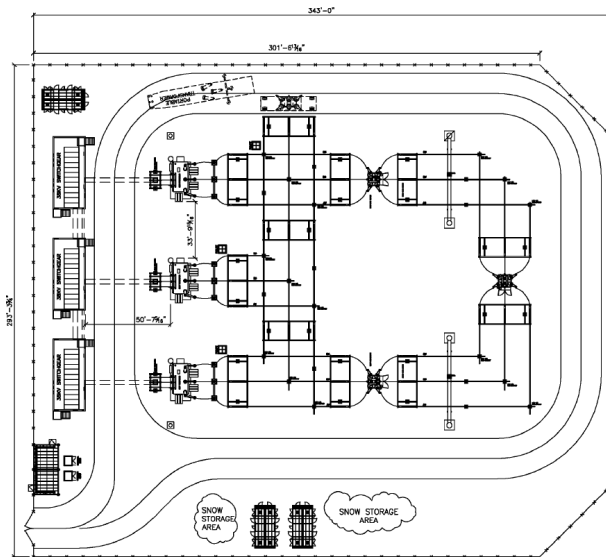


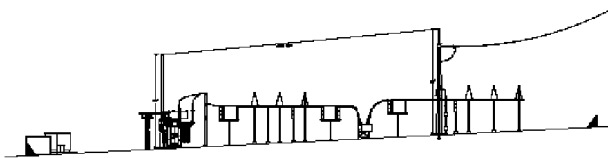
PTARMIGAN SUBSTATION

SUBSTATION ENGINEERING

Electric distribution substations are a key component of any electric delivery system because they are the main transition point between the high voltage transmission levels and lower voltage distribution levels. Distribution substations receive electric power from high voltage transmission lines and serve to reduce, or “step-down”, these higher voltage levels to lower voltage levels. Once the voltage is reduced, it is distributed to customers by way of electric distribution lines or “feeders”.



Typical Substation Plan View



Typical Substation Side View

Substations typically contain a number of electrical components and related physical supporting structures, including: 1) dead-end structures and static masts; 2) voltage modification devices called transformers, regulators, and capacitors; 3) circuit protection and control devices called switches, relays, and circuit breakers; and 4) high voltage cables or rigid tubing typically referred to as a bus, which carries electricity between components of the substation. The heart of all substations is the transformer. The transformer and all other associated equipment are referred to as a transformer bay.

To accommodate the substation components, approximately 2.5 acres would be graded and fenced. The dead-end structure and static masts are typically +/- 55 to 62-feet tall. The busses are typically +/- 35-feet tall and the electrical equipment enclosures are generally no taller than 12 feet.

Grading and landscaping amenities can require additional area, typically increasing the substation site size, usually not exceeding five acres. The total site size depends on existing topography and visual screening opportunities.

The substation will require an access road suitable of supporting the transformers, which can weigh in excess of 135,000 lbs. The typical access road width is 24 feet with maximum slopes of 6 percent – 8 percent.

QUESTIONS?

**If you have any questions
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