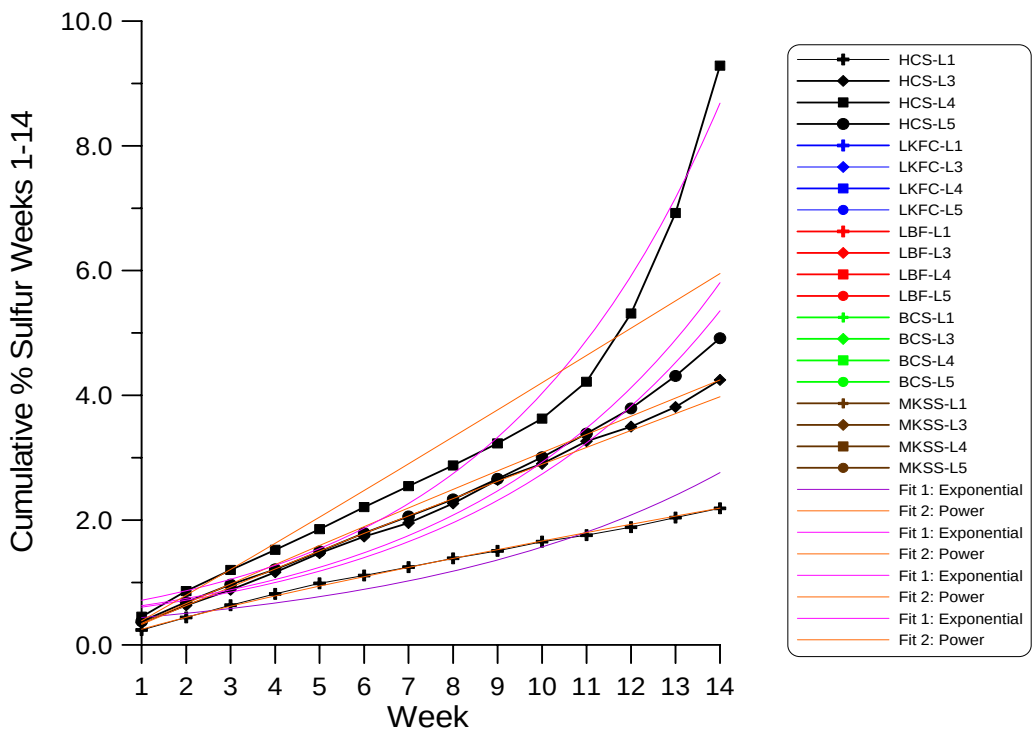

Figure 7.26. Sulfur leaching from HCS-IN, the Houchins Creek Shale. Both power law and exponential fitting curves are shown.

Carbonate Leaching

Determining Carbonate Dissolution Rates

There are two ways to calculate carbonate dissolution rates, the "cation" approach and the "anion" approach. The rate of reaction can be determined from the amount of material that is weathered each week as a portion (or percentage) of the total of that material that is in the rock. Neutralization potential was determined two ways, the traditional Sobek et al,. (1978) method and the modified Skousen et al., (1997) method that takes steps to reduce the effects of siderite interference. Hydrogen peroxide is added in order to oxidize and precipitate iron. Siderite ($FeCO_3$), a non-alkalinity generating carbonate can give falsely high NP readings if the water is not oxidized (Skousen et al., 1997; Rose and Cravotta, 1998). The Skousen method NP results are about half the Sobek method results (Table 7.5). This is consistent with the mineralogic analyses performed by Hammarstrom et al., (this volume, Table 5.4), where about half the carbonates in the Brush Creek shale are siderite. The Skousen method NP numbers were used to determine the average NP, and the calcium carbonate content, for the all rocks in this study.

Although NP does not in and of itself specify the forms of carbonate, with the improved NP method of Skousen et al., it is reasonable to assume that most of the NP is from alkaline earth carbonates. For simplicity and accuracy, results are expressed as calcium carbonate equivalent.