New Construction/Reconductor 69KV Transmission Line

Design Document

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1 Introduction

1.1 PROJECT STATEMENT

Analyze the economic and system viability for reconductoring or new construction of an existing transmission line to meet growing load demand.

1.2 PURPOSE

The current transmission line does not meet the growing load needs, if the line is not improved, some customers will not have power.

1.3 GOALS

- Deliver a viable, robust, and complete design for each option.
- Learn from being involved in a major design process.
- Learn about and research power systems topics that we do not know, but need for the project.

2 Deliverables

To meet the goals outlined in the introduction, the project give these specification:

- Create economic plan with a cost benefit analysis of four type of conductors (T2, ACSR, AAAC, and ACSS).
- Create sag/tension charts for each conductor.
- Construction plane. (next semester deliverable)
- List of equipment required for construction.
- Structure design with material list
- Propose reconductoring line 98 and have an engineering analysis plane done.
- Pole loading with different conductor.
- Budget report

3 Design

3.1 SYSTEM SPECIFICATIONS

Al least 89 MVA on 69 KV transmission line, located in Muscatine, Iowa.

3.1.1 Non-functional

- Consideration of new locations for poles in case of changed surrounding environment.
- Different properties of pole.
- Budget and phase consideration.

3.1.2 Functional

The technical requirement:

- Civil and construction requirements that influence the poles
- Protection and control equipment for the transmission line
- Design for the reconductor and reconstruction
- Economic analysis for both cases

3.1.3 Standards

For types of conductors we are using National Electric Code (NEC).
IEEE

3.2 PROPOSED DESIGN/METHOD

We started with conductor analysis, based on cost, weight, ampacity. Also, we are going to choose between re-conducting the existing poles of line 98, or new construction with new poles, same rout or different. But these considerations are under the economic analysis.

3.3 DESIGN ANALYSIS

So far, we finished the conductor research part, including properties for T2, ACSR, ACSS, AAAC. Also, we have the chart including two types of poles which can be used in our project. We are waiting for the client with the information about the specification of existing poles, and their decisions about switching some of the poles.

4 Testing/Development

4.1 INTERFACE SPECIFICATIONS

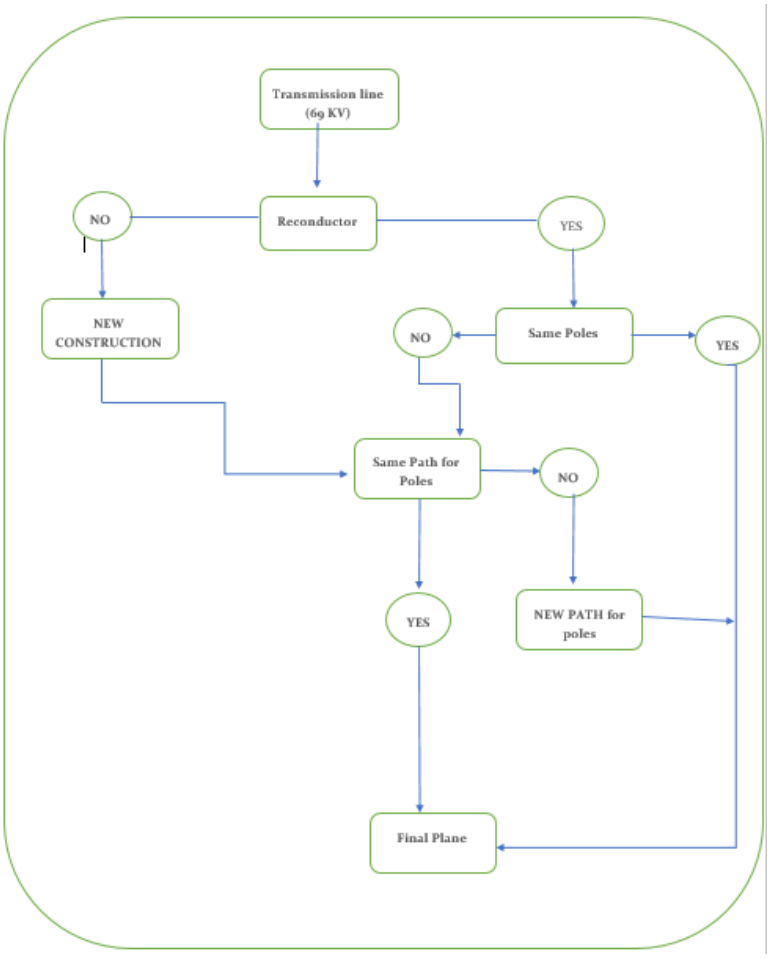
The only software we are using so far is Osmose O-Calc Pro 5.2 this based on team decision. this software helps us to calculation the load on the poles beside the sag and tension. We might use other software based on client suggestion during this project.

4.2 HARDWARE/SOFTWARE

So far there is no specification for any type of tests. We still waiting the client to provide us with some information. For example, if we asked to do the protection on the we will need to use some software to test the results.

4.2 PROCESS

Explain how each method indicated in the design section was tested. It might be a good idea to insert a flow diagram of the process.



5 Results

List and explain any and all results obtained so far during the testing phase. Include failures and successes. Explain what you learned and how you are planning to change it as you progress with your project. If you are including figures, please include captions and cite it in the text.

6 Conclusions

Summarize the work you have done so far. Briefly re-iterate your goals. Then, re-iterate the best plan of action (or solution) to achieving your goals and indicate why this surpasses all other possible solutions tested.

7 References

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