ABSTRACT

DOWNSTREAM PETROCHEMICAL PRODUCTION
AND NATURAL GAS LIQUID RECOVERY
IN TRINIDAD AND TOBAGO

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The potential for petrochemical production is intricately linked to the availability of natural gas as a feedstock and fuel. Gas composition and the rate of gas production determine largely the possibility of downstream petrochemical production from natural gas.

A techno-economic evaluation shows that it may not be feasible to pursue olefin production from the products of natural gas liquids (NGL) in Trinidad and Tobago, but the possibilities exist for downstream petrochemical production from methanol (a primary derivative of methane). The relatively small amounts of propane and ethane that are likely to be extracted using a natural gas liquid recovery plant are insufficient to meet the requirements of a minimum size economic ethylene or propylene plant; and hence the liquids produced are to be sold on the export market.

Estimation of the amount of liquids to be produced from a natural gas liquid recovery plant using

an expansion process, was determined using a compositional simulator. A numerical scheme for the calculation of two phase equilibrium state in a compositional simulator has been used to predict liquid yields. The mathematical formulation of the compositional simulator uses the Rachford and Rice objective function with some slight modification as suggested by Prausnitz.

The thermodynamic behaviour of the hydrocarbon phases is predicted using the Peng-Robinson equation of state, where recommended interaction parameters have been used to give reasonable estimates of the equilibrium constants for the lighter hydrocarbons.

Finally, the amount of liquid that can be produced using an absorption process was estimated. Absorption processes are used when increased recoveries of ethane and propane are desired.