ABSTRACT

Naturally occurring arsenic-contaminated groundwater is present within the Eastern Slate Belt (ESB) of North Carolina. Long-term, integrated geologic and geochemical investigations have determined the presence of arsenic by analyzing precipitates from first and second order streams under base flow conditions. When groundwater discharges into streams, arsenic and other metals are precipitated from solution, due to redox changes between the subsurface and surface environments. Analyses (As, base metals, Fe and Mn) were determined following chemical extraction of naturally occurring manganese-iron oxide-coatings, which had precipitated from solution onto streambed cobbles. Additionally, artificial redox fronts were produced by placing ceramic tiles in streambeds to collect and analyze oxide precipitates. Thermochemical plots from these data, as well as information from respective stream water measurements (pH and Eh), water sampling, and rock chemical analyses indicate mobile arsenic in predicted stability fields. Initial results show that naturally occurring arsenic-contaminated groundwater is present within the study area. However, the resulting oxidation and precipitation within streams appreciably removes this contaminant from surface water solution.