

EE/CprE/SE 492 BIWEEKLY REPORT 2 SDDec21-10

Iowa State BESS (Lithium-Ion Battery Energy Storage System)

Sept 9th – Sept 27th

Client: Burns & McDonnell (Point of Contact: Chris Ruckman)

Faculty Advisor: Dr. Venkataramana Ajjarapu

Team Members/Role:

Aisha Alzaabi- Client Communicatory

Hussein Abbakar- Load flow analysis and one-line diagram

Gregory Bizoff - Webmaster and Assistant Circuits Specialist

Matthew Pfeiffer - CAD Design Specialist, Site Layout Engineer, and Project Manager

Chase Stahl - Secondary CAD Designer

Julia Zhang - Circuits Specialist and Assistant Webmaster

Biweekly Summary

- *Weekly client meetings held on Thursdays from 3:30 - 4:30*
 - *9/16/2021 meeting:*
 - *This was a short meeting, due to Chris Ruckman having another meeting at 4:00. We covered our progress over the past week, and discussed what we were going to work on for the next meeting. We didn't have time to discuss details.*
 - *9/23/2021 meeting:*
 - *We discussed developing a grounding diagram and power loss calculations. We are not quite sure how to perform these, and we are in contact with a company that develops software to assist us with these calculations. We are working on a deal that would let us use their software for free.*

- 12-week design schedule to learn materials and present deliverables that include but are not limited to grounding diagrams, load flow analysis, short circuit analysis, and circuit sizing and scheduling.
- Review faculty panel year-end presentation (Spring 21 semester) and touch base on where the last semester ended.

Accomplishments

- Contacted ETAP representative for fully functional version of ETAP software (needed for load flow and short circuit analysis
- Contacted client for example for load flow and short circuit analysis
- Developed approaches to create a grounding diagram and a load flow for the ISU BESS
- During our client meeting, we discussed several softwares in order to design and create our BESS. We were taught about Etap and tried to familiarize ourselves with the software.
 - This task will be the first initial testing of our new team evaluation method where someone (or multiple team members) design something and the others provide quality assurance and double check the feasibility and accuracy of the deliverable.

Pending

- Site layout re-evaluation
 - As referenced in the faculty panel presentation, it is not legal to “build” our theoretical BESS in the location we have currently chosen, so a new site needs to be found and potentially redesigned/ worked.
- Meeting with our faculty advisor
 - We contacted Dr.Ajjarapu in order to set up a meeting with him to discuss our progress.
- Grounding Diagram - Matt
 - Develop and overlay grounding materials on initial site layout design per NEC 2020 code
- BESS Load Flow Study - Hussein/ Julia
- BESS Short Circuit Study - All

- Still need to work out a free way to obtain a fully functional version of ETAP. Response from the representative is asking for too much from the team. The following was the email received:” Here are the requirements in order to qualify:
 - “A formal letter on how you will be using ETAP at your University on a University Letterhead
 - Computer lab to setup the Power Lab license
 - Course syllabus with power engineering courses
 - Introduction to your facilities department (if applicable)
 - Recognition on your university website or Engineering department”

Individual contributions

NAME	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative Spring</u>
Aisha Alzaabi	Site Layout review	2	4
Hussein Abbakar	BESS Load flow study	3	5
Gregory Bizoff	Site Layout review	2	4
Matthew Pfeiffer	Grounding plan	3	6
Chase Stahl	Site Layout review	2	4
Julia Zhang	BESS Load flow study	3	5

Plans for the upcoming week

- Grounding Plan - Matt
 - Overlay Grounding wire, grounding rod, and connection points to site layout
 - Refresh and learn NEC 2020 grounding code to ensure everything is up to standards and ensure safety.

- Site Layout review - All
 - Review site layout for a new placement
 - Determine if the site layout needs to be reworked entirely or just moved to a new location
- BESS Load Flow Study - Hussein/ Julia
 - Work on ETAP
 - Ask our client if he can assert his authority and get us the free fully functional version of ETAP without meeting their requirements. Or, if that is not possible, ask if Dr. Ajjarapu is willing to set up an ETAP power lab at Iowa State to fulfill the requirements given to us by the ETAP representative. The second option may actually not be a bad idea, as it will leave our “legacy” and contribute to Iowa State’s power systems program significantly.
- BESS Connection Diagrams - All
- BESS Cables/Sizing/Cable Schedules - Chase