

EE/CprE/SE 491 – sdmay20-15

Substation Design

Week 5-6 Report

October 1st – October 8th

Client: Burns & McDonnell

Faculty Advisor: James McCalley

Team Members:

Kaitlyn Ziska – Professor Client Liaison

Brian Mace – Chief Engineer

Brandon Kaas – Scribe

Salvador Salazar – Meeting Facilitator

Justin Fischbach – Test Engineer

Robert Huschak – Report Manager

Past Week Accomplishments:

ORGANIZATIONAL ACCOMPLISHMENTS:

- Began physical drawings of substation
- Created and submitted one-line diagram to Burns & McDonnell for review

TECHNICAL ACCOMPLISHMENTS:

- 1.)** Begin working on physical drawings of substation
 - Will be working with autoCAD again to create several physical drawings plans of the substation from all angles
- 2.)** Finalized One-Line Drawing and submitted to Burns & McDonnell for review
 - Submitted first draft CAD drawing for one-line drawing
 - One-Line included technical elements:

I. Install three (3) 138 kV circuit breakers (B1, B2 & B3), to be used for the transformer high-side.

- The standard short circuit rating is sufficient.
- Four (4) sets of 1200/5 ampere, MR, C800 accuracy class, rf=2.5 CT's per breaker (two (2) CT's per bushing)

II. Install one (1) 69 kV circuit breaker (B4), to be used for the transformer low-side.

- The standard short circuit rating is sufficient.
- Four (4) sets of 1200/5 ampere, MR, C800 accuracy class, rf=2.5 CT's per breaker (two (2) CT's per bushing)

III. Install three (3) Coupling Capacitor Voltage Transformers (CCVT's) (one per phase) on all three of the ring bus exits.

- CCVT's to be rated 80.5,500V phase-to-neutral on the primary.
- CCVT's to have two (2) secondary windings rated at 115/67V.

IV. Station surge arrester specification to be determined by substation engineer.

V. All substation equipment and bus should be rated for at least 2000A. All line conductor and equipment should be rated for at least 750A.

VI. Install one (1) station service transformer on the 138 kV bus side of the 138/69kV transformer MOAB to provide AC station service and relaying potentials.
40250 – 120/240V, 100 kVA.

VII. New 3-phase 140-72-13.2 Kv, 100/134 MVA OA/FOA power transformer with Z1 = 5.6% on 100 MVA base.

Complete with the following CTs.

- a. 2 sets of 138 kV CTs, — 1200:5 A MR, C800 @ 1200:5A
- b. 2 sets of 69 kV CTs — 2000:5 A MR, C800 @ 2000:5A
- c. 1– 13.2 kV CT — 1200:5 A MR, C400 @ 1200:5A
- d. All CTs shall have a thermal factor equal to 2.0

VIII. Install one (1) 138kV motor operated air break switch (A1).

Pending Issues:

- Wait for Burns & McDonnell's feedback on our one-line drawing in order to continue with drafts and perfect the final product

Plans for Coming Week:

- Continue perfecting One-Line Drawing to be reviewed and returned from Burns and McDonnell this week
- Begin working on physical drawing plans of the substation to be completed on autoCAD

Individual Contributions:

TEAM MEMBER:	CONTRIBUTION:	WEEKLY HOURS:	TOTAL:
Kaitlyn Ziska	Worked on CAD drawing of one-line, worked on parts 1&4&6 of design document, created weekly status report	8	32
Brian Mace	Worked on part 3 of design document, worked on CAD drawings	5	30
Brandon Kaas	Worked on CAD drawing of one-line, organized meetings & conference calls, worked on part 4 of design document	6	30
Salvador Salazar	Reviewed substation parameters, worked on part 5 of design document	6	30
Justin Fischbach	Worked on CAD drawing of one-line, reviewed substation parameters, worked on part 1 of design document	7	33
Robert Huschak	Worked on CAD drawing of one-line, reviewed substation parameters, helped group members acclimate to CAD	8	32