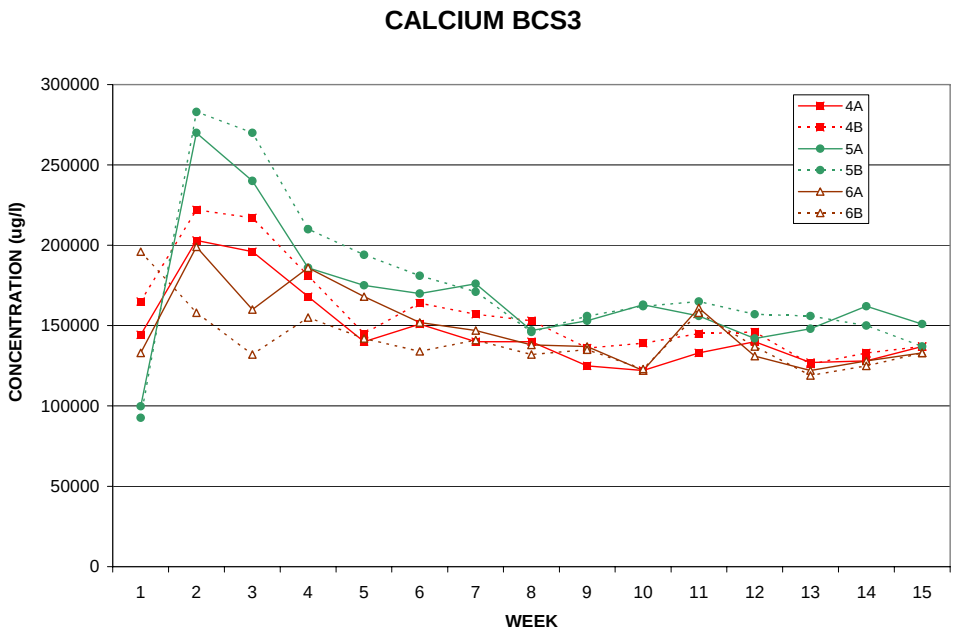

Figure 7.19. Similarity of variations of calcium concentrations (ug/l) in leachate at Labs 4, 5, and 6.

Variations in Leaching Behavior Between All Rock Types

The sulfate leached from all five rock types is shown on Figure 7.20 using data only from Lab 5. This data set shows very close agreement of duplicate columns for the four rock types having duplicate leaching columns. When the sulfate data are plotted on a log scale in Figure 7.20, the five rock types are neatly arranged in the increasing order of sulfate (and acidity) production that would be expected from the acid/base accounting data with the MKSS-PA sandstone the lowest to the HCS-IN shale the highest sulfate.

The alkalinity data shown in Figure 7.21 contains numerous findings that were not evident from the acid/base accounting data, and therefore illustrates the value of the leaching column method for mine drainage prediction. The Brush Creek shale produces 500 to 600 mg/L alkalinity throughout the weathering period as seen in Phase 1 and Phase 2 of the project, and as expected herein. However, the KBF-WV shale and the MKSS-PA sandstone both produce far greater alkalinity than expected from the relatively low NP values. Also, two more subtle types of weathering behavior are seen in Figure 7.21. First, the HSC-IN shale has appreciable alkalinity for the first few weeks of the weathering period, and then declines and is depleted by week 8. The second subtle pattern of weathering in Figure 7.21 is the LKFC-PA shale which starts with the lowest alkalinity of the five rock types, but gradually increases to an appreciable amount by the end of the weathering period. These two types of weathering behavior were not found in Phases 1 and 2 of this study. The succeeding sections of this chapter contain discussion that the leaching column effluents from the BCS3-PA shale, the KBF-WV shale and the MKSS-PA sandstone are saturated with respect to calcite.