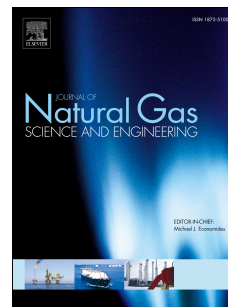


Accepted Manuscript

Gas turbine inlet air cooling system for enhancing propane recovery in a gas plant:
Theoretical and cost analyses

Mohamed Bin Shams, E.M. Elkanzi, Zakareya Ramadhan, Sadiq Rahma, Mohamed
Khamis



PII: S1875-5100(17)30156-7

DOI: [10.1016/j.jngse.2017.03.031](https://doi.org/10.1016/j.jngse.2017.03.031)

Reference: JNGSE 2132

To appear in: *Journal of Natural Gas Science and Engineering*

Received Date: 22 October 2016

Revised Date: 10 March 2017

Accepted Date: 22 March 2017

Please cite this article as: Shams, M.B., Elkanzi, E.M., Ramadhan, Z., Rahma, S., Khamis, M., Gas turbine inlet air cooling system for enhancing propane recovery in a gas plant: Theoretical and cost analyses, *Journal of Natural Gas Science & Engineering* (2017), doi: 10.1016/j.jngse.2017.03.031.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Gas Turbine Inlet Air Cooling System for Enhancing Propane recovery in a gas plant: Theoretical and Cost analyses

Mohamed Bin Shams*, E.M. Elkanzi, Zakareya Ramadhan, Sadiq Rahma, Mohamed Khamis

Department of Chemical Engineering, University of Bahrain, P.O. Box 32038, Isa Town,
Kingdom of Bahrain

Tel. +973 (1) 7876050; Fax +973 (1) 7680935; email: mshams@uob.edu.bh

Abstract

A local gas processing plant exhibits a decrease in propane recovery during summer. In this paper, the feasibility of using inlet air cooling system by utilizing a cold residue-gas stream to increase the cooling capacity of the plant's refrigeration system is theoretically and economically analysed. The theoretical study showed that as the inlet air temperature to the gas turbine decreases by 1°C the generated power and the thermal efficiency of the gas turbine increase by 0.53% and 0.22%, respectively resulting in 0.192% increment of propane recovery. When the inlet air temperature of the gas turbine is cooled from 40°C to 15°C (ISO condition), the propane production rate increases by 245 bbl/day. This corresponds to savings of \$18000 /day. The resulting payback period with 100% usage of the residue-gas is 8.5 months and that with 20% usage of residue gas is 2.5 years. In both cases, the internal rate of return (IRR) and Net Present Value (NPV) are very high making the investment highly lucrative prospect.

Keywords: Gas processing, Air Cooling, Gas turbine performance, Propane recovery

*Corresponding Author: Tel. +973 (17) 876050; Fax +973 (17) 680935; email: mshams@uob.edu.bh

Download English Version:

<https://daneshyari.com/en/article/5485100>

Download Persian Version:

<https://daneshyari.com/article/5485100>

[Daneshyari.com](https://daneshyari.com)