SUBSTATION ENGINEER

A Minnkota substation engineer works on many aspects within a substation – utilizing civil, structural and electrical engineering backgrounds along with project management. This begins with laying out the substation as needed to fulfill the requirements of the project. This may be distribution substations (13.8 kV) or transmission substations (115 to 345 kV) or both depending on the project. They will then provide a site grading design for the substation. Next, foundations are designed that may include concrete piers, slabs, spread footings and/or pile. At that point structural analysis is completed to design structures to support the electrical equipment. These are typically steel structures. A substation engineer will also be involved in designing a control house where substation protection equipment is stored. Finally, a substation engineer will lay out the electrical equipment that is shown on physical plans, cable layouts, general arrangements and grounding.

TELECOMMUNICATIONS ENGINEER

Minnkota's telecommunications engineering department is responsible for establishing communications to Minnkota's substations via fiber-optic cable, private microwave links, cellular connections or leased lines. Communications to these remote substations allows the power system operators to monitor the status of the substations in real time, and issue control commands to operate breakers and switches through our Supervisory Control And Data Acquisition (SCADA) system. Telecom engineering also supplies the necessary communications channels to haul the protection schemes designed by the substation engineering department. Keeping various communications links secure is very important. As such, telecom engineering is tasked with designing and implementing solutions to comply with the communications portion of the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection standards. Challenges arise when new technologies must be integrated with equipment that has been in the field for 30-plus years. Finding solutions to these challenges keeps the job interesting.
PLANT ENGINEER

A Minnkota plant engineer’s major job functions include project engineering, project management, engineering analysis, operating and maintenance support of a running facility and support of plant priorities. Each function brings with it a host of responsibilities. Project engineering includes preparing engineering designs and evaluating alternatives to make a final design selection based on total cost of ownership. The project management side starts with project budgeting, and as the project progresses job duties turn to construction coordination. These tasks include everything from contractor management, to acquisition of materials, to the final start up and testing of the installed system. O&M support of a running facility and support of plant priorities requires technical expertise in problem areas of the plant. This allows guidance and assistance to be provided to plant personnel under normal and emergency operation conditions.

PLANNING AND TRANSMISSION ENGINEERS

Minnkota’s planning and transmission engineers work on a wide range of projects. Possibilities include building new transmission lines ranging from 69 kilovolts (kV) up to 345 kV. Other projects include rebuilding, rerouting and uprating existing lines. More specific tasks include PLS-Cadd modeling, structure design (wood, steel and lattice), including load and design drawings, foundation design (direct burial and concrete pier foundations), material assembly design and preparing construction packages. Possibilities are endless each day – with new projects and project scopes.

SUBSTATION ELECTRICAL ENGINEER

A Minnkota substation electrical engineer works on a variety of projects. These projects can range from protection and control (P&C) for either new or existing 69- to 345-kV substations, meter installations and replacements and load control. Job responsibilities include CAD drawings associated with P&C projects (AC schematics, DC schematics, wiring diagrams, control house layouts), relay settings (ex. line, transformer, bus protection), Aspen modeling (relay setting test environment) and preparing construction packages for technicians. A substation electrical engineer works directly with relay technicians during the testing and implementation phases. Each day brings a different type of work, depending on project scope.