EE/CprE/SE 491 WEEKLY REPORT #7

Start Date - March 19, 2024

End Date - March 25, 2024

Group Number: 02

Project Title: Ames Substation

Client &/Advisor: Burns & McDonnell / Hugo Villegas

Team Members/Role:

Derek Elkins - Project Lead
Patrick Musoy - Pilot Scheme Researcher
Mackenzie Ray - Meeting Manager
Nathan Tegeler - Pilot Scheme Researcher
Matthew Wells - Pilot Scheme Researcher

Weekly Summary:

This week we began finalizing the piloting report and began working on the I/O assignments. This included providing justifications for or selected piloting schemes, descriptions of the piloting scheme and how they will be implemented for the transmission lines, and the AC assignments for relaying. We looked into the power line carrier communication that will be used for the Ames Ankeny line and what devices we will need for this. We discussed the DC I/O assignments and asked our client questions.

Past Week Accomplishments:

Mackenzie Ray: This week, I focused on the bus configuration report and started to look into the elevation drawings that we added to the scope of our project.

Patrick Musoy: Finalized the piloting scheme research report based on the client preference and provided any information required for relaying selection. Starting researching on the I/O assignments.

Derek Elkins: I completed and submitted the bus configuration report for review. I created the files to start the substation overview design. I also started working on the design.

Nathan Tegeler: Worked on the piloting scheme report based on the feedback from our client Joseph for what information we should include in this document. Provide details on what pilot scheme we chose for each line. Included information about what the scheme does and why it is the best option for each line. Began working on the I/O assignments, including identifying the AC inputs that will be used for each relay.

Matthew Wells: I continued to work on the relay specification report by researching power line carrier (PLC) communication systems, including the sizing for the components based on our project's requirements. Our pilot group identified the AC inputs for the relays and deliberated on the DC inputs and outputs.

Name	**Individual Contributions**	**Hours this week**	**Cumulative Hours**
Derek Elkins	I completed the bus configuration report and sent it in for review. I started working on the overview of the substation.	4	17
Patrick Musoy	Finalized the piloting scheme research report. Researching on the I/O assignments.	3	13.4
Mackenzie Ray	Started research on the elevation plans and finalized the bus configuration report.	2	15
Nathan Tegeler	Wired on rewriting the piloting report to include reasoning for piloting selections.	3	25
Matthew Wells	PLC communication research.	3	16

Action Item Table

Status	Action Item	Assigned to	Due Date	Priority	Notes
In-progress	One-Line	Kenzie/Derek	Next Semester	Low	
In-Progress	General Overview	Derek/Kenzie	4/8	High	Started the basic design
Not Started	Elevation Design	Derek	4/15	Medium	Started research
Overdue	Transformer protection	Patrick Nathan Matt	3/4	High	
In-progress	I/O assignments	Patrick Nathan Matt	4/23	Medium	

Plans for Upcoming Week

Mackenzie Ray: I plan to start looking into IEEE standards and other resources to develop a plan for our elevation drawing. Alongside this, I will reference the drawings given to us to see how many bus supports we can anticipate we will need for our site.

Patrick Musoy: Researching on the I/O assignments, AC & DC I/O, and finishing piloting schemes report.

Derek Elkins: I want to complete a general design for the overview so the client can review it with enough time to implement suggestions and changes. I will also start the Elevation Design.

Nathan Tegeler: Finish the piloting report as needed. Finish the AC I/O and start identifying what to do for the DC I/O.

Matthew Wells: This week I will help finish the pilot scheme selection report. I'll also do some short-circuit analysis of our system to correctly size the PLC equipment. In addition to sizing, I will deliberate the pros/cons of different tx/rx systems for our DCB scheme on the Ankeny line. All PLC information will be included in the relay specification report.

Summary of Weekly Advisor Meeting

We did not have a meeting with our advisor this past week.

Questions for the client meeting:
Do we have to do the calculations for sizing the PLC equipment or are there industry standards we should use?
When designing the DC output, how do we determine what inputs and outputs are needed for each? For example, how do we implement the POTT signal through the relay output?
Are there specific distances between the equipment needed, and where would I find that information?
How is a specific carrier frequency determined for the PLC communication channel?