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RELIABILITY
U.S. DEPARTMENT OF ENERGY
HEARING ON FEDERAL ELECTRIC TRANSMISSION CORRIDORS:
CONSEQUENCES FOR PUBLIC AND PRIVATE PROPERTY**

BEFORE THE

**HOUSE COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM
SUBCOMMITTEE ON DOMESTIC POLICY**

APRIL 25, 2007

Mr. Chairman and Members of the Committee, thank you for this opportunity to testify before you today on the Department of Energy's (DOE) statutory authority under section 1221(a) of the Energy Policy Act of 2005 (EPACT) regarding national interest electric transmission corridors (National Corridors).

Electricity is Vital to Americans

Today, the availability of and access to electricity is something that most Americans take for granted even though it is vital to nearly every aspect of our lives from powering our electronics and heating our homes to supporting commerce, transportation, finance, food and water systems, and national security.

As our Nation's economy continues to grow, consumers' demand for more electricity will steadily increase as we move forward into the 21st Century. In fact, even when accounting for advances in energy efficiency, the Energy Information Administration estimates that by the year 2030, U.S. electricity consumption will increase by 43 percent from the 2005 level. Although this is a positive indicator of a growing economy, it is also a significant amount of new demand on an electricity infrastructure that is already stressed and aging.

Meeting our future electricity needs will not occur overnight or with one solution. The need will only be met through a combination of options, such as new generation, transmission, advanced technologies, demand response programs, and improved efficiency. That said, perhaps the greatest challenge will be developing the appropriate network of wires and other facilities to reliably and responsibly deliver electricity. For example, the Department expects that much of the Nation's future electricity demands will be supplied by clean and renewable sources of energy. Wind generation, for example, holds great promise, but will almost always be sited in locations far from densely populated demand centers.

DOE/OE Mission

The mission of the Office of Electricity Delivery and Energy Reliability (OE) at DOE is to lead national efforts to modernize the electricity delivery system, enhance the security

and reliability of America's energy infrastructure, and facilitate recovery from disruptions to energy supply. These functions are vital to DOE's strategic goal of protecting our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally responsible energy. Following the passage of EPACT, OE was assigned the responsibility of executing many of the provisions in Title XII—Electricity.

National Electric Transmission Congestion Study

Specifically, section 1221(a) of EPACT amended the Federal Power Act (FPA) by adding a new section 216 to that Act. My testimony will reflect the new authority under this Act as it relates to OE's role under FPA 216(a). Section 216(a) requires that, "[n]ot later than [one] year after the date of enactment of this section and every [three] years thereafter, the Secretary of Energy (Secretary), in consultation with affected States, shall conduct a study of electric transmission congestion." In accordance with the law, on August 8, 2006, DOE published the first *National Electric Transmission Congestion Study* (Congestion Study).

The Congestion Study examines transmission congestion and constraints and identifies constrained transmission paths in many areas of the Nation, based on the analysis of historical studies of transmission conditions, existing studies of transmission expansion needs, and unprecedented region-wide modeling of the North American Electric Reliability Corporation's (NERC) Eastern and Western Interconnections.

Stakeholder Involvement

During the development of the study, which relied on extensive consultation with States and other stakeholders, the Department provided numerous opportunities for discussion and comment by States, regional planning organizations, industry, and the general public as required by FPA section 216(a)(1). The Department initiated a series of conference calls with States in December 2005 and January 2006 to describe the Department's plan for the development of the Congestion Study and to request their suggestions and relevant information. On February 2, 2006, the Department published a Notice of Inquiry explaining the Department's intended approach for the Congestion Study and invited comment. On March 29, 2006, the Department held a technical conference for the public in Chicago, Illinois to address the questions presented in the Notice of Inquiry. In addition to these efforts, the Department held numerous meetings with State officials to discuss the Congestion Study and participated in several State conferences and events where information about the study was presented.

The Department sought input from the following: National Conference of State Legislatures, Seattle, WA, Aug. 18, 2005; Southern States Energy Board, Atlanta, GA, Aug. 27, 2005; Midwest State Energy Office, via webcast, Aug. 31, 2005; National Association of State Energy Officials, New York, NY, Sept. 12, 2005 and Washington, DC, Feb. 7, 2006; CREPC, San Diego, CA, Sept. 20, 2005, Sept. 27, 2006, and Portland, OR, April 4, 2006; NARUC, Palm Springs, CA, Nov. 14, 2005, Washington, DC, Feb. 14

and 22, 2006, San Francisco, CA, Aug., 1, 2006, and via conference calls on Jan. 11, 2006, and June 16, 2006; NYPSC, Albany, NY, Dec. 20, 2005; OMS, via conference call, May 11, 2006; Florida Public Service Commission, Tallahassee, FL on June 15, 2006; Midwestern Legislative Conference, Chicago, IL, Aug. 20, 2006; Organization of PJM States, Inc., Cambridge, MD on Sept. 17, 2006; CPUC, via conference call on Sept. 20, 2006; CEC, via conference call on Sept. 22, 2006; and Maine PUC, via conference call, Oct. 6, 2006.

Definitions of Congestion and Constraints

The Congestion Study described congestion as the “condition that occurs when transmission capacity is not sufficient to enable safe delivery of all scheduled or desired wholesale electricity transfers simultaneously.” When actual or scheduled flows of electricity on a transmission line or a related piece of equipment are constrained below desired levels, either by the physical or electrical capacity of the line, or by operational restrictions created and enforced to protect the security and reliability of the grid, congestion occurs. Although transmission congestion varies hourly and even daily, the examination of data from longer periods of time can reveal recurrent congestion patterns.

As used in the Congestion Study, a transmission “constraint” may refer either to a piece of equipment that limits electricity flows in physical terms, or to an operational limit imposed to protect reliability. Constraints can contribute to or cause electric congestion. When a constraint prevents the delivery of a desired level of electricity across a line in real time, system operators have few options. They may increase output from a generator on the customer’s side of the constraint and reduce generation on the other side, cut wholesale transactions that were previously planned to meet customers’ energy demand at lower cost, or reduce electricity deliveries to consumers. All of these actions have adverse impacts on electricity consumers.

Analyzing Transmission Congestion

In analyzing transmission congestion, the Department identified reliability and other congestion-related concerns through two approaches. First, in order to ensure that the Congestion Study built upon the work of others and did not duplicate any existing data, the Department conducted a thorough review of recent reliability studies and transmission expansion plans conducted by regional reliability councils, regional transmission organizations (RTOs), independent system operators (ISOs), and sub-regional transmission planning groups. Key findings and conclusions from these studies were noted and summarized in sections 3.1 and 4.1 of the Congestion Study. Altogether, the Department reviewed 65 studies and related documents for the Eastern Interconnection and 38 for the Western Interconnection. The eastern studies and the western studies are listed in Appendices I and J, respectively, of the Congestion Study. These appendices are included with my testimony.

Second, DOE developed projections for both the Eastern and Western Interconnections using standard industry transmission planning models. DOE identified constraints in this

modeling using all of the reliability and security limits required at the time by both the North American Electric Reliability Council (NERC), which is now the North American Electric Reliability Corporation, and relevant regional reliability organizations. It is necessary for the industry to adhere to these limits in order to maintain network reliability in the event of unanticipated events, such as the outage of a major generator or transmission line.

Eastern Interconnection

The model used for analysis of the Eastern Interconnection was based on load flow cases provided by the NERC Multiregional Modeling Working Group (MMWG). This analysis used the MMWG 2005 series load flow cases for the summer of 2007 and the summer of 2010. The load flow cases encompassed the entire Interconnection, including lines, transformers, phase shifters, and direct current ties. The Cross-Sound and Neptune high voltage Direct Current cables were added to these cases. Apart from these direct current cables, no transmission upgrades were added except for those included in the MMWG cases. Monitored constraints were identified from the following sources:

- The NERC flowgate book.
- The list of flowgates published by the Midwest ISO on their website.
- A list of flowgates provided by the Southwest Power Pool.
- FERC Form 715 filings, seasonal transmission assessment reports, and studies published by NERC regions and Independent System Operators.
- Regional Transmission Expansion Plan (RTEP) reports published by various ISOs.
- The 2004 Intermediate Area Transmission Review published by the New York ISO.
- The CP-10 Working Group report (2004) by the Northeast Power Coordinating Council.
- Contingency analyses performed by General Electric and by CRA International.
- Historically binding constraints monitored by CRA International.

Western Interconnection

The western analysis reflected the traditional western practice of identifying constraints in a catalogue of transmission paths. (The Eastern Interconnection does not have an official path catalogue.) Key reliability-related assumptions and inputs to DOE's simulations included:

- Models of all WECC Cataloged Paths, representing potentially constrained Western Interconnection (W.I.) Paths, including Unscheduled (Loop) Flow Qualified Paths and Operating Transfer Capability (OTC) Policy Group paths. They represent all the significant paths in the W.I. These catalogued paths were supplemented in the study with other known constraints.

- A Path may represent a single line or combination of parallel transmission lines from one area or a combination of areas to another area or combination of areas.
- A Path may be between Control Areas or internal to a Control Area.
- Paths are defined based upon extensive planning studies and operating experience. They are well documented through a formal process.
- Ratings are established thru an open process described in the WECC “Procedures for Regional Planning Project Review and Rating Transmission Facilities” document.
- Ratings are documented in the WECC Path Rating Catalog. The ratings of all paths were updated with the most recent information available for the study timeframe.
- Ratings include both non-simultaneous and simultaneous limits, including development of nomograms.
- All ratings are established applying NERC/WECC reliability criteria; the path must be able to withstand an outage while operating at rated capacity.
- Ratings in the West are determined by the more restrictive of either applicable steady state or contingency limits. These include transient, voltage stability and thermal limits.
- At the time of the analysis, 67 existing WECC paths were rated in the catalogue.
- The WECC OTC Policy Committee reviews seasonal operating ratings for selected critical paths.
- All production cost modeling in the West (SSG-WI, RMATS, STEP & CDEAC studies) recognizes seasonal OTC limits on all WECC paths and on all “internal” lines, but not the “day to day” operational limits that are based upon prevailing system conditions.
- To maintain reliable operation, western path ratings are often based upon stability limits which may be more limiting than the thermal limits that typically limit eastern paths. This is primarily because of long transmission distances in the West.

Congestion Identified

DOE identified existing and projected or potential congestion and reliability problems in various areas by thoroughly reviewing recent reliability studies and transmission expansion plans and by modeling to confirm data and project congestion problems. The first category, "Critical Congestion Areas," is comprised of two large, economically vital, and heavily populated areas that have widespread existing or potentially severe congestion and reliability problems. These two geographic regions are in Southern California and the Atlantic coastal area from New York City to northern Virginia.

The Department's review of historical transmission studies and data and found that key transmission paths into and within southern California have been constrained for portions of time in recent years. The modeling performed for the Congestion Study projected that several of these constraints will continue to be significant in 2008. Additionally, the California ISO's summer assessment for 2006 found that electricity import capability into Path 26 (an area of southern California that includes Los Angeles) was so limited that various combinations of extreme electricity demand, generator unavailability, and transmission facility outages could require that non-firm or firm loads be cut to maintain reliability. NERC's summer assessment for 2006 came to the same conclusion.

New York City is one of the most congested areas of the country. Additionally, some of the transmission constraints creating this congestion may affect grid operations across a large part of the Eastern Interconnection. Given these facts and New York City's economic and strategic importance to the Nation as a whole, the Department concluded that it is appropriate to include the City in the Mid-Atlantic Critical Congestion Area.

A second group, "Congestion Areas of Concern," consists of four areas where a large-scale congestion problem exists or may be emerging, but that isn't critical. These are: New England, the Phoenix-Tucson area, the Seattle-Portland area, and the San Francisco Bay area. Generally speaking, the "Congestion Areas of Concern" have congestion problems, but the problems are not as long-standing, widespread, or acute as in the first category. The third group, "Conditional Congestion Areas," consists of areas where congestion is not acute at present, but where congestion would become so if large amounts of new electric generation were to be built without associated transmission capacity, including: Montana-Wyoming, the Dakotas-Minnesota, Kansas-Oklahoma, Illinois, Indiana, Upper Appalachia, and the Southeast.

Because of the broad public interest in the implementation of section 216(a), the Department invited and received over 400 public comments on the findings of the Congestion Study and on ways to improve future studies. The formal comment period began on August 8, 2006 and ended on October 10, 2006. Since the end of the comment period, the Department has continued to accept written comments and has posted all of the comments it has received since August 8, 2006 on its website for public information.

Annual Reports and Triennial Studies

In 2006 the Department announced that, in addition to the statutory requirement under section 216(a)(1) that the Department release a congestion study every three years, DOE would issue annual progress reports in addition to the triennial studies. Accordingly, the Department is beginning a review of mitigation activities underway in each of the congestion areas identified in last year's Congestion Study, which was released on August 8, 2006. The activities that will be examined include the status of transmission projects that are proposed, permitted and completed since last August's study. We will also be identifying new or proposed local generation, demand response programs, and

energy conservation and efficiency programs affecting congestion in the identified congestion areas.

Draft Corridor Designation

Section 216(a) of the Federal Power Act also requires that, “after considering alternatives and recommendations from interested parties (including an opportunity for comment from affected States), the Secretary shall issue a report, based on the study, which may designate any geographic area experiencing electric energy transmission capacity constraints or congestion that adversely affects consumers as a national interest electric transmission corridor.” However, prior to issuing a report that designates any National Corridor, the Department will first issue a draft designation to allow affected States, regional entities, and the general public additional opportunities for review and comment. Following an appropriate comment period on a draft designation, the Department would decide whether the designation of a Corridor is, in fact, warranted.

Modernizing the Electric Grid

In order to meet the demands of our growing economy and population, we must consider ways of upgrading and modernizing our energy infrastructure, paying particular attention to the electricity grid. Although the problems that we are examining are not new, they will get substantially worse if we don’t take action. In fact, my office has been very active in providing technical assistance, when requested, to States, regional grid operators, and utilities on demand response, energy efficiency, and coordinated regional planning. These efforts include facilitating the Mid-Atlantic Distributed Resources Initiative, the Midwest Distributed Resources Initiative, the Pacific Northwest Distributed Resources Project, and a previous project in New England. We have also partnered with the Environmental Protection Agency in developing the National Action Plan for Energy Efficiency, under which a group of leading electric and gas utilities, utility regulators, and related organizations issued a call for increased energy efficiency as delivered by utilities and allied groups.

Conclusion

With the enactment of the new section 216(a) of the FPA, Congress gave the Federal Government the new responsibility of identifying electric congestion and its causes. The Department takes this new role seriously, and will execute the spirit of the law conscientiously with the Nation’s best interest in mind.

This concludes my statement, Mr. Chairman. I look forward to answering any questions you and your colleagues may have.