

EE/CprE/SE 491 Months REPORT Weeks 5-10

Start Date - October 3, 2024

End Date - October 31, 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

Summary:

PSCAD work which included working on setting up the model for each transmission line. This included several meetings with Christopher to provide us with necessary PSCAD knowledge to learn how to implement relays including the distance and current differential relays. He also provided blocks in PSCAD to simulate the piloting logic for the POTT and DCB schemes. We then began editing the distance relay block parameters to calculate the blinders for the quadrilateral for determining the zone 1 fault impedance range.

Past Months Accomplishments:

Mackenzie Ray: Worked on finishing the one-line and relay assignments. Revised the formatting of the one line. Also started research for the Lightning Study.

Patrick Musoy: PSCAD Simulation, drawing, calculations, and testing.

Derek Elkins: Completed the elevation design

Nathan Tegeler: PSCAD simulations including extensive research on distance relay quadrilateral RX settings for the Ames Ankeny transmission line. Final calculations for these settings and assisted with building the fault circuits.

Matthew Wells: Modeling the transformer in CAD. Certified to use campus 3D printers.

<u>Name</u>	<u>Individual Contributions</u>	<u>Hours weeks 5-10</u>	<u>Cumulative Hours</u>
Derek Elkins	Completed the Elevation design and research	40	85.5
Patrick Musoy	PSCAD	51	93.5
Mackenzie Ray	One-line diagram, Lightning Study	10	55.5
Nathan Tegeler	PSCAD	51	103.5
Matthew Wells	Transformer AutoCAD modeling & 3D printing training course.	10	41.5

Action Item Table

Status	Action Item	Assigned to	Due Date	Priority	Notes
Complete	I/O list	Nathan	9/20		
In-progress	PSCAD model	Nathan Patrick	11/28	High	This will be broken into subtasks once more information is provided on this deliverable.
Complete	One Line	Kenzie	10/22	Medium	Sent in for review
Complete	Elevation Design	Derek	10/22	Medium	Want feedback before sending in for review
Just started	3D model	Matt/Kenzie	11/25	Low	Started the transformer model.

Plans for Upcoming Week

Mackenzie Ray: Continue looking into lighting study and am hoping to start math for it once the elevation plan is completed.

Patrick Musoy: Meeting up with Christopher to provide some clearance on how to complete the relay configurations and try to finish our design and requirements. Working on applying and connecting distance relays on circuits and others.

Derek Elkins: I will be starting to assist in the PSCAD and where I am needed.

Nathan Tegeler: Set up a meeting with Christopher to answer questions. Continue testing our relay settings to determine if they work. Build logic circuit to control the operation of circuit breakers for faults internal to the bus. Test various faults on the system to see if the breakers open when expected.

Matthew Wells: Finalize the model of the transformer by 11/5. Begin modeling the circuit breaker.