PRODUCED WATER TREATMENT USING CROSSFLOW FILTRATION HYDROCYCLONE BASED ON CERAMIC MEMBRANES

Vlad Tarabara*
Andrii Gorobets
Brian Starr
Abdul Motin
André Bénard
Merlin Bruening
Michigan State University
3564 Engineering Building
428 S. Shaw Lane
East Lansing, MI 48824
517-432-1755
tarabara@msu.edu

We report on the development of a crossflow filtration hydrocyclone (CFFH) as a hybrid hydrocyclone-membrane technology that separates oil-water mixtures to produce water stream that meets standards for discharge into the environment. Simulations and experimental studies demonstrate that rotational flow in the CFFH forces oil droplets away from a membrane surface and decrease fouling of the membrane. The synergistic benefits of hybridizing membrane and hydrocyclone technologies are shown for the two cases when the tail pipe of a deoiling hydrocyclone is replaced with ceramic tubular microfiltration membranes of two different pore sizes: 0.14 µm and 3.5 πm. Ongoing work is focused on maximizing the clean water permeate stream while maintaining the reduction in fouling.

###