ENERGY ANALYSIS AND DESIGN IMPROVEMENTS OF AN EXISTING CRUDE VACUUM DISTILLATION UNIT

By

Tarek Mohamed Zein El-Deen

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
CHEMICAL ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Under the Supervision of

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Title of Thesis:

Energy Analysis and Design Improvements of an Existing Crude Vacuum Distillation Unit

Key Words:

Vacuum; Distillation; Pinch; Energy; Integration

Summary:

In this thesis, a newly developed methodology is established for the optimisation of an existing energy integrated process, this methodology is applied on a real Vacuum Distillation Unit (VDU). Furthermore, the pinch technology is introduced and is briefly discussed, which helps in the energy analysis of the process then calculating both the heating and cooling targets. The results is very promising from the optimisation and energy saving point of view, about 9.9% and 9.3% reduction in the heating and cooling duties respectively.

Acknowledgments

I would like to express my deepest appreciation to every person who taught a single word. I acknowledge the gratitude to Our University (Cairo University) for giving us the opportunity to complete this work. Last but not least, thanks to all the people who took part in making this thesis real.

Dedication

I dedicate this thesis to my late grandmother, my great mother and my beloved wife. I also want to dedicate my work to my country, Egypt, may God prosper our country back again.

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