

US Nuclear Regulatory Commission Input to **DOE Request for Information/RFI** (Federal Register / Vol. 75, No. 180 / Friday, September 17, 2010/Pages 57006-57011 / Notices) / **Smart Grid Implementation Input** – NRC Contact: Kenn A. Miller, Office of Nuclear Reactor Regulation, 301-415-3152

Comments relevant to the following two sections of the RFI: “Long Term Issues: Managing a Grid with High Penetration of New Technologies” and “Reliability and Cyber-Security,” Page 57010.

Nuclear Power Plants (NPPs) are designed as base load units and are not designed to load follow (either by plant operator action or automatically via external control signal). While operators can adjust power in general, rapid changes are difficult and power changes are most problematic near the end of a fuel cycle (typically 18 months) where reactor power control is more complicated.

NPPs control systems will not be interfaced with or controlled from grid network control systems. Control of a NPP has to be handled by the NRC licensed operators to ensure nuclear safety.

NPPs control and/or protection systems will initiate a unit trip when grid interface parameters are not in accordance with the NPP/Grid Interface Specification (FERC/NERC Standard NUC-001), established with plant specific voltage and frequency limits. The current fleet of nuclear plants is designed to have the bulk power system as the preferred source of power for normal and emergency shutdown situations to preserve nuclear safety. At the instant of a plant trip, the NPP reverts to a load of approximately 5% of its generation capacity. Both NRC regulation and FERC/NERC standards call for the grid to remain stable to support this safety function and grid reliability.

NPPs are to be given priority for restoration of offsite power following a loss-of-grid event (blackout) for the same reasons stated above.

Development and deployment of Smart Grid technology will have to maintain grid reliability and availability in accordance with the limits established in the current FERC/NERC standards.

Integration of large amounts of variable generation such as wind and solar will have to be carefully planned, operated and managed such that adequate reserves are available to balance their loss while maintaining grid stability and operating parameters in accordance with FERC/NERC standards and remain in compliance with NUC-001 commitments at each plant location.

Federally funded research should be considered for the following topics:

1. Assessing the limits and impact of load following for NPPs with full consideration that load/control signals can be manipulated via cyber means.
2. Assessing the sensitivities and vulnerabilities for grid management, Smart Grid, and cybersecurity for the new and operating fleet of NPPs.