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Authors: Yajun Li, Feiyu Xu, Canteng Gong

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System Optimization of Turbo-expander Process for Natural Gas Liquid Recovery

Yajun Li^{a,*}, Feiyu Xu^a, Canteng Gong^a

^aKey Lab of Heat Transfer Enhancement and Energy Conservation of the Ministry of Education, South China University of Technology, Guangzhou, China

*Corresponding author. Tel.: 86-020-87112044.

Address: SHAW Engineering Building, South China University of Technology, Wushan RD., Tianhe District, Guangzhou, Guangdong Province, P.R.China

Postal code: 510640

E-mail address: liyajun@scut.edu.cn

Highlight

- **A certain NGL recovery system is optimized.**
- **An optimization model is developed considering all the influential factors.**
- **A proper optimization strategy is put forward based on SQP algorithm.**
- **Optimal parameters and maximum overall profit are obtained by Aspen and Excel VBA.**

Abstract: Turbo-expander process is a complex technology to recover the light hydrocarbon in natural gas where energy is highly integrated and some important parameters such as demethanizer pressure and precooling temperature interact with each other, which also codetermine both the recovery and energy consumption of the system. Based on an NGL recovery engineering of 60×10^4 Nm³/h pipeline gas, this paper focuses on the optimization for NGL recovery system. The overall profits of whole process are chosen as objective function and optimization model is developed. Considering all the influential factors and restrictions such as CO₂ freezing, a proper optimization strategy is put forward which is based on SQP (Sequential Quadratic Programming) along with constraint boundary research. The optimization model is solved by Aspen Plus combined with Excel VBA to determine the optimal value of

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