Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Analytical Model for the Diffusion Process in a In-Situ Combustion Tube PATRICIA GUTIERREZ, ADRIAN REYES, Universidad Nacional Autónoma de México — The in-situ combustion process (ISC) is basically an air or oxygen enriched gas injection oil recovery process, inside an extraction well. In contrast to a conventional gas injection process, an ISC process consists in using heat to create a combustion front that raises the fuel temperature, decreasing its viscosity, making extraction easier. The oil is taken toward the productor by means of a vigorous gas thrust as well as a water thrust. To improve and enhance this technique in the field wells, it has been widely perform experimental laboratory tests, in which an in-situ combustion tube is designed to simulate the extraction process. In the present work we propose to solve analytically the problem, with a parabolic partial differential equation associated to the convection-diffusion phenomenon, equation which describes the in-situ combustion process. The whole mathematical problem is established by completing this equation with the correspong boundary and initial conditions, the thickness of the combustion zone, flow velocity, and more parameters. The theoretically obtained results are compared with those reported in literature. We further, fit the parameter of our model to the mentioned data taken from the literature.

Adrian Reyes
Universidad Nacional Autónoma de México

Date submitted: 11 Nov 2014 Electronic form version 1.4