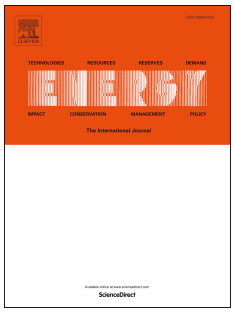
Accepted Manuscript



Numerical study of foulant-water separation using hydrocyclones enhanced by ejection device: Effect of ejection velocity

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PII: S0360-5442(18)31444-0

DOI: 10.1016/j.energy.2018.07.151

Reference: EGY 13416

To appear in: *Energy*

Received Date: 29 April 2018

Revised Date: 23 June 2018

Accepted Date: 22 July 2018

Please cite this article as: Tian J, Ni L, Song T, Shen C, Zhao J, Numerical study of foulant-water separation using hydrocyclones enhanced by ejection device: Effect of ejection velocity, *Energy* (2018), doi: 10.1016/j.energy.2018.07.151.

Numerical study of foulant-water separation using hydrocyclones enhanced by ejection device: Effect of ejection velocity

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Abstract： To solve the blockage and fouling issues of sewage heat exchangers in sewage source heat pump, a novel de-foulant hydrocyclone with ejection device was proposed and studied with FLUENT software. The pressure and velocity fields were coupled by the SIMPLEC algorithm, whereas the Reynolds Stress Model was used to predict the 3-D strong swirling turbulent flow due to its anisotropic nature. The Discrete Particle Method was employed to study the particle motion. Results showed that, compared with the variable underflow-pipe diameter, adjusting the ejection velocity could significantly enhance the separation performance by achieving the low split ratio without the risk of blocking the underflow pipe. Unlike the effects of conventional ejectors, the increasing ejection velocity increased the back pressure of the underflow and hence decreased the split ratio. Specifically, if the ejection velocity was higher than a certain value (e.g., 2.0 m/s in this paper), all the 3-D strong swirling