

# **Produced Water Treatment for Agricultural Use in Kansas Oil, And Gas Production Fields**

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Enhanced oil recovery (EOR) processes used by oil and gas companies in the State of Kansas and the Midwest region generate a large amount of water (up to 90%) as byproduct. Water or steam injection into oil reservoirs is necessary for maintaining the oil flow and other operations. Oil and gas reservoirs usually have water in the same formation of oil, or gas and it flows to the surface during production. Produced water is a term used to describe water that is produced as a byproduct of oil and gas operations. The amount of the produced water significantly increases as wells age. Currently, the produced water is disposed into designated wells to avoid environmental concerns and ground water contaminations of toxic minerals and bacteria. The main goal of the project is to find low-cost maintenance, energy efficient, cost-effective, and environmentally friendly methods for produced water treatment. The objective of this research is to study the elemental contents of the produced water in Kansas and develop a novel filtration method for the recovery of water and use it in the local agricultural fields. Produced water samples were obtained from Kansas Mid-Continent Region (Lario Oil & Gas Co), acidified with HNO<sub>3</sub> and HCl, then Autoclaved according to ASTM D1971 standards for Optical Emission Spectroscopy and plasma-mass spectrometric testing. Filtration of produced water by multi-layers of ceramics, zeolite, micro size carbon, and aluminum hydrate, shows promising results in terms of bacteria elimination, total dissolved metal TDS, as well as salt removal.