

**FEASIBILITY STUDY FOR MODIFICATION COOLING CHANNEL FOR
GAINING STEAM PRODUCTION IN GEOTHERMAL POWER PLANT
(STUDY CASE IN DIENG GEOTHERMAL POWER PLANT)**

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MASTER'S DEGREE
in

ENGINEERING MANAGEMENT
MASTER OF MECHANICAL ENGINEERING
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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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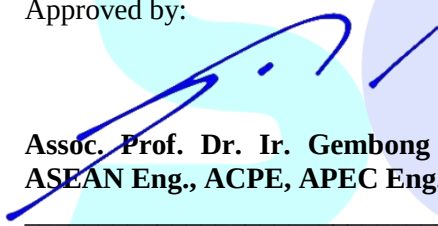
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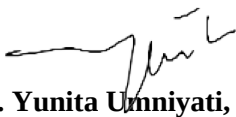
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ABSTRACT

FEASIBILITY STUDY FOR MODIFICATION COOLING CHANNEL FOR GAINING STEAM PRODUCTION IN GEOTHERMAL POWER PLANT (STUDY CASE IN DIENG GEOTHERMAL POWER PLANT)

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At the Dieng Geothermal Power Plant, the HCE-33 production well demonstrated a significant increase in steam deliverability following tie-in activities and the installation of additional separation facilities. However, this improvement was constrained by the limited capacity and thermal performance of the existing brine cooling channel, which was originally designed for lower brine flow rates and resulted in excessive brine temperature at the pump inlet.

The study adopts the Design for Six Sigma (DFSS) DMADV methodology—Define, Measure, Analyze, Design, and Verify—to ensure a structured and multidisciplinary evaluation. The existing cooling channel is hydraulically and thermally inadequate under increased production scenarios. The proposed modified cooling channel design successfully meets flow and temperature requirements, enhances brine pump reliability, and enables higher sustainable steam production from the HCE-33 well. Economic analysis confirms that the investment is financially feasible and attractive, offering improved power generation output without the need for additional drilling. This study highlights the critical role of surface facility optimization in geothermal production enhancement and provides a replicable framework for similar geothermal field applications.

Keywords: Geothermal energy, brine management, cooling channel modification, feasibility study, DMADV, steam production optimization



DEDICATION

This thesis is dedicated to my family, whose constant support, patience, and encouragement have been an invaluable source of strength during the completion of this study.



ACKNOWLEDGEMENTS

First and foremost, the author expresses sincere gratitude to God Almighty for His guidance and blessings, which have enabled the completion of this thesis entitled “Feasibility Study For Modification Cooling Channel For Gaining Steam Production In Geothermal Power Plant (Study Case In Dieng Geothermal Power Plant)” This thesis is submitted as a partial fulfillment of the requirements for obtaining a Master’s degree. The preparation of this thesis represents not only an academic requirement but also a comprehensive learning process involving technical analysis, engineering judgment, and practical evaluation. This study focuses on assessing the technical, operational, environmental, and economic feasibility of modifying the open channel HCE-33, with the objective of improving system performance while maintaining operational safety and sustainability. It is expected that the findings of this research may contribute to practical decision-making and provide reference for similar engineering applications in the future.

The author would like to express sincere appreciation to the thesis supervisor for valuable guidance, constructive feedback, and continuous support throughout the research and writing process. Appreciation is also extended to the examining committee, lecturers, colleagues, and all parties who have provided assistance, data, and encouragement during the completion of this study.

The author fully realizes that this thesis is not without limitations. Therefore, constructive comments and suggestions are highly welcomed for future improvement and further research. Finally, it is hoped that this thesis will provide meaningful benefits for academic development as well as practical implementation in the relevant field of study.

TABLE OF CONTENTS

STATEMENT BY THE AUTHOR.....	2
ABSTRACT.....	3
DEDICATION.....	5
ACKNOWLEDGEMENTS.....	6
TABLE OF CONTENTS.....	7
LIST OF FIGURES	9
LIST OF TABLES.....	10
CHAPTER 1 – INTRODUCTION	11
1.1 Background.....	11
1.2 Research Problem	18
1.3 Research Objective	19
1.4 Research Question	19
1.5 Hypothesis	19
1.6 Research Limitation.....	19
1.7 Significance of Study	19
CHAPTER 2 - LITERATURE REVIEW	21
2.1 Geothermal Production Process From Production Well To Injection Well	21
2.2 Brine Management In Geothermal Systems.....	22
2.3 Reducing Brine Temperature At/Near The Brine Pump	22
2.4 Hydraulic Design (Brine Conveyance, Channels, And Pipelines)	23
2.5 Feasibility Study (FS) For Geothermal Brine System Modification.....	24
2.6 Economic Sensitivity Analysis (For Geothermal Modifications)	25
2.7 DMADV (Design For Six Sigma) as a Structured Improvement Methodology.....	25
CHAPTER 3 – RESEARCH METHODS	27
3.1 Research Framework	27
3.2 Research Methodology	28
3.3 DMADV Methodology	32
3.4 Research Timeline	44
CHAPTER 4 – RESULTS AND DISCUSSIONS.....	45
4.1 Overview	45
4.2 Define	45

4.3 Measure	48
4.4 Analyze.....	51
4.5 Design.....	64
4.6 Verify Phase	79
CHAPTER 5 – CONCLUSION & RECOMMENDATION	86
5.1 Conclusion	86
5.2 Recommendations	87
GLOSSARY	90
REFERENCE.....	93
CURRICULUM VITAE	96



LIST OF FIGURES

Figures.....	Page
Figure 1.1 Ring of Fire on Earth	12
Figure 1.2 Location of the Dieng Geothermal Field within the simplified tectonic map of the Java Island in respect to major Quaternary volcanoes in Java (compiled from Simandjuntak and Barber, 1996)	14
Figure 1.3 Welltesting Result in 2022	15
Figure 1.4 Welltesting result in 1999.....	15
Figure 1.5 Steam output curve HCE-33 on 2023 and 2024.....	17
Figure 3.1 Flowchart of Research Framework	28
Figure 3.2 Quantitative Analysis Brine Management Feasibility.....	29
Figure 3.3 IDEF0 diagram Quantitative Analysis	29
Figure 3.4 Flowchart and IDEF0 diagram Qualitative Feasibility Analysis.....	31
Figure 3.5 Flowchart and IDEF0 diagram Feasibility Modeling.....	32
Figure 3.6 Flowchart and IDEF0 diagram Define Phase	34
Figure 3.7 Flowchart and IDEF0 diagram Measure Phase	37
Figure 3.8 Flowchart and IDEF0 diagram Analyze Phase.....	39
Figure 3.9 Flowchart and IDEF0 diagram Design Phase.....	41
Figure 3.10 Flowchart and IDEF0 diagram Verify Phase	43
Figure 3.11 Research Timeline	44
Figure 4.1 CTQ Diagram	47
Figure 4.2 Surface Facility Parameter.....	49
Figure 4.3 Wellhead Pressure and Total Steam Flow Graphic	49
Figure 4.4 Fishbone Diagram.....	51
Figure 4.5 Design for Open Channel Section 1 and 3	60
Figure 4.6 Design for Open Channel Section 2	61
Figure 4.7 Layout Cooling Channel Design Alternative 1	61
Figure 4.8 Section Drawing of Cooling Channel Type 1	66
Figure 4.9 Section Drawing of Cooling Channel Type 2	66
Figure 4.10 Structure Model of Cooling Channel Type 1	69

LIST OF TABLES

Tables	Page
Table 1.1 Brine Rate Result After Additional Facilities	17
Table 3.1 Correlation Between DMADV & Feasibility Study Parameters	27
Table 4.1 Brine Rate	46
Table 4.2 Gaining Production	46
Table 4.3 Brine Data in Cooling Channel	51
Table 4.4 Brine Production Data	51
Table 4.5 Dieng Area Ambient Data	52
Table 4.6 Comparison of 2 Design Alternative	64
Table 4.7 Summary of Number Standard Penetration Test (N-SPT) BH-01	65
Table 4.8 Load Combination (ASD) Cooling Channel Tipe 1	69
Table 4.9 Load Combination (ASD) Cooling Channel Tipe 1	69
Table 4.10 Risk Operational and Safety Analysis & Control	77
Table 4.11 Cost Estimate	79
Table 5.1 Recommended KPI, Instrumentation, and Acceptance Criteria (Post- Modification)	88