

EE/CprE/SE 491 WEEKLY REPORT 02

Start Date - February 06, 2024

End Date - February 13, 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 completed research on the bus configuration design. We also researched piloting schemes, including specifics on transformer protection schemes and transmission lines. We conducted research on the required pilot scheme 87L. 87L is the line's current differential protection scheme. We reviewed the required documentation needed for the piloting scheme and located examples and templates in the substation design guide our client provided for us. Then, we looked at the IEEE standards for transformer protection and transmission line protection to compare the information to ensure accuracy.

Past Week Accomplishments:

Mackenzie Ray: Made folder and template for weekly reports and did research into the pros and cons of the different bus configuration options we were given.

Patrick Musoy: Researching pilot schemes for different transmission line protection, power line current and permissive overreaching transfer trip (POTT), directional and phase comparison, and protective relays.

Derek Elkins: Started to organize the Google Drive and started research on bus configurations.

Nathan Tegeler: Updated team website added weekly report one, member bios, and project description. Research on pilot scheme transmission lines.

Matthew Wells: Researched the logic of the different relay pilot schemes and the advantages of using each scheme under different circumstances.

<u>Name</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>Cumulative Hours</u>
Derek Elkins	Started Research on Bus Configurations.	2	4
Patrick Musoy	Researching pilot schemes for different transmission line protection, POTT, and other protection system lines.	2.5	3.75
Mackenzie Ray	Researched bus configuration options for our station	3	4
Nathan Tegeler	Research pilot schemes, transformer protective relaying schemes, and updated project website.	4	6
Matthew Wells	Researched pilot schemes: Blocking, unblocking, and permissive tripping.	2	3

Action Item Table

Status	Action Item	Assigned to	Due Date	Priority	Notes
In progress	Piloting scheme research	Patrick Nathan Matt	2/18	high	
In progress	Bus configurations	Derek Kenzie	2/20	high	
Not started	Sight layout	Derek Kenzie	tentatively 3/1	Medium	
Not started	Piloting scheme report	Patrick Nathan Matt	2/27	high	

Plans for Upcoming Week

Mackenzie Ray: This coming week, I plan to start figuring out which bus configuration would be ideal for our case, taking into account spatial limitations as well as redundancy expectations.

Patrick Musoy: I plan to continue researching the pilot scheme transmission line, POTT/PLC, understand different transmission line protection options, and identify which type of pilot is needed for our project.

Derek Elkins: Complete research on Bus Configurations. I will also start applying my research to our project. I also want to work with Mackenzie on combining our common findings.

Nathan Tegeler: This coming week we will compile our notes on the pilot scheme and meet as a group before 2/19 to identify how to apply to our pilot scheme. Also, finish notes for pilot schemes on bus protection and breaker failure.

Matthew Wells: In this next week, I plan to wrap up my initial pilot scheme research and begin to apply those findings to the restraints of our project.

Questions for Advisor/Client

For Advisor

N/A

For Client

Should we worry about pricing or budget / Should we only focus on the cheapest option?

For protection devices, we have several options, including remote and local tripping to protect buses and transformers. What is the best way to choose which scheme to use?

Are we assuming a delta-wye-connected step-up transformer?

For selecting the transformer, should we accommodate future add-ons to the solar farm?

Or assume 2MVA?

For selecting CT ratios, we will need to know the currents flowing in the lines. Is there load information provided? If not, what is the procedure for selecting CT ratios?

Would you agree double breaker is not worth implementing in our circuit?

Is having four-ring bus configurations an option? Same with main and transfer?