Your Challenge
To meet regulatory requirements Regulatory Guide 1.9, Design, Qualification, and Testing of Emergency Diesel Generators (EDG), nuclear power plants in the United States need an accurate analysis of their EDG’s loading profile. The purpose of the analysis is to determine that all loads can be safely started under all load scenarios (load sequencing analysis). Some plants are still in need of performing the analysis, while others already have the analysis and require its adaptation to changing system components like a new governor or excitation / voltage regulation system.

Your Solution
You will benefit from a unique and powerful team:
• System engineers provide nuclear plant experience
• Analytical engineers define the principle design inputs used for the analytical model, develop transient loading scenarios, evaluate the results, and fine-tune the model for precision
• Hardware OEMs help determine input data, which may include practical tests
• A local university in Charlotte is a capable partner in the efficient resolution of particularly challenging modeling tasks

We have accomplished analytical tasks by developing and utilizing procedural and software tools that are designed to efficiently, precisely, and consistently gather required plant configuration and equipment data, and subsequently develop an accurate model in ETAP® software. Where plant data may not be available, we have developed valid and defensible assumptions based on accepted industry standards and practices.

Our systematic process provides the necessary documentation for our customers to maintain their own models if they choose to do so. Our thorough understanding of ETAP® calculation methodology and extensive experience with the proper selection of static and dynamic solution control variables and configuration status enables us to provide an accurate analysis of the power distribution system for a nuclear station.

For you, AREVA can resolve numerous issues:
• Minimal design margins on diesel generators and power distribution equipment
• Marginal protective device coordination
• Sequence load group overlap due to drift of timers
• Low voltage levels based on existing calculations
• Numerous stand-alone electrical power system calculations with poor integration
• Inability to quickly determine impact of proposed modifications
• Inability to perform dynamic motor starting studies and / or transient event analyses
• Poor correlation between power system calculations and nuclear power plant licensing / design bases
• Inability to accurately model the complete EDG system
• Inability to verify all load scenarios in practical tests

Features and Benefits
• The accurate analysis of the power systems will prove the capability of your plant’s EDG system to perform as needed
• The analysis will help identify areas of available design margins or deficiency
• Models can be utilized to perform realistic “what-if” analyses to evaluate plant perturbations or proposed plant modifications
• AREVA provides long-term maintenance of the ETAP® model and support from problem identification to resolution, either through analytical evaluation, equipment replacement or system modifications
References
AREVA is a leading provider of ETAP® modeling services in the United States and Europe and has assisted numerous nuclear and non-nuclear facilities in accurately evaluating their electrical power distribution systems using ETAP® software. Utilizing the High Impact (Nuclear) version of ETAP®, AREVA has modeled nuclear power plant electrical power distribution systems, including EDGs, with unprecedented accuracy and performance for several client utilities. The models include plant loading categories and configurations to specifically and accurately evaluate normal and accident configurations to which the plant has been designed and licensed.

AREVA is experienced in complete EDG modeling and calculation including governor and exciter modeling for new build and existing sites.

Comprehensive Portfolio
AREVA offers a comprehensive portfolio of products and services to ensure the reliable and safe operation of your plant. Our delivery model includes the whole spectrum of electrical, I&C and mechanical products. Analytical modeling as well as modification and implementation engineering complete our offering. We can provide turnkey solutions from task identification through resolution. AREVA provides quality products and engineering service to lower risk, increase reliability and improve plant performance.

We have experience in developing and applying analytical models for a variety of tasks including:
- EDG governor setting
- Dynamic motor starting
- Transient and static analysis
- Short circuit and load flow calculation
- Protective relay and breaker coordination
- Degraded grid analysis
- Cable ampacity calculation

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10/13 ANP:U-444-V1-13-ENG