

ABSTRACT

An Evaluation of the Tar Sands
of Trinidad

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In this thesis a comprehensive evaluation of the outcropping tar/oil impregnated sands of the petroliferous province in the Southern Basin of Trinidad is presented. This evaluation includes geological analysis, oil in place reserves determinations and mining feasibility.

A geological genetic model from the geological analysis postulates that the surface tar/oil sand deposits are as a result of fault conduits transmitting deep seated oil to anticlinal uncapped surface sands. Thirteen originally mapped deposits fit into the model, with the discovery of three new additional deposits on application of the genetic model. Twenty-one potential areas compatible with the genetic model need actual ground delineation. Resource evaluation techniques for oil in place reserves from lowest to highest confidence levels are termed "Speculative", "Probable", "Measured" and "Calculated". "Speculative", "Probable", and "Measured" are compatible with ore mining methods and are based on weight percentage of extracted tar/oil, while "Calculated" is aligned to oil exploitation methods and is based on volumetric measurements. Data needs for the "Measured" and "Calculated" resource evaluation methods necessitate the selection of the

Parrylands deposit as the best candidate for oil mining. Subsurface interpretation indicate an extension of the Parrylands tar/oil sand deposit underground to the south, with an estimate of tar/oil in place approximately equal to the tar/oil in place estimate of the surface, outcrop deposit.

Technical assessment of mining characteristics derived from geological, physical/reservoir and chemical properties establishes the Parrylands deposit as a viable mineable prospect. Moreover, viscosity and density/gravity measurements place crudes of the Parrylands deposit transitionally between extra-heavy crude and natural tar (bitumen).

Mining parameters together with initial upgrading and economic feasibilities suggest recovery processes of in situ and surface/strip mining methods. Furthermore, comparative costing reveals that the Mine Assisted In Situ recovery process for Parrylands crude at US\$19.00 per barrel is the most financially favourable prospect.