

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

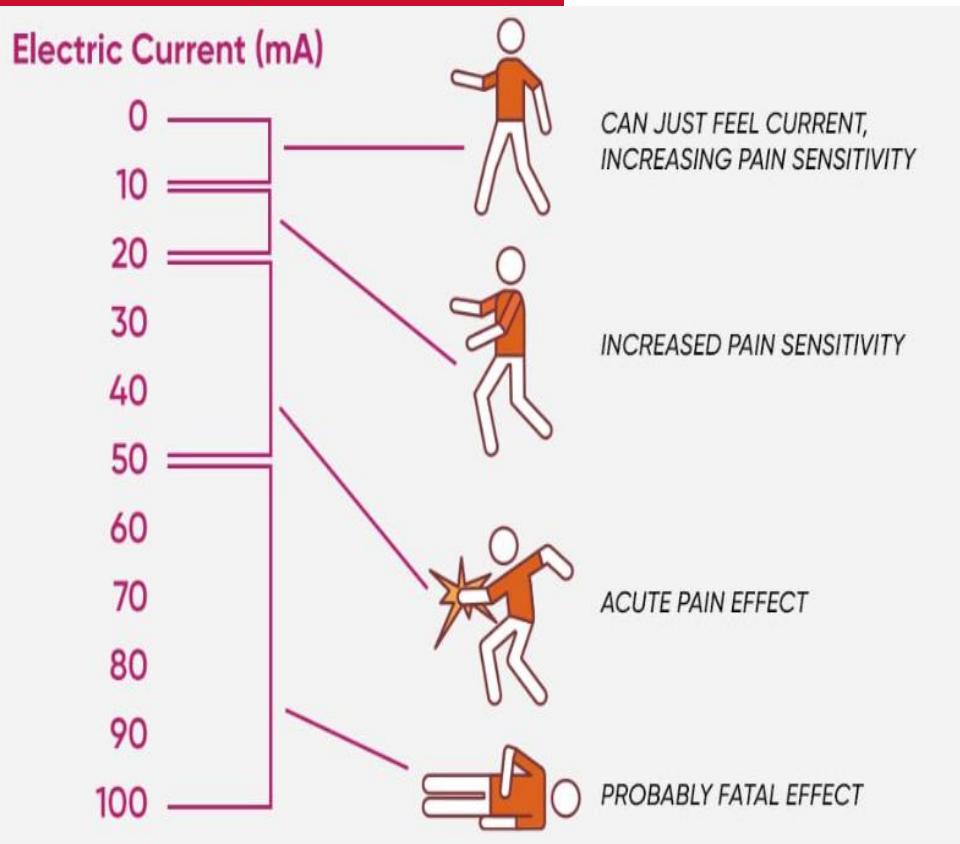
| 11/21/2024

Agenda

- Safety Moment – Shock or electrocution from energized conductors
- New Technology – Solar Aeroplane
- Bill of Materials
- Fencing
- AutoCAD Updates

Safety Moment

Preventing Shock or Electrocution from Energized Conductors:



- Energized conductors in solar PV systems pose significant risks of shock or electrocution.
- This hazard occurs when current flows through the body due to:
 - ✓ Faulty wiring or equipment.
 - ✓ Improper system grounding.
 - ✓ Lack of appropriate safety measures.
 - ✓ Effects can range from burns to fatal heart failure.



New Technology

Solar-Powered Aircraft:

Milestones in Sustainable Aviation:

Energy Storage for Night Flight

- **Batteries:** Store energy from solar panels for nighttime use.
- **Hydrogen Systems:** Convert solar energy into hydrogen for lightweight, efficient storage.

Milestones in Solar Aviation

- **2015-2016: Solar Impulse** completed a global circumnavigation, proving solar-powered long-distance flight is feasible.
- **2020: Phasa-35** conducted its first successful test flight in Australia.
- **2023:** Phasa-35 achieved a **24-hour high-altitude flight** into the stratosphere.

Significance

- Zero-emission technology for sustainable aviation.
- Applications in surveillance, communications, and scientific research.
- Paving the way for the future of renewable energy in flight.

[Solar flight](#)

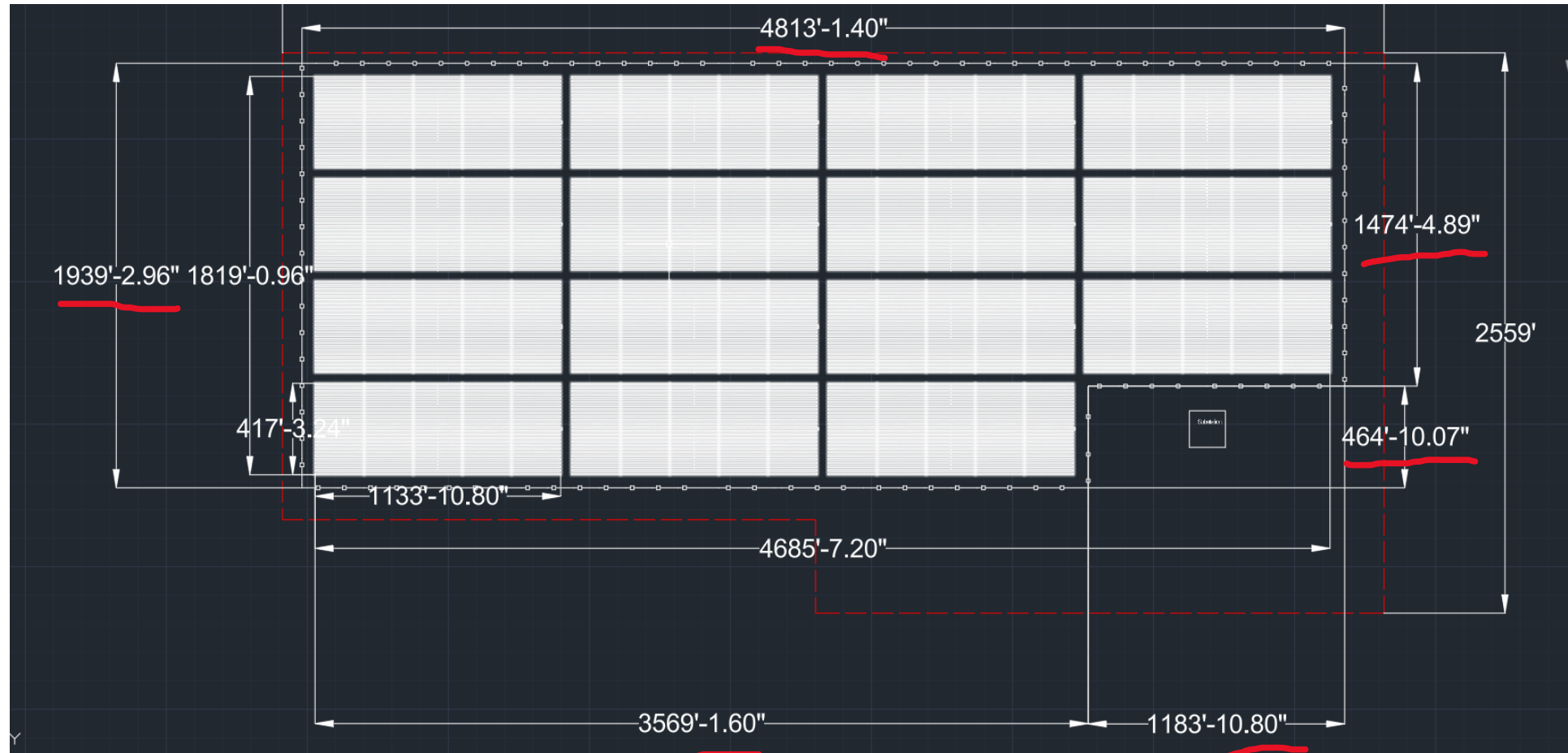
Bill of Materials

	A	B	C	D	E	F	G
1	60 MW Solar Farm Components						
2	Component Type	SKU/Model Number	Quantity	Price	Datasheet	Total Quantity Price	Pricing
3	Canadian Solar PV Modules	TOPBiHiKu7 CS7N-700TB-AG	113,100	\$223	Link	\$25,221,300	Link
4	DC Combiner Boxes	CA1500-24-20S	390	\$2,156.00	Link	\$840,840	Link
5	Inverters	SLG-330-0279	15	\$119,210.14	Link	\$1,788,152	Link
6	600 kcmil					\$0	
7	Land		311 Acres			\$217,700	Link
8	Fencing					\$0	
9	Labor		6+ Months @ \$24/hr., 50 Workers			\$0	Link
10						\$0	
11						\$0	
12						\$0	
13						\$0	
14						\$0	
15						\$0	
16						\$0	
17						\$0	
18					Total Cost	\$28,067,992	

- Working on implementing this in an AutoCAD BOM sheet

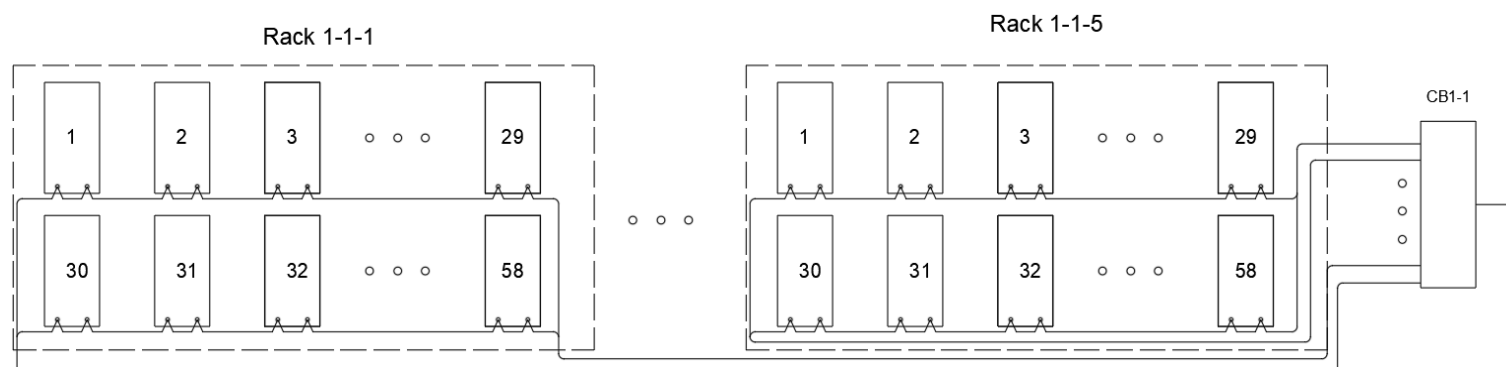
Fencing

Total: $4813-1.40 + 1474-4.89 + 464-10.07 + 1183-10.8 + 3569-1.6 + 1939-2.96 = 13,444.64 \text{ ft}$



AutoCAD Updates

- Working on updating everything per BV comments
- Keeping track of all comments on excel, have no comments back so far.
- Comments will be completed and will have progress on wiring drawings for next meeting.



General Notes

1. Rack Naming Convention: Rack (CB# - Rack#)
2. CB Naming Convention: CB(Inv#-Row#)

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THANK YOU

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