

IOWA STATE UNIVERSITY

Department of Electrical and Computer Engineering



BLACK & VEATCH

115/34.5kV Solar Plant & Substation

Senior Design Project

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| Senior Design Team 41

| 02/03/2025

AGENDA

- Safety Moment
- New Technology
- Updates to One-Line Diagram
- ETAP Simulation Progress
- Discuss any Comments from 10% and/or Fall 2024 Package
- Discuss Physical Layout

Safety Moment

Battery Risks and Safety

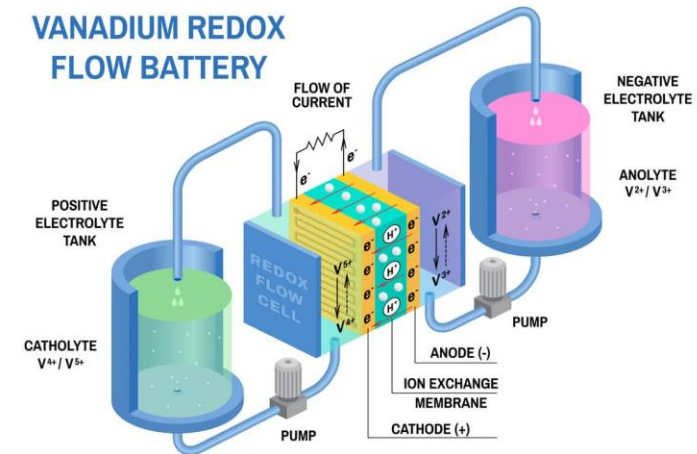
- Electrical shock and arc flash risk
- Chemical burn risk
- Gas build up/ flammable risk
- Make sure everyone is trained properly on safety, and that only authorized personnel interact with the batteries
- Wear proper PPE and use the proper tools when conducting work
- Ensure the battery area is illuminated
- Proper ventilation in the building if the batteries are stored inside
- Post hazard warnings to alert people about the risks possible
- Have an easily accessible fire extinguisher nearby
- In case of an accident, have an emergency plan ready and known



<https://codes.iccsafe.org/s/ISEP2021P1/national-electrical-code-nec-solar-provisions/ISEP2021P1-NEC-Sec480>

NEW TECHNOLOGY

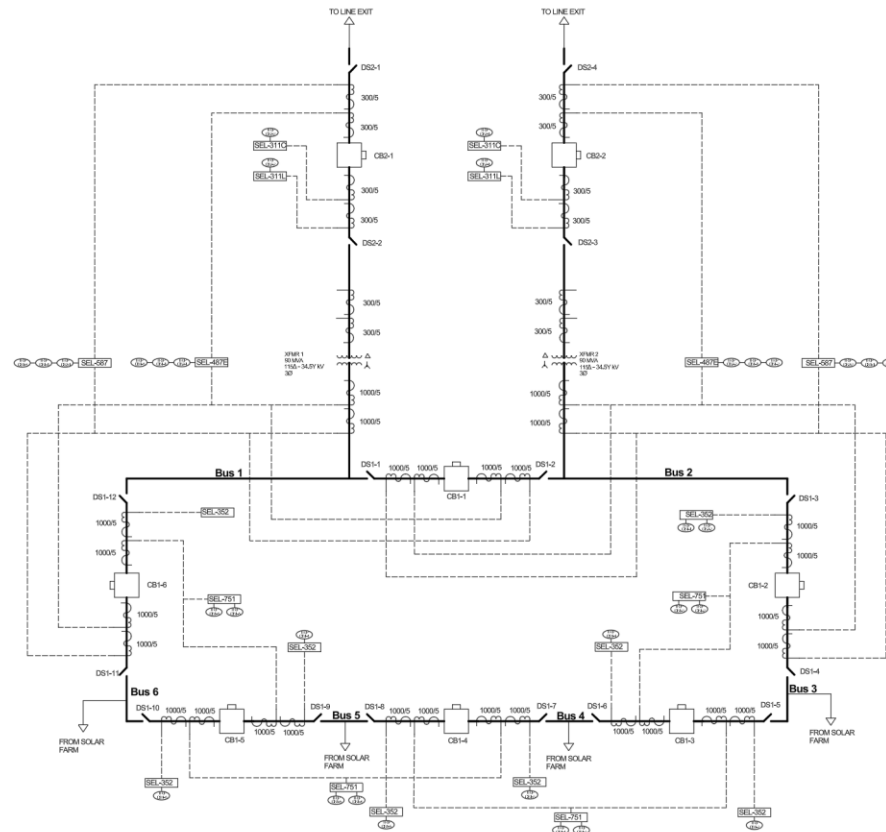
- **Flow Batteries**
- Uses liquid electrolytes for energy storage in external tanks – usually 2 tanks
- Nearly unlimited charge/discharge cycles with very little degradation
- Scalable capacity by adjusting tank size
- Long lifespan – over 20 years
- Has been used for large project such as in Dalian, China (700 MWh)
 - <https://www.energy-storage.news/rongke-power-completes-grid-forming-175mw-700mwh-vanadium-flow-battery-in-china-worlds-largest/>



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AutoCAD

- Implementing comments from BV
- Will be creating a 3-Line Drawing and starting on section views



ETAP Simulation Progress:

- Updated the ETAP drawing to match the AutoCAD single-line diagram.
- Performed load flow analysis.
- Submitted the ETAP file to Black & Veatch for feedback.

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THANK YOU

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