

Crude Oil Electrostatic Mathematical Modelling on an Existing Industrial Plant

Authors : Fatemeh Yazdanmehr, Iulian Nistor

Abstract : The scope of the current study is the prediction of water separation in a two-stage industrial crude oil desalting plant. This research study was focused on developing a desalting operation in an existing production unit of one Iranian heavy oil field with 75 MBPD capacity. Because of some operational issues, such as oil dehydration at high temperatures, the optimization of the desalter operational parameters was essential. The mathematical desalting is modeled based on the population balance method. The existing operational data is used for tuning and validation of the accuracy of the modeling. The inlet oil temperature to desalter used was decreased from 110°C to 80°C, and the desalted electrical field was increased from 0.75 kv to 2.5 kv. The proposed condition for the desalter also meets the water oil specification. Based on these conditions of desalter, the oil recovery is increased by 574 BBL/D, and the gas flaring decrease by 2.8 MMSCF/D. Depending on the oil price, the additional production of oil can increase the annual income by about \$15 MM and reduces greenhouse gas production caused by gas flaring.

Keywords : desalter, demulsification, modelling, water-oil separation, crude oil emulsion

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