## TITLE OF THE INVENTION

**Algorithm for Optimal ICD Configuration Using a Coupled Wellbore-Reservoir Model**

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The present disclosure relates generally to the recovery of subterranean deposits and more specifically to methods and systems for improving production of an oil well by optimizing inflow control device parameters along a horizontal wellbore using an algorithm.

### 2. Discussion of the Related Art

Horizontal wellbores, as opposed to vertical wells, are often favored by operators for exploiting narrow, oil-bearing formations to maximize contact with the pay zone. However, as depicted in Figure 1, these wells are subject to early water and gas coning toward the heel because of the flow's frictional pressure drops along the horizontal section. Moreover, variations in permeability can result in unbalanced inflow along the horizontal section and accelerate early water and gas breakthrough and uneven inflow downhole. These conditions can limit sweep efficiency and reduce hydrocarbon recovery from horizontal wells, leaving bypassed oil.

To combat the above problem, inflow control devices (ICDs) are used to increase performance of horizontal wells in unfavorable environments. ICDs are designed to improve completion performance and efficiency by balancing inflow throughout the length of a completion. By using ICDs, it is possible to create a homogeneous production profile that can effectively delay the water/gas breakthrough while increasing oil recovery as a consequence.

## SUMMARY OF THE INVENTION

According to a first aspect of the present invention, there is provided a computer implemented method for improving production of an oil well, the method comprising: generating a model of a wellbore in a wellbore simulator; and executing an algorithm that determines optimal parameters of inflow control devices (ICD) along a horizontal portion of the wellbore, wherein the determined optimal parameters of the inflow control devices yields a substantially uniform approach of at least one of water and gas along the horizontal portion of the wellbore.

According to a second aspect of the present invention, there is provided a system, comprising: at least one processor; and at least one memory coupled to the at least one processor and storing computer executable instructions for improving production of an oil well, the computer executable instructions comprises instructions for: generating a model of a wellbore in a wellbore simulator; and executing an algorithm that determines optimal parameters of inflow control devices (ICD) along a horizontal portion of the wellbore, wherein the determined optimal parameters of the inflow control devices yields a substantially uniform approach of at least one of water and gas along the horizontal portion of the wellbore.

According to a third aspect of the present invention, there is provided a non-transitory computer readable medium comprising computer executable instructions for improving well production, the computer executable instructions when executed causes one or more machines to perform operations comprising: generating a model of a wellbore in a wellbore simulator; and executing an algorithm that determines optimal parameters of inflow control devices (ICD) along a horizontal portion of the wellbore, wherein the determined optimal parameters of the inflow control devices yields a substantially uniform approach of at least one of water and gas along the horizontal portion of the wellbore.

## BRIEF DESCRIPTION OF THE DRAWINGS

Illustrative embodiments of the present invention are described in detail below with reference to the attached drawing figures, which are incorporated by reference herein and wherein:

Figure 1 is a diagram illustrating an example of a horizontal well without the use of inflow control devices in accordance with the disclosed embodiments;

Figure 2 is a diagram illustrating an example of a horizontal well that uses inflow control devices in accordance with the disclosed embodiments;