U.S. NUCLEAR REGULATORY COMMISSION

DESIGN-SPECIFIC REVIEW STANDARD FOR mPOWER™ iPWR DESIGN

BRANCH TECHNICAL POSITION 8-3

STABILITY OF OFFSITE POWER SYSTEMS

REVIEW RESPONSIBILITIES

Primary - Organization responsible for electrical engineering

Secondary - None

A. BACKGROUND

General Design Criterion (GDC) 17 requires applicants to perform stability studies for the electrical transmission grid that would be used to provide the offsite power sources to the plant. The basic requirement is that loss of the largest operating unit on the grid will not result in loss of grid stability and availability of offsite power to the plant under consideration. Isolated power systems of limited generating capacity are inherently less stable than equivalent systems with supporting grid interties. Limited systems may also be more vulnerable to natural disasters, such as tornadoes or hurricanes. Therefore, due to the siting versatility expected of the modular mPower design and the potential for a limited number of transmission lines to the plant site, grid stability needs to be a focus of the electrical power system review.

Regulatory Guide (RG) 1.206 addresses anticipated combined license applications submitted under Title of the *Code of Federal Regulations*, Part 52. Detailed information and guidance are provided in Section C.I.8 of RG 1.206, which provides that applicants submit detailed analyses and studies for staff review.

In addition, Institute of Electrical and Electronics Engineers (IEEE) Standard (Std.) 242 and IEEE Std. 399 provide technical information and guidance regarding the protection and performance of the offsite electric power system.

B. BRANCH TECHNICAL POSITION

1. Given that mPower designs may well be sited in fairly remote areas, grid stability may become more of a concern. The offsite power system interface requirements in the design control document must be fully sufficient to enable the combined license applicant to perform the necessary stability studies required to support the requirements of GDC 17 and the safety analyses of the mPower design.

2. The staff will examine the generating capacity of the offsite power system per the guidance of Section C.1.8 of RG 1.206. If the available capacity is judged marginal in its ability to provide adequate stability of the grid, additional measures may be necessary.

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These may include provisions for additional capability and margin for the onsite power system beyond the normal requirements or other measures that may be appropriate in a particular case. The additional measures to be taken should be determined on an individual case basis.

C. REFERENCES

1. RG 1.206, “Combined License Applications for Nuclear Power Plants (LWR Edition),” 2007.

2. IEEE Std. 242-2001, “Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems,” 2001.

3. IEEE Std. 399-1997, “Recommended Practice for Power Systems Analysis,” 1997.