19}Wo_{32-50}$ are present, as are rare olivines of Fa_{12}. These meteorites are howardites.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10102	Dominion Range	21346	6.7 x 4.4 x 1.3	61.072	CV3 Chondrite

Macroscopic Description: Cecilia Satterwhite
The exterior is covered with fractured black fusion crust over 75% of its surface. Some of the surfaces are frothy and abundant chondrules/inclusions are visible in areas devoid of fusion crust. The meteorite has a pebbly texture. The interior matrix is a dark gray to black with abundant light colored inclusions/chondrules. Evaporites and moderate oxidation are present.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
The section exhibits few large chondrules (up to 3 mm) and CAIs in a lighter colored matrix. Olivines range from Fa_{1-32}. The meteorite is unequilibrated, and is probably a reduced CV3 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10103	Dominion Range	21979	6.0 x 3.0 x 3.0	73.640	Eucrite

Macroscopic Description: Kathleen McBride
The exterior has dark brown fusion crust on half of its surface. The exposed interior is weathered to a yellow gray color and has experienced "plucking" showing numerous vugs. The interior is a white to light gray with rusty haloes and small black and white clasts.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach, Andrew Beck and Nicole Lunning
This meteorite is dominated by fine-grained (~200 micron average grain size) basaltic material which occurs as both the host and clasts. Occasional coarser-grained clasts, with grain sizes up to 0.5 mm, are observed. Mineral compositions are homogeneous with orthopyroxene ($Fs_{62}Wo_{2}$), with lamellae of augite ($Fs_{27}Wo_{43}$), and plagioclase ($An_{91}Or_{0.3}$). The Fe/Mn ratio of the pyroxene is 27-32. The meteorite is a brecciated eucrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10121	Dominion Range	21359	3.1 x 2.7 x 1.2	16.151	CO3 Chondrite

Macroscopic Description: Cecilia Satterwhite
The exterior has some black frothy fractured fusion crust. The interior is a black matrix with abundant mm sized white clasts, minor oxidation and evaporites.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
This section consists of abundant small (up to 1 mm) chondrules, chondrule fragments and mineral grains in a dark matrix, which exhibits a distinct planar fabric. Metal and sulfide occur within and rimming the chondrules. Glass within chondrules appears to be very clear/fresh. CAIs are abundant (mostly Type A), and range in size up to 1 mm. AOAs up to 1 mm are present, as well. Olivine ranges in composition from Fa_{1-39}. This is a CO3 chondrite (likely type 3.0-3.2).

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10350	Dominion Range	21699	3.5 x 2.5 x 2.0	27.290	Diogenite

Macroscopic Description: Kathleen McBride
30% of the exterior surface has black patches of fusion crust and the exposed interior consists of dark, crystalline material. This crystalline interior has green subangular grains held together with rust, stained, elongated or radiating clear grains with some black or dark angular grains mixed in. The meteorite is slightly friable.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach, Tim McCoy, Andrew Beck and Nicole Lunning
This section shows an unusual texture of coarse crystals of pyroxene (up to 1.5 mm). Triple junctions are present though grains are not equigranular, suggesting that this meteorite has been recrystallized. Minor amounts of plagioclase and rare chromite are present. Orthopyroxene has a composition of $Fs_{25}Wo_{2-4}$ and plagioclase is $An_{88-93}Or_{0.3}$. The Fe/Mn ratio of the pyroxene is ~29. The meteorite is a diogenite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10351	Dominion Range	21002	4.0 x 2.8 x 1.5	38.374	CV3 Chondrite

Macroscopic Description: Cecilia Satterwhite
The exterior has some fractured patches of black fusion crust. Areas without fusion crust show a matrix that is dark gray to black with evaporites and oxidation. Abundant chondrules/inclusions are visible and fractures penetrate the surface. The interior is a dark gray to black matrix with greenish color in areas; abundant inclusions/chondrules and moderate weathering.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
This section exhibits large sporadically altered chondrules (up to 3 mm) and CAIs in a slightly altered matrix. Olivines range from Fa_{0-13}. The meteorite is unequilibrated, probably a CV3 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
LAP 10030	LaPaz Icefield	22310	4.0 x 3.6 x 2.5	50.753	CK5 Chondrite

Macroscopic Description: Cecilia Satterwhite
75% of the exterior has fractured brown/black fusion crust. Areas devoid of fusion crust reveal a gray matrix. This interior is gray with abundant darker inclusions; some have a crystalline appearance.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
The section consists of large (up to 2 mm), poorly-defined chondrules in a matrix of light colored coarser-grained silicates, sulfides and abundant magnetite. The meteorite is slightly weathered. Olivine is Fa_{34}. The meteorite is a CK5 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
LAP 10031	LaPaz Icefield	22335	2.9 x 2.0 x 1.5	12.338	R6 Chondrite
LAP 10033		22308	3.0 x 2.0 x 1.5	16.879	

Macroscopic Description: Cecilia Satterwhite
Both of these meteorites have brown/black fusion crust frothy in areas and some oxidation. Areas without fusion crust are a mottled gray color. The mottled gray matrix has numerous dark inclusions.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
These sections are texturally heterogeneous, containing relict chondrules up to 1 mm, isolated mineral grains of 100-200 microns and microcrystalline areas reaching 1 mm with mafic silicate grain sizes of 5-10 microns. Shock effects are pervasive, particularly in plagioclase. The rock consists of FeO-rich olivine (Fa_{38-39}) and orthopyroxene ($Fs_{30-32}Wo_1$). Plagioclase is $An_{8-63}Or_{1-3}$. Brown, strongly pleochroic hornblende comprises ~15% of the section. Opaques include troilite, pentlandite and chromite. The meteorite is an R chondrite of petrologic type 6. These are likely paired with LAP 04840.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
LAP 10032	LaPaz Icefield	22314	1.5 x 0.7 x 0.5	1.548	CO3 Chondrite

Macroscopic Description: Cecilia Satterwhite
Black fractured fusion crust and evaporites cover 60% of this carbonaceous chondrite's exterior. Some areas reveal a dark gray to black matrix with light and dark inclusions/chondrules and exhibits some oxidation. The black interior has abundant white inclusions with some weathering present.

Thin Section (,2) Description: Cari Corrigan, Linda Welzenbach and Nicole Lunning
This section consists of abundant, small (up to 1 mm) chondrules, chondrule fragments and mineral grains in a dark matrix, which exhibits a distinct planar fabric. Metal and sulfide occur within and rimming the chondrules. Glass within chondrules appears to be very clear/fresh. CAIs are abundant (mostly Type A), and range in size up to 1 mm. AOAs up to 1 mm are present, as well. Olivine ranges in composition from Fa_{1-42}. This is a CO3 chondrite (likely type 3.0-3.2).

Correction: Reclassification of MacAlpine Hills 02453 (LL6):

MAC 02453 was classified as a CK5 chondrite in AMN 28(1), reported in MetBull 89. New data by J.T. Wasson and A.E. Rubin (UCLA) show that it is actually an ordinary chondrite (LL6). Bulk composition by INAA: Na 6.1, K 0.97, Ca 12.9, Cr 3.50, Mn 2.59, Fe 177, Ni 8.3 (all mg/g); Sc 8.31, Co 450, Zn 50, Ga 5.0, As 1.35, Se 8.0 (all ug/g); Ru 550, Sb 79, La 318, Sm 195, Eu 79, Yb 197, Os 347, Ir 320 (all ng/g). Contains plagioclase > 50 um in size, chromite, troilite and pentlandite. Magnetite is not present, as originally reported. The published mineral compositions, Fa32 and Fs26, and bulk composition are all consistent with an LL classification.

Sample Request Guidelines

The Meteorite Working Group (MWG), is a peer-review committee which meets twice a year to guide the collection, curation, allocation, and distribution of the U.S. collection of Antarctic meteorites. The deadline for submitting a request is 2 weeks prior to the scheduled meeting.

Requests that are received by the MWG secretary by **Sept. 16, 2011 deadline** will be reviewed at the MWG meeting **Sept. 22-23, 2011 in Arlington, Va**. Requests that are received after the deadline may be delayed for review until MWG meets again in the Spring of 2012. Please submit your requests on time. Questions pertaining to sample requests can be directed to the MWG secretary by e-mail, fax or phone.

Requests for samples are welcomed from research scientists of all countries, regardless of their current state of funding for meteorite studies. Graduate student requests should have a supervising scientist listed to confirm access to facilities for analysis. All sample requests will be reviewed in a timely manner. Sample requests that do not meet the curatorial allocation guidelines will be reviewed by the Meteorite Working Group (MWG). Issuance of samples does not imply a commitment by any agency to fund the proposed research. Requests for financial support must be submitted separately to an appropriate funding agency. As a matter of policy, U.S. Antarctic meteorites are the property of the National Science Foundation, and all allocations are subject to recall.

Samples can be requested from any meteorite that has been made available through announcement in any issue of the ***Antarctic Meteorite Newsletter*** (beginning with 1(1) in June, 1978). Many of the meteorites have also been described in five *Smithsonian Contributions to the Earth Sciences*: Nos. 23, 24, 26, 28, and 30. Tables containing all classified meteorites as of August 2006 have been published in the Meteoritical Bulletins and *Meteoritics* and *Meteoritics and Planetary Science* (these are listed in Table 3 of this newsletter. They are also available online at:

http://www.meteoriticalsociety.org/simple_template.cfm?code=pub_bulletin

The most current listing is found online at:

http://curator.jsc.nasa.gov/curator/antmet/us_clctn.htm

All sample requests should be made electronically using the form at:

http://curator.jsc.nasa.gov/curator/antmet/samreq.htm

The purpose of the sample request form is to obtain all information MWG needs prior to their deliberations to make an informed decision on the request. Please use this form if possible.

The preferred method of request transmittal is via e-mail. Please send requests and attachments to:

JSC-ARES-MeteoriteRequest@nasa.gov

Type **MWG Request** in the e-mail subject line. Please note that the form has signature blocks. The signature blocks should only be used if the form is sent via Fax or mail.

Each request should accurately refer to meteorite samples by their respective identification numbers and should provide detailed scientific justification for proposed research. Specific requirements for samples, such as sizes or weights, particular locations (if applicable) within individual specimens, or special handling or shipping procedures should be explained in each request. Some meteorites are small, of rare type, or are considered special because of unusual properties. Therefore, it is very important that all requests specify both the optimum amount of material needed for the study and the minimum amount of material that can be used. Requests for thin sections that will be used in destructive procedures such as ion probe, laser ablation, etch, or repolishing must be stated explicitly.

Consortium requests should list the members in the consortium. All necessary information should be typed on the electronic form, although informative attachments (reprints of publication that explain rationale, flow diagrams for analyses, etc.) are welcome.

Antarctic Meteorite Laboratory Contact Numbers

Please submit request to**: JSC-ARES-MeteoriteRequest@nasa.gov**

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Meteorites On-Line

Several meteorite web site are available to provide information on meteorites from Antarctica and elsewhere in the world. Some specialize in information on martian meteorites and on possible life on Mars. Here is a general listing of ones we have found. We have not included sites focused on selling meteorites even though some of them have general information. Please contribute information on other sites so we can update the list.

JSC Curator, Antarctic meteorites	http://curator.jsc.nasa.gov/antmet/index.cfm
JSC Curator, Lunar Meteorite Compendium	http://curator.jsc.nasa.gov/antmet/lmc/index.cfm
JSC Curator, martian meteorites	http://curator.jsc.nasa.gov/antmet/marsmets/index.cfm
JSC Curator, Mars Meteorite Compendium	http://curator.jsc.nasa.gov/antmet/mmc/index.cfm
Antarctic collection	http://geology.cwru.edu/~ansmet/
Smithsonian Institution	http://mineralsciences.si.edu/
LPI martian meteorites	http://www.lpi.usra.edu
NIPR Antarctic meteorites	http://www.nipr.ac.jp/
Meteoritical Bulletin online Database	http://tin.er.usgs.gov/meteor/metbull.php
Museo Nazionale dell'Antartide	http://www.mna.it/english/Collections/collezioni_set.htm
BMNH general meteorites	http://www.nhm.ac.uk/research-curation/departments/mineralogy/research-groups/meteoritics/index.html
Chinese Antarctic meteorite collection	http://birds.chinare.org.cn/en/yunshiku/
UHI planetary science discoveries	http://www.psrd.hawaii.edu/index.html
Meteoritical Society	http://www.meteoriticalsociety.org/
Meteoritics and Planetary Science	http://meteoritics.org/
Meteorite! Magazine	http://meteoritemag.uark.edu
Geochemical Society	http://www.geochemsoc.org
Washington Univ. Lunar Meteorite	http://epsc.wustl.edu/admin/resources/moon_meteorites.html
Washington Univ. "meteor-wrong"	http://epsc.wustl.edu/admin/resources/meteorites/meteorwrongs/meteorwrongs.htm

Other Websites of Interest

Mars Exploration	http://mars.jpl.nasa.gov
Rovers	http://marsrovers.jpl.nasa.gov/home/index.html
Near Earth Asteroid Rendezvous	http://near.jhuapl.edu/
Stardust Mission	http://stardust.jpl.nasa.gov
Genesis Mission	http://genesismission.jpl.nasa.gov
ARES	http://ares.jsc.nasa.gov/
Astromaterials Curation	http://curator.jsc.nasa.gov/