ADVANCED CONTROL OF MULTIPHASE OIL PRODUCTION IN WELLS BY GUARANTEE OF DRAINAGE BY BIOTECHNOLOGICAL COMPOUNDS IN CFD

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ABSTRACT: Brazilian pre-salt oil producing wells are important for supplying the market consumer and for the country's economy as they are responsible for producing oil from deposits oil deposits that lie beneath the extensive layers of salt, rocks and water that cover it. Given away its importance makes it necessary to study the different ways of guaranteeing production/flow of its products over time, as phenomena such as corrosion, scale, paraffins and Hydrate formation can significantly reduce the useful life of wells or even permanently stop production. The majority of pre-salt producing wells are emerging and with high production flows in the multiphase regime. Based on this, a study will be carried out substances already created and synthesized by microorganisms that can be used to guarantee flow under the conditions defined for these wells in order to maintain production throughout the useful life of the facilities provided for by the project. A simulation will be carried out, with real data, of the CFD flow of a well, with its flowline and riser, to the separator vessel of a Brazilian pre-salt platform of the FPSO type (floating, production, storage and offloading) in order to analyze the impacts and benefits of using each compound studied. In the same CFD simulation, the meshes will also be implemented. control currently used on the platform, with validation with real data, in order to compare the current control efficiency with multivariate control loops and artificial intelligence proposed by this thesis in order to promote process control in regions of the operational envelope of scale, corrosion, paraffins and hydrates, with the biotechnological products used, in regions that avoid precipitation, plugging or premature wear of piping and equipment. Some parameters and correlations necessary to make the simulation adhere to reality will be elaborated by a deep learning study carried out with operational information collected by instrumentation currently installed in the wells and FPSO studied in order to have the best representation possible from reality. With the simulation ready, it will be evaluated with the current tunes and settings and possible control of the separator vessel and the well production control shock valve that will bring

the best choice result with the range of biotechnological compounds used and the expected operational variations. The results of this research are expected to obtain which compounds biotechnological products are suitable for guaranteeing flow under normal operating conditions of the platform and which control configurations are ideal and better than current ones to maintain the flow under the optimal conditions of the operational envelopes. Furthermore, control strategies will be planned and adjusted in order to maintain the process, even with the expected fluctuations operationally, in a position to maintain production variables in the condition of best efficiency of trained biotechnology products. This is expected to reduce premature stoppages of wells and longer useful life of production facilities.

KEYWORDS: CFD, oil, biotechnology, control.

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