Parametric Study of a Novel Low Temperature Cycle for Electricity and Fresh Water Production

By

Eng. Karim Ehab Ahmed Hassan Hussain

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

Mechanical Power Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY

GIZA, EGYPT

2017

Parametric Study of a Novel Low Temperature Cycle for Electricity and Fresh Water Production

By

Eng. Karim Ehab Ahmed Hassan Hussain

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

Mechanical Power Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY

GIZA, EGYPT

2017

Parametric Study of a Novel Low Temperature Cycle for Electricity and Fresh Water Production

By

Eng. Karim Ehab Ahmed Hassan Hussain

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

Mechanical Power Engineering

Under Supervision of

Prof. Dr. Amin Mohamed Mobarak
Mechanical Power Engineering Department
Faculty of Engineering
Cairo University

Dr. Taher Mohamed Aboudeif
Mechanical Power Engineering Department
Faculty of Engineering
Cairo University

FACULTY OF ENGINEERING, CAIRO UNIVERSITY

GIZA, EGYPT

2017

Parametric Study of a Novel Low Temperature Cycle for Electricity and Fresh Water Production

By

Eng. Karim Ehab Ahmed Hassan Hussain

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

Mechanical Power Engineering

Approved by the Examining Committee:

Prof. Dr. Amin Mohamed Mobarak **Thesis Main Advisor**

Professor of Mechanical Power Engineering, Faculty of Engineering, Cairo University.

Prof. Dr. Zeinab Saleh Safar **Internal Examiner**

Professor of Mechanical Power Engineering, Faculty of Engineering, Cairo University.

Prof. Dr. Mahmoud Abdelfattah ElKadi **External Examiner**

Professor of Mechanical Power Engineering, Faculty of Engineering, Al-Azhar University.

FACULTY OF ENGINEERING, CAIRO UNIVERSITY

GIZA, EGYPT

2017

Personal information

Engineer	**Karim Ehab Ahmed**
Address	112 / Sudan St. Mohandeseen, Giza, (Egypt)
Telephone	+20-237606088 Mobile +20-1141108577
E-mail	karimehab@live.com / karimehab_1@hotmail.com
Nationality	Egyptian
Date of birth	06 March 1987
Gender	Male
Marital status	Married
Military status	Accomplished (2012)

Other Information

Registration Date	1 / 10 / 2012
Awarding Date	/ / 2017
Degree	Master of Science
Department	Mechanical Power Engineering
Main Supervisor	Prof. Dr.Amin Mohamed Mobarak
Supervisor	Dr. Taher Mohamed Aboudeif
Examiners	Prof. Dr. Amin Mohamed Mobarak Prof. Dr. Zeinab Saleh Safar Prof. Dr. Mahmoud Abdelfattah ElKadi Mechanical Power Engineering, Faculty of Engineering, Al-Azhar University.
Title of Thesis	Parametric Study of a Novel Low Temperature Cycle for Electricity and Fresh Water Production
Key Words	Modeling and Simulation, MSF, Parametric Design, Performance Optimization, Turbo-vapor Compressor, LP Steam Turbine.
Summary	Working on desalination and energy production is needed. And the best approach is the one which can produce both in parallel. The previous work was "A Novel Combined Low Temperature Cycle for Electricity and Fresh Water Production" Professor Amin Mobarak. Modeling and Simulation was conducted. The study also shows that changing the path of the distillate leaving the MSF plant may be useful. And finally plant optimizing is conducted which shows the best operating conditions for each environmental condition.

Acknowledgments

I would like to thank Prof. Amin Mobarak. He not only did suggest and provide the material, but also supervised the work step by step. I am also indebted to Dr. Taher Mohamed who lent me his expertise and encouragement.

I would also Like to thank the system founders at the British University in Egypt (BUE) for allowing the teaching staff to have a free day per week to work on their research studies.

Special thanks to my parents and my wife for supporting me throughout the work and every single day.

Table of Contents