Exergy destruction and losses on four North Sea offshore platforms: A comparative study of the oil and gas processing plants - DTU Orbit (17/12/2018)

The oil and gas processing plants of four North Sea offshore platforms are analysed and compared, based on the exergy analysis method. Sources of exergy destruction and losses are identified and the findings for the different platforms are compared. Different platforms have different working conditions, which implies that some platforms need less heat and power than others. Reservoir properties and composition vary over the lifetime of an oil field, and therefore maintaining a high efficiency of the processing plant is challenging. The results of the analysis show that 27%-57% of the exergy destruction take place in the gas treatment sections, 13%-29% take place in the gas recompression sections and 10%-24% occur in the production manifolds. The exergy losses with flared gas are significant for two of the platforms. The exact potential for energy savings and for enhancing system performances differs across offshore platforms. However, the results indicate that the largest rooms for improvement lie in (i) gas compression systems where large amounts of gas may be compressed and recycled to prevent surge, (ii) production manifolds where well-streams are depressurised and mixed, and (iii) in the installation of flare gas recovery systems. © 2014 Elsevier Ltd. All rights reserved.

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