

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Managing Transmission Line Ratings

Docket No. AD19-15-000

Comments of Francisco Velez on behalf of
Virginia Electric and Power Company,
dba Dominion Energy Virginia

Francisco Velez provides the following comments on behalf of Virginia Electric and Power Company (“Dominion Energy Virginia” or “the Company”). Dominion Energy Virginia is a public service corporation organized under the laws of the Commonwealth of Virginia and a public utility subject to regulation by the Federal Energy Regulatory Commission (“FERC or “the Commission”). It is a subsidiary of Dominion Energy, Inc. a holding company under the Public Utility Holding Company Act of 2005. Dominion Energy Virginia furnishes electric service to approximately 2.5 million retail customers in its approximately 30,000 square miles of certificated service territory covering parts of Virginia and North Carolina. It does so by operating a diverse fleet of natural gas, renewable, nuclear, oil, pumped storage, and coal fired power stations, which collectively provide approximately 24,000 MW of generation capacity. It also owns approximately 6800 miles of electric transmission facilities.

Dominion Energy Virginia is subject to pervasive regulation by the Virginia State Corporation Commission (“VSCC”) and by the North Carolina Utilities Commission (“NCUC”) whose regulations establish Dominion Energy Virginia’s retail customer rates. Dominion Energy Virginia provides electric service by making wholesale power purchases from PJM Interconnection, L.L.C. (“PJM”), a regional transmission organization (“RTO”) that Dominion Energy Virginia joined effective May 1, 2005 after obtaining prior approval from FERC, the VSCC, and the NCUC. PJM has operational control over Dominion Energy Virginia’s transmission assets.

Francisco Velez is the Manager of Electric Transmission Reliability at Dominion Energy Virginia, and his Biography is attached to these comments. As Manager of Electric Transmission Reliability, he is responsible for studying the reliability performance of the Company's transmission network and developing programs to improve reliability metrics. Dominion Energy Virginia would like to thank the FERC staff for organizing this Technical Conference on the potential use of Dynamic Line Ratings ("DLR") and Ambient Adjusted Line Ratings ("AAR"). Dominion Energy Virginia appreciates the background information contained in the FERC technical white paper titled "Managing Transmission Line Ratings" and the effort that went into preparing the paper. The pilots mentioned in the paper and the reports listed as references give us a wide perspective of the benefits and challenges of using DLRs and AARs.

Upon joining PJM in 2005, Dominion Energy Virginia adopted and currently utilizes PJM's AAR methodology. The Company's rating process for transmission line facilities take into account all the elements that comprise the line, including those at the terminal stations. The ratings process produces facility ratings for NORMAL operating conditions, whereby facilities can be operated continuously with acceptable equipment loss of life for nine ambient temperatures between 32 and 104 degrees Fahrenheit (0 and 40 degrees Celsius). Similarly the Company also generates EMERGENCY and LOAD DUMP facility ratings for these nine temperatures for 8 hour and 15 minute operating periods respectively. Ratings information for new facilities, updated existing facilities, and lines with temporary or long term de-rates are communicated electronically to PJM.

In Dominion Energy Virginia's system operator center, shift supervisors adjust line ratings under the highest temperature setting according to the temperature gradients across the service territory in real-time. The ambient adjusted ratings used in real time operations are validated and implemented in a fashion that allows reasonable and necessary reliability margin for the safe and long term operation of our system while allowing the maximum line capacity to be used based on true ambient temperature.

The operational experiences at Dominion Energy Virginia system operator planning and operation procedures have shown its transmission system is more frequently voltage constrained than thermally constrained in real-time operations and the benefits of having Dynamic Line Ratings might not materialize in real-time operations. However, Dominion Energy Virginia does recognize the potential benefits of having Dynamic Line Ratings on its most congested region(s) in terms of allowing more flow on the transmission lines to obtain higher efficiency of those transmission assets.

Dominion Energy Virginia has partnered with different Dynamic Line Ratings providers to install pilot sensors and assess their ability to provide line rating data. The pilots have been focused on the evaluation of the sensor installation and validation of the dynamic data provided by these sensors. Currently, Dominion Energy Virginia is testing two different line sensor products. The first one is a ground based sensor, manufactured by Linevision, and is located in the right-of-way of a 500 kV transmission line. This sensor is currently providing measurements of ampacity loading, ground clearance, conductor temperature, power flow, and dynamic line rating. This sensor system will be upgraded to measure blowout, galloping and aeolian vibration as well. At this time, Dominion Energy Virginia is in the process of validating the data provided by this sensor.

Dominion Energy Virginia is also working with EPRI to install three sensors on three different 500 kV transmission lines for a 4 year long pilot program. One of them will be installed at the same 500 kV line as the Linevision system. The EPRI sensors will be installed directly on the transmission line. This system also contains a ground weather station with communication equipment used to transmit its data. These sensors will provide similar information as the Linevision unit but using a different methodology. With these pilots, Dominion Energy Virginia expects to gain experience in the installation and data management/validation of the DLR systems.

Even with the execution of these pilot programs, Dominion Energy Virginia foresees some challenges in the implementation of a full DLR system. First, currently, Dominion Energy Virginia's Energy Management System (EMS) does not have the ability to incorporate DLR, and we understand while PJM has the capability to accept dynamic ratings in its EMS system, the capability has never been used either by PJM or by any of its member Transmission Owners. An EMS upgrade will be needed to support this technology. Second, a DLR system might introduce uncertainty to operations due to unforeseeable weather conditions and terrain discrepancies. As an example, Dominion Energy Virginia operates a 500 kV line that has an elevation difference of 2500 feet along its 65 mile long distance. Third, the opportunity to realize increased line facility capacity through the use of higher ambient wind speeds may be limited by substation terminal equipment. Fourth, the line and terminal equipment that comprise a line facility including line switches, line leads, wave traps, substation conductors, and underground line segments have different thermal characteristics than a line conductor which may make full DLR implementation difficult to achieve. Some of these and other challenges for DLR implementation are documented in the staff's white paper and its references.

Dominion Energy Virginia supports the FERC staff on their intentions and actions to study the benefits that DLR can bring to the electric transmission industry. It is encouraging that other industry players have been able to communicate DLR to operating centers and that system operators have been able to use this information during regular operation of the transmission system. Dominion Energy Virginia believes that the experience and learning opportunities obtained from the pilot programs referenced in the staff white paper and Dominion Energy Virginia's own pilot programs can facilitate the adoption of this technology into our system operations.

However, Dominion Energy Virginia believes more pilot programs and studies are needed in order to gain more operating experience about the installation, reliability, and use of DLR systems.

Dominion Energy Virginia is open to studying our most congested transmission lines to determine how DLR can be cost effective and feasible with existing voltage and stability constraints. We look forward to the implementation of pilot projects to further test DLR assumptions to gain insight in the implementation of AAR and DLR methodologies.

Dominion Energy Virginia appreciates the opportunity to provide these comments.

Respectfully Submitted,

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Francisco Velez received his B.S. degree in Mechanical and Electrical Engineering from Monterrey Tech (ITESM), Monterrey, Mexico, and his M.S. and Ph.D. degree in Electrical Engineering from Virginia Polytechnic Institute and State University, Blacksburg, Virginia, USA. He joined Dominion Energy Virginia in 2011; he has held engineering positions in Transmission Planning, System Protection Engineering and Field Operations Engineering. Presently he is the Manager of Electric Transmission Reliability; his tasks include the development of reliability programs, substation equipment specifications and field engineering support for transmission line assets. He is a senior member of IEEE and a registered professional engineer in the state of Virginia