

This lithologic unit was selected to serve as a “blank” in these weathering tests, but was not included in the 2003 weathering experiments due to financial constraints on the number of different rock types to be tested. The range in total sulfur contents of this sample is 0.03% to 0.08% as shown in Table 3.1, while the range of NP values is 14.3 to 20.9 ppt. This Middle Kittanning sandstone sample was stored in sealed containers and was used as the “blank” sample in the 2006 interlaboratory weathering tests described in Chapter 4.

Table 3.1: Sample Characterization

Description	Total Sulfur %	Fizz Rating	Neutralization Potential
SH Bucket #26 Shale PSU Brush Creek ¹	0.90	3	112.05
SH Bucket #28 Shale PSU Brush Creek ¹	0.90	3	121.42
SH Bucket #32 Shale PSU Brush Creek ¹	0.91	3	120.78
LRBT Bucket #4 Coal Refuse ²	6.64	0	2.64
LRBT Bucket #9 Coal Refuse ²	6.94	0	-0.39
LRBT Bucket #14 Coal Refuse ²	7.67	0	-1.71
VLS Bucket #1 Limestone ³	0.00	3	902.94
VLS Bucket #9 Limestone ³	0.01	3	915.77
VLS Bucket #11 Limestone ³	0.00	3	899.73
HSS Bucket #2 Sandstone ⁴	0.08	0	20.87
HSS Bucket #8 Sandstone ⁴	0.04	1	17.70
HSS Bucket #12 Sandstone ⁴	0.03	1	14.29

¹ Brush Creek Shale from Route 66 road cut near Greensburg, PA

² Lower Kittanning Coal Refuse from Rosebud deep mine near Leechburg, PA

³ Vanport Limestone from Allegheny Minerals mine in Butler County, PA

⁴ (Not used in method evaluation) Middle Kittanning Sandstone - Hawbaker quarry in Clearfield County, PA

Study Design and Laboratory Tasks

To further evaluate performance of the draft methods, the 2003 study involved three laboratories and the three sample types described above (shale, limestone, and coal refuse). Laboratories 1 and 2 (Geochemical Testing and Mahaffey Laboratories) were tasked with evaluating (1) the two exposure scenarios (constant exposure to CO₂-enhanced air vs. exposure to water saturated with CO₂-enhanced air) and (2) the leaching column (24-hour saturation periods) vs. humidity cell (1-hour saturation periods) methods. Laboratory 3 (Materials Research Institute at Penn State University) was tasked with implementing the leaching column method using three sizes of cylindrical testing structures (i.e., 2-inch, 4-inch, and 6-inch diameter). Laboratory 3 (MRI) also performed surface area measurements, using BET methods, on each of 8 particle size classes, before and after the weathering tests, on selected lithologic units.

For a period of 15 weeks (12 weeks for Laboratory 3), each laboratory collected weekly water samples from all columns and cells, and analyzed the samples for pH, specific conductance,