UT Permian Basin
College of Engineering

Texas Water and Energy Institute Virtual Water Lecture Series

The University of Texas Permian Basin

Friday, March 29
10:00 am - 11:30 am
Virtual Link: Link in the Bio

Registration required!
Email twei-info@utpb.edu or call (432) 552-3430

+ Presenting

Topic: Produced Water Treatment and Reuse – Solar Thermal Desalination with Combined Heat & Power Cycle, and High Salinity Carbonated Water Flooding

approximately 24.4 billion barrels of produced water were generated in the USA in 2017. This volume is more than 70 times the volume of all the liquid hazardous wastes generated in the country. The estimated produced water treatment cost for reuse, and/or disposal ranges from $0.57 to $7.49 per barrel. Typically produced water salinity ranges from a few thousand to 463,000 ppm TDS. Processing and disposal of high salinity produced water poses a significant environmental and economic burden for the industry and communities. Thermal desalination technologies are one class of the methods used to treat produced water. But, the high-energy demand and the associated cost are a major concern for the technologies. The high-energy requirement is mainly due to the high latent heat of vaporization and inefficient boiling process especially due to 'boiling crisis'. Produced water can also be reinjected into the oil reservoirs for waterflooding purposes. However, high salinity brine flooding is known to be not as efficient for oil recovery compared to low-salinity water flooding (LSWF), therefore, the high salinity brine should be diluted using freshwater.

In the first part of this talk, we will present a next-generation wettability-based solar-thermal-powered mechanical vapor compression desalination system primarily intended to reduce energy consumption, lower the cost of desalination, and reduce environmental impacts such as induced seismicity due to high volume of high salinity produced water injection into Class II disposal wells.

In the second part of the talk, we will present a high salinity carbonated water flooding (HSCWF) technology that has a potential for simultaneous enhanced oil recovery (EOR), safer produced water disposal and CO2 (which is another major environmental pollutant) sequestration.

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LECTURE SERIES

Water lecture series

Prem Bikkin

Associate Professor, Harold Courson Chair in Petroleum Engineering, and the Petroleum Program Coordinator in the School of Chemical Engineering, Oklahoma State University

ABOUT THE SPEAKER

Dr. Prem Bikkina is an Associate Professor, Harold Courson Chair in Petroleum Engineering, and the Petroleum Program Coordinator in the School of Chemical Engineering, Oklahoma State University, Stillwater. He has B.S. and M.S. degrees in Chemical Engineering from NIT Warangal and IIT Guwahati, India, respectively, and Ph.D. degree in Petroleum Engineering from the University of Tulsa. He worked as a postdoctoral fellow at Lawrence Berkeley National Laboratory. He also worked for various chemical and petroleum industries. His research work on enhanced hydrocarbon recovery, geological sequestration, and multiphase separation resulted in high-impact journal publications and patents. His research projects have been funded by various private and government funding agencies. He has been a peer reviewer for more than 17 international journals, ACS PRF, DOE, and NSF EPSCoR proposals. Dr. Bikkina received the '2016 Outstanding Reviewer Award' from the Journal of Environmental Chemical Engineering, '2016 SPE Mid-Continent Regional Service Award', '2017 SPE Distinguished Petroleum Engineering Faculty Award', and 2019 CEAT Excellent Teacher Award. He is a professional member of SPE, AIChE, ACS, and ASME, and an Editorial Board Member of Petroleum Science and Technology journal.