Table 3.5. Summary of changes in surface areas after weathering.

Rock Type	Column Size	m^2/g before	m^2/g after	% change
Shale	6”	14.0	12.5	10.71
Shale	6”rpt	14.3	15.1	-5.59
Shale	4”	14.3	14.1	1.40
Shale	2”	14.3	15.5	-8.39
Limestone	6”	3.5	3.0	14.29
Sandstone	6”	1.0	1.1	-10.00
Coal Refuse	6”	1.4	0.6	57.14

calculation of SA/V ratio: The design of the column experiments allows a direct calculation of the surface area to volume ratio. The surface area for the reconstituted rock mass in the column is calculated as shown above. This quantity is then scaled to the total rock mass in the column. The volume is simply the volume of water drained from the column after each weekly 24-hour fill-and-drain cycle.

$$\frac{SA}{V} = \frac{1000\, m\, SA_{Bulk}}{V}$$

Where:
SA/V = surface area to volume ratio (meters $^{-1}$)
m = mass of solids in column (grams)
SA_{Bulk} = BET surface area of solids (meter-squared/gram)
V = volume of leachate from each drain cycle (liters)

The significance of the surface area to volume ratio in leaching processes is described in Machiels and Pescatore (1983), Pederson et al., (1983), White (1986) and Scheetz et al., (1981).

Method Preparation, Implementation and Results

The laboratories assembled leaching columns and humidity cells as described in Figure 3.1 from the draft leaching column method (see Appendix A of this report). Samples were reconstructed after sieving according to the particle size distributions presented in Table 3.3 above. To provide an assessment of method precision, Laboratories 1 and 2 prepared duplicate Shale and Coal Refuse samples for exposure to identical weathering conditions. Table 3.6 presents the weight of each sample added to each leaching column/humidity cell exposed to either constant flow of CO_2-enhanced air or CO_2-Air saturated water during wet weathering conditions.

The leaching column and humidity cell weathering procedures were conducted for a period of 15 weeks in the three laboratories. Evaluations were made of: (a) the two options for introducing the CO_2-enhanced gas mixture into the leaching columns, (b) laboratory performance on duplicate samples by calculation of relative percent differences (RPD’s) and relative standard