EE/CprE/Se 492 WEEKLY REPORT 4

February 18, 2019- February 24, 2019

Group Number : sdmay19-17

Project Title: Substation Design

Client: Burns & McDonnell

Advisor: Manimaran Govindarasu

Team Members:
Jacob Heiller- Controls Engineer
Rebecca Franzen- Studies Engineer
Connor Mislivec- Quality Control Specialist
Riley O'Donnell- Administrator
Tom Kelly- Project Manager
Wilson Pietruszewski- AutoCAD Engineer
Nicolaus Cory- AutoCAD Engineer

Weekly Summary:
This week, we focused on the AC and DC studies that are due on March 1. After completion of the battery design, a QC check was performed on the report to ensure that all loads were accounted for and all calculations were done correctly and according to IEEE standards. For the AC studies, we continued tabulating loads so that we could size the AC panelboards and the conductors between the station service transformer and the AC panels. With the one-line, we began drafting it in AutoCAD and explained the process of creating the oneline to all those in the group so that we could continue with the rest of the design work.

Past Week Accomplishments:

- 125V DC Battery Design- Becca
    - Calculated battery loading based on IEEE 485 Standards
    - Determined manufacturer and type of battery to be used in DC system
    - Calculated size of battery charger necessary to support DC system
    - Selected manufacturer and type of battery charger
    - Created report for DC Study / Battery Sizing
    - Created presentation for Team Meeting to go through methodology
- AC Study- Nic
    - Working on excel sheet provided by client
    - Calculating demand factor of all ac loads
    - Reviewing vendor drawings of circuit breakers (69kV and 138kV and transformer for associated AC loads

    - Research other power demands from AC loads we don't have drawings for
- Perform QC check on 125V DC Battery Design- Tom, Riley, & Wilson
    - Checked that all loads were account for in calculations
    - Read through and corrected errors in report
    - Used IEEE spreadsheet to ensure battery sizing was done correctly
    - Checked duty cycle and followed method of creating a duty cycle
- Continue work on one-line relay schematic and transformer schematic - Wilson & Riley
    - Went through process of creating one-line to better understand how to create schematics
- Continue work on protection and controls one-line - Jake & Connor
    - Went through the process of finishing the one-line
    - Drafted the design in Visio for approval from client
    - Started draft in AutoCAD for finalized design

Pending Issues:

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Individual Contributions:

Name / Role	Individual Contribution	Hours this week	Cumulative Hours
Rebecca Franzen	125V DC Battery Design	10	114
Jacob Heiller	Protection and Controls One-Line	6	109
Tom Kelly	QC Check on DC Battery Design	4	105
Connor Mislivec	Generated first draft for communications one-line. Cisco Packet Tracer tutorial. Assisted P&C	5	104.5
Riley O'Donnell	QC Check on DC Battery Design & Continued Work on Schematics	6	108
Wilson Pietruszewski	QC Check on DC Battery Design & Continued Work on Schematics	6	109.5
Nicolaus Cory	AC Study Excel Sheet	8	26.5

Comments and extended discussion:

Plan for the coming week:

- Continue work on one-line relay schematic and transformer schematic - Wilson & Riley
    - Finalize contact assignments for all relays reacting with the transformer
    - Continue work in AutoCAD to submit an initial draft of the transformer schematic
- Complete 3D model of substation- Riley & Wilson
- Conductor design between the auxiliary transformer and ac panels- Nic
- Finish work on the Protection and Controls One-Line - Jake & Connor
    - Finalize the design in AutoCAD and obtain client feedback and approval

Weekly Advisor Meeting Summary:

- Discussed progress of AC/DC Studies
- Ran through the process of creating the one-line diagram
- Looked at IEEE Standard for AC/DC Studies
- Discussed 3D printing of the substation and the best software to use
- Discussed timeline of tasks
    - Can now begin work on schematics