ABSTRACT

The Development, Optimization and Characterization of
Trinidad Lake Asphalt Emulsions

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Current methods of working with Trinidad lake asphalt (TLA) involve
the use of heat application or organic solvents, both of which have
harmful environmental impacts. An attractive alternative in making TLA
more easily workable and at the same time addressing many
environmental concerns is by emulsification.

In this thesis a method for the emulsification of TLA is developed
utilizing surfactants from the three main surfactant groups. The key
role of sodium hydroxide (NaOH) in the emulsification process has
been elucidated, resulting in a proposed mechanism for emulsification.
This mechanism involves the disruption of the dimerized structures of
the TLA allowing the surfactant to penetrate the bitumen component
and promote emulsification.

A novel method for the stabilization of the resulting TLA emulsion has
been developed involving the formation of a cross-linked structure in
the emulsion by treatment with electrolyte (calcium chloride) solution.
This stabilization significantly increases the shelf life of the emulsion.

Keywords: Clifton Balkaran; Trinidad Lake Asphalt (TLA); Emulsions