BEFORE THE WASHINGTON
UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. CENTURYLINK COMMUNICATIONS, LLC Respondent.	DOCKET UT-181051

OPENING BRIEF OF PUBLIC COUNSEL

January 17, 2023

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

REDACTED VERSION

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I. INTRODUCTION

1. 9-1-1 service is not merely a convenience. Washingtonians rely on 9-1-1 to work when dialed in moments of need. Reliable 9-1-1 service is critical to reach police, fire departments, and paramedics during emergencies. Outages pose potential danger to public safety, particularly when the public does not have access to adequate information. Washington experienced a significant 49-hour intermittent statewide 9-1-1 outage in December 2018, during which the 9-1-1 system received approximately 34 percent fewer calls compared to historical averages.

2. CenturyLink Communications, LLC f/k/a Qwest Communications Company, LLC (CenturyLink) was one of two 9-1-1 service providers responsible for the 9-1-1 system in Washington in December 2018. The outage occurred as Washington transitioned the 9-1-1 service from CenturyLink to a new provider. CenturyLink's contract governed its obligations during this transition period and makes clear that CenturyLink was responsible for the outage. Additionally, CenturyLink made certain design and implementation decisions that exacerbated the outage for Washingtonians. As a result, the Commission should hold CenturyLink responsible and impose maximum statutory penalties for the violations alleged in this case, totaling $26,865,000 under Public Counsel's analysis of call volumes.

II. BACKGROUND/FACTS

3. Beginning early on December 27, 2018, CenturyLink experienced a network outage impacting a variety of telecommunications services, most notably the 9-1-1 system, which

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disrupted emergency and public safety communications across Washington State.[1] During the outage, 9-1-1 calls placed by some Washington residents could not reach Public Safety Answering Points (PSAPs).[2] As a result, 9-1-1 call agents could not dispatch emergency services, leaving some Washingtonians without assistance.[3]

4. At the time of the outage, and since 2009, CenturyLink provided Internet Protocol-enabled 9-1-1 services to Washington under contract with the Washington Military Department (WMD).[4] In 2016, WMD awarded a new contract for 9-1-1 services to TeleCommunication Systems, Inc. d/b/a Comtech Telecommunications Corp. (Comtech) that would ultimately transfer 9-1-1 services from CenturyLink to Comtech.[5] To facilitate the transition to a new 9-1-1 vendor, the 2009 contract between WMD and CenturyLink was amended (Amendment M) to add transition services and a scope of work for the additional transition services.[6] Because the transition of 9-1-1 services from CenturyLink to Comtech was not completed by December 2018, Amendment M was in effect during the outage.[7] At the time of the outage, the full

[1] Direct Testimony of Brian Rosen, Exh. BR-1CTr at 6:3–6 [citing *Investigation Report, CenturyLink Communications, LLC, UT-181051, Staff Investigation, Consumer Protection and Regulatory Services* at 3 (filed Dec. 2020) (henceforth "Staff Investigation Report")].
[2] Rosen, Exh. BR-1CTr at 6:6–8.
[3] Direct Testimony of Angela White, Exh. AW-1T; Direct Testimony of David White, Exh. DW-1T; Direct Testimony of Samantha Hovey, Exh. SH-1T; and Direct Testimony of Victor Barajas, Exh. VB-1T.
[4] Rosen, Exh. BR-4C (WMD Response to Public Counsel Data Request No. 3, Attachment Washington State Military Department Contract E09-196).
[5] Testimony of Jacque Hawkins-Jones, Exh. JHJ-1CT at 4:8–12; Hawkins-Jones, Exh. JHJ-3C at 9.
[6] Rosen, Exh. BR-4C (WMD Response to Public Counsel Data Request No. 3, Attachment Washington State Military Department Contract E09-196, Amendment M).
[7] Rosen, Exh. BR-1CTr at 7:4–16; Hawkins-Jones, Exh. JHJ-3C (Staff Investigation Report).

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transition from CenturyLink to Comtech had not yet occurred, and only 47 of the 62 PSAPs had transitioned to Comtech's Emergency Services Internet Protocol Network[8] (ESInet).[9]

5. The cause of the outage is not in dispute. Specifically, an Infinera switching node[10] on one of CenturyLink's six nationwide optical transport networks (the "Green network") generated malformed packets that continuously transmitted in a feedback loop.[11] This packet flooding[12] prevented equipment from appropriately routing and transmitting data, causing multiple voice, Internet Protocol (IP), and transport outages across CenturyLink's nationwide network.[13] CenturyLink's national optical network failure disrupted routing of Washington 9-1-1 calls from CenturyLink's ESInet vendor, Intrado,[14] to Comtech's ESInet, and many calls made to Comtech-controlled PSAPs could not be completed.[15]

A. Washington 9-1-1 Network Configuration at the Time of the Outage

6. During the transfer of 9-1-1 services from CenturyLink to Comtech, CenturyLink's ESInet was connected to Comtech's ESInet until all PSAPs had transitioned to Comtech. CenturyLink's ESInet was handled by its contractor, Intrado. However, because none of the

[8] An ESInet is an IP-based network used for 9-1-1 emergency response communication. *See* James D. Webber, Exh. JDW-9 at 2.
[9] Staff Investigation Report at 9–10.
[10] *See* Webber, Exh. JDW-4 at 6–8 (*Pub. Safety and Homeland Sec. Bureau, December 27, 2018 CenturyLink Network Outage Report*, 6–8 (F.C.C., Aug. 19, 2019) (hereinafter "FCC Report"), https://docs.fcc.gov/public/attachments/DOC-359134A1.pdf). Each node provides optical fiber switching, a process that ensures that network traffic is directed towards the intended network path, between networks components called line modules. *Id.* at 5.
[11] Rosen, Exh. BR-1CTr at 6:8–14 (citing FCC Report at 6–8).
[12] Packets are units of data routed between an origin and a destination on a network. The packets in this instance contained a value purporting to be the length of the packet, but was incorrect. Due to the way the software was designed and configured, the incorrect length meant that packets were not discarded, as they should have been, and instead were re-broadcast to other switches. Rosen, Exh. BR-1CTr at 6, n.6.
[13] Rosen, Exh. BR-1CTr at 6:11–7:3 (citing FCC Report).
[14] Formerly West Telecom Services, Inc.
[15] *Id.*

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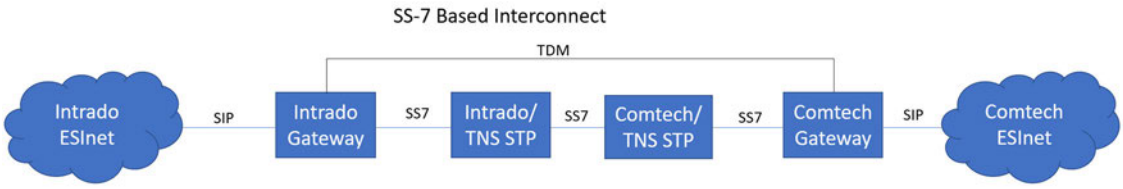
originating service providers had been provisioned at the time,[16] CenturyLink determined which calls were destined for PSAPs served by Comtech. CenturyLink passed those calls through an interconnection between CenturyLink and Comtech. Comtech then routed the calls to the proper PSAP.

7. The two IP-based ESInets were connected using older technology called Signaling System 7 (SS7) in the following configuration.[17] SIP in this diagram stands for Session Initiation Protocol, which provides the signaling and call setup protocol implemented in both ESInets.

Figure 1 SS7 Interconnect between CenturyLink/Intrado ESInet 1 and Comtech ESInet 2



8. SS7 has two parts: a signaling connection and a voice trunk connection. The signaling connection alerts the other side that a call is being initiated and should be completed (the call setup). The signaling messages include information about the called party (in this case, the 9-1-1 PSAP), the caller's telephone number, and the voice trunk the originating service has selected for the call. The voice trunk carries the actual audio of the call. SS7 signaling messages pass from an originating device to a terminating device. On Figure 1, above, the SS7 originating device was the Intrado gateway,[18] and the terminating device was the Comtech gateway.[19] The signaling

[16] Staff Investigation Report at 8.
[17] Rosen, Exh. BR-30CT at 28:6.
[18] *See* Rosen, Exh. BR-5 at 4 (Attachment PC-7a, Intrado RCL, Item 7).
[19] *See id*. at 4 (Attachment PC-7a, Comtech RCL, Item 8).

passes through one or more Signaling Transfer Points (STPs), which are switches that route the SS7 signaling messages from the originating device to the terminating device. In this case, the STPs were supplied by Transaction Network Services, Inc. (TNS).[20]

9. When a caller placed a 9-1-1 call, it traversed CenturyLink/Intrado's ESInet. Calls intended for PSAPs that had transitioned to Comtech were routed to the SS7 interconnect via the Intrado gateway. A call setup message would then originate from the Intrado gateway (originating device) to be sent to one of TNS's STPs operating as the Intrado STP. As Figure 1 shows, the setup message would then travel through TNS's network of STPs to another TNS STP operating as the Comtech STP and then to the Comtech gateway (terminating device). An acknowledgement of the call setup was sent back through the SS7 to the Intrado gateway and the call was accepted.

10. The Intrado and Comtech gateways both consisted of two physical gateways and each of these gateways had two, redundant signaling links that connected to the STPs.[21] The STPs were arranged in pairs, and each had two links to each of the devices it served, as well as redundant links to other STPs.[22] In total, there were four SS7 signaling links at each end.[23] If at least one of these four signaling links was working, calls could traverse the interconnect between CenturyLink/Intrado and Comtech.[24] If none of the four links were working, no calls could complete.

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[20] *See* box labeled TNS SS7 Network on Rosen's Exhibit BR-5 at 4 (Attachment PC-7a).
[21] *See* Rosen, Exh. BR-5 at 5 (Attachment PC-7b).
[22] *Id.*
[23] *Id.*
[24] Rosen, Exh. BR-1CTr at 10:12–14.

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B. Impact of the National Transport Outage on Washington 9-1-1 Service

11. All four links carrying the SS7 signaling between the TNS network and the Comtech network were supplied by CenturyLink.[25] These links were all affected by the national transport network outage, and calls to Comtech were unable to be completed.[26] Comtech states that, although [redacted], there were periods when none of the four links were available, [redacted] when no 9-1-1 call could complete.[27]

12. CenturyLink did not provide actual phone numbers and call detail records of the callers who attempted to call 9-1-1 during the outage. While parties do not know precisely how many unique telephone numbers were impacted during the outage, parties determined how to estimate the number of callers impacted. Public Counsel witness Brian Rosen conducted an analysis of average call tallies, which shows a reduction in call volume during the outage of at least 34 percent from historical average.[28] When CenturyLink stated that it could not provide call records, Public Counsel requested call tallies for periods before, during, and after the outage and for the same periods for several years before and after the outage.[29] Public Counsel also requested call tallies from Comtech covering the same time periods.[30] The data showed that call volumes increased dramatically to PSAPs connected to CenturyLink's network during the outage,

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[25] *Id.* at 10:16–18.
[26] *See* Rosen, Exh. BR-5 at 5 (Attachment PC-7b).
[27] Rosen, Exh. BR-1CTr at 11:3–6.
[28] Direct Testimony of Stephanie Chase, Exh. SKC-1Tr at 13:8–15.
[29] Rosen, Exh. BR-1CTr at 14:4–7.
[30] *Id.* at 14:8–9.

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possibly because callers were calling multiple times when failures occurred.[31] The data also showed that PSAPs connected to Comtech's network received 10,752 fewer calls than average.[32] Because we cannot discern how many failures occurred through CenturyLink's data, the number of fewer calls occurring in Comtech's data is the minimum number of failed 9-1-1 calls during the outage. Comtech's data shows a drop of 34 percent in call volume.[33] Each person in the state may have been impacted at some point during the outage.[34]

III. CENTURYLINK WAS RESPONSIBLE FOR THE WASHINGTON 9-1-1 OUTAGE OF DECEMBER 2018 AND SHOULD BE APPROPRIATELY PENALIZED AT THE MAXIMUM STATUTORY AMOUNT

A. CenturyLink Was Not Relieved of its Responsibility for 9-1-1 Calls

13. The Commission should exercise its authority to hold CenturyLink responsible for failing to meet its regulatory responsibility to maintain a reliable 9-1-1 system. For years, CenturyLink provided 9-1-1 service to the State of Washington under contract with the Washington Military Department. The contract terms define CenturyLink's responsibilities to provide 9-1-1 service and maintain the 9-1-1 system. The question before the Commission is not one of breach of contract, but rather a question of regulatory liability. Contractual liability is separate from regulatory liability, although CenturyLink seeks to conflate the two. The Commission looks to the contract to understand what CenturyLink was tasked with related to the 9-1-1 system.

[31] Rosen, Exh. BR-1CTr at 14:19–15:3.
[32] *Id*. at 15:4–8.
[33] *Id*. at 15:7–8.
[34] Chase, Exh. SKC-1Tr at 13:13–17.

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1. CenturyLink was responsible for providing network and transport throughout the 9-1-1 system and was never relieved of that responsibility.

14. CenturyLink provided 9-1-1 service to the state of Washington since 2004. The 2009 contract between CenturyLink and the Washington Military Department involved transitioning the legacy 9-1-1 system to an IP-based system.[35] The 2009 contract tasked CenturyLink with modernizing Washington's 9-1-1 system and continuing to provide 9-1-1 service to the State. The contract is rather specific regarding the services the State required of CenturyLink. Those services included "network, transport, PSAP interfaces, 911 trunk support, selective routing and ALI interfaces."[36] The contract states further that, "The system must be scalable, affordable, *reliable*, *redundant*, and capable of resolving the limitations of the current legacy system."[37] These provisions remained in place through subsequent contract amendments.

15. How the contract addresses the various components of the 9-1-1 system is important because each is a separate service. Public Counsel witness Brian Rosen explained at hearing the "layer cake" concept of how the different components create the overall 9-1-1 system.[38] The contract established explicit obligations for CenturyLink with respect to the "network" and "transport" components of the 9-1-1 system.[39] The term "network" generally refers to "the signaling and voice path, plus the interconnects for auxiliary services, such as location."[40]

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[35] Rosen, Exh. BR-1CTr at 7:6–7; Hawkins-Jones, Exh. JHJ-1CT at 3:14–21.
[36] Rosen, Exh. BR-4C at 15 (WMD Response to Public Counsel Data Request No. 3, Attachment Washington State Military Department Contract E09-196 at 14).
[37] *Id.* (emphasis added).
[38] Rosen, TR. 336:23–340:2.
[39] Rosen, Exh. BR-4C at 15 (WMD Response to Public Counsel Data Request No. 3, Attachment Washington State Military Department Contract E09-196 at 14).
[40] Rosen, Exh. BR-30CT at 22:14–16.

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"Network" is distinguished from the "*services* that ride on the network."[41] One such service that rides on the network is the actual 9-1-1 call.

16. "Covered 9-1-1 Service Provider," is a term used by the FCC to define the service provider who delivers calls to a PSAP[42] and has regulatory obligations with respect to reporting outages. Covered 9-1-1 Service Providers may provide network or transport services, as well as routing and location services. However, since the contract called out network, transport, routing, and "ALI" (the location service for legacy 9-1-1 systems) independently from Covered 9-1-1 Service Providers, the meaning of that term in the contract is largely limited to the FCC's regulatory obligations it places on them.

17. CenturyLink continued to be the sole statewide 9-1-1 provider until the Washington Military Department awarded the contract to Comtech in 2016. The 2009 contract was amended several times during its effective term, including to extend the contract through the transition from CenturyLink to Comtech.[43] Amendments J, K, L, and M amend the 2009 contract to address the transition from CenturyLink to Comtech.[44] Amendment J initially provided that CenturyLink would provide information necessary to effectuate the transition and would not remove equipment, hardware or software, or cease providing services until the State notified CenturyLink in writing.[45] Amendment J also addressed transfer of files and information to the State and/or the new 9-1-1 provider.[46] Amendment K extended the contract term for an

[41] Rosen, Exh. BR-30CT at 22:16 (emphasis in original).
[42] *Id*. at 22:18–23:1.
[43] Rosen, Exh. BR-1CTr at 7:6–7; Hawkins-Jones, Exh. JHJ-1CT at 3:14–21.
[44] Webber, Exh. JDW-38C (WMD Contract E09-196 and Amendments J, K, L, and M).
[45] *Id.* at 18.
[46] *Id.* at 19.

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additional 12 months,[47] and Amendment L provided for a meeting in February and March 2017, to discuss proposals to effectuate the transition.[48] Amendments J, K, and L each state, "All other terms and conditions remain in full force and effect."[49]

18. Amendment M added a specific scope of work related to the transition.[50] Consistent with the prior amendments, Amendment M provided, "All other terms and conditions remain in full force and effect."[51] Amendment M provided that CenturyLink would route calls over ESInet I (CenturyLink's system) to the appropriate PSAP prior to PSAPs being transitioned to Comtech's ESInet II.[52] Amendment M provided that CenturyLink would be the "Covered 911 Service Provider" for PSAPs that had not migrated to ESInet II and for routing calls destined for a migrated PSAP to a designated demarcation point.[53] At the designated demarcation point, Comtech would become the Covered 9-1-1 Service Provider.[54]

19. Importantly, Amendment M did not relieve CenturyLink of the obligations established under the 2009 contract to provide network and transport, nor did it effectively establish where the demarcation point was located, as discussed further in Section III.A.2., below.[55] The plain language of the contract demonstrates that WMD believed it was crucial that CenturyLink be responsible for network and transport *in addition* to being the Covered 9-1-1 Service Provider.[56]

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[47] *Id.* at 20.
[48] *Id.* at 21.
[49] *Id.* at 19, 20, and 21.
[50] *Id.* at 23; Rosen, Exh. BR-4C at 19.
[51] Rosen, Exh. BR-4C at 20.
[52] *Id.* at 19.
[53] *Id.*
[54] *Id.*
[55] Rosen, Exh. BR-4C at 19–20; Rosen, Exh. BR-1CTr at 33:14–15; Rosen, TR: 297:14-23.
[56] Rosen, Exh. BR-4C at 15, 19–20. WMD confirmed its understanding and intention. *See* Rosen, Exh. BR-27 at 3 (WMD Supplemental Response to Public Counsel Data Request No. 7 (WMD "believes CenturyLink retained a role,

CenturyLink would be the Covered 9-1-1 Service Provider for calls destined for PSAPs still served under ESInet I and would also be responsible for providing network and transport for all calls, whether they are destined for PSAPs served under ESInet I or ESInet II. CenturyLink's obligations as a Covered 9-1-1 Service Provider were separate and distinct from its obligations to provide network and transport under Amendment M.

20. Indeed, if the State intended to relieve CenturyLink of its network and transport obligations, it would have done so in Amendment M. Amendment M relieved CenturyLink only of its obligations to route calls to PSAPs that had already migrated to Comtech's system.[57] Accordingly, CenturyLink continued to be responsible for network and transport throughout the entire 9-1-1 system during the transition from its network to Comtech's network and would only be relieved of those responsibilities once the transition to Comtech was complete. As a result, CenturyLink remained responsible for network and transport during the December 2018 outage.

2. Amendment M did not clearly define a demarcation point, leaving CenturyLink responsible for all 9-1-1 calls. Regardless, CenturyLink's obligation to provide network and transport services carried through any demarcation point.

21. Where two service providers interconnect, it is routine to describe a "point of demarcation" that defines when responsibility shifts from the one service provider to another.[58] Defining the point of demarcation is important so there is clarity regarding who is responsible

and thus an obligation under the Washington Military (WMD) CenturyLink, Contract No. E09-106, until there were no parts of the originating network nor the terminating network connected to the CenturyLink/Intrado ESInet.")

[57] Rosen, Exh. BR-4C at 19 (Term 11, ¶ 1(a)).

[58] Rosen, Exh. BR-30CT at 19:7–10.

based on where issues take place.[59] CenturyLink concedes that Amendment M and the attached Scope of Work failed to specify the location of the demarcation point.[60] Because the point of demarcation constitutes an agreement between parties, one party cannot unilaterally identify the point of demarcation if no agreement exists.[61] Indeed, CenturyLink's effort to create a point of demarcation years later is merely an *ex post facto* attempt to escape liability for its failure to maintain a reliable 9-1-1 network.

a. Amendment M does not identify the location of the point of demarcation, and CenturyLink and Comtech did not agree as to where the point of demarcation was located.

22. Amendment M states that a point of demarcation [redacted] ."[62] None of this language clearly or effectively identifies the location of the point of demarcation. Indeed, both CenturyLink and Comtech point to different locations as being the point of demarcation.[63]

23. CenturyLink presents a simplified diagram depicting the system that existed in December 2018 in company witness Carl Klein's Exhibit CDK-3. CenturyLink identifies the demarcation point being within the Comtech/TNS STP Node. The diagram in Exhibit CDK-3 [redacted]

[59] Rosen, Exh. BR-30CT at 19:14–16; Rosen, TR. 296:24–297:2; Webber, JDW-89CX (Turner Deposition, TR. 62:8–24 and 62:25–63:10).
[60] Response Testimony of Jeanne W. Stockman, Exh. JWS-1TC at 28:5–6; Response Testimony of Steven E. Turner, Exh. SET-1T at 43:1–17; *see* Rosen, Exh. BR-1CTr at 29:11.
[61] Rosen, Exh. BR-30CT at 19:13–14; Rosen, TR. 335:21–336:22.
[62] Rosen, Exh. BR-4C at 19.
[63] Turner, Exh. SET-7C; Carl D. Klein, Exh. CDK-3; Rosen, Exh. BR-32C.

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[redacted].[64]

[redacted].[65]

[redacted]

[redacted]

[redacted].”[66]

[redacted].[67]

[redacted]

[redacted].[68]

24. CenturyLink witness Steven Turner points to a document purporting to show the transition call flows between CenturyLink and Comtech in Exhibit SET-7C. The document is dated November 21, 2016.[69] Amendment M, which contained the scope of work related to the transition, was executed in July 2017.[70] Exhibit SET-7C fails to show the demarcation point that existed between CenturyLink and Comtech. Rather, Exhibit SET-7C shows a *proposed* call flow.[71] The interconnection shown in Exhibit SET-7C is not the interconnection actually implemented.[72] Rather, Exhibit SET-7C contains a proposal from Comtech that CenturyLink rejected.[73]

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[64] Klein, TR. 441:23–442:5.
[65] Klein TR. 442:7–22, 449:16–21.
[66] Klein, TR. 442:12–22.
[67] Klein, TR. 445:9–20.
[68] Klein, TR. 449:24–450:6.
[69] Turner, Exh. SET-7C at 1.
[70] Rosen, Exh. BR-4C at 20.
[71] Rosen, Exh. BR-30CT at 19:19–20.
[72] *Id*. at 20:1–3.
[73] Rosen, Exh. BR-30CT at 20:1–3; Rosen, TR. 308:20–309:15.

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25. In discovery, Comtech explained that the document contained in Exhibit SET-7C was Comtech's proposed "direct, IP-based interconnection with CenturyLink."[74] Comtech further explained, "Due to CenturyLink's refusal to connect [Comtech] either (1) directly and (2) via an IP-based interconnection, this was not the point of demarcation between CenturyLink and [Comtech] at the time of CenturyLink's December 2018 outage."[75] Comtech provided a diagram showing where it identified the point of demarcation;[76] however, neither CenturyLink nor Comtech can establish where the point of demarcation is when there is no agreement between the companies. CenturyLink and Comtech pointing to two different locations is evidence of the lack of agreement.

b. CenturyLink remained responsible for calls destined for Comtech PSAPs.

26. Under the contract and Amendment M, [redacted]. To avoid liability, CenturyLink unilaterally attempts to rewrite the contract to establish a point of demarcation that was neither agreed upon by the contract parties nor sufficiently defined in contract.[77]

27. Because there was no demarcation point established, responsibility for routing and delivering calls could not transition from CenturyLink to Comtech. Thus, CenturyLink was never relieved of *any* of its obligations with respect to the 9-1-1 calls made during the transition period. Moreover, even assuming *arguendo* that the parties had clearly identified a point of demarcation,

[74] Rosen, Exh. BR-32C at 1.
[75] *Id*. at 1.
[76] *Id*. at 3.
[77] Turner, Exh. SET-7C; Rosen, Exh. BR-30CT at 19:19–22:8 Rosen, TR. 297:12–15, 298:17–25.

such an identification would not absolve CenturyLink of liability because CenturyLink continued to be responsible for network and transport, as discussed above. The responsibility for network and transport would have carried through any point of demarcation.

B. CenturyLink Was Responsible for the Impact of the National Transport Network Outage on Washington 9-1-1 Services.

28. CenturyLink's national transport outage affected the SS7 signaling links between the CenturyLink and Comtech ESInets, which prevented urgent 9-1-1- calls from reaching Comtech PSAPs. CenturyLink unreasonably claims to bear no responsibility for the impacts on the national transport outage on the State's 9-1-1 services by arguing that the national transport outage only impacted Comtech's SS7 network.[78] As discussed, above, however, CenturyLink maintained responsibility for the 9-1-1 system throughout the transition. CenturyLink was still obligated to provide 9-1-1 service to the state of Washington and was responsible for the continued operation of the service during the transition phase. As such, CenturyLink should have paid close attention to the construction of the SS7 interconnect.

29. CenturyLink, however, made a series of network design and implementation decisions during the transition of the 9-1-1 system to Comtech that exacerbated the impact of the nationwide outage on Washington's 9-1-1 service. CenturyLink refused to use a reasonable IP-based interconnect, and instead proposed the use of outdated SS7 technology and subjected the connection to the failures of the older technology and increased the complexity of the system. CenturyLink also refused to directly connect to Comtech, requiring the insertion of a third party in the middle of the interconnection, which also increased the complexity and decreased the

[78] Stockman, Exh. JWS-1TC at 9:14–15.

reliability of the system. CenturyLink also failed to ensure diversity in the network design, which may have prevented the outage or mitigated its impacts. Finally, when the network failed, CenturyLink failed in its duty to notify PSAPs of the outage.

1. CenturyLink was responsible for the use of outdated SS7 technology for the interconnect.

30. CenturyLink and Comtech's ESInets were both IP-based networks[79] yet they were connected using SS7, a non-IP-based technology. Comtech originally attempted to persuade CenturyLink to connect directly using an IP-based interconnect that would have used SIP signaling, which adhered closely to current Next Generation 9-1-1 (NG9-1-1) standards published by National Emergency Number Association (NENA).[80] The similarity of Comtech's proposed interconnect to current NG9-1-1 standards indicate that the proposal was reasonable.[81] CenturyLink, however, refused to connect directly to Comtech and rejected the proposed IP interconnect.[82] It appears that CenturyLink proposed to use a different IP interconnect using protocols that are not used in NG9-1-1 systems.[83] CenturyLink alternatively proposed to use SS7 to interconnect, which Comtech ultimately agreed to over CenturyLink's proposed IP solution.[84]

31. CenturyLink's refusal to use Comtech's proposed IP interconnect in favor of outdated technology was at odds with the original contract between CenturyLink and WMD, which memorialized the need to avoid using outdated technology.

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[79] Rosen, Exh. BR-30CT at 3:1–2.
[80] *Id*. at 3:6–11. While the current NG9-1-1 standards were published after the outage at issue here, Comtech's proposal used SIP signaling which adhered closely to SIP signaling used within a standards-based NG9-1-1 system.
[81] *Id*. at 3:11–14.
[82] Rosen, Exh. BR-17 at 1.
[83] Rosen, Exh. BR-30CT at 3:3–5
[84] *Id*. at 3:18–4:2.

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> To accommodate Next Generation 911 and provide the citizens of Washington State with a modern internet protocol system that will allow the 911 system to accept information from a wide variety of communication devices from consumers in emergencies, it is first necessary to update the network used to transfer voice/data information from the consumer to the Public Safety Answering Point (PSAP). To accomplish this, there must be a switch from the antiquated legacy analogy telephone system to a system used in cellular and computer voice over internet (VoIP) protocols by telephone and communications providers.[85]

By insisting that the interconnect use SS7 despite Comtech's objections, CenturyLink subjected the 9-1-1 interconnect to all of SS7's well-known failures.[86]

a. SS7 was the inappropriate technology to connect two ESInets.

32. Using an SS7 interconnect between two IP networks is highly unusual and is not common in the industry.[87] CenturyLink's direction to use SS7 to connect the two ESInets was particularly inappropriate because it introduced unnecessary complexity and additional opportunity for failure into the state's critical 9-1-1 system, while also reducing the ability of the system to quickly recovery from failures.

33. At the time of the transition from CenturyLink to Comtech, the originating service providers were connected to the CenturyLink ESInet by SS7 or older Centralized Automatic Message Accounting (CAMA) technology, not IP.[88] The PSAPs were also connected using this older CAMA technology.[89] This meant that there were two conversions between technologies at the ends of the 9-1-1 call even before considering the impact of the SS7 interconnect.[90] Once call

[85] Rosen, Exh. BR-4C at 15 (WMD Response to Public Counsel Data Request No. 3, Attachment Washington State Military Department Contract E09-196 at 14).
[86] Rosen, Exh. BR-1CTr at 31:8–10.
[87] Rosen, Exh. BR-30CT at 3:3–5.
[88] *Id*. at 4:11–14. *See also* Webber, Exh. JDW-9 at 5. CAMA is an analog transmission protocol.
[89] Rosen, Exh. BR-30CT at 4:11–14.
[90] *Id*. at 4:14–17.

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information arrived at the interconnect, CenturyLink's choice of SS7 technology required that the information be translated from SIP to SS7 and then from SS7 back to SIP.[91] That means every 9-1-1 call destined for a Comtech PSAP would have had to navigate through at least four conversions between technologies.[92] Each transition added unnecessary complexity and an opportunity to introduce failure into the 9-1-1 system, reducing the reliability of the system.

34. SS7 was also a poor choice for connecting the two 9-1-1 systems because it has a known weakness where designers must anticipate all possible failures and engineer backup paths into the system expressly.[93] In contrast, IP networks have the very desirable characteristic for a 9-1-1 system where they automatically discover backup paths and use them, regardless of how circuitous or complex the path is, if that is the only way to get from point A to point B.[94] In extreme failure conditions, IP networks are more likely to work compared to SS7 networks.[95] Indeed, there were IP connections between the contractors providing location information for calls (Automatic Location Identification query),[96] and they worked throughout the incident.[97] Had CenturyLink agreed to Comtech's proposed IP interconnect, the failure would likely not have happened.[98] If the interconnection had been IP-based as Comtech requested, even if the failure had been able to take out several IP paths, enough paths should have remained to complete some of the calls.[99] Even if the outage had managed to impair the IP network, it still

[91] Rosen, Exh. BR-30CT at 4:17–19. *See also* Figure 1, above.
[92] Rosen, Exh. BR-30CT at 4:19–20.
[93] *Id*. at 4:22–5:1.
[94] *Id*. at 5:1–4.
[95] *Id*. at 5:5–6.
[96] Rosen, Exh. BR-29C (Comtech Response to Public Counsel Data Request No. 9).
[97] Rosen, Exh. BR-30CT at 5:6-8.
[98] *Id*. at 18:18–19.
[99] Rosen, Exh. BR-1CTr at 25:3–5.

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could have delivered most calls to the transitioned PSAPs.[100]

35. CenturyLink argues that SS7 technology is commonly used by the industry in 9-1-1 network architecture,[101] but this is misleading. SS7 technology is obsolete and being phased out in favor of SIP across the country for NG9-1-1 systems, wireless networks, Voice over Internet Protocol (VoIP) networks, and enterprise networks.[102] IP-based, NG9-1-1 is being deployed across the country for the reasons mentioned above, among others, and no new 9-1-1 systems use SS7 other than for connecting to originating service providers.[103] SS7 is retained in the 9-1-1 network in those instances, not because it is the superior technology, but because the originating service providers have not yet converted to SIP technology.[104] SS7 is not used in the middle of the NG9-1-1 network.[105]

2. CenturyLink's refusal to directly connect to Comtech required the insertion of a third party vendor between the two companies, further increasing complexity and potential points of failure.

36. CenturyLink's refusal to directly connect to Comtech via SS7 using its own SS7 network required the companies to use Transaction Network Services (TNS) to provide the actual SS7 signaling interconnect.[106] Adding another entity to the path increases the probability of failure, greatly increased the complexity of the interconnect, and made CenturyLink less able to observe and manage the network.[107]

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[100] Rosen, Exh. BR-1CTr at 24:16–18.
[101] Turner, Exh. SET-1TC at 8:17–18.
[102] *See* Rosen, Exh. BR-30CT at 6:2–10.
[103] Rosen, Exh. BR-30CT at 5:8–11.
[104] *Id*. at 2:8–10.
[105] *Id*. at 7:6–7.
[106] Rosen, Exh. BR-18C at 1.
[107] Rosen, Exh. BR-1CTr at 22:8.

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37. TNS is a commercial supplier of SS7 interconnect, not a carrier, and it does not offer or claim to offer 9-1-1 capability. Its network is not subject to diversity requirements, and it does not claim to offer audited diverse paths within its network as 9-1-1 providers are required to do.[108] CenturyLink highlights Comtech's use of TNS as a contractor[109] and Comtech's failure to ensure the SS7 interconnect provided by TNS would be redundant and reliable.[110] CenturyLink's witness, Valence, places all responsibility on Comtech and argues that Comtech knew CenturyLink was providing the circuits for all of the SS7 links but did not disclose its lack of supplier diversity to CenturyLink, as if CenturyLink was entirely blind to the ordering process for this crucial service.[111] Valence also opines that had CenturyLink only known of the lack of supplier diversity, the Company could have helped Comtech.[112]

38. However, both Intrado (CenturyLink's contractor) and Comtech had relationships with TNS prior to this interconnect. CenturyLink knew or should have known that TNS would be used as the SS7 vendor for the Washington 9-1-1 system given that CenturyLink, [redacted] .[113] [redacted] attached to Amendment M of the CenturyLink contract with WMD.[114] At the time of the outage, CenturyLink was responsible for the continued

[108] Rosen, Exh. BR-30CT at 5:14–6:1.
[109] *See* Stockman, Exh. JWS-1TC at 13:4–9, 18:18–19:6.
[110] *See id*. at 20:3–6.
[111] *See* Response Testimony of Martin D. Valence, Exh. MDV-1TC at 7:8–8:20.
[112] *See* Valence, Exh. MDV-1TC at 8:12–20.
[113] *See* Rosen, Exh. BR-18C at 5 (Comtech Response to Public Counsel Data Request No. 4 with Confidential Attachment B.1(b)).
[114] *See* Rosen, Exh. BR-4C at 34 (WMD Response to Public Counsel Data Request No. 3, Confidential Attachment, Washington State Military Department Contract E09-196 Amendment M

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operation of the service during the transition phase, and CenturyLink, as well as Comtech, should have paid close attention to the design and provisioning of the SS7 interconnect, particularly given the use of TNS in between the two companies.[115] CenturyLink and Comtech should have been checking on each other and verifying that the entire network was designed and built to meet both company's availability requirements.[116]

39. Staff's witness, James Webber, similarly stated that CenturyLink [redacted][117] and that, given the Company was "[redacted]."[118]

3. The SS7 interconnect was designed with multiple points of failure due to lack of diversity.

40. First, the SS7 interconnect was designed with insufficient network and supplier diversity because all four links used in the SS7 interconnect from TNS to Comtech's gateway were provisioned by CenturyLink on the same optical network.[119] This lack of network diversity meant that when CenturyLink's optical network failed, the SS7 interconnect failed, causing Washington's 9-1-1 outage. To avoid this problem, the SS7 should have been designed with an additional supplier to provide some of the links between CenturyLink and Comtech.[120]

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at 16, items 0-5 and 0-6); *id.* at 45:39–40.
[115] *See* Rosen, Exh. BR-30CT at 23:2–24:11.
[116] *See id.* at 23:2–24:11.
[117] Webber, TR at 205:4–10.
[118] Webber, TR at 206:8–16.
[119] *See* Rosen, Exh. BR-1CTr at 20:18–21:3.
[120] *See id.* at 20:18–21:1

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41. Second, CenturyLink built its optical network using multiple optical network switches supplied by a single vendor, Infinera Corporation.[121] Theoretically, the optical network was redundant, such that a failure of one of the optical network switches should not take down the entire system, but, in this case, the entire optical network failed essentially due to a software error.[122] The packet storm that caused the outage on the Green network was allowed to propagate because of the software configuration of the switches, and the redundancy in the hardware could not prevent the failure. That software was the single point of failure.[123] The only defense against this problem is to use interoperable devices based on standards such that multiple devices can be fielded in a single system.[124]

42. Had CenturyLink deployed two vendors for the switches, the nationwide failure that impacted Washington's 9-1-1 system either would not have happened, or the scope and duration of the failure would have been reduced dramatically.[125] CenturyLink's witness, Martin Valence, argues that CenturyLink has more than one network and could have offered a form of supplier diversity to Comtech.[126] In the opinion of Public Counsel's expert, Brian Rosen, that would not have provided actual or functional supplier diversity, particularly given at least one of the networks that CenturyLink offered as part of its definition of supplier diversity used the same manufacturer.[127]

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[121] FCC Report at 5.
[122] *See* Rosen, Exh. BR-1CTr at 19:9–14.
[123] *See* Rosen, Exh. BR-30CT at 12:7–14.
[124] *See id*. at 12:15–22.
[125] Rosen, Exh. BR-1CTr at 20:6–9.
[126] *See* Response Testimony of Martin D. Valence, Exh. MDV-1TC at 5–6.
[127] Rosen, Exh. BR-30CT at 15:11–15.

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4. CenturyLink failed to mitigate the risk of outage on its national transport network.

43. The nationwide outage of December 2018 on CenturyLink's optical network was caused by an equipment failure catastrophically exacerbated[128] by CenturyLink's failure to mitigate a known risk to its network. Infinera switches on CenturyLink's Green network generated malformed packets that continuously transmitted in a packet storm on the management channel in the Infinera hardware.[129] The management channel was enabled by default in the nodes, and CenturyLink was aware of the management channel but neither configured nor used it and left the channel enabled.[130] While the management channel had a filter that was configured to prevent packets exactly 64 bytes in size, it did not automatically filter the malformed packets because they were larger than 64 bytes.[131] CenturyLink left the management channel enabled despite the fact the company had sufficient warning that the management channel could be compromised by malformed packets in a previous failure in its Infinera Red network in early 2018.[132]

44. The Red network is another one of CenturyLink's six national optical transport networks. The Red network [redacted] before the outage at issue here.[133] The outage on the Red network [redacted].[134] As with the Green network, [redacted]

[128] Webber, Exh. JDW-4 at 3 (FCC Report at 3).
[129] *See* Valence, Exh. MDV-1TC at 17:2–13.
[130] Webber, Exh. JDW-4 at 6.
[131] *Id.* at 7.
[132] *See* Valence, Exh. MDV-1TC at 11:19–21.
[133] Testimony of James D. Webber, Exh. JDW-1CT at 24:17–19.
[134] *Id.* at 25:3–5.

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[redacted] enabled[135] and the outage was caused [redacted].[136] After the outage, [redacted].[137] [redacted]. Infinera then informed CenturyLink that it need not close the management channel.[138]

45. CenturyLink's witness Valence opines that the December 2018 outage on the Green network was not foreseeable,[139] however, the Red network failure showed that it was possible for an optical network to fail when the management channel, which was not being used, became clogged with packets and exhausted resources in the switch to the point where traffic was impeded.[140] As Public Counsel's witness, Rosen, explains, "When doing root cause analysis on highly available systems, the root cause is not *what* failed. The root cause is *why that failure caused the entire system to fail.*"[141] In this case, the root of the failure was that the network management system could create a packet storm that shut down the network. Infinera only focused on what caused the packet storm on the Red network—[redacted] of the

[135] *Id.* at 25:6.
[136] *See id.* at 25:7–17.
[137] Valence, Exh. MDV-1TC at 13:24–14:2.
[138] *See id.* at 15:4–9.
[139] *Id.* at 10:17–11:12.
[140] Rosen, Exh. BR-30CT at 15:20–16:2.
[141] *Id.* at 16:2–16:3.

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malformed packets—and claimed that because of the [redacted].[142] As Rosen further explains,

> CenturyLink accepted this explanation and compounded it by not insisting Infinera disable the management channel on the Green network. Bad packets happen. Bugs in code handling packets happen. But, if the entire network can be disabled because it is possible for the management channel to create a packet storm, the management channel should be turned off until it is no longer possible for a packet storm on the management channel to take down the network. As an example, Infinera could have disabled the ability of the management channel to send any packets. It could have also refused to process any received packets. That the cause of the packet storm in the Red network was different from the cause of the packet storm in the Green network is immaterial. The real problem was that the network could generate a packet storm and be taken down by such a packet storm, regardless of cause.
>
> Further, packet storms may arise under various scenarios. CenturyLink's networks should have been resilient enough to withstand packet storms, regardless of cause.[143]

46. CenturyLink knew that packet storms on the management channel were possible, resulting in a network outage. Infinera's solution to this problem would only apply to a very specific, narrow set of circumstances. As the FCC points out in its Network Outage Report, the malformed packets were able to propagate because other characteristics of the packet were not considered.[144] In the professional opinion of Rosen, CenturyLink should have insisted that Infinera disable the management channel and fix the root cause so that it was not possible to take down the network if a packet storm occurred on the management channel.[145] Indeed, the FCC states that disabling system features that are not in use is an industry best practice that could have prevented the outage or at least mitigated its effects. The FCC further stated, "Leaving the

[142] *See* Valence, Exh. MDV-1TC at 14:3–12.
[143] Rosen, Exh. BR-30CT at 16:16–17:8.
[144] Webber, Exh. JDW-4 at 15.
[145] Rosen, Exh. BR-30CT at 17:14–17:16.

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channel enabled created a vulnerability in the network that, in this case, contributed to the outage by allowing malformed packets to be continually rebroadcast across the network.[146]

5. CenturyLink failed to notify Comtech or Public Safety Answering Points of the outage and failed to timely notify the Commission.

47. When CenturyLink's optical network outage began to impact Washington's 9-1-1 service in the early morning of December 27, 2018, CenturyLink failed to notify any PSAP of the outage[147] and did not notify the Commission until late in the evening of the 27th.[148] CenturyLink also did not promptly notify Comtech of the outage.[149] CenturyLink argues that there was no major outage affecting the 15 PSAPs for which it was still responsible, and as a result, it was not required to notify them.[150] The plain language of the rules, however, do not support CenturyLink's interpretation of its obligations.

48. WAC 480-120-412 requires CenturyLink to notify the Commission and "any PSAPs serving the affected area" as soon as possible of any major outage CenturyLink "receives notice of or detects..."[151] The WAC does not limit the notification requirements to only those PSAPs directly connected to the company. The rule also broadly requires notification if the company merely receives notice of or detects a major outage but does not specify that the outage must be directly impacting specific PSAPs. Under typical circumstances where a single ESInet is responsible for the state's 9-1-1 services, this distinction may not matter—if a company detected

[146] Webber, Exh. JDW-4 at 15.
[147] Staff Investigation Report at 19.
[148] *Id*. at 19.
[149] Rosen, Exh. BR-1CT at 12:3–8.
[150] Stockman, Exh. JWS-1TC at 49:1–9.
[151] WAC 480-120-412(2).

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an outage that impacted a PSAP, it would be a PSAP it served itself. In this case, however, CenturyLink and Comtech were both responsible for the State's 9-1-1 service together, and, importantly, CenturyLink was responsible for providing access from the originating service providers for all 9-1-1 calls.[152] All PSAPs depended on CenturyLink for all 9-1-1 calls.[153] CenturyLink learned that the outage was affecting 9-1-1 systems early during the incident, but the companies appear to have been unclear for some time about which portions of the system were impacted and whether the impact was isolated.[154] CenturyLink should therefore have promptly notified *all* PSAPs, Comtech, and the Commission of the outage, and, at the very minimum, CenturyLink should have notified the 15 PSAPs under its responsibility that the outage was affecting 9-1-1 services in Washington.

IV. VIOLATIONS AND PENALTIES

49. CenturyLink was responsible for the December 2018 outage experienced by the Washington 911 system. In this section, Public Counsel will discuss the statutory and rule violations alleged in the Complaint,[155] the outage impact, the Commission's penalty rubric, and the penalties that the Commission should impose on CenturyLink.

A. CenturyLink Violated RCW 80.36.080.

50. RCW 80.36.080 requires companies to render service that is prompt, expeditious, and efficient; to keep its facilities, instrumentalities, and equipment safe and in good condition and repair; and to ensure that its appliances, instrumentalities, and services are modern, adequate,

[152] Rosen, Exh. BR-1CTr at 16:15–17.
[153] *Id*. at 17:3–4.
[154] *Id*. at 16:18–17:3.
[155] Complaint, *Wash. Utils. & Transp. Comm'n v. CenturyLink Commc'ns*, *LLC*, Docket UT-181051 (Dec. 22, 2020).

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sufficient, and efficient. CenturyLink's regulatory obligation was to ensure that the 9-1-1 system provided to the state of Washington met the requirements of RCW 80.36.080. It failed to do this in December 2018 when at least 10,752 9-1-1 calls failed due to a widespread outage.

51. CenturyLink was obligated by contract to provide 9-1-1 service to the State of Washington. As discussed above, no point of demarcation was effectively established. And, even if one had been established, CenturyLink was responsible for providing network and transport services throughout the 9-1-1 system for all calls even beyond a point of demarcation. Moreover, CenturyLink failed to mitigate the risk of outage on its national transport network, and further made a series of design and implementation decisions regarding the transition to Comtech that exacerbated the impact of the nationwide outage on Washington.

52. Thousands of 9-1-1 calls failed during the December 2018 outage. As such, 9-1-1 service was not provisioned in a prompt, expeditious, and efficient manner. While failed calls do not in and of themselves result in violations (failure of calls do not result in strict liability),[156] widespread outages caused by a failure to ensure that the 9-1-1 system was properly designed results in violations and supports a finding of regulatory liability.

53. Additionally, the outage revealed that CenturyLink's appliances, instrumentalities, and services were not modern, adequate, sufficient, and efficient. CenturyLink insisted on using SS7 to interconnect Comtech's ESInet with the CenturyLink ESInet. SS7 is still used to connect originating service providers with 9-1-1 systems when the originating service providers have not migrated to IP-based systems. To place SS7 within the 9-1-1 system to connect two parts of the

[156] *Wash. Utils.& Transp. Comm'n, v. Qwest Corp*., Docket UT-190209, Order 03 - Initial Order Dismissing Complaint, ¶ 28 (June 25, 2020).

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system was a critically deficient choice that increased the complexity of the system, making failure more likely. SS7 networks do not recover as nimbly as IP-based systems when problems occur. Current NG9-1-1 NENA standards dictate that IP should be used.

54. The 9-1-1 system lacked sufficient diversity, creating a single point of failure, which also indicates that the appliances, instrumentalities, and services are not modern, adequate, sufficient, and efficient. CenturyLink was obligated under contract to ensure sufficient redundancy. Unfortunately, CenturyLink did not have the goal of ensuring that the transition from it to Comtech was safe and successful.[157]

B. CenturyLink Violated RCW 80.36.220.

55. Under RCW 80.36.220, CenturyLink had the regulatory obligation to transmit 9-1-1 calls from the originating service provider to the appropriate PSAP. CenturyLink's refusal or neglect to comply with this obligation results in a regulatory violation. Here, CenturyLink took a hands-off approach to the transition,[158] despite explicit contractual obligations to do everything necessary to ensure a smooth transition.[159] CenturyLink was not invested in ensuring the success of the 9-1-1 transition.[160] That, coupled with the refusal to directly interconnect its system with Comtech's ESInet and the rejection of Comtech's request for an IP connection, resulted in the December 2018 outage impacting Washington such that at least 10,752 calls failed. The call failures are attributable to CenturyLink's neglect.

[157] Rosen, TR. 291:22–25 and 323:5–15; Klein, TR. 438:24–440:24.
[158] Klein, TR. 438:24–440:24.
[159] Webber, Exh. JDW-38C (WMD Contract E09-196 and Amendments J, K, L, and M).
[160] Rosen, TR. 291:22–25 and 323:5–15; Klein, TR. 438:24–440:24.

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C. CenturyLink Violated WAC 480-120-412.

56. WAC 480-120-412 requires CenturyLink to notify PSAPs of major outages as soon as possible. This is true of any major outage CenturyLink "receives notice of or detects," and the rule requires CenturyLink to notify "any PSAP serving the affected area."[161] CenturyLink failed to notify any PSAPs of the December 2018 outage. The Complaint alleges only 15 rule violations for CenturyLink's failure to notify the PSAPs connected to the CenturyLink ESInet at the time of the outage. Violations for failing to notify the 15 PSAPs connected to CenturyLink's ESInet is the minimum extent of violations. CenturyLink knew the national transport network outage impacted a variety of services, including Washington 9-1-1 service. When impact to Washington 9-1-1 became apparent, CenturyLink should have alerted *all* PSAPs in Washington, including the 15 still connected to its ESInet.[162] Rosen testifies, "Therefore, in my expert opinion, CenturyLink should have notified all PSAPs, not just the ones for which it would explicitly have been the 'Covered 9-1-1 Service Provider.'"[163] The purpose for requiring outage notices to PSAPs is to allow affected PSAPs to promptly alert the public of alternative ways to contact 9-1-1.[164]

D. CenturyLink Violated WAC 480-120-450.

57. WAC 480-120-450 requires local exchange companies to provide enhanced 9-1-1 (E9-1-1) services. The Commission has not updated its rules to reflect NG9-1-1 services, but the Commission's intent is clear: to require companies to provide critical 9-1-1 service so

[161] WAC 480-120-412(2).
[162] Rosen, Exh. BR-1CTr at 5:7–8, 11:1–2, 15:9–13, 16:9–17:10.
[163] *Id*. at 16:7–10.
[164] *Id*. at 15:14–16:3.

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Washingtonians can access timely emergency services. CenturyLink was responsible for providing 911 service to the State of Washington under contract. It failed to provide this critical service when at least 10,752 calls failed during the December 2018 outage.

E. Under the Commission's Penalty Rubric, the Commission Should Impose the Maximum Statutory Penalty upon CenturyLink for its Violations.

58. The Commission has identified 11 factors it will consider when determining if an enforcement action is appropriate, and if so, what level of penalty to impose.[165] Those factors are:

(1) How serious or harmful the violation is to the public;
(2) Whether the violation is intentional;
(3) Whether the company self-reported the violation;
(4) Whether the company was cooperative and responsive;
(5) Whether the company promptly corrected the violations and remedied the impacts;
(6) The number of violations;
(7) The number of customers affected;
(8) The likelihood of recurrence;
(9) The company's past performance regarding compliance, violations, and penalties;
(10) The company's existing compliance program; and
(11) The size of the company.

Applying the 11 enforcement factors to this case demonstrates that CenturyLink should be held accountable to the fullest extent.[166]

1. Factor 1: CenturyLink's violations were extremely serious and harmful to the public.

59. The first factor considers how serious or harmful the violation is to the public. In this case, Washington experienced a multiple-day outage that intermittently impacted the public's

[165] Complaint, ¶ 36, *Wash. Utils. & Transp. Comm'n v. CenturyLink Commc'ns,* Docket UT-181051 (Dec. 22, 2020).
[166] Chase, Exh. SKC-1Tr at 8:18–16:7.

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ability to reach 9-1-1. The outage lasted more than 49 hours, creating a very serious and very harmful public safety situation.[167] Similar to prior 9-1-1 outages, the full extent of harm will never be known.[168] However, Public Counsel presents four citizen witnesses who were not able to reach 9-1-1 during the outage.[169]

60. Victor Barajas encountered icy roads during the early morning hours of December 28, 2018, as he drove to work.[170] He hit the median of I-182, and his vehicle rolled three times, smashing his roof and leaving his car with no power.[171] He found his phone and dialed 9-1-1. There was no ring or busy signal. After attempting two or three times to reach 9-1-1, Victor Barajas began calling people in his contacts.[172] Eventually, he reached his supervisor, who contacted the non-emergency line for him.[173] Luckily, Victor Barajas was not seriously injured, and his car did not catch fire with him trapped inside.[174]

61. When Samantha Hovey and her husband arrived home late in the evening of December 27, 2018, they found a prowler.[175] Samantha Hovey called 9-1-1, dialing four or five times and receiving a busy signal.[176] She called her mother, who lives in a neighboring county, and her

[167] Chase, Exh. SKC-1Tr at 9:11–15.
[168] *Id*. at 10:9–11.
[169] *Id*. at 9:14–10:8.
[170] Barajas, Exh. VB-1T at 1:9–10.
[171] *Id.* at 1:9–14.
[172] *Id.* at 1:16–19.
[173] *Id.* at 1:19–22.
[174] *Id.* at 2:1–20.
[175] Hovey, Exh. SH-1T at 1:8–23.
[176] *Id.* at 1:20–22.

mother was able to contact 9-1-1.[177] The prowler ran away, and she was glad they "did not need police help more urgently" as a result.[178]

62. David White experienced a medical emergency the morning of December 27, 2018.[179] His wife, Angela White, transported him to the hospital in her own car after she tried repeatedly to contact 9-1-1.[180] In order to transport him, Angela White had to dress David White, move him on her back down the front steps, and walk him from the front door to the vehicle with the aid of the couple's daughter.[181] He continues to experience effects from the events of December 27, 2018.[182]

63. Each of these witnesses' experiences illustrate the impact of 9-1-1 outages. Each person was not aware that 9-1-1 was unavailable when they needed it during the outage, and emergency responders each witness interacted with seemed likewise unaware.[183] The Commission has recognized the gravity of 9-1-1 outages due to their "potentially life-threatening" nature.[184] "The citizens of this state reasonably rely on their ability to access emergency services by dialing 911. Their inability to do so for even a short period of time poses a serious threat to public health, safety, and welfare." Because the harm in this case was serious and harmful and sustained for a significant length of time, the Commission should impose maximum statutory penalties on CenturyLink.[185]

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[177] *Id.* at 2:4–12.
[178] *Id.* at 3:1–5.
[179] D. White, Exh. DW-1T at 1:8–21.
[180] A. White, Exh. AW-1T at 1:12–14.
[181] *Id*. at 1:18–21.
[182] D. White, Exh. DW-1T at 3:9–16.
[183] Barajas, Exh. VB-1T at 2:8-12; SH-1T at 2:8-17, 3:3-4; A. White, Exh. AW-1T at 2:17-20.
[184] *Wash. Utils. & Transp. Comm'n v. Qwest Corp.*, Docket UT-140597, Order 03, ¶ 9 (Feb. 22, 2016).
[185] Chase, Exh. SKC-1Tr at 10:9–12.

2. CenturyLink's violations were irresponsible, if not intentional.

64. The second factor addresses whether the violations are intentional. "A company that willingly and intentionally violates a Commission requirement may be dealt with more severely than a company that unknowingly committed a violation."[186] Although the 9-1-1 outage was unintentional from the standpoint that CenturyLink likely did not decide to cause an outage, CenturyLink's design allowing single points of failure was irresponsible.[187] At the time of the outage, CenturyLink was a seasoned 9-1-1 provider, and the Commission could reasonably interpret its failure to avoid single points of failure as being intentional. Even if the Commission declines to impute intent, this factor does not mitigate the level of appropriate penalty under the circumstances.[188]

3. CenturyLink did not self-report the violations.

65. The third factor considers whether CenturyLink self-reported the violations. The Commission "may consider being more lenient with a company that self-reports" violations.[189] In this case, CenturyLink did not notify the Commission about the 9-1-1 service interruption. Rather, WMD notified the Commission, and CenturyLink did not communicate to the Commission until more than 24 hours after the outage began. Moreover, once CenturyLink communicated to the Commission, it stated that the outage had ended and that it was not a

[186] Enforcement Policy, ¶ 15, *In re Enforcement Policy of the Wash. Utils. & Transp. Comm'n*, Docket A-120061 (2013).
[187] Chase, Exh. SKC-1Cr at 10:13 – 11:2.
[188] *See* Docket UT-140597, Order 03, ¶ 19 ("Under the circumstances presented here, [that] CenturyLink's intent with respect to the violations is neither an aggravating nor a mitigating factor in our assessment of the appropriate penalty.")
[189] Enforcement Policy, ¶ 15, *In re Enforcement Policy of the Wash. Utils. & Transp. Comm'n*, Docket A-120061 (2013).

reportable 9-1-1 outage.[190]

66. Not only did CenturyLink not self-report the violations, but it was aware that there were system failures, even if it was not aware initially the extent of the failures.[191] This factor is an aggravating factor that weighs in favor of imposing the maximum penalty. This is particularly true since CenturyLink has a strong history of failing to notify appropriate entities.[192]

4. CenturyLink's cooperation was not complete.

67. The fourth factor evaluates whether the company was cooperative and responsive. Although Staff reports that CenturyLink was generally responsive during the investigation, CenturyLink did not provide call detail records to show how many calls failed during the outage.[193] This failure to provide important information is not consistent with cooperation.[194] This factor does not weigh in favor of CenturyLink, but rather supports imposing a significant penalty.

5. While CenturyLink corrected violations and brought the 911 system back online, it took a considerable amount of time and CenturyLink did not approach the issue with "all hands on deck."

68. The fifth factor looks at whether CenturyLink promptly corrected the violations or remedied the impact. While CenturyLink took some steps to correct the violations, it is important to note the lengthy amount of time it took CenturyLink to bring the 9-1-1 system back online.[195] Forty-nine hours is a significant amount of time for 9-1-1 to be impacted, and CenturyLink failed

[190] Chase, Exh. SKC-1Tr at 11:4–11.
[191] *Id*. at 11:9–11.
[192] *Id*. at 11:15–12:2.
[193] Staff Investigation Report at 24.
[194] Chase, Exh. SKC-1Tr at 12:3–10.
[195] *Id*. at 12:11–20.

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to use the "all hands on deck" approach to address the outage.[196] As a result, this factor supports imposing maximum penalties and does not serve to mitigate CenturyLink's liability.

6. CenturyLink committed a large number of violations and impacted every person in the State.

69. The sixth and seventh factors evaluate how many violations were committed and how many customers were affected. Because CenturyLink did not provide actual phone numbers and call detail records of the callers who attempted to call 9-1-1 during the outage, there is no way to know precisely how many unique telephone numbers were impacted during the outage.[197] As a result, parties were required to estimate the number of callers impacted. Public Counsel witness Brian Rosen conducted an analysis of average call tallies, which shows a reduction in call volume during the outage of at least 34 percent (10,752 calls) from historical average.[198] Thus, at least 10,752 calls were impacted, the outage lasted over 49 hours, and the outage was intermittent and widespread across the state. Moreover, because it is impossible to identify how many failed calls occurred on CenturyLink's system, each person in the state may have been impacted at some point during the outage.[199]

70. The number of violations and customers affected in this case is significant. Violations of RCW 80.36.080, RCW 80.36.220, and WAC 480-120-450 are measured by the number of missed calls, and CenturyLink violated each by at least 10,752 failed calls. With respect to WAC 480-120-412, the Complaint alleged 15 violations, limited to only the PSAPs connected to

[196] *Id*. at 13:1–6.
[197] *Id*. at 13:8–11.
[198] *Id*. at 13:11–15.
[199] *Id*. at 13:13–17.

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CenturyLink's network at the time of the outage, although CenturyLink's responsibility extended to all PSAPs in the State. In total, CenturyLink has incurred at least 32,271 violations.[200] In weighing this factor, the Commission is more likely to take action against a company that has more violations.[201] In this case, each missed call represents a Washingtonian who was denied access to critical 9-1-1 services. Factors six and seven weigh in favor of imposing the full statutory penalty.

7. While this case does not present a traditional likelihood of recurrence, CenturyLink's underlying network presents a risk of recurrence that warrants penalties.

71. The eighth factor considers the likelihood of recurrence. While CenturyLink provided 9-1-1 service to the state of Washington for several years, it is no longer the 9-1-1 provider. However, CenturyLink's underlying network supports emergency services in Washington, meaning that another similar outage may be possible in the future.[202] A significant penalty is warranted to press upon CenturyLink the importance of maintaining its underlying network and to address the serious nature of avoiding outages that impact emergency services.[203]

8. CenturyLink's past performance issues are significant.

72. The ninth factor is CenturyLink's past performance. CenturyLink has been subject to many compliance actions, including those involving 9-1-1 failures, over the last 10 years. In addition to 9-1-1 compliance issues, the Commission has brought actions against CenturyLink

[200] 10,752 + 10,752 + 10,752 + 15 = 32,271
[201] Enforcement Policy, ¶ 15, *In re Enforcement Policy of the Wash. Utils. & Transp. Comm'n*, Docket A-120061 (2013).
[202] Chase, Exh. SKC-1Tr at 14:3-5; Staff Investigation Report at 24.
[203] Chase, Exh. SKC-1Tr at 14:1–8.

alleging failure to extend service to a customer within 1,000 feet of the nearest CenturyLink facilities (dismissed),[204] improperly billing customers a city tax,[205] failure to complete line locate services within two days of receiving a request from an excavation company,[206] failure to notify the Commission of residential rate changes,[207] and for unlawfully disconnecting customers during Governor Inslee's COVID-19 pandemic disconnection moratorium.[208]

73. CenturyLink's past 9-1-1 failures include timely notification of outages and significant outages that left Washingtonians without vital services.[209] In Docket UT-132234, the Commission penalized CenturyLink for an outage resulting from an underwater cable cut. The outage lasted from November 5 to 13, 2013, and resulted in a telecommunication and broadband outage. The Commission found 15,935 violations and issued a $173,210 penalty with all but $50,000 suspended.[210] Within a year of the order, 100,000 Washingtonians lost 9-1-1 service, and the Commission assessed the suspended penalty of $123,210.[211]

74. In Docket UT-140597, the Commission penalized CenturyLink $2,854,750 for a six-hour, statewide 9-1-1 outage resulting in 11,495 violations.[212] The Commission noted, "The

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[204] *Wash. Utils. & Transp. Comm'n v. Quest Corp.*, Docket UT-171082, Order 03: Final Order (Aug. 23, 2018).
[205] Staff Letter to Amanda Maxwell, *In re CenturyLink City Tax Investigation*, Docket UT-200982 (2021).
[206] *In re Penalty Assessment against CenturyLink*, Docket D-210811, Order 01: Denying Mitigation (Dec. 30, 2021).
[207] *In re Penalty Assessment against CenturyLink*, Docket UT-220397, Order 01: Denying Mitigation (Sept. 30, 2022).
[208] *Wash. Utils. & Transp. Comm'n v. Lumen Technologies Group; Qwest Corp.; CenturyTel of Washington, Inc., CenturyTel of Inter Island, Inc.; CenturyTel of Cowiche, Inc.; United Telephone Company of the Northwest*, Docket UT-210902, Order 03 (July 29, 2022).
[209] Chase, Exh. SKC-1Tr at14:9–16.
[210] *Wash. Utils. & Transp. Comm'n v. CenturyLink of Inter Island*, Docket UT-132234, Order 03, Final Order Accepting and Adopting Settlement Agreement with Conditions, ¶ 33 (Oct. 20, 2015).
[211] *Wash. Utils. & Transp. Comm'n v. CenturyTel of Inter Island*, Docket UT-132234, Order 06: Imposing Suspended Penalties, ¶ 1 (June 1, 2017).
[212] *Wash. Utils. & Transp. Comm'n v. Qwest Corp*., Docket UT-140597, Final Order 03 Approving Settlement Agreement (Feb. 22, 2016).

citizens of this state reasonably rely on their ability to access emergency services by dialing 911. Their inability to do so for even a brief period of time poses a serious threat to public health, safety, and welfare, not just a violation of statute and Commission rules."[213]

75. In CenturyLink's past compliance cases, evidence shows that it simply does not timely notify the Commission, WMD, and PSAPs of 9-1-1 outages.[214] Evidence in this case continues this troubling trend—CenturyLink unreasonably felt that the outage in this case did not warrant providing notice.[215]

76. CenturyLink has had considerable challenges complying with regulatory requirements in a variety of settings. While each issue has been important, perhaps the most troubling is CenturyLink's many issues with maintaining a sufficient 9-1-1 system and meeting its regulatory requirements. While CenturyLink no longer is the State 9-1-1 contract holder, it continues to be regulated. Maximum statutory penalties are important in this case for two reasons: (1) to hold CenturyLink responsible for the December 2018 outage and (2) to convey to CenturyLink that regulatory compliance is not optional in the state of Washington.

9. CenturyLink has not demonstrated that it has an existing compliance program.

77. The tenth factor evaluates the company's existing compliance plan. In its Investigation

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[213] *Wash. Utils. & Transp. Comm'n v. Qwest Corp*., Docket UT-140597, Final Order 03 Approving Settlement Agreement, ¶ 9 (Feb. 22, 2016).
[214] Complaint*, Wash. Utils. & Transp. Comm'n v. CenturyLink of Inter Island*, Docket UT-132234 (Nov. 5, 2014); *Wash. Utils. & Transp. Comm'n v. CenturyLink of Inter Island*, Docket UT-132234, Order 06 Order Imposing Suspended Penalties (June 1, 2017); Complaint*, Wash. Utils. & Transp. Comm'n v. Qwest Corp.*, Docket UT-140597 (Feb. 19, 2015); *Wash. Utils. & Transp. Comm'n v. Qwest Corp*., Docket UT-140597, Final Order 03 Approving Settlement Agreement (Feb. 22, 2016); Complaint and Notice of Pre-hearing Conference, *Wash. Utils. & Transp. Comm'n v. Qwest Corp*., Docket UT-190209, (Apr. 24, 2019).
[215] Chase, Exh. SKC-1Tr at 15:12–17.

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Report, Staff cites no existing compliance program.[216] Since CenturyLink is no longer the 9-1-1 provider to the State of Washington, it may be appealing to reason that CenturyLink does not need a compliance program. However, CenturyLink's underlying network continues to support Washington's 9-1-1 system. To avoid future outages, it is important for CenturyLink to develop a compliance plan that will ensure that CenturyLink detects and addresses network issues before they adversely impact Washington's 9-1-1 service. The lack of any compliance plan weighs against CenturyLink and supports imposing the full penalty.

10. CenturyLink is a substantial company, both in size and sophistication.

78. In 2019, CenturyLink reported total Washington operating revenue of $245,079,768.[217] CenturyLink provided 9-1-1 service in Washington beginning in 2004, and terminating once the transition to Comtech was completed in August 2020. CenturyLink is a large, multi-state company that has decades of regulatory experience as an incumbent local exchange carrier, that held the contract to provide the State of Washington with 9-1-1 service for more than 15 years, and that approached the transition to Comtech with less than an enthusiastic commitment to ensuring a smooth transition. This factor weighs in favor of imposing the maximum penalty.[218]

11. Public Counsel's Analysis Demonstrates that the Commission Should Impose the Maximum Statutory Penalty against CenturyLink.

79. Rosen's call analysis shows that a minimum of 10,752 calls failed during the December 2018 outage. Additionally, CenturyLink failed to notify any PSAP during the outage and failed to report the outage to the Commission in a timely manner. For violations of RCW 80.36.080,

[216] Staff Investigation Report at 25; Chase, Exh. SKC-1Tr at 15:17–19.
[217] Chase, Exh. SKC-1Tr at 16:2–3.
[218] *Id*. at 16:3–5.

WAC 480-120-450, and WAC 480-120-412, the maximum penalty available is $1,000 per violation. For violations of RCW 80.36.220, the maximum penalty available is $500 per violation. Maximum penalties in this case would be as follows:

- $1,000 for each of 10,752 violations of RCW 80.36.080 ($10,752,000)
- $500 for each of 10,752 violations of RCW 80.36.220 ($5,376,000)
- $1,000 for each of 10,752 violations of WAC 480-120-450 ($10,752,000)
- $1,000 for each of 15 violations of WAC 480-120-412 alleged in the Complaint ($15,000)

80. Maximum penalties total $26,865,000, based on Public Counsel's calculation of violations. As Public Counsel witness Stephanie Chase noted in testimony, the Commission may ultimately find a different number of dropped calls.[219] The number presented by Public Counsel represents the minimum number of dropped calls. Regardless of the number of dropped calls the Commission ultimately finds, Public Counsel recommends that the Commission apply the maximum statutory penalty.[220]

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[219] Chase, Exh. SKC-1Tr at 18:13–15.
[220] *Id*. at 18:13–17.

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V. CONCLUSION

81. For the reasons stated above, Public Counsel recommends that the Commission impose maximum statutory penalties for violations of RCW 80.36.080, RCW 80.36.220, WAC 480-120-450, and WAC 480-120-412. Based on Public Counsel's call analysis and the number of PSAP notifications alleged in the Complaint, violations in this case total 32,271, and maximum penalties total $26,865,000. If the Commission determines a different number of violations, it should apply maximum statutory penalties to those violations.

DATED this 17th day of January, 2023.

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