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November 5, 2021

Via Electronic Submission

Ms. Holly Anderson
Clerk
Vermont Public Utility Commission
112 State Street
Montpelier, VT 05620

Re: Case No. 19-0869-PET: Petition of the Vermont Department of Public Service for a Workshop Regarding Host-Remote Isolation

Dear Ms. Anderson,

This will serve as the status report referenced in my correspondence of October 19, 2021. I had reported that after a recent discovery conference with members of the Department of Public Service (the “Department”) and the Vermont Enhanced 9-1-1 Board (the “Board”), an updated status report would be filed on or before November 5, 2021. This is the updated status report.

At the outset, I note that the Vermont Public Utility Commission (the “Commission”) opened this case as a result of a March 27, 2019, request for a workshop regarding host-remote isolation filed by the Vermont Department of Public Service. The Department requested the Commission open this Case believing “...it appropriate to further develop the public record regarding isolation and investigate potential remedies to mitigate the risk of isolation events.” *See* Department’s Request for Workshop Regarding Host-Remote Isolation, at p. 2. In turn the Commission opened the case seeking:

- the identification of the current status, location, and impact of host-remote isolation vulnerabilities in Vermont wireline telephone networks; and
- the identification of potential solutions and corresponding costs for the resolution or mitigation of the identified host-remote isolation vulnerabilities.

See Commission Order Opening Investigation, at p. 2, entered April 16, 2019.

Since the public workshop held on July 12, 2019, and pursuant to the terms of the Commission’s Protective Order issued on October 6, 2020, Consolidated has met with members of the Department’s Staff and members of the 911 Board to review various requests for information related to host-remote isolation. Consolidated has agreed with the Department and the 911 Board to issue this status report addressing several issues with as much public information as possible.

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This is consistent with Consolidated's proposed process for the disclosure of allegedly confidential information filed with the Commission on July 22, 2019.

Consolidated first addresses the issue of its overall network improvements leading to a decline in Vermont municipalities that are subject to host-remote isolation events. Since the time of the FairPoint Communications' acquisition of the Verizon New England wireline assets in 2007, the various network improvements have led to a fifty-seven percent (57%) decrease in the number of Vermont communities susceptible to host-remote isolation - from sixty (60) susceptible communities in 2009 to twenty-six (26) communities in 2020. Several factors accounted for this decrease.

- ❖ Between 2008 and 2011, FairPoint Communications upgraded the legacy Verizon Asynchronous Transfer Mode ("ATM") network backbone to an IP-MPLS backbone. This led FairPoint Communications to install network fiber and electronics upgrades in all legacy Verizon central offices. During this network upgrade, FairPoint Communications upgraded many remote, non-diverse switches in remote central offices with existing fiber route diversity to be technologically diverse. Physical diversity, or route diversity, refers to multiple paths (at least two) for communications/data to travel; if one communication path is cut, as an example, the switch redirects the communications/data traffic to another route connecting to a different central office. Technological diversity refers to the existence in the central office or remote-host of all necessary equipment (including cards) to ensure communications/data may be redirected in the event of equipment failure or a break/cut in the primary communications transmission path.
- ❖ Also during this time and on-going during routine technical enhancements, other remote, non-diverse switches within central offices were put on diverse ring designs for physical diversity.
- ❖ Of the 26 communities referenced above, eleven (11) communities do not have route or physical diversity. Seventeen (17) communities have partial diversity.

During the course of this Case, Consolidated has analyzed 911 call statistics to determine the overall scope of calls from communities vulnerable to isolation events. Call volume data reflect the 911 calls (including all classes of service - landline, wireless and VoIP) from the susceptible communities accounted for approximately 4.98% of the statewide 911 calls in 2018. Landline calls to 911 from these communities accounted for 1.38% of the total 2018 statewide 911 call volume. This low percentage of 911 landline calls is likely a significant improvement from 2007 caused both by (i) the above referenced network upgrades and (ii) the continuous decline in landlines to increased use of cell phones and VoIP based phones.

Second, Consolidated addresses issues related to the work necessary to remediate the network in communities that do not have physical diversity or technological diversity in the Consolidated central offices. Consolidated's Network Architecture Team reviewed the network infrastructure

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in seven communities and developed cost estimates related to equip the central offices or remote-hosts with the necessary diversity to eliminate potential isolation events. This work is tedious and time consuming due to the nature of the research required related to the network and the development of estimates related to the work necessary to complete the work. This exercise demonstrated that such work is prohibitively expensive. Consistent with the confidentiality concerns addressed by Consolidated during the workshop and as discussed in the Protective Order, these communities are not named herein.

For example, several communities without physical or technological diversity interconnect with Consolidated's Burlington central office, which has route diversity and technological diversity, as the host office for their communications/data traffic. The work required to construct a diverse path for the telecommunications/data traffic entails Consolidated interconnecting the communities with another host office. This work requires the installation of an extensive number of new utility poles, many needing to run through national forest land or state forest land, with associated installation of miles of inter-office fiber. New pole lines and new fiber require extensive vegetative maintenance to prepare the necessary clearing for the work, the hanging of the necessary aerial fiber and equipment as well as underground conduit and underground fiber. A cost estimate for three communities along the same network path came to \$1,605,000.00.

This high cost estimate included the required installation of over three hundred (300) new utility poles, over ninety thousand (90,000) feet of aerial fiber and over five thousand (5,000) feet of underground fiber, plus associated conduit. These communities also require additional central office equipment or switch card upgrades for technological diversity. Vegetative maintenance expense was not included in this estimate due to the state/national park considerations; the costs of such work would be extraordinarily high and the Consolidated team is uncertain if necessary permits could be obtained.

Another cost estimate for a different community came to \$371,000.00. This lower cost community did not require new utility pole installation work, but would require the installation of over thirty thousand (30,000) feet of new aerial fiber and over five thousand (5,000) feet of underground fiber, plus associated conduit. These community also requires additional central office equipment or switch card upgrades for technological diversity.

Additional communities not interconnected to Burlington as the host office were reviewed as well. The cost estimates to add necessary diversity included the same elements as discussed above for the communities interconnected to Burlington as the host office. Total costs ranged from over \$220,000.00 to over \$900,000.00. In total, the cost of upgrading the network for additional diversity for the seven communities examined for the discussions with the 911 Board and the Department totaled \$3,643,000.00.

Third, Consolidated addresses potential further mitigation opportunities through the development of recent grant programs. Given the significantly high costs associated with mitigation of the isolation issues reviewed in this case, Consolidated notes that the Vermont Legislature recently enacted Act 71 (2021) - An act relating to accelerated community broadband deployment.

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Pursuant to Section 1, subsection b of the Act's Findings and Intent, the act is intended to protect the public interest by (among multiple other points):

- (1) ensuring broadband availability to all Vermonters and Vermont addresses;
- (2) ensuring public accountability for maintaining and upgrading critical broadband infrastructure; and
- (6) directing public resources to the development of public broadband assets intended to provide universal access...

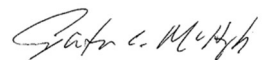
The Act also established the Vermont Community Broadband Board (the "VCCB"). According to the VCCB's web page – at <https://publicservice.vermont.gov/vcbb> - the VCCB will develop policies and programs to accelerate community efforts that advance the State's goal of achieving universal access to reliable, high-quality, affordable, fixed broadband achieving speeds of at least 100 Mbps symmetrical. Indeed, the VCCB's Broadband Funding web page acknowledges "Expanding broadband is expensive..." This is consistent with what Consolidated reported herein regarding the significant network resiliency cost projections.

However, the VCBB may be in a uniquely qualified position to assist with the remediation of host-remote vulnerabilities. Expanding symmetrical Broadband service to every Vermont address provides another avenue of communication in the communities where such Broadband networks are built (or expanded). Symmetrical Broadband bandwidth of 100 Mbps necessarily entails the development of a non-copper cable based network, with an obvious choice being a fiber based network. Such networks allow for voice based transmission services and afford customers another avenue of communication with 911 systems.

With the submission of this status report, Consolidated believes the objectives set forth by the Department in its initial request for a workshop and the objectives set forth in the Commission's order establishing this Case have been met. Therefore, Consolidated respectfully requests the Case be closed.

Please let me know of any questions.

Sincerely,



Patrick C. McHugh
On Behalf of Consolidated Communications of Vermont Company, LLC

Cc: EPUC Service List