

## Validation of Electrical Field Effect on Electrostatic Desalter Modeling with Experimental Laboratory Data

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**Abstract :** The scope of the current study is the evaluation of the electric field effect on electrostatic desalting mathematical modeling with laboratory data. This research study was focused on developing a model for an existing operation desalting unit of one of the Iranian heavy oil field with a 75 MBPD production capacity. The high temperature of inlet oil to dehydration unit reduces the oil recovery, so the mathematical modeling of desalter operation parameters is very significant. The existing production unit operating data has been used for the accuracy of the mathematical desalting plant model. The inlet oil temperature to desalter was decreased from 110 to 80°C, and the desalted electrical field was increased from 0.75 to 2.5 Kv/cm. The model result shows that the desalter parameter changes meet the water-oil specification and also the oil production and consequently annual income is increased. In addition to that, changing desalter operation conditions reduces environmental footprint because of flare gas reduction. Following to specify the accuracy of selected electrostatic desalter electrical field, laboratory data has been used. Experimental data are used to ensure the effect of electrical field change on desalter. Therefore, the lab test is done on a crude oil sample. The results include the dehydration efficiency in the presence of a demulsifier and under electrical field (0.75 Kv) conditions at various temperatures. Comparing lab experimental and electrostatic desalter mathematical model results shows 1-3 percent acceptable error which confirms the validity of desalter specification and operation conditions changes.

**Keywords :** desalter, electrical field, demulsification, mathematical modeling, water-oil separation

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