Large Power Transformers - Project Planning and Design Considerations

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Abstract
Large Power Transformers (LPTs) are an integral part of the critical infrastructure required for the operation of electric power transmission and distribution systems throughout the world. Although early designs date back to the late nineteenth century, large power transformers are still custom-designed today. They represent a major capital investment and their procurement generally involves long lead times due to the intricate procurement and manufacturing process required to achieve high reliability. The price of a large power transformer varies by capacity, voltage class, manufacturer, and material/component prices. A large unit can cost millions of dollars and weigh between 100 and 400 tons. The procurement and manufacturing of large power transformers involve complex processes, which include detailed engineering analyses, prequalification of manufacturers, a competitive bidding process, the purchase of raw materials, skill of the craft, and special modes of transportation due to size and weight.

This presentation will discuss the key elements associated with the planning and construction of a large power transformer procurement project. The presentation will cover transformer sizing considerations, important elements of a detail procurement specification, the bid evaluation process, and the scope of a customer’s detailed design review preformed prior to the release for manufacturing. Typical factory inspection and factory acceptance tests will be summarized along with the challenges associated with shipping and handling. The presentation also addresses considerations for successful site assembly, test, and commissioning.

Biography
Robert Carritte is an electric power engineer with Bachelor of Electrical Engineering Technology and Bachelor of Science in Electrical Engineering degrees from Northeastern University in Boston, Massachusetts. He also earned a Master of Engineering degree in Electric Power Engineering from Rensselaer Polytechnic Institute in Troy, New York. Mr. Carritte is a member of the American Nuclear Society (ANS) and a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE).

For the last 30 years, Mr. Carritte has worked for MPR Associates, a mid-size engineering firm headquartered in Alexandria, Virginia. At MPR, he has worked a wide variety of challenging engineering projects involving different types of facilities and technologies, including nuclear, coal, and gas fired power plants, large scale wind farms, high voltage switchyards and substations, transmission lines, LNG facilities, petrochemical and steel facilities, and naval vessels.

Currently, Mr. Carritte is a Principal Officer at MPR. In that role, he is responsible for defining and communicating a vision and direction for the business enterprise, one that provides opportunities for growth in a sustainable manner consistent with the company's culture and values.