

Enhancement of Single Mixed Refrigerant Natural Gas Liquefaction Plants through Proposed Knowledge Based Decision Method and Structure Modification

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In this work, the energy efficiency improvement of the single mixed refrigerant (SMR) natural gas (NG) liquefaction plants was investigated. The main parameters, such as mixed refrigerant (MR) composition and operating pressure were investigated for their effect on the compression energy requirement. The knowledge based decision making method was exploited for liquefied natural gas process optimization. The results show that the proposed optimization methodology, which is simple and effective in finding the optimal operating variables, can save up to 30.58% in terms of compressor duty as compared to the base case. In addition, the proposed optimization methodology provides process understanding, which is essential to process engineer. One benefit from this methodology is that it can be applied to any liquefaction cycle, where a MR is involved. The effect of intercooler outlet temperature on energy saving was also considered. This research was supported by a grant from the Gas Plant R&D Center funded by the Ministry of Land, Transportation and Maritime Affairs (MLTM) of the Korean government.