Three main observations are made from examining Figure 2.6 and comparing it to Figures 2.2a and 2.2b for the same shale and sandstone samples: (1) the alkalinity concentrations for the shale and sandstone samples are more consistent (i.e. exhibit less week to week variability) throughout the weathering test period than the weekly variations shown in Figures 2.2a and 2.2b, (2) the shale sample produced more alkalinity than the sandstone for each week of the test (and more than the limestone for each week except week 4), and (3) the alkalinity concentrations for the shale and sandstone samples in Figure 2.6 are significantly higher than shown for the same lithologic units in Figures 2.2a and 2.2b. The range of alkalinity concentrations for the sandstone sample in Figure 2.6 are 386 to 535 mg/L with a median alkalinity of 435.5 mg/L. The highest alkalinity concentration for the same sandstone sample in Figure 2.2b is 374 mg/L, which is much less than the median in Figure 2.6 and slightly less than the lowest alkalinity in Figure 2.6. The corresponding range of alkalinity concentrations for the shale sample in Figure 2.6 are 458 to 770 mg/L, with a median of 551.5 mg/L. The highest alkalinity concentration for the same shale sample in Figure 2.2a is 397 mg/L, which is considerably less than the median and the lowest alkalinity in Figure 2.6.

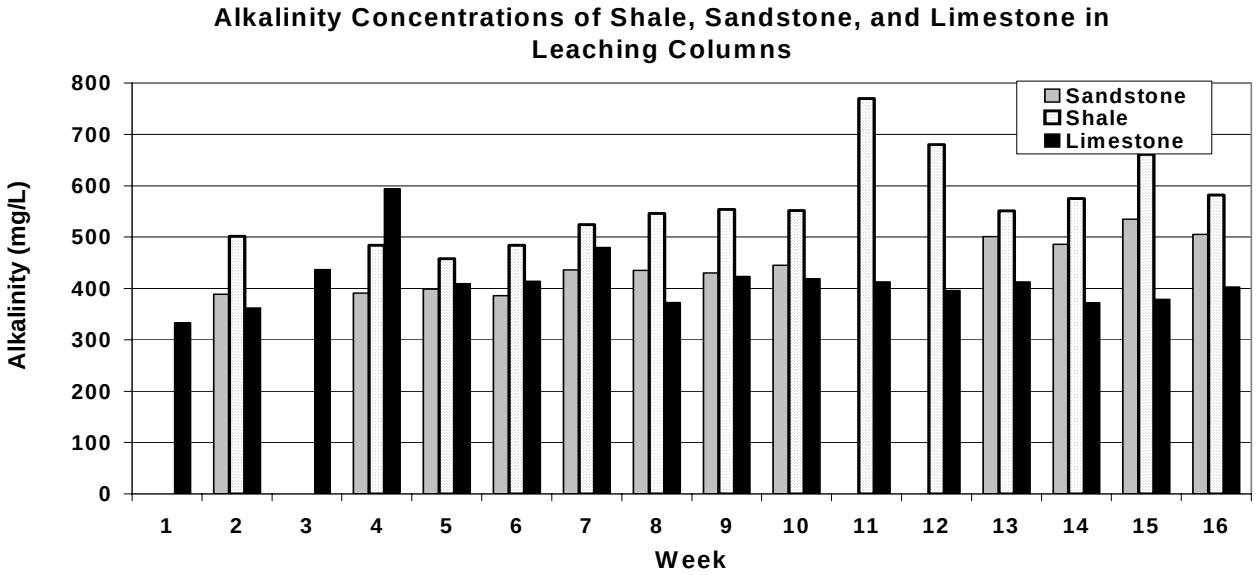

Figure 2.6. Alkalinity Concentrations of Shale, Sandstone, and Limestone Samples in Leaching Columns

preliminary study of particle size and surface area effects: The MRI researchers at Penn State University evaluated the differences in the sieve analyses of the shale and sandstone samples performed prior to the start of the weathering test and after the completion of the 16 week test in the leaching columns. The differences in the post-leaching particle size distributions were not as great as expected, but the shale sample did have a greater amount of fines in the 100 and 200 mesh size classes prior to weathering and had a greater percentage of loss in these size classes post-leaching, than the sandstone, as was expected.

The researchers at MRI also conducted some preliminary surface area measurements on the sandstone sample using BET equipment. The measurement of surface areas by the Brunauer,