

Application of artificial intelligence in north-sea petroleum production enhancement and intervention

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In this work, an artificial intelligence technique for petroleum production enhancement and intervention in north-sea field operation is developed. It highlights the use of real time data generated from oilfields in delineating the performance of operational processes and proactive intervention. Applications in predictive operational practice particularly in offshore operations and management is also discussed. First, production data was numerically generated and matched against historical data from offshore fields. For each well, the subsurface production assembly was designed and modelled for two cases containing leaking and non-leaking production tubing systems. The matched data is then used in artificial intelligence platform to detect and predict the onset of a leak in subsurface production tubing. The artificial intelligence platform is a hybrid system consisting of fuzzy logic and artificial neural network superimposed on an enhanced algorithm for high precision and speed. The developed workflow provides opportunities for detection of leakage pathways in subsurface production tubing; provision of a proactive systems operation; reduction in prolonged equipment downtime in offshore operations; cost saving maintenance operation; accurate prediction of potential equipment failure; identification of well flow and reservoir pressure fluctuation; elimination of calendar-based reactive maintenance culture largely in practice; and screening reservoir candidates for enhanced oil recovery.

Biography: Dr. Lateef Akanji is a Senior Lecturer at the University of Aberdeen, UK since 2014. His research interests include fluid flow and transport in porous media, petroleum reservoir flow simulation and characterisation, subsurface production and enhanced oil recovery. He has authored and co-authored more than 20 technical papers and served as a peer reviewer for many prestigious journals. He holds a Ph.D. in Petroleum Engineering from Imperial College London UK. Lateef is a board member of Series Editorial Board for Springer Briefs in petroleum geoscience and engineering and editorial board member of Journal of Oil, Gas and Petrochemical Sciences. He is a chartered engineer, chartered petroleum engineer, fellow of higher education academy, EUR ING, and a member of the Energy Institute UK and the Society of Petroleum Engineers, SPE.

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