# **Team Meeting**

10/15//2018 Coover 1324

Type of meeting:	Meeting with Client		
Note taker:	Chufu Zhou		
		1	
Attendees:	Whole team present		
Please read:			
Please bring:	Laptop		
	Minute	5	
Agenda item: S	Safety Moment	Presenter:	YJ
Discussion:			
	which is merely dangerous every time. A tify the thickness or the ice strength.	nd what we are suppose to do v	vhen we walk on

Aganda itana	Valtage Dren Calculation	Dresenter	Kataji
Agenda item:	Voltage Drop Calculation	Presenter:	Kataji

## Discussion:

The value of power per rack that we got from the template does not match the calculation from the array parameter tool, did we input the values wrong for vmp and imp?

So we only use current parameter, to calculate the parameter in following chart

Circuit	from	to	power (W)	Voltage (Vmp)	Current (Imp)	DCB Fuse (A)	Cable Size (AWG)	Cable Length (Ft)
1	ER - 1	DCB	28,674	972	29.5	30	10	200.3
2	ER - 2	DCB	28,674	972	29.5	30	10	137.9
3	ER - 3	DCB	28,674	972	29.5	30	10	75.5
4	ER - 4	DCB	28,674	972	29.5	30	10	14.1
5	ER - 5	DCB	28,674	972	29.5	30	10	14.1
6	ER - 6	DCB	28,674	972	29.5	30	10	75.5
7	ER - 7	DCB	28,674	972	29.5	30	10	137.9
8	ER - 8	DCB	28,674	972	29.5	30	10	200.3
Tot	al:		229,392		236			8

# With DCB whip wire referring, we use 500 to calculate the rack harness resistance. As following chart.

=ROUND(E4\*G4/500,3)

Strings per Harness	IMP for circuit	Rack Harness Length	Rack Harness wire size	Rack Harness resistance	Rack Harness resistance	Voltage Drop from Rack to CB	Jumper Length	Jumper wire size	Jumper resistance	Jumper resistance	Voltage Drop Across a String	DCB Whip length	DCB Whip wire size	DCB Whip resistance	DCB Whip resistance	Total resistance	Total voltage drop	Voltage drop for branch
per rack	Amp	feet	AWG	Ohm/kft	Ohm	Volts	feet	AWG	Ohm/kft	Ohm	Volts	feet	AWG	Ohm/kft	Ohm	Ohm	Volts	percent
2	29.5	200.3	10	0.9989	0.4	4.72708	62.4	12	1.588	0.198	0.3644784					0.598	5.0915584	0.52%
2	29.5	137.9	10	0.9989	0.275	2.2374275	62.4	12	1.588	0.198	0.3644784					0.473	2.6019059	0.27%
2	29.5	75.5	10	0.9989	0.151	0.6726295	62.4	12	1.588	0.198	0.3644784					0.349	1.0371079	0.11%
2	29.5	14.1	10	0.9989	0.028	0.0232932	62.4	12	1.588	0.198	0.3644784					0.226	0.3877716	0.04%
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2	29.5	200.3	10	0.9989	0.4	4.72708	62.4	12	1.588	0.198	0.3644784					0.598	5.0915584	0.52%

Disconnect Combiner Box NUMBER	INPUT DC FUSE SIZE	NUMBER OF STRINGS	NUMBER OF INPUTS	SHORT CIRCUIT CURRENT (ISC)	MAX POWER CURRENT (IMP)	MAX POWER VOLTAGE (VMP)	DC FEEDER WIRE SIZE AND TYPE	ONE WAY DISTANCE NOT TO EXCEED
DCB#-##	AMP			AMP	AMP	VOLT		(FT)
		A second to		18.8	29.50	972		
DCB1-01	30	16	8	150	236	972	( <quantity>) - <wire and="" size="" type=""></wire></quantity>	- 11
DCB1-02	30	16	8	150	236	972	dial do	0
DCB1-03	30	16	8	150	236	972		0
DCB1-04	30	16	8	150	236	972		<u>)</u>
DCB1-05	30	16	8	150	236	972		
DCB1-06	30	16	8	150	236	972		
DCB1-07	30	16	8	150	236	972		
DCB1-08	30	16	8	150	236	972		
DCB1-09	30	16	8	150	236	972		
DCB1-10	30	16	8	150	236	972		
DCB1-11	30	14	7	150	207	972		
DCB1-12	30	14	7	150	207	972		
DCB1-13	30	16	8	150	236	972		
DCB1-14	30	16	8	150	236	972		
DCB1-15	30	16	8	150	236	972		
DCB1-16	30	16	8	150	236	972		
DCB1-17	30	16	8	150	236	972		
DCB1-18	30	16	8	150	236	972		
DCB1-19	30	16	8	150	236	972		
DCB1-20	30	16	8	150	236	972		
DCB1-21	30	16	8	150	236	972		· · ·
DCB1-22	30	16	8	150	236	972		
INVERTER	1 TOTALS	348	174	3302	5133	972		

# Based on NEC 310 Table 300.50

Solar Plant Cost				
Panels	236664	48.279456	million \$	
CBs	432	0.55320192	million \$	
Inverters	36	15.556275	million \$	
Land	348.2920827	0.195	million \$	560 acres
	Total Cost	64.58393292	million \$	

Results from Voltage Drop Calculation sheet

Combiner	Strings	Racks in	Per CB Output (A)
1	16	8	236
2	16	8	236
3	16	8	236
4	16	8	236
5	16	8	236
6	16	8	236
7	16	8	236
8	16	8	236
9	16	8	236
10	16	8	236
11	14	7	206.5
12	14	7	206.5
13	16	8	236
14	16	8	236
15	16	8	236
16	16	8	236
17	16	8	236
18	16	8	236
19	16	8	236
20	16	8	236
21	16	8	236
22	16	8	236
Total			5133

Total Voltage Drop from Panels to CB	s in an Array	399.1329114	V
Percentage of Voltage Drop Per CB			
		1.77%	2 CBs
	Average	1.87%	

Ac	tion items	Person responsible	Deadline
1	Final plant layout	Kat and Nur	10/15
1	Voltage drop sheet	Cole	10/9

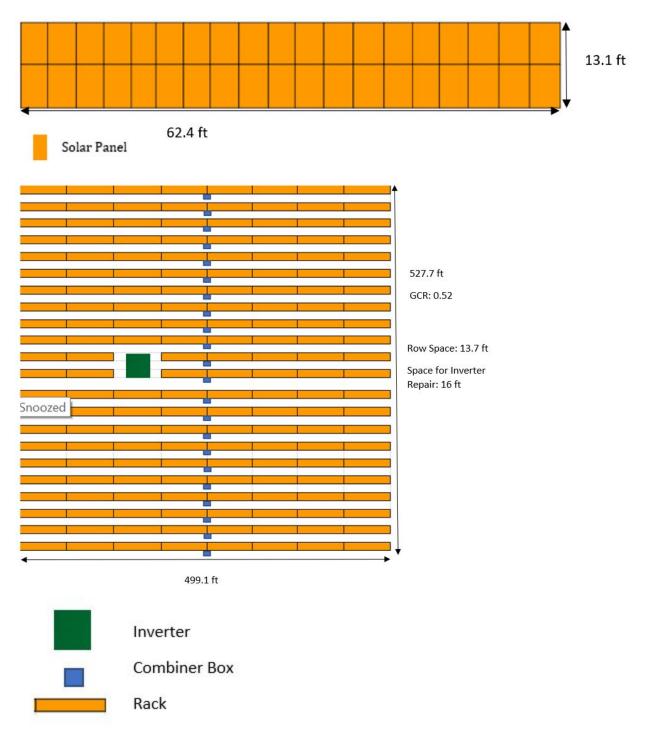
# Agenda item: Ground Coverage Ratio

Presenter: Nur

#### Discussion:

Using the supplementary software provided, students design the layout and ground Coverage ratio by given Row space = height of rack + tan(tilt angle) = 13.65 ft Pitch = height of rack + row space

GCR = height of rack/pitch = 0.52



Single Array Layout: 8x22 Racks With 2 Removed, 1 Inverter, 22 CBs, ILR: 1.29

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Solar Plant Layout: 36 Arrays, 36 Inverters

#### **Conclusions:**

With so far given research, we designed above layout.

#### Action items

🖌 n/a

Person responsible

Deadline

Agenda item: Collector & Feeder

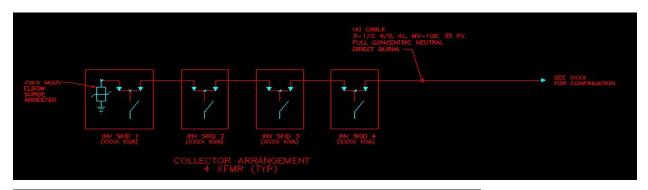
Presenter: Ahmed & Tam

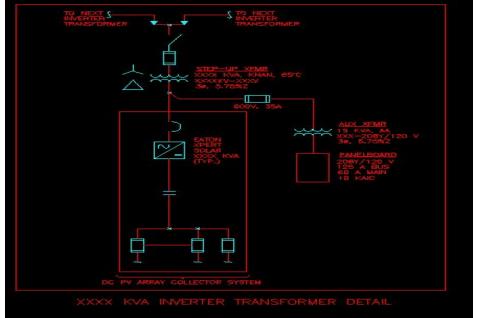
#### Discussion:

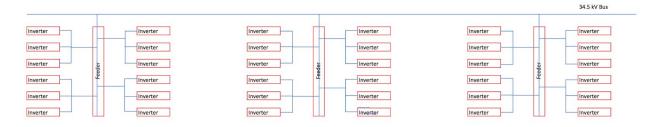
Students have research about collector and check how the collector work and how it display on AutoCAD, Collector Arrangement can collect the output from the inverters and transformers (inverter skid). Each inverter has a step-up transformer attached to it. It sum up all the skids output and deliver it to the 3 bus feeder. Inverter skid details: Combiner box coming from the solar array, inverter DC to AC, an attached step-up transformer And about feeder, the Output of collector

- Input to 34.5 kV bus.

- 4 terminal collectors, each terminal has a 22kV surge arrester and a switch.
- 3 inverter for each collector .
- 3 feeders.







### **Conclusions:**

Design our own collector and feeder by AutoCAD next time.

Action items

# Person responsibleDeadline

	Action Item List											
Item	Description	Date Added	To Be Completed By	Date Closed	Scheduled Completion Date	Notes						
Present the circuit concept	Do the initial layout of each circuit	10/15	10/22			Nur and Katayi						
Feeder	Basic drawing of feeder	10/15	10/22			Tam and YJ						
Collector	Basic drawing of collector	10/15	10/22			Ahmed and Chufu						

# **Other Information**

#### **Resources:**

http://www.sunmaxxsolar.com/laying-out-the-solar-array.php http://may1602.sd.ece.iastate.edu/uploads/6/2/1/4/62140729/design\_document\_may1602\_v2\_fi nal1\_\_2\_.pdf https://sciencing.com/substation-basics-7376138.html Special notes: None