

April 8, 2019

Senator Brian Birdwell, Chair
Senator Judith Zaffirini, Vice Chair, and
Members of the Committee on Natural Resources and
Economic Development
Texas State Senate

Comments of officers of the InfraGard Electromagnetic Pulse (EMP) Special Interest Group on Texas SB 76), submitted as individuals only

To the Members of the Texas State Senate Committee on Natural Resources and Economic Development:

We are members of the non-profit InfraGard National Members Alliance comprised of more than 60,000 volunteers committed to the resilience of our nation's critical infrastructures. We are also the co-editors of the InfraGard book sponsored by InfraGard's Electromagnetic Pulse (EMP) Special Interest Group, **Powering Through: From Fragile Infrastructures to Community Resilience** (Version 1.0, 2016; Version 2.0, forthcoming, 2019). We write this letter in our individual capacities only.

Members of the InfraGard EMP Special Interest Group have sponsored eight annual InfraGard summits on the protection, mitigation, and recovery of America's critical infrastructures from natural occurring and man-made disasters. Some of us have testified before the Texas State legislature. We follow state legislation in all fifty states for assessment and protection of the critical infrastructures.

First, we urge the Texas State Legislature to embrace the whole of government commitment of the President and federal departments and agencies to defend the nation, its critical infrastructures and people from catastrophic risks to our critical infrastructures.

Second, we urge the Texas State Legislature to recognize that complementary state-initiated protections within the State of Texas and the ERCOT regional electric transmission system, at modest cost, can strengthen the economic development of Texas.

In December 2017 InfraGard's EMP Special Interest Group was pleased to sponsor and award a plaque in honor of (the late) John Houston, former Senior Vice President of CenterPoint Energy for initiating and successfully completing the first EMP-protected control center of any commercial electric utility company in the United States. This initiative strengthened electric distribution system reliability in the Houston, Texas region and inspired design, construction and certification of EMP-protected control centers in many other states.

We also commend the electric utilities operating in Texas and ERCOT system managers who have executed the replacement of many vulnerable electric substation control housings with EMP-protected control housings that contribute to national deterrence and improved reliability for electric transmission in the ERCOT system.

The President's March 26th Executive Order No. 13865, [Coordinating National Resilience to Electromagnetic Pulses](#), provides for a Whole of Government program to protect the nation from both natural occurring solar storms and man-made electromagnetic pulse hazards.

By instituting a system to assess and strengthen grid resilience, Texas S.B. 76 could extend the system of financial incentives for transmission system resilience to both the generation and distribution components of the Texas electric grid.

Recall that on April 16, 2016 Robert W. Bradish, Vice President for Transmission Planning and Engineering, American Electric Power (AEP), appeared before the Texas State Senate and explained that in many of the 13 states where they operate, including Texas and the ERCOT transmission system, AEP has replaced unprotected substation control housings with Electromagnetic Pulse (EMP) protected control housings *at lower cost* per unit than the control housings being replaced. These cost savings result from smarter equipment designs: EMP-protected control housings can be serially produced as modular units that can be transported on interstate highways and fully assembled on site. Moreover, ERCOT provides for cost recovery of these and other resilience upgrades for which all transmission entities operating in ERCOT qualify.

Similarly, in year 2017 the Electric Infrastructure Security Council released a report (co-sponsored by the Defense Threat Reduction Agency) demonstrating that equipment testing to failure has confirmed that, while millions of the commercial relays now deployed might now be vulnerable to the ultrafast E1 pulses in a High Altitude EMP (or HEMP) attack, other relays that are EMP-survivable are also widely deployed, and these field-tested relays provide adequate protection against the E1 pulses at comparable or only slightly higher per unit costs.

Two key ingredients in protecting the electric grid from both natural occurring and man-made electromagnetic threats are: designing resilience into system architectures instead of retrofitting, and validating equipment resiliency before selection among alternatives. If Texas creates financial and architectural incentives for a more resilient grid, the costs of protection should be both affordable and a magnet for businesses to select Texas whenever grid resilience is recognized as a competitive advantage.

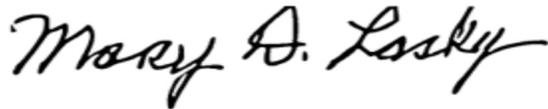
At present Texas remains vulnerable to man-made cyber-kinetic-EMP hazards and to solar storms. At the Geomagnetic Disturbance Task Force meeting of the North American Electric Reliability Corporation (NERC) in Austin on January 30, 2019, a spokesperson for a group of ERCOT-based utilities acknowledged that large power transformers within ERCOT have experienced *geomagnetic-induced currents* (GICs) as high as 70 amps per phase during just moderate-level solar storms. Even in South Texas, large power transformers are at risk of loss during severe solar storms. Compare the known 70 amp per phase GIC in Texas to the test done by Idaho National Laboratory, which, in 2012, applied current injections of just 22 amps per phase which caused transformer heating, vibration, and downrange DC current saturation of another transformer.

The July 2017 EMP Commission Reports released in year 2018 (see the reports at www.firstempcommission.org) explained that the same equipment that would protect against more severe high altitude nuclear EMP detonations (HEMP) will also protect against damage of the late-time E3 pulses from less energetic solar storms. Note that protecting for solar Geomagnetic Disturbance storms (GMD) alone will not also protect for HEMP.

SB 76 provides broader stakeholder representation, and would be likely to accelerate adoption of standards and cost-recovery mechanisms for the Texas electric grid. Designing EMP and GMD protections into new infrastructure systems may add 2 to 5 percent to overall system costs. Retrofitting, if later required, can add 25 percent or more to system costs.

The State of Texas now has an opportunity to complement federal initiatives embedded in Executive Order 13865 with state initiatives to build economic prosperity throughout Texas and particularly in demonstration program municipalities.

Respectfully submitted in our individual capacities only:



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The above letter from officers and members of the InfraGard EMP SIG does not necessarily represent the views of the Board of the InfraGard National Members Alliance.