

Title: Determination of the CEC in SRS soils and the capability of EPA Model 9081 for CEC of acidic soils

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Abstract

Introduction: The remediation of nuclear contamination in soils and sediments at the Savannah River Site, SC (SRS) is an ongoing government project with implications for the health of ecosystems near the site. In addition to environmental protection, the safety of the food and drinking water produced in the region is also at risk for impurity. In previous studies, hydroxy-interlayered vermiculite (HIV) has shown patterns of significant sorption trends within its interlayer and along frayed edge sites; which has been previously measured to have a significant percentage within soil cores from the SRS.

Method: In this study, three soil cores were taken from the SRS, for each core the extracted clay and bulk soil samples were tested and measured for cation exchange capacity (CEC) using EPA method 9081.

Results: Each sample had been previously measured to have a certain clay percentage, and with these clay percentages a maximum, minimum, and average CEC was previously determined according to measured clay in each sample. All results gave trends of varying inflation when comparing the measured values versus calculated values.

Conclusion: Overall, the clay samples gave inflated results, which resulted in treatment of bulk soil samples in hopes of complete saturation of each site. The bulk soil samples also proved to give overall inflated CEC results, the sodium determined in the NH_4OAc solution was (in most cases) very high, and exceeded previously determined maximum CEC values from the previously measured phyllosilicate percentages. Further investigation is needed to determine if there is, in actuality, a flaw in the EPA 9081 method.