EE 491 – sdmay19-26
115kV / 34.5kV SOLAR POWER PLANT/SUBSTATION DESIGN PROJECT
Week 10 Report

Monday (11/05/2018) – Sunday (11/11/2018)
Client: Black & Veatch
Advisor: Venkataramana Ajjarapu
Team Email: sdmay19-26@iastate.edu

Team Members:

Katayi Katanga – Communication Leader
Nur Shuazlan – Meeting Scribe
Yao Cheah – Website Manager #1
Ahmed Sobi – Team Leader/Layout Designer #1
Chufu Zhou – Website Manager #2/Layout Designer #2
Tam Nguyen – Report Manager

Weekly Summary:

We had a meeting with a client on Monday for an hour; a team meeting on Tuesday and Sunday for 2 hours each; and a meeting with the advisor for 1 hour ---> 6 hrs total

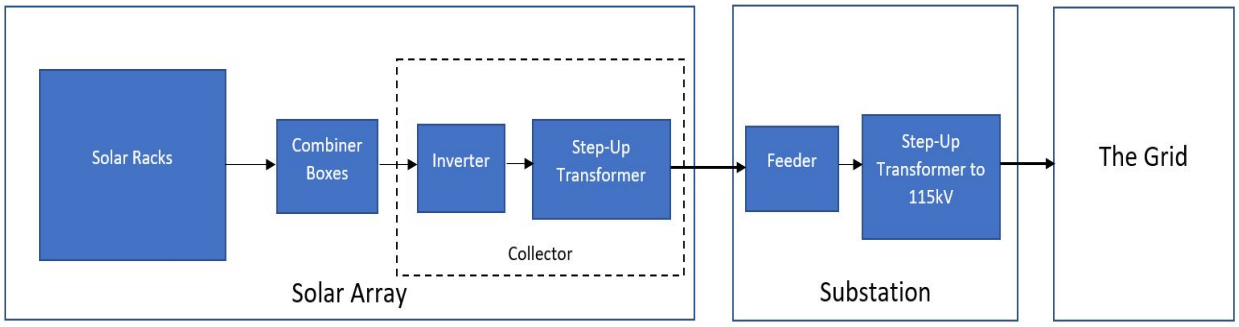
This week, we had one meeting with our client, and one with our advisor. In our meeting with the client, we showed what we understood and the questions that we had about the key protection diagram. In the meeting with the advisor, we talked about how we applied our knowledge, how we applied what we learned in classes to our project. Then, we started making changes in the key protection diagram.

Summary of Client meeting:

- Tam did safety moment about downed power lines.
- Then, we presented the first AutoCAD drawings version of the key protection diagram to the client. We went over changes we made and explained why we decided to make those changes. We also came up with a list of questions to ask the client.

Summary of Advisor meeting:

- First, we went through the overview of the project.



- Solar rack and the currents that go to combiner box from each rack.
- Then, we talked about conductor sizes and types that we used in the project.
- Then, we showed our advisor what we understand about Inverter Load Ratio (ILR).
- Lastly, we showed our advisor our calculations that we used in the inverter, collector, and feeder.

Past Week Accomplishments:

Katayi Katanga
- Worked on AutoCAD for key protection diagram
- Worked on AutoCAD for IT relay, looked over Primary Relay drawing
- Edited drawing list showing the name of all the AutoCAD drawing we are going to create

Nur Shuazlan
- Worked on AutoCAD for key protection diagram
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Yao Cheah
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Tam Nguyen
- Worked on AutoCAD for key protection diagram
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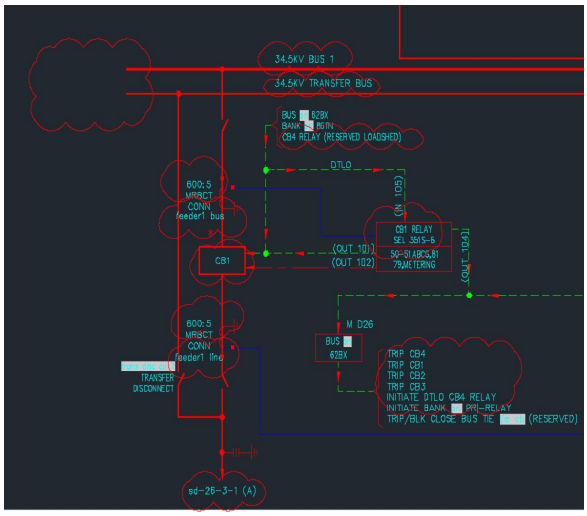
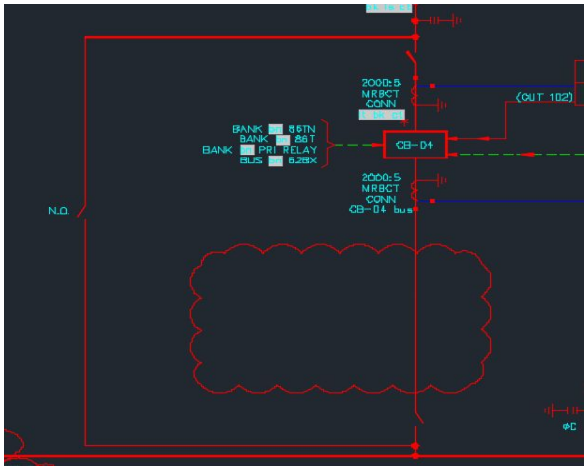
We all worked together this week, and this was what we had:
Key Protection - Low Side

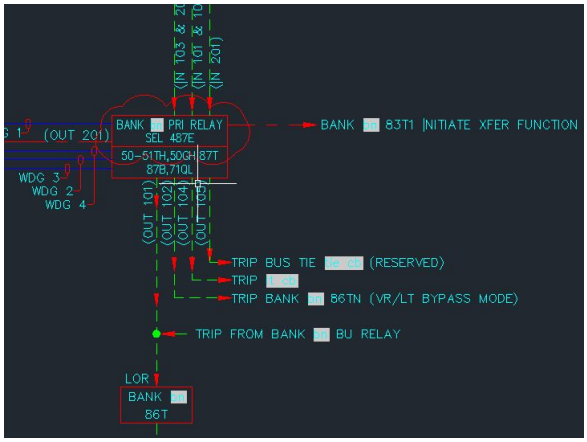
We deleted mobile connections and changed the rating of the buses and the ratio of the MRBCT
What is the B in MRBCT? What does the ratio mean in 600:5 MRBCT?
How do we go about replacing SEL - 351Ss with the SEL - 351Ss with ethernet?



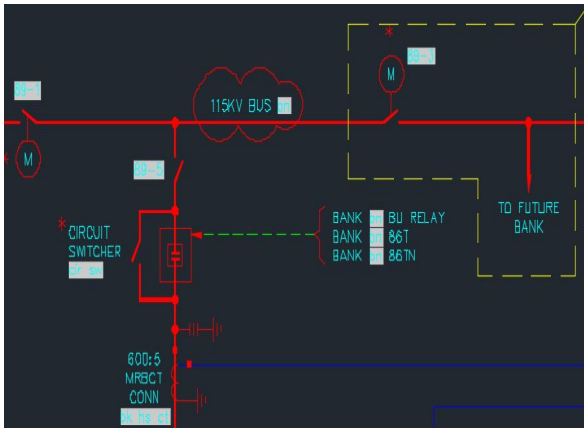
We deleted the voltage regulator since it's not within our project scope



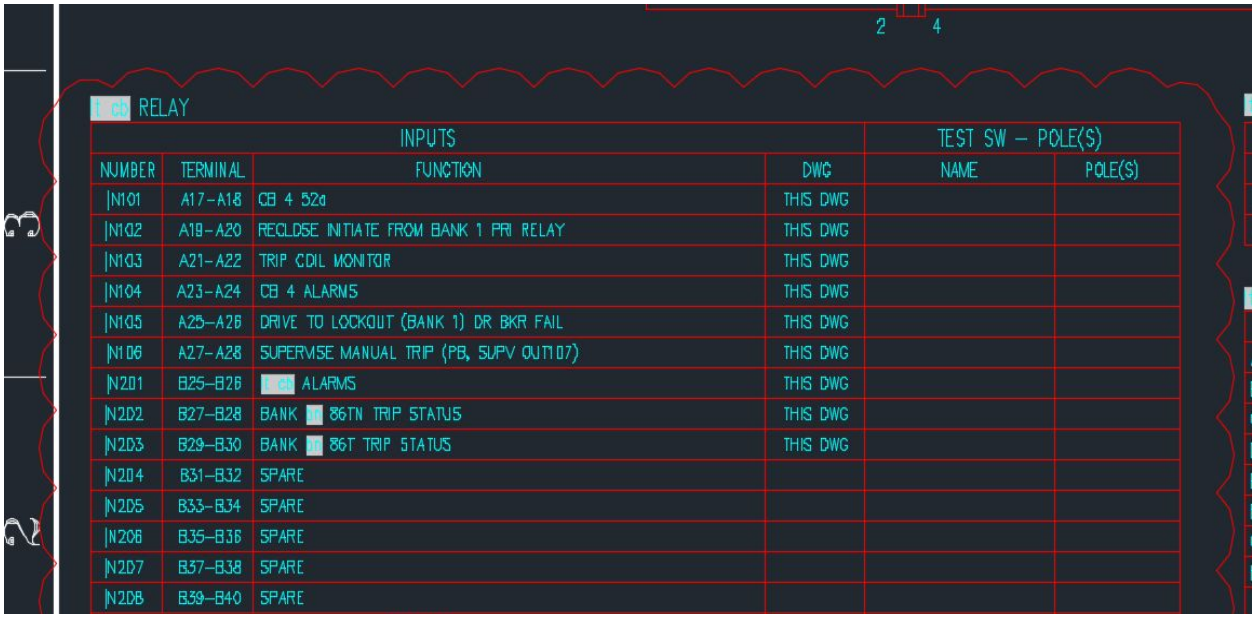
Added the correct relay type



Key Protection - High Side
Placed the rating of the bus



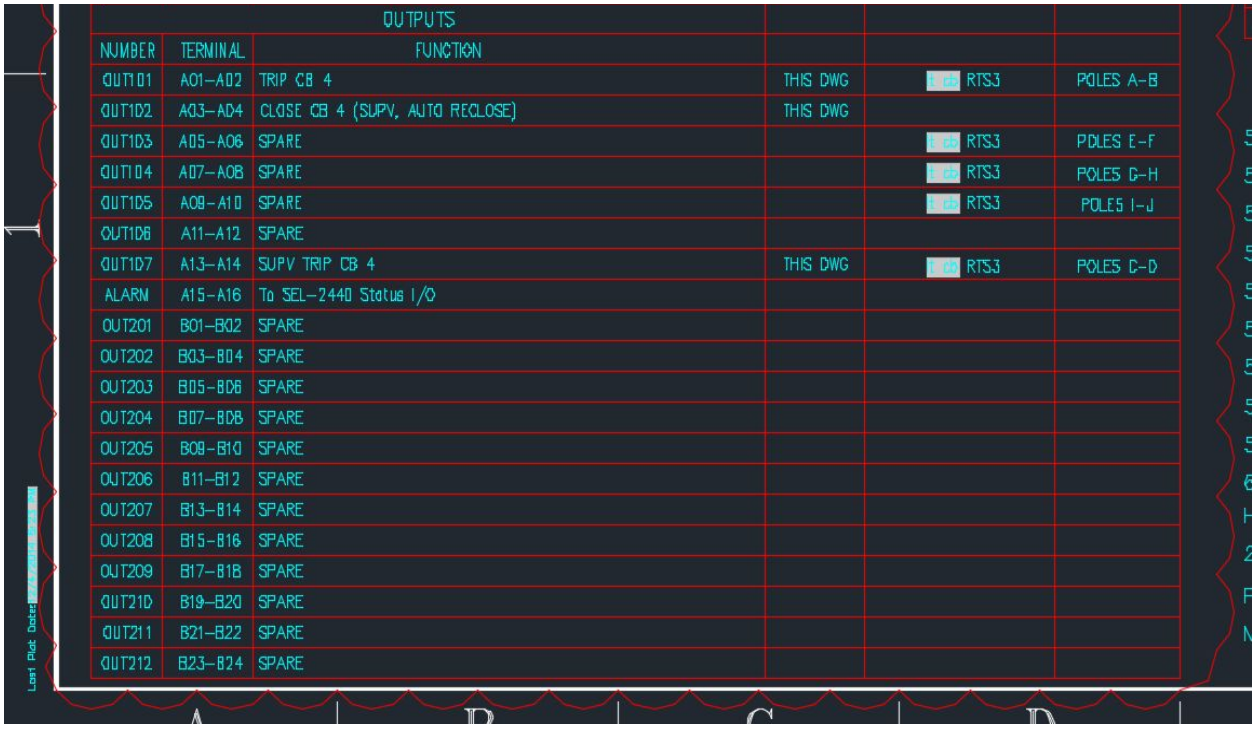
It Relay - Input Connections
Reviewed functions of inputs according to project scope.



RELAY

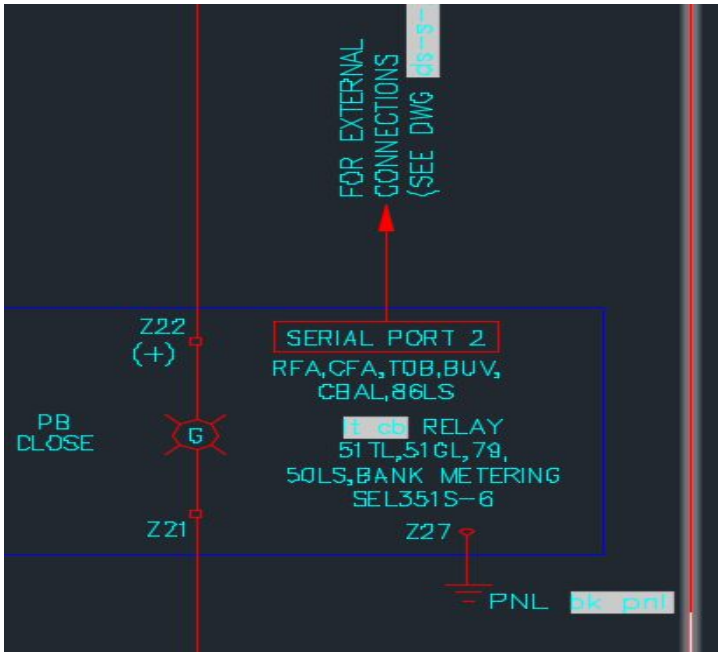
INPUTS				TEST SW – POLE(S)	
NUMBER	TERMINAL	FUNCTION	DWG	NAME	POLE(S)
N101	A17–A18	CB 4 52a	THIS DWG		
N102	A19–A20	RECLOSE INITIATE FROM BANK 1 PRI RELAY	THIS DWG		
N103	A21–A22	TRIP COIL MONITOR	THIS DWG		
N104	A23–A24	CB 4 ALARMS	THIS DWG		
N105	A25–A26	DRIVE TO LOCKOUT (BANK 1) OR BKR FAIL	THIS DWG		
N106	A27–A28	SUPERVISE MANUAL TRIP (PB, SUPV OUT107)	THIS DWG		
N201	B25–B26	ALARMS	THIS DWG		
N202	B27–B28	BANK 86TN TRIP STATUS	THIS DWG		
N203	B29–B30	BANK 86T TRIP STATUS	THIS DWG		
N204	B31–B32	SPARE			
N205	B33–B34	SPARE			
N206	B35–B36	SPARE			
N207	B37–B38	SPARE			
N208	B39–B40	SPARE			

It Relay - Output Connections
Reviewed functions of outputs according to project scope.

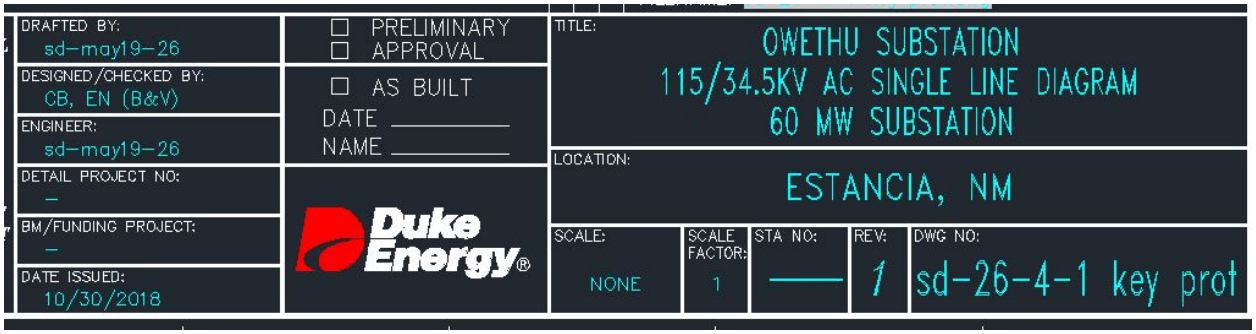


OUTPUTS					
NUMBER	TERMINAL	FUNCTION			
OUT101	A01–A02	TRIP CB 4	THIS DWG	RTS3	POLES A-B
OUT102	A03–A04	CLOSE CB 4 (SUPV, AUTO RECLOSE)	THIS DWG		
OUT103	A05–A06	SPARE		RTS3	POLES E-F
OUT104	A07–A08	SPARE		RTS3	POLES G-H
OUT105	A09–A10	SPARE		RTS3	POLES I-J
OUT106	A11–A12	SPARE			
OUT107	A13–A14	SUPV TRIP CB 4	THIS DWG	RTS3	POLES C-D
ALARM	A15–A16	To SEL-2440 Status I/O			
OUT201	B01–B02	SPARE			
OUT202	B03–B04	SPARE			
OUT203	B05–B06	SPARE			
OUT204	B07–B08	SPARE			
OUT205	B09–B10	SPARE			
OUT206	B11–B12	SPARE			
OUT207	B13–B14	SPARE			
OUT208	B15–B16	SPARE			
OUT209	B17–B18	SPARE			
OUT210	B19–B20	SPARE			
OUT211	B21–B22	SPARE			
OUT212	B23–B24	SPARE			

It Relay - Connections
In the ds-s-22-4 It rel drawing, do we delete the thing that's connected to PORT 2 since PORT 2 shouldn't be connected to anything? Where is Port 5 and what is a Cisco switch?



Title Block



Drawing List

Drawing List	
Drawing Number/Name	**Description**
sd-26-1-1 singlearray	Wiring diagram of a single array
sd-26-1-1 powerplant	Wiring diagram of the entire solar plant
sd-26-2-1 collector	Collector diagram
sd-26-3-1 feeder	Feeder diagram
sd-26-4-1 key prot	Substation key protection diagram
sd-26-4-1 it rel	Installation relay diagram
sd-26-4-1 pri rel	Primary relay diagram
sd-26-4-1 ethernet port	Ethernet port diagram
sd-26-4-1 bu relay	Back-up protection diagram

Pending Issues:

- There were still more things that we need to change in the key protection diagram. The client asked us to read the project more deeply then make changes.

Plans For Next Week:

We are waiting for feedback from the client regarding our first deliverables, which we provided them in week 8. We will also review the key protection diagram and send the final version of this to the client.

Individual Contributions

Team Member	Individual Contributions	Hours	Cumulative Hours
Katayi Katanga	Did research on: - Project scope Created/Performed: - AutoCAD modification to the diagram - attended all meetings	6	123
Nur Shuazlan	Did research on: - Project scope Created/Performed: - AutoCAD modification to the diagram - attended all meetings	6	125
Yao Cheah (YJ)	Did research on: - Project scope Created/Performed: - AutoCAD modification to the diagram - attended all meetings - Website update	6	101
Ahmed Sobi	Did research on: - capacitor bank - circuits breakers - disconnect switch Created/Performed: - prepared slide for key protection diagram - AutoCAD modification to the diagram - attended all of the meetings	6	116
Tam Nguyen	Did research on: - Project Scope - Single Line Diagram.	9	97.5

	Created/Performed: - Weekly reports. - Edit AutoCAD drawing. - Attend three meetings		
Chufu Zhou	Did research on: - Conductor sizing for the collector - Output of the transformer Created/Performed: - determine the collector parameters - attended all the most of the meeting	6	90

Team Hours: 39
Cumulative Team Hours: 652.5