ANALYSIS AND EVALUATION OF TECHNOLOGICAL AND OPERATIONAL ALTERNATIVES FOR HEAVY OIL GATHERING SYSTEMS IN THE FIELDS OF CASTILLA AND CHICHIMENE – COLOMBIA

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ABSTRACT

The exploitation of heavy oil has become an important business opportunity for all oil companies worldwide. The leading Colombian oil company, ECOPETROL, has several projects related to the production of extra heavy oils. This paper presents the main activities conducted and the most significant results obtained in an interdisciplinary project developed by ECOPETROL and the Universidad de Los

Andes. The main objective of the project was to develop, in advance, a general methodology and support models for the analysis and evaluation of transportation alternatives for heavy crude in two particular fields, before all the relevant information from these fields was available. ECOPETROL assessed and provided accurate information that lead to a final transportation alternative recommendation. In order to include all the technical aspects of the problem, such as chemical and physical characteristics of the fields, a multidisciplinary work team was organized to develop the different types of models needed for the decision analysis. Three models were developed, a hydraulic model (multiphase model), a financial model, and a qualitative model (Analytic Hierarchy Process), that interact to achieve the main objective. In a first step, these models were applied to a generic unit of analysis, where simulated wells are distributed in a generic manner, and then the results were successfully used in the real fields. The paper begins with a problem description, followed by the depiction of models development and simulation design. Finally, it presents a summary of the main results and conclusions.

Keywords: analytic hierarchy process, heavy oil gathering systems, heavy oil multiphase flow