

**UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION**

Reliability Technical Conference)
)
) Docket No. AD19-13-000

**POST – TECHNICAL CONFERENCE COMMENTS OF
THE EDISON ELECTRIC INSTITUTE, THE NATIONAL RURAL ELECTRIC
COOPERATIVE ASSOCIATION AND UTILITIES TECHNOLOGY COUNCIL**

I. INTRODUCTION

The Edison Electric Institute (EEI), the National Rural Electric Cooperative Association (NRECA) and the Utilities Technology Council (UTC) (collectively the Trade Associations) hereby respectfully submit the following post-technical conference comments in accordance with the Commission’s notice issued July 23, 2019. On June 27, 2019, the Federal Energy Regulatory Commission (FERC or Commission) convened a Commissioner-led technical conference (Technical Conference) to discuss issues related to the reliability of the bulk power system (BPS). The focus of these comments is on Panel 4 of the Technical Conference, which addressed issues related to changes in the communications industry and the potential impact of communications policy decisions on electric power industry reliability and resiliency.

EEI is the trade association that represents all U.S. investor-owned electric companies. Our members provide electricity for more than 220 million Americans and operate in all 50 states and the District of Columbia. As a whole, the electric power industry supports more than 7 million jobs in communities across the United States. EEI’s members are committed to providing affordable and reliable electricity to customers now and in the future. EEI’s diverse membership includes electric companies that own and operate transmission and generation

resources in all regions of the country, as well as distribution systems. Accordingly, they are responsible for maintaining the reliability and security of the BPS as well as other energy infrastructure supporting local distribution. As a result, EEI members are directly impacted by and provide a broad-based perspective on the issues discussed during the Technical Conference.

NRECA is the national trade association representing nearly 900 local electric cooperatives operating in 48 states. America's electric cooperatives power over 20 million businesses, homes, schools and farms across 56 percent of the nation's landmass and serve one in eight (42 million) consumers. NRECA's member cooperatives include 62 generation and transmission (G&T) cooperatives and 831 distribution cooperatives. The G&T cooperatives generate and transmit power to distribution cooperatives that provide it to the end-of-the-line co-op consumer-members. Collectively, G&T cooperatives provide power to nearly 80 percent of the nation's distribution cooperatives. The remaining distribution cooperatives receive power from other generation sources within the electric sector. Both distribution and G&T cooperatives share an obligation to serve their members by providing safe, reliable and affordable electric service. NRECA's member cooperatives include cooperatives that are Registered Entities with compliance obligations under Reliability Standards established by NERC to ensure the reliability of the BPS. In addition, cooperatives own and operate substantial local distribution facilities and are responsible for the reliability and security of their local distribution systems.

UTC is the international trade association for the telecommunications and information technology interests of electric, gas and water utilities and other critical infrastructure industries. UTC's members include large investor-owned electric companies who serve millions of customers across multi-state service territories, as well as smaller rural electric cooperative and public power utilities, which may serve only a few thousand customers in isolated communities

or remote areas. UTC's members own, manage and control extensive infrastructure that they use to support the safe, reliable and secure delivery of essential services to the public at large.

II. COMMENTS

The Trade Associations appreciate the Commission convening the Technical Conference to discuss issues related to the reliability of the BPS. The energy grid is rapidly changing and advancing, creating both opportunities and challenges for those entities charged with maintaining its reliability. New players and technologies are interconnecting to the grid to provide electricity and other services to electric utilities and their customers. Central to this transition to an energy grid that can reliably manage the two-way flow of power are digital networks and network-connected devices. Over the last two decades, electric and communications infrastructure have become increasingly interdependent, driving advances in grid sensors and network and software technologies. As a result, electric companies now rely on broadband services to provide, among other things, greater levels of wide-area situational awareness and enhanced operational efficiencies. As further discussed below, this highlights the need not only for increased coordination between the electric and communications industries but also for unencumbered access to broadband services that meet the operational needs of the electric power industry, which will help ensure the continued reliable operation of the BPS.

During the panel on "Managing Changes in Communications Technologies in the New Grid," the Commission received testimony on issues related to changes in the communications industry and the potential impact of communications policy decisions on electric power industry reliability and resiliency. The panelists discussed issues such as current and emerging communications requirements for electric companies, how 5G communications are poised to become the next major development in information and data exchange and the electric power

industry’s perspectives on adopting and deploying 5G infrastructure. Panelists described the potential benefits, risks and costs of 5G, as well as how the increasing use of wireless technology places new demands for radio frequency spectrum that could impact the electric power industry’s ability to maintain the reliability of the BPS and local distribution systems. For example, electric companies must compete for limited spectrum against incumbent communications carriers who provide services over much larger footprints and tailor those services to meet their customer needs, not electric company reliability needs. As the penetration of smart technologies continues to increase, the Commission and the Federal Communication Commission (FCC) concurrently will need to increase their cooperation to ensure that electric companies have needed access to the spectrum, including the 6 GHz band without abatement or unintended interference.

A. The Commission should coordinate with the FCC regarding potential adverse impacts to electric power industry reliability from unlicensed devices operating in the 6 GHz band.

The FCC has proposed to allow unlicensed devices to operate in the 6 GHz band that many electric companies currently rely on to support critical electric company wireless networks.¹ As discussed herein, electric companies are concerned that potential interference from these unlicensed devices would degrade the service levels necessary to provide reliable service to electric customers, which could result in utility communications outages that could potentially impact areas beyond the company’s service territory.

¹ The FCC is currently considering in a rulemaking whether to open access to licensed spectrum in the 6 GHz band and how to protect incumbent licensees, such as electric companies, that operate in that band. *See In the Matter of Unlicensed Use of the 6 GHz Band, Expanding Flexible Use in the Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Proposed Rulemaking, ET Docket No. 18-295 and GN Docket No. 17-183 (Released Oct. 24, 2018). *See also* Comments of the Utilities Technology Council, the Edison Electric Institute, the American Public Power Association, the National Rural Electric Cooperative Association, the American Petroleum Institute and the American Water Works Association, *In the Matter of Unlicensed Use of the 6 GHz Band, Expanding Flexible Use in the Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Proposed Rulemaking, ET Docket No. 18-295 and GN Docket No. 17-183 (filed Feb. 15, 2019), <https://www.fcc.gov/ecfs/filing/10215631615474> (“Joint Trade Associations FCC 6 GHz Comments”).

At the Technical Conference, Chairman Chatterjee stated that he understood “at a conceptual level...why interference within the 6-gigahertz band is problematic,” and wanted “to drill down a little bit on particularly what the actual reliability impacts could be.”² Given the importance of the data and transmission carried on 6 GHz communications networks for electric system reliability and the risk presented by a hasty FCC decision to permit unfettered and unlicensed access to this band, the Commission should coordinate with the FCC regarding its 6 GHz rulemaking. In particular, as the federal agency charged with ensuring the reliability of the nation’s electric system, the Commission is uniquely situated to engage with the FCC regarding concerns about electric system reliability and how potential reliability impacts associated with increased unlicensed use of the 6 GHz band could be mitigated.

6 GHz microwave communications networks are some of the most reliable networks available and are used by the electric power industry to support a wide variety of utility applications, including voice and data communications that are essential to maintaining operational reliability, safety and security.³ The 6 GHz communications networks are used to support Supervisory Control and Data Acquisition (SCADA) systems that allow utilities to monitor and control substations and other critical assets remotely. Interference to SCADA systems could also impair the ability of electric companies to maintain situational awareness, thereby undermining system reliability.⁴ Moreover, these 6 GHz microwave systems are used to

² See Transcript at 290-291.

³ See Transcript at 292.

⁴ The newer SCADA systems have the ability to send back more detailed data to the control centers to provide improved situational awareness.

backhaul communications,⁵ including voice and data, such that interference could affect large areas beyond where the interference actually occurs.

Electric companies are concerned that increased interference from unlicensed devices in the 6 GHz band would degrade the service levels necessary to provide reliable service to customers and provide required data points to energy markets. Interference to an electric company relying on 6 GHz microwave systems could result in outages on the grid, if the 6 GHz spectrum it uses becomes unreliable due to interference from unlicensed devices. Thus, if communications are lost or degraded, an electric company's ability to monitor and control electric service could be compromised, potentially impacting an area beyond the company's service territory.⁶ Because proposed unlicensed use would occur primarily on the same platforms that carry the network backhaul, the electric power industry is concerned that the likelihood of interference with these communications is unacceptably high.

The FCC's proposal further presents a risk that generation, transmission and distribution SCADA communications could be compromised. Loss of distribution SCADA would mean a company would no longer have site visibility at locations dependent on 6 GHz microwave radio systems, causing a loss of station control, telemetry, equipment status and alarms, and it also would impact outage restoration. The loss of distribution SCADA can have immediate impacts on customers and potentially endanger the company's personnel because the electric company would lose part of its ability to quickly detect where outages are happening and remedy them.

⁵ The backhaul communications comprise the intermediate links between the core network, or backbone network, and the small subnetworks at the edge of the network.

⁶ See Joint Trade Associations FCC 6 GHz Comments; Attachment: Spectrum and Utility Communications Networks: How Interference Threatens Reliability, M. Douglas McGinnis, Red Rose Tele. Comm, prepared for the Utilities Technology Council, at 16. (If interference prevents teleprotection systems from operating within milliseconds, it could result in unreliable electric service).

An electric company would have to rely on customers calling in their outages to trigger an electric company's outage response plan, rather than getting real-time information from the substations' SCADA Remote Terminal Units (RTUs) and Advance Metering Infrastructure (AMI). For many electric companies, this disruption would undermine the major investments that have been made in smarter energy infrastructure such as smart meters and other sensors that have been deployed on the energy grid to automatically detect and pinpoint outages.

Loss of generation site communications could compromise access to a wider array of plant systems that are dependent on reliable communications. Among the many potential impacts could be a loss of critical plant data inputs from the generating facilities to Generator Operator (GOP) SCADA RTU and the responsible Balancing Authority, etc., as well as intertie meters. At the Technical Conference, Chairman Chatterjee asked about Alliant Energy's generators reliance on 6 GHz wireless networks for sending information to MISO via microwave every two seconds.⁷ The Alliant Energy witness explained how interference from unlicensed devices in the 6 GHz band could cause a significant disruption, making it extremely difficult for the company to operate its Local Balancing Area within MISO.⁸ MISO's data specification requires Alliant Energy to send the real-time data from these generators every two seconds. Losing visibility to them would not only require notification to MISO and the Transmission Operator, but the company also would not be able to monitor or control the generators or calculate an accurate system load. This could ultimately result in higher costs for customers and decreased grid performance.

⁷ See Transcript at 291.

⁸ See Transcript at 291.

While the loss of voice or data itself does not result in a compliance violation (under NERC Standard TOP-001-4, Requirement 9), the failure to comply with data availability obligations could.⁹ The potential for interference to some companies' wireless networks could increase the risk of such violations. Further, the loss of voice or data to a generating plant may not allow some companies to operate their generators on Automatic Generation Control (AGC).

As discussed, the 6 GHz microwave paths provide the connectivity for network backhaul for some electric companies. If a company loses reliability on the microwave backhaul, its two-way radio system would not function. This would create a safety issue for field personnel, since the Distribution System Operator would lose the ability to communicate via radio with crews during outage restoration and other emergency situations. Interference with 6 GHz wireless networks also impacts the safety of electric company workers during outages, if they lose the ability to communicate their status through the "Emergency" button on the radios or to communicate with the dispatching centers. This also would impact the ability of electric companies to provide local authorities and first responders with real-time situational awareness during emergencies.

Microwave systems in the 6 GHz band also provide communications links with critical infrastructure systems for remote monitoring and control systems, including protective relaying, AMI, wide area situational awareness, integration of distributed energy resources and storage,

⁹ See TOP-001-4 – Transmission Operations, IRO-002-5 – Reliability Coordination, IRO-010-2 – Reliability Coordinator Data Specification and Collection, TOP-003-3 – Operational Reliability Data, TOP-010-1(i) – Real-time Reliability Monitoring and Analysis Capabilities, IRO-018-1(i) – Reliability Coordinator Real-time Reliability Monitoring and Analysis Capabilities and EOP-008-2 – Loss of Control Center Functionality. See also Comments of the American Public Power Association, The Edison Electric Institute and The National Rural Electric Cooperative Association, Critical Infrastructure Protection Reliability Standard CIP-012-1 – Cyber Security – Communications between Control Centers, Docket No. RM18-20-000 (filed June 24, 2019).

electric transportation, distributed grid management, outage detection, phasor measurement units, security monitoring and field dispatch monitoring. A breakdown in communication could result in a loss of radio communications to electric company field employees, such as when they are responding to outages in the wake of a disaster.

Given these potential impacts to both electric companies and the public, the importance of the data and transmission carried on 6 GHz communications networks and the risk presented by potential interference, the Commission should follow up on the testimony presented in the Technical Conference by coordinating directly with the FCC, so that both agencies can fully understand the risks to reliability and resiliency of the grid posed by allowing unlicensed devices to operate in the 6 GHz band. The Commission also should consider formally commenting in that proceeding.¹⁰ The Commission could address not only the threat of interference to electric company private wireless networks but also could explain how lack of interference-free spectrum for private broadband use by electric companies may pose adverse impacts to efficiency of energy markets, including the ability for electric companies to provide reliable power to communications providers.

To address concerns regarding adverse impacts to electric power industry reliability and resiliency, the Commission could suggest that it is appropriate for the FCC to delay a decision on unlicensed use of the 6 GHz band until field testing can be completed.¹¹ The FCC's proposal hinges on the ability of nascent and untested technology to mitigate interference through

¹⁰ Although the period for filing comments and reply comments has closed in the above-referenced dockets, input may still be provided to the FCC on written ex parte basis.

¹¹ Commissioner Glick asked if the Commission was to engage in a dialogue with the FCC, should the Commission "ask the FCC to delay the rule-making until the field-testing is done?" See Transcript at 288. Commissioner LaFleur also discussed whether, in such a dialogue with the FCC, the Commission should address the need for field testing for interference related to the FCC's 6 GHz proposal. See Transcript at 319.

automated frequency coordination (AFC). The electric power industry is concerned that this mitigation scheme is difficult in practice to implement, particularly with respect to electric company operations in the 6 GHz band. Before finalizing any rule to permit increased unlicensed access to the 6 GHz band, it is both reasonable and prudent for the FCC to ensure that AFC can address concerns about the impacts of interference on electric reliability. This means there must be a reasonable time for independent testing under real-world conditions in all seasons.¹² A delay in the FCC process to allow for such testing is, therefore, appropriate.

Such independent testing would provide greater confidence among stakeholders and the electric power industry that reliability concerns were being thoroughly examined while also alleviating the burden of reviewing competing studies, which may not provide a comprehensive evaluation of the risk faced by critical energy infrastructure. For example, RigNet Satcom, Inc., which operates a microwave network in the 6 GHz band that provides high reliability backhaul network for mission critical communications serving more than 300 offshore oil and gas production platforms in the Gulf of Mexico, provided a study to the FCC to demonstrate that opening the 6 GHz band to unlicensed use in the Gulf of Mexico would create unreasonable risk of interference to existing critical communications systems.¹³ In contrast, Apple Inc., Broadcom Inc., Cisco Systems, Inc., Facebook, Inc., Google, LLC, Hewlett Packard Enterprise, Intel Corp., Marvell Semiconductor, Inc. and Qualcomm Incorporated have submitted their own analyses to the demonstrate that unlicensed devices do not pose harmful interference risk to incumbent

¹² Adequate testing requires at least 12-18 months to account for devices operating both indoors and outdoors, seasonality, various meteorological and geographic conditions.

¹³ See Letter from James Arden Barnett, Jr., Senior Vice President, RigNet Satcom, Inc., to Marlene H. Dortch, Secretary, FCC, ET Docket No. 18-295 (filed July 11, 2019), https://ecfsapi.fcc.gov/file/10711942815756/RigNet_Interference_UNII5_Roberson_1.0.pdf. The study describes “extremely high levels of interference” that render the links inoperable and sever the Real Time Monitoring service, mission critical and 911 communications for oil and gas production platforms in the Gulf.

users.¹⁴ The FCC should therefore get interference mitigation right with independent testing of its proposed interference mitigation scheme fully in the field.¹⁵ To this end, independent testing could involve the FCC’s collaboration with other federal partners such as the Commission, the U.S. Department of Energy and the national labs.

B. The Commission should coordinate with the FCC regarding potential impacts to electric power industry reliability and resiliency from radio frequency interference with electric company wireless networks.

Chairman Chatterjee focused on the potential impacts to reliability, electric companies and customers with respect to the uses of communications networks.¹⁶ Likewise, Commissioners LaFleur¹⁷ and McNamee¹⁸ also concentrated on the issue of radio frequency interference and its potential for adverse impact on electric company wireless networks. This should be an area of focus for Commission engagement with the FCC.

During the Technical Conference, Commissioner McNamee appropriately questioned whether electric companies and communications providers define interference differently. Commissioner McNamee stated that “there may be a fundamental problem that—that FCC speak about what is tolerable and FERC speak about what is tolerable are two different standards.”¹⁹ Commissioner McNamee illustrated that if a cell phone cuts out, then “it’s not a big deal,” while

¹⁴ See Letter from Paul Margie, Harris, Wiltshire and Grannis LLP, on behalf of Apple Inc., Broadcom Inc., Cisco Systems, Inc., Facebook, Inc., Google, LLC, Hewlett Packard Enterprise, Intel Corp., Marvell Semiconductor, Inc. and Qualcomm Incorporated, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 18-295; GN Docket No. 17-183 (filed July 31, 2019).

¹⁵ See Transcript at 288-289. Note Qualcomm states “testing is definitely within the realm of something that should be done here.” See Transcript at 290.

¹⁶ See Transcript at 291.

¹⁷ See Transcript at 315-318.

¹⁸ See Transcript at 319.

¹⁹ See Transcript at 326-327.

“on the electric side, you have a blip, it may disrupt a dispatch signal that’s critical.”²⁰

Commissioner McNamee is correct that shared expectations around interference, what that looks like, what is acceptable and what is not are very important to any effort to ensure that increased broadband deployment does not create undue risks for the reliability of the BPS and should be a topic of discussion between the Commission and the FCC, in addition to issues related specifically with the 6 GHz band.²¹

Electric companies use spectrum in support of private wireless networks in a variety of ways as part of the operation of the energy grid and to connect operation centers to service crews. Due to the criticality of these networks, electric companies cannot accept degraded wireless networks caused by radio frequency interference. Losing access to interference-free spectrum for electric company wireless networks presents a risk that an electric company will suffer both diminished operational capabilities and situational awareness, which can result in degraded reliability. Electric companies require communications systems that are used for mission-critical communications to maintain high standards for reliability. For instance, most electric company communications systems are designed for availabilities of 99.999 percent or better; and some even operate at 99.9999 percent reliability. To maintain this standard, any individual link in the system must have a high “mean time between failures,” which means that routine interruptions caused by microwave loss of signal caused by interference cannot be tolerated.²²

²⁰ See *Id.*

²¹ See *Id.*

²² See Joint Trade Associations FCC 6 GHz Comments; Attachment: Spectrum and Utility Communications Networks: How Interference Threatens Reliability, M. Douglas McGinnis, Red Rose Tele. Comm, prepared for the Utilities Technology Council, at 11.

Wireless networks degraded by radio frequency interference presents a further risk to SCADA systems that poll or request information to provide visibility to manage the grid in real-time. Newer devices being introduced with improved telecommunications are able to push more intelligence further into the field, providing additional detail to the health of the grid and improving overall situational awareness. In sum, the Commission should coordinate with the FCC regarding potential impacts to electric power industry reliability and resiliency from radio frequency interference with electric company wireless networks and not just with respect to the 6 GHz band, but with regard to its general policies for spectrum.

C. The Commission should seek to facilitate coordination with the Federal Communications Commission on cross-industry issues.

Coordination and engagement between the Commission and the FCC beyond the issues related the 6 GHz band would be valuable to all stakeholders because the electric power industry is a major user of wireless telecommunications systems to support the goals of reliability, grid modernization and to promote customer solutions. To support the BPS and the distribution system, electric companies must possess reliable, secure communications systems capable of handling large amounts of data and traffic with an extremely low level of latency, including during electric system service outages, natural or man-made disasters, or other emergency situations affecting the grid. Consequently, wireless networks have become a critical component of the provision of safe, reliable and secure electric service and electric companies face a growing need for spectrum to carry out the industry's mission.

During the Technical Conference, EEI and UTC witnesses emphasized that the electric power industry uses private wireless networks to address reliability and security requirements and that they also are used to support the resilience of the grid. The increased use of grid modernization applications and smart meters also highlights the need for enhanced monitoring

and control of the grid to maintain safe, secure and reliable operations and the need for unencumbered access to broadband frequency.

Yet, as the electric power industry's need for spectrum has grown to support robust and highly reliable internal communications systems, it has become increasingly difficult for electric companies to obtain spectrum due to the competing needs of commercial telecommunications services. This problem is worsening as electric companies are potentially forced to share licensed spectrum with unlicensed users in bands that are already heavily-used and the FCC seeks to satisfy commercial carriers' uses in other bands. Chairman Chatterjee appeared to recognize this concern when he asked whether there are communication issues that the Commission might need to monitor, given that the electric power industry's use of spectrum is expected to grow and change.²³ The growing interdependence between the electric and communications industries does warrant the Commission coordinating and formally engaging the FCC and other stakeholders in regular meetings.²⁴ These engagements also can provide a forum for considering ways to improve service restoration and cross-sector coordination in the aftermath of extreme weather events like Hurricane Michael or other emergencies. This type of engagement is consistent with the FCC's recent recommendation to increase federal and state coordination to identify ways for federal regulators to harmonize restoration practices across sectors. Opening such a dialogue will help the Commission understand the increasing

²³ See Transcript at 295.

²⁴ See Transcript at 288-289. See also Statement of JP Brummond, Vice President, Business Planning, Alliant Energy on behalf of the Edison Electric Institute, *Reliability Technical Conference*, at 6-7, Docket No. AD18-11-000.

interdependencies between these sectors and provide a basis for broader policy discussions and awareness.²⁵

III. CONCLUSION

The Trade Associations appreciate the Commission convening the July 27, 2019, reliability technical conference and the opportunity to submit additional comments. Interference in the 6 GHz range could create risks to reliable grid operations and public safety. Due to the vast service territories and the rapid communication timeframes required for critical systems, the 6 GHz band is an extremely important band to the electric power industry because it can accommodate the bandwidth and performance objectives needed over long microwave paths to ensure grid reliability. The Commission should seek to coordinate with the FCC on cross-industry issues as described above, including on potential impact to electric power industry reliability and resiliency from radio frequency interference with electric company wireless networks and from unlicensed devices operating in the 6 GHz band.

Respectfully submitted,

EDISON ELECTRIC INSTITUTE

/s/ Aryeh B. Fishman

Aryeh B. Fishman

Associate General Counsel, Regulatory Legal
Affairs

Edison Electric Institute

701 Pennsylvania Avenue NW

Washington, D.C. 20004

afishman@eei.org

²⁵ See *In the Matter of Public Safety and Homeland Security Bureau Seeks Comment on Hurricane Michael Preparation and Response*, October 2018 Hurricane Michael's Impact on Communications: Preparation, Effect, and Recovery, A Report of the Public Safety and Homeland Security Bureau, PS Docket No. 18-339 (May 2019), <https://docs.fcc.gov/public/attachments/DOC-357387A1.pdf>.

UTILITIES TECHNOLOGY COUNCIL

Brett Kilbourne
Vice President, Policy, and General Counsel
Utilities Technology Council
2511 Jefferson Davis Highway
Suite 960
Arlington, VA 22202
brett.kilbourne@utc.org

NATIONAL RURAL ELECTRIC
COOPERATIVE ASSOCIATION

Randolph Elliott
Senior Director, Regulatory Counsel
Barry R. Lawson
Senior Director, Regulatory Affairs
National Rural Electric Cooperative Association
4301 Wilson Blvd.
Arlington, VA 22203
Randolph.elliott@nreca.coop
Barry.lawson@nreca.coop

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