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December 16, 2021

SENT VIA WEB PORTAL

Amanda Maxwell
Executive Director and Secretary
Washington Utilities and Transportation Commission
621 Woodland Square Loop SE
Lacey, Washington 98503

Re: *Washington Utilities & Transportation Commission v. CenturyLink Communications*,
(2018 911 Outage), Docket UT-181051

Dear Director Maxwell:

Enclosed for filing in the above-referenced docket is a Public Counsel Motion to File Revised Testimony, along with the revised direct testimonies of Stephanie K. Chase and Brian Rosen on behalf of Public Counsel. And errata sheet detailing the revisions are also included.

The testimonies are provided in both clean and redlined versions. Please note that the Direct Testimony of Brian Rosen is designated confidential per protective order in Docket UT-181051.

Please let me know if you have any questions about this filing.

Sincerely,

/s/ 

NINA SUETAKE, WSBA No. 53574
Assistant Attorney General
Public Counsel
(206) 389-2055

NMS/CM
Enclosures

cc: Service List (via E-mail)
ALJ Samantha Doyle (via E-mail)
ALJ Gregory Kopta (via E-mail)

**BEFORE THE WASHINGTON
UTILITIES & TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

Complainant,

v.

CENTURYLINK COMMUNICATIONS, LLC

Respondent.

DOCKET UT-181051

**DIRECT TESTIMONY OF BRIAN ROSEN
ON BEHALF OF
WASHINGTON STATE OFFICE OF THE ATTORNEY GENERAL
PUBLIC COUNSEL UNIT**

Exhibit BR-1CT

December 15, 2021

(Revised December 16, 2021)

**Shaded Information is Designated Confidential
per Protective Order in Docket UT-181051**

1 can gain cost savings. The better practice remains to deploy two vendors,
2 particularly in a system as important as 9-1-1.

3 **Q. Did CenturyLink design its optical network to mitigate software failures in**
4 **this manner?**

5 A. No, in this case, CenturyLink built its optical network using multiple
6 optical network switches supplied by one vendor, Infinera Corporation.⁵⁶ Had
7 CenturyLink deployed two vendors, the nationwide failure that impacted
8 Washington's 9-1-1 system either would not have happened, or the scope and
9 duration of the failure would have been reduced dramatically.

10 **Q. Was the design of the interface between CenturyLink and Comtech**
11 **sufficiently redundant?**

12 A. Yes and no. The general advice for highly reliable systems like 9-1-1 is to
13 provision at least two physical locations, with at least two of everything at each of
14 those sites. In this case, the failure happened in the SS7 signaling links between
15 the Comtech STP and the Comtech RCL,⁵⁷ where there were indeed two sites and
16 two links from each site.⁵⁸ It would appear, therefore, that a lack of redundancy at
17 the apparent failure point was not the source of the failure.

18 I believe the failure occurred because all four links used the same optical
19 network.⁵⁹ In building 9-1-1 systems, I generally advise that supplier diversity be

⁵⁶ *Id.*

⁵⁷ See Rosen, Exh. BR-5 (CenturyLink Supplemental Response to Public Counsel Data Request 7, Attachment PC-7a).

⁵⁸ *Id.*

⁵⁹ *Id.*

1 used to guard against the kind of failure that occurred here. In this case, there was
 2 no supplier diversity. CenturyLink supplied [REDACTED]
 3 [REDACTED].⁶⁰

4 **Q. Was Comtech aware of the link supplier diversity issue?**

5 A. [REDACTED]
 6 [REDACTED]
 7 [REDACTED].⁶¹ [REDACTED]
 8 [REDACTED].⁶² Had
 9 they been able to complete this process before the outage, I believe the system
 10 would have remained functional.

11 **Q. Please discuss the problems you have identified with CenturyLink’s design of
 12 the 9-1-1 system in this case.**

13 A. When CenturyLink provided 9-1-1 service to Washington, it used Intrado as its
 14 third-party vendor.⁶³ When WMD later awarded Comtech the 9-1-1 contract,
 15 CenturyLink/Intrado’s system had to interconnect with Comtech’s system to
 16 effectuate the transition between the two companies.⁶⁴ Both
 17 CenturyLink/Intrado’s ESInet and Comtech’s ESInet are based on Internet
 18 Protocol (IP). The way CenturyLink designed the interconnection between the

⁶⁰ Rosen, Exh. BR-15C (Comtech Confidential Response to Public Counsel Data Request No. 1); *see also* Rosen, Exh. BR-5 at 5 (CenturyLink Supplemental Response to Public Counsel Data Request No. 7, Attachment PC-7b).

⁶¹ Rosen, BR-16C (Comtech Confidential Response to Public Counsel Data Request No. 3).

⁶² *Id.*

⁶³ Staff Investigation Report at 6.

⁶⁴ *Id.* at 8.

1 **Inserting a third-party company into the SS7.** Comtech requested to
2 interconnect directly to CenturyLink, but CenturyLink refused to do so.⁹⁵ Direct
3 connection would have minimized SS7's loss of reliability. CenturyLink's refusal
4 required Comtech to utilize a third party, TNS, for the SS7 connection.⁹⁶ Any
5 extra element in the path between points decreases reliability, and incorporating
6 another company increased the probability that Washington's 9-1-1 system would
7 wind up as it did—having to use the same optical network for all four connections
8 between TNS and Comtech.

9 **Lack of Redundancy/Vendor Diversity.** A failure can affect all call elements
10 from a single vendor in a network. If the network has only one vendor, the failure
11 can impact the whole network. Failures in a network that lacks vendor diversity is
12 one of the most common sources of widespread outages. I believe the only
13 defense against these kinds of failures is never to rely on a single vendor, with a
14 single software stack, in any network that supports 9-1-1.

15 Telecom companies like CenturyLink routinely qualify at least two
16 vendors for such equipment as the Infinera systems that failed here. Had
17 CenturyLink deployed two vendors, failure of all the Infinera devices could likely
18 not have caused failure of the 9-1-1 system.

19 Similarly, CenturyLink failed to ensure vendor diversity in the
20 interconnect with Comtech. The CenturyLink experts who worked on the design

⁹⁵ Rosen, Exh. BR-18C (Comtech Response to Public Counsel Data Request No. 4); Rosen, Exh. BR-17 (Comtech Response and Supplemental to Public Counsel Data Request No. 26).

⁹⁶ Rosen, Exh. BR-18C (Comtech Response to Public Counsel Data Request No. 4).

1 of Washington's network certainly should have reviewed the entire network
2 design between Intrado and Comtech. Any such detailed review would have
3 shown them that all four links were provisioned in the same network, which I
4 believe would not have been acceptable to any expert, no matter whether physical
5 redundancy was achieved. Based on the design used, I believe CenturyLink's
6 experts either did not conduct the needed review, or did so but lacked the ability
7 to spot this issue.

8 **Q. Please summarize your conclusions regarding CenturyLink's responsibilities**
9 **and obligations at the time of the outage.**

10 A. The contract between WMD and CenturyLink made CenturyLink responsible not
11 just for routing and delivery of calls, but for network and transport as well. As the
12 transition from CenturyLink to Comtech occurred, subsequent contract
13 amendments relieved CenturyLink of responsibility for routing and delivery to
14 PSAPs that transitioned to Comtech, but did not relive the Company of its
15 network and transport responsibility. In fact, CenturyLink provided network and
16 transport for both signaling and voice all the way from Intrado to Comtech.
17 Accordingly, CenturyLink bears responsibility for the failure of that network and
18 transport.

19 Additionally, WMD, the agency responsible for overseeing the statewide
20 9-1-1 system, believes CenturyLink retained a role, and thus an obligation, under
21 its contract that would not end until no parts of the originating or terminating
22 networks were connected to CenturyLink. WMD also believes strongly that the
23 citizens of Washington expect that any entity involved in the process of