
Bentonite Characteristics from Deposits near Rosalind, Alberta

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Abstract: Two bentonite deposits having average thicknesses of 10 and 4 ft are exposed within nonmarine strata of Late Cretaceous age along the Battle River near Rosalind, Alberta. They are characterized by scarcity of $>44\ \mu\text{m}$ material and variable 44-2 μm and $<2\ \mu\text{m}$ contents. Material $>44\ \mu\text{m}$ in size in excess of 2 per cent is primarily attributable to secondary calcite, and $<2\ \mu\text{m}$ content may be related to the amount of 44-2 μm material that has altered diagenetically from volcanic glass to montmorillonite. Rhyodacite was the probable composition of the parent ash; therefore, the high iron content in one deposit is probably due to diagenesis. The blocking effect of iron on exchange sites can explain differences in exchangeable Na and Ca in different deposits. High exchangeable Na found in finer subdivisions of fractionated clay can be explained by increased purity of the bentonite.

Multiple regression analysis of the analytical data shows that 48 per cent of the variation in yield (bbl/T.) of 15 centipoise drilling mud can be attributed to concomitant variation in seven interrelated compositional properties. Sequential analysis shows that $<0.2\ \mu\text{m}$ clay content is the most important contributor to variation in yield. The remaining variables (total clay content, exchangeable Na, exchangeable Ca + Mg, Fe^{2+} and Fe^{3+} contents, and CEC) contribute little additional precision to the regression analysis when $<0.2\ \mu\text{m}$ clay content is included in the equation.

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