BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

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

CENTURYLINK COMMUNICATIONS, LLC'S OPENING POST-HEARING BRIEF

January 17, 2023

REDACTED

Shaded Information is Designated as Confidential Per Protective Order in Docket No. UT-181051

TABLE OF CONTENTS

PAGE

TABLE OF AUTHORITIES

Cases **Page(s)**

Statutes

Other Authorities

I. INTRODUCTION

1. CenturyLink Communications, LLC ("CLC")—indeed the telecommunications industry writ large—understands the critical importance of completing 911 calls. Numerous regulations and standards exist for the specific purpose of designing 911 networks in a manner that limits the potential for failed calls to emergency services. In December 2018, CLC experienced an outage on one of its transport networks (its Green Network). During that outage, thousands of 911 calls failed to complete in Washington. The primary question in this case is "Why did those calls fail?" We know this is the right question because in an earlier case involving dropped 911 calls, the Commission said,"we must determine whether the 911 calls at issue in this proceeding failed as a result of CenturyLink's noncompliance with the systemic requirements …."[1]

2. Since there were two 911 providers providing service in Washington at the time, the answer to this question is actually quite simple. Comtech (which had recently won the contract to provide 911 service in Washington) served 47 Public Service Answering Points ("PSAPs"). CenturyLink (which had been Washington's long time 911 provider), continued to serve 15 PSAPs. Even though both CenturyLink and Comtech both used the Green Network for some of their signaling links, calls to CenturyLink's PSAPs completed, while thousands of 911 calls to Comtech PSAPs failed. The difference: CenturyLink provisioned its SS7 circuits with network and supplier diversity, but Comtech did not. Comtech's failure to diversify circuits violated the most fundamental tenets of both signaling and 911 architecture; specifically, signaling and 911 networks are supposed to be designed to complete during a network outage. Comtech—not CenturyLink—is directly responsible for 911 calls not completing. It is not just CLC who says this. Shortly after the outage, Public Counsel's expert wrote an article about the outage and concluded: "[T]he root cause of CALL failures, which is what we and the FCC really care about, was lack of diversity. That was foreseeable,

[1] Docket UT-190209, Order 03 ¶¶ 24-25 (Initial Order) (footnotes omitted).

REDACTED

Shaded Information is Confidential Per Protective Order in Docket No. UT-181051

that was preventable, and that is almost universally a critical design fault of 9-1-1 networks, including NG9-1-1 networks today."[2]

3. Given this obvious answer, Staff seeks to change the question. Instead of asking why 911 calls did not complete, Staff asks why the outage occurred on the Green Network. This ignores both the purpose of this proceeding—to determine why 911 calls failed to complete—as well as many of the critical facts that preceded the Green Network outage. A timeline identifying those key facts, shows (among other things) the following:[3]

- Jan. to Feb. 2017: Comtech recommended use of SS7 interconnection of the companies' ESInets;
- Spring 2017: Comtech deployed its initial SS7 network, with [redacted];
- Sept. 2017: [redacted].
- Jan. 2018: TNS (Comtech's SS7 provider) says it is "[redacted];
- Sept. 2018: [redacted];
- Sept. 2018: TNS offers to [redacted]; and,
- Dec. 2018: the Green Network outage occurs, and calls to CenturyLink PSAPs complete but thousands of calls to Comtech PSAPs fail.

4. In other words, in 2018 Comtech knowingly transformed a 911-supporting signaling network originally designed with network and supplier diversity into a fundamentally flawed, non-diverse network all because it wanted to save money. While Comtech says this flawed design was "[redacted]," it kept its design flaw secret. It did not inform CLC or WMD. Indeed, had Comtech simply told CLC that it lacked diversity in its signaling links, CenturyLink could have fixed the problem on its own by provisioning two of

---

2 *See* https://brianrosen.net/wp/2019/09/02/analysis-of-centurylink-dec-2018-outage-transport-operator-supplier-diversity-is-critical/. A copy of the article is appended as *Attachment 1*.

3 *See* Attachment 2C. Wanting the Commission to focus only on one fact (the open IGCC on the Green Network—a fact that doesn't establish culpability by CLC for the reasons discussed below), Staff ignores almost every aspect of the timeline.

the links on one of its other networks. Indeed, this is exactly how CenturyLink designed its signaling network, and why 911 calls completed to its 15 PSAPs during the Green Network outage.

5. Staff brought this complaint against CLC not in spite of these facts, but without knowledge of these facts. After the December 2018 outage, Staff appears to have simply presumed that CenturyLink caused the 911 calls to fail. Staff now argues that the outage on the Green Network was foreseeable because CenturyLink experienced an outage on a different (Red) network in February 2018. This could not be the basis of what led Staff to bring this complaint, as it discovered these facts during this proceeding. Moreover, close inspection of the facts shows significant differences between the Red and Green network outages. While both networks used Infinera equipment, they used different software versions and the software on the Green Network was designed to block all data packets the network was designed to generate. For this reason, Infinera [redacted]. In order for the Green Network outage to occur, four data packets merged together to create packets larger than anticipated and retained necessary header information—something no witness in this proceeding had ever heard of before, let alone experienced. In other words, it took a completely unforeseeable event, and an event radically different from that experienced on the Red Network, to cause the Green Network outage. Staff completely ignores the unforeseeability of these circumstances, and asks the Commission to apply a strict liability view of the outage.

6. Given this set of facts, Commission precedent precludes finding in Staff's favor. In another case involving a 911 outage, the Commission stated:

> No system is foolproof, whether it depends on computers, people, or a combination of both. Errors will inevitably occur in software coding, for example, both in its development and in its deployment in actual 911

> operating systems. What is important for our review is to ensure that CenturyLink has adequate management and oversight systems in place to both reduce the risks of such errors occurring and also to have systems in place to provide awareness of outages and to restore 911 service as rapidly as possible. The Commission thus requires the Company to take all reasonable steps to reduce the foreseeable risks of a 911 outage and to deploy systems that will limit, detect, and immediately remedy whatever service interruptions occur."[4]

7. Given that the standard is foreseeability—not strict liability—and the event that led to the outage on the Green Network was not reasonably foreseeable, fining CenturyLink for calls that failed during the outage would be a departure from both Commission precedent and fundamental fairness. For a myriad of reasons set forth below (and in its response to Public Counsel's Motion for Partial Summary Determination), CLC respectfully requests that the Commission deny the Complaint in all respects.

II. STATEMENT OF FACTS

8. The record in this case is voluminous and technical. Complexity aside, there are virtually no facts in dispute. All parties agree on that in December 2018 (a) CenturyLink was transitioning Covered 911 Service Provider responsibility to Comtech (a/k/a TeleCommunication Systems, Inc. or TSYS); (b) Comtech failed to design its SS7 signaling network supporting 911 calling in Washington with network/supplier diversity and instead placed all four signaling links on the Green Network (unbeknownst to CenturyLink); (c) the Infinera Green transport network experienced an outage involving a packet storm; and (d) both 911 networks and SS7 networks are supposed to be designed to complete calls during such an outage. There appears little dispute (at least none that is supported by direct evidence rather than mere presumption) that even though both Comtech and CLC used the Green Network for at least some of their signaling links, because CenturyLink designed its SS7 network with diverse circuits, only 911 calls to Comtech-served PSAPs failed in Washington *as a result of* the December 2018 transport network outage. In other words, what caused 911 calls to fail was a lack of diversity in Comtech's signaling links; something

[4] Docket UT-140597, Order 03 ¶ 25.

Comtech knew was a problem before the outage, but failed to correct in an effort to save money.

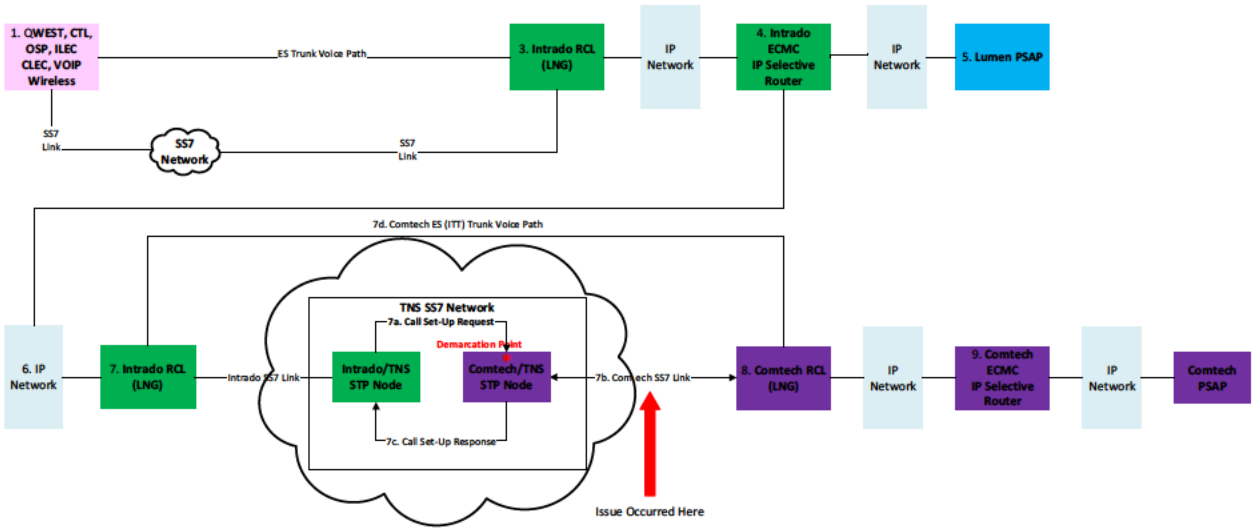
9. There is likewise no dispute that Staff's two-year investigation—one that culminated in this multi-million-dollar enforcement complaint against CLC—failed to examine Comtech's practices, decisions or network design. Had that examination been pursued, it would have been abundantly clear that Comtech, despite acute awareness of the risks to its signaling and 911 networks, made short-sighted decisions at odds with fundamental principles of network design that led directly to thousands of failed 911 calls.

A. OVERVIEW OF 911 NETWORKS AND CRITICAL DESIGN PRINCIPLES

1. 911 vs. Signaling Networks

10. Calls to 911 traverse at least 3 separate networks, as displayed in the following simplified diagram appended as Ex. CDK-3 to the Response Testimony of Carl Klein.

Figure 1: Simplified Phase 1 Call Flow



11. An emergency call begins on the network of the caller's originating service provider ("OSP") (encapsulated within step 1 above) and traverses between the OSP network and the 911 provider's gateway (step 3 above), where it enters the 911 network (network 2, steps 3-9, excluding steps 7a through 7c). The 911 network contains numerous components and was

concisely summarized in the introduction to the 2009 statement of work attached to the 911 contract between CLC's predecessor and the Washington Military Department ("WMD"). The contract described the emergency network as containing the following: "The Emergency Services Internet Protocol Network (ESINet) will also allow the transportation of Automatic Location Information (ALI) database information meeting the current National Emergency Number Association (NENA) standard 4.xx XML format. This solution must include, but is not limited to, network, transport, PSAP interfaces, 911 trunk support, selective routing and ALI interfaces."[5]

12. The third network is the signaling network (steps 7a through 7c), which is a separate network parallel to the voice network that is used to transmit messages necessary to set up, break down and track critical information about the voice calls.[6]

13. There were two active 911 networks in Washington at the time of the December 2018 outage as WMD was transitioning from CenturyLink to Comtech. Each operated an emergency services internet protocol network ("ESInet") (CenturyLink's was ESInet1; Comtech's was ESInet2), and the ESInets were interconnected via an inter-tandem trunk ("ITT") (step 7d above). Both CenturyLink and Comtech used SS7 protocol for call set up, breakdown and related messaging (for calls destined to a Comtech PSAP, the SS7 network is depicted in steps 7a-7c above). The selection of SS7 interconnection was the joint decision of Comtech,

---

[5] Ex. BR-4 at 15. As discussed in paragraph 29 below, Public Counsel badly misconstrues the breadth and import of this simple summary of ESInet functions. Public Counsel argues that this 911 solution overview created contract and regulatory liability in the event of a single failed 911 call. There is absolutely no support for this notion in the agreement itself (which the Commission lacks jurisdiction to enforce) or state statute or rule. CLC spelled out the myriad of problems with these contract theories in response to Public Counsel's Motion for Summary Determination, which CLC incorporates by reference here.

[6] Turner, Ex. SET-1TC at 15:17-20.

CenturyLink and Intrado (CenturyLink's 911 vendor), with the support of WMD.[7] The selection of SS7 interconnection is discussed in detail in paragraphs 30-31 below. Contrary to the protestations of Public Counsel witness Brian Rosen, SS7 is commonly-used and industry standard.[8] Even Staff agrees, extolling the virtues of SS7 as a "very flexible technology that can perform many other functions, including transmitting the geographic address of a person dialing 911 to the PSAP receiving an emergency call, in order to speed the response time of the appropriate public safety agency."[9]

2. The Critical Importance of Geographic, Network and Supplier Diversity

14. When using SS7, calls do not complete if the signaling network is down. For that reason, SS7 is set up in "mated pairs" to ensure network redundancy.[10] As Mr. Turner explained, "[n]etwork redundancy is implemented by means of ensuring route diversity. Route diversity does not simply mean geographic diversity of the transport facilities for the network. Its meaning is much broader. It requires that redundant network components must travel on different routes not only using diverse transport facilities, but also with no single points of failure either from a physical equipment or software standpoint."[11]

---

7 Exs. SJH-4 (WMD responses to CLC DRs 5 and 6), SJH-5C. All "SJH" exhibits are appended to the response testimony of CLC witness Jeanne Stockman, who adopted the response testimony of Stacy Hartman.

WMD admits that it did not insist on IP-based interconnection. Ex. SJH-4 at 3. Moreover, WMD was clear that the parties negotiated and collaborated to choose the interconnection design: "Over the course of several months, Comtech, CenturyLink, and CenturyLink's subcontractor Intrado, worked together to further develop and refine the interconnection solution, which culminated in a formal presentation by all parties to WMD. At the conclusion of the presentation, WMD accepted the solution for implementation. The level of collaboration described above, continued for the most part, throughout the transition." Id. at 3-4.

8 *See* Turner, Ex. SET-1TC at 44:4-45:20.

9 Webber, Ex. JDW-1CT at 35:3-6.

10 Turner, Ex. SET-1TC at 25:2-27:8; Rosen, Ex. BR-1TC at 20:19-21:1 ("In building 9-1-1 systems, I generally advise that supplier diversity be used to guard against the kind of failure that occurred here.").

11 Turner, Ex. SET-1TC at 25:6-11.

15. It is a Covered 911 Service Provider's responsibility to ensure that sufficient diversity exists to avoid single points of failure. To that end, the FCC recognizes that a Covered 911 Service Provider has the following responsibilities:

> Covered 911 service providers *are required to take reasonable measures to provide reliable 911 service in three specific respects: circuit diversity*, central office backup power, and diverse network monitoring. They must also "*certify annually* whether they have, within the past year, *audited the physical diversity of critical 911 circuits* or equivalent data paths to each PSAP they serve, tagged those circuits to minimize the risk that they will be reconfigured at some future date, and eliminated all single points of failure."[12]

16. A carrier's responsibility extends beyond its own network and includes the need to ensure that its vendors' facilities are likewise diverse.[13] Carriers routinely cooperate with each other in providing information when they understand that circuit diversity is needed.[14] There is no record evidence that Comtech audited even its own facilities, let alone the DS-0 and DS-1 circuits it was leasing from CLC to use as signaling links.[15] In discovery, Comtech all but

---

[12] Ex. SJH-13 (August 2019 FCC Report) ¶ 6 (emphasis added); *see also* Ex. JDW-16.

[13] Ex. JDW-67X at 40 of 92 (NENA standards); Webber, Tr. 172:9-19 ("[redacted]").

[14] Turner, Tr. 362:7-363:6. The Commission has a strong interest in minimizing the amount of information that is designated as confidential and shielded from public view. For logistical reasons, significant portions of the evidentiary hearing were conducted in confidential session, meaning that much of the hearing transcript is likewise marked confidential. CLC believes that the confidential transcript excerpts contain considerable information that is not proprietary. CLC is willing (if the Commission directs) to work with the parties to redesignate portions of the transcript as non-confidential.

[15] Webber, Tr. 154:17-157:20 (Webber unaware of any Comtech audit, but agrees that an audit would have revealed lack of diversity), Rosen, 284:15-24 (Rosen testifies that Comtech should have audited for the diversity of signaling links). At hearing, Mr. Webber speculated that CenturyLink should have known of Comtech's lack of diversity. Webber, Tr. 154:17-158:20, 202:12-204:16. In response to questioning by Commissioner Doumit, Mr. Webber admitted that was simply supposition and that there is no evidence of such communication or awareness. Webber, Tr. 204:6-10 (Commissioner Doumit: [redacted]).

admitted its failure to audit.[16]

17. There are different types of diversity, each containing greater degrees of redundancy: (1) geographic diversity where calls do not travel along the same physical path at any point; (2) network diversity, where a network outage will not prevent calls from completing; and (3) supplier diversity where one uses multiple carriers to guard against outages. CLC claims that SS7 used to support 911 calling is best served by all three types of diversity.[17] Public Counsel's witness, Mr. Rosen, agrees that SS7 networks must be deployed using network and supplier diversity.[18]

18. Staff, on the other hand, argues that geographic diversity is all the FCC mandates.[19] Mr. Webber is wrong. Citing CSRIC standards, the FCC stated: "Network operators, service providers and public safety entities should periodically audit the physical and logical diversity, including provider diversity, in their networks segment(s) to ensure that a single outage won't simultaneously affect different circuits."[20] Mr. Webber tries to distance himself from the FCC by arguing this order post-dates the December 2018 outage.[21] However, the same standard applied earlier. NENA is the organization the FCC relies upon to oversee 911 network design.[22] In April 2018—8 months before the Comtech 911 outage—NENA stated:

- "The mission critical infrastructure and systems that support NG9-1-1 must be established with the very highest degree of security, reliability, resiliency, redundancy, survivability and diversity, to meet the expectation of the 9-1-1 industry and first responder communities. Further, these systems and networks will remain fully operational during regular daily operations as well as during and immediately following a major natural or

---

16 Turner, Exs. SET-1TC at 29:10-24, SET-8.

17 Turner, Ex. SET-1TC at 25:2-27:8.

18 Rosen, Ex. BR-1CT at 20:19-21:1; Rosen, Tr. 277:2-278:21, 345:6-364:4 [redacted]

19 Webber, Ex. JDW-33CT at 8, 13-15.

20 Ex. JDW-16.

21 Webber, Tr. 125:11-126:10.

22 Webber, Tr. 130:14-132:13.

manmade disaster on a local, regional, and even nationwide basis."[23]

- "A best practice when designing connections into an ESInet is to utilize a mix of diverse transport mediums, technologies and service providers as is operationally and economically feasible. The emphasis on "no single point of failure" in 9-1-1 applies to all ESInets. Some considerations that should be addressed include: … Circuit diversity; Network diversity."[24]

19. Indeed, shortly after the December 2018 outage, Mr. Rosen wrote an article stating: "[CenturyLink] is a fine network operator, Infinera is generally well thought of. There is no reason to think that any other network operator, or any other vendor would be better at this kind of thing. They all are dependent on humans, and humans make mistakes. What is wrong is relying entirely on CL, or any other single network operator, for all of your paths." "So, to me, the root cause of this particular NETWORK failure was coding bugs in the switch complicated by the configuration issue. But the root cause of CALL failures, which is what we and the FCC really care about, was lack of diversity. That was foreseeable, that was preventable, and that is almost universally a critical design fault of 9-1-1 networks, including NG9-1-1 networks today."[25]

B. COMTECH, NOT CENTURYLINK, EXPERIENCED A 911 OUTAGE.

1. All Failed Calls Attributable to the Green Network Outage Were Destined for Comtech-Served PSAPs.

20. Since well before the complaint was filed in December 2020, Staff has been aware that each Washington 911 call that failed *as a result of the December 2018 transport outage* was destined for a Comtech-served PSAP. In the fall of 2020, CenturyLink provided Staff two detailed 911 call analyses—one for CenturyLink PSAPs and one for Comtech PSAPs—which broke down by PSAP and hour each attempted 911 call in the state between midnight December 27, 2018 and midnight December 29, 2018.[26]

---

[23] Ex. JDW-67CX at page 40 of 92.

[24] *Id.*

[25] *See* Attachment 2C.

[26] Exs. JDW-27C-30C; Hawkins-Jones, Tr. 90:21-92:8.

21. Those analyses (which contain data extracted from Intrado call detail records ("CDRs")) identify [redacted] attempted 911 calls to the 15 remaining CenturyLink PSAPs. All but [redacted] completed, and none failed as a result of the Infinera Green Network transport outage.[27] CenturyLink described the error codes associated with the [redacted] calls in its narrative response to Staff's August 2020 data requests,[28] and no party has refuted those explanations. The overwhelming majority of those [redacted] were "one party left in call," indicating that the caller hung up before the PSAP operator could answer. This bears no connection to the transport outage, which is confirmed by the fact that these calls reached and were answered by the PSAP, refuting any assertion that the call failed.[29]

22. The parallel analysis reveals a total of [redacted] attempted 911 calls to the 47 Comtech-served PSAPs during the same time period, and that [redacted] failed. Of those, [redacted] are indicated with a 404 error code,[30] which means they were tied to the Green Network outage. Importantly, CLC set up two of its signaling links using the same Green Network, but deployed the other two with a different carrier (Qwest Corporation) on a separate network.[31] This validates that Comtech's 911 calls did not fail as a result of the Green Network outage, but because of Comtech's inadequate signaling network design (as discussed below). Neither Staff nor Public Counsel offers direct evidence that any 911 calls failed to reach CenturyLink-served PSAPs a result of the network outage on the Green Network. Public Counsel ignores the issue altogether, while Staff attempts to overcome CDR data with supposition that CenturyLink PSAP calls must have failed due to the outage. Staff witness Webber conjures up [redacted] failed 911 calls to CenturyLink PSAPs.[32] As CLC witness Klein

---

27 The Infinera Green Network ("Green Network") is one of six transport networks operated by Lumen. The Green Network is a legacy CenturyLink network. The Infinera Red Network ("Red Network") is another of the six, and is a legacy Level 3 network. Valence, Ex. MDV-1TC at 4:8-10.

28 Ex. JDW-27C.

29 Klein, Tr. 435:8-23.

30 Ex. JDW-29C at 2; Klein, Tr. 431:11-432:11.

31 Klein, Ex. CDK-1TC at 10:15-16; Ex. SET-4C at 3.

32 Webber, Ex. JDW-1TC at 44:13.

explains, Mr. Webber fails to put forward evidence that calls destined to a CenturyLink-served PSAP *failed as a result of the outage*.[33] Indeed, Mr. Webber admits he did not evaluate the error codes associated with the calls, which would identify the reason for the failure.[34] Instead, Mr. Webber speculates that there must have been failed calls to CenturyLink PSAPs due to a spike in unsuccessful calls.[35] The CDR data presented by CenturyLink demonstrates that almost all unsuccessful calls to CenturyLink PSAPs were due to the caller hanging up.[36] Indeed, the CDR data shows these calls reached the PSAP, which *per se* disproves Staff's suggestion that calls must have failed to reach those PSAPs.[37] If there was a spike of calls to 911 during those hours—perhaps because of the emergency alert sent to smartphones by the State of Washington late in the evening on December 27, 2018[38]—it would make sense that an unusual number of "test" calls were made by concerned citizens, who then hung up having no actual need for emergency services.

23. Ms. Hawkins-Jones asserts that CenturyLink PSAPs were affected by the outage based on emails between herself and five PSAPs regarding the outage.[39] What Staff fails to recognize is that none of the concerns identified by the PSAPs related to the failure of end user 911 calls to the PSAP. The concerns all relate to intermittent *long distance service* interruptions. There is no record evidence that CLC was the long-distance carrier for the subject PSAPs and there are no allegations in the complaint that CLC violated state law due to intermittent

---

33 Klein, Ex. CDK-1TC at 11:5-12:9.

34 Webber, Tr. 200:16-25.

35 Webber, Ex. JDW-1TC at 54:1-60:9; Webber, Tr. 198:11-199:23.

36 Klein, Tr. 435:9-23.

37 *Id*.

38 *See* https://www.geekwire.com/2018/widespread-911-outage-hits-washington-emergency-alerts-sent-smartphones-friday-night/ ("A 911 outage affected agencies across Washington state on Thursday and continued into the early hours of Friday, as people received emergency alerts on their smartphones late Thursday evening with alternatives to 911 phone number * * * People in Washington and parts of Oregon had tweeted about receiving the emergency alert on their smartphones just past 11:20 p.m. PT Thursday…").

39 Hawkins-Jones, Exs. JHJ-1TC at 19:3-20:8, JHJ-15, JHJ-16, JHJ-17CT, at 2:7-3:18, JHJ-18.

long distance service issues.

2. Neither Staff Nor Public Counsel Points to Any Failure on the CenturyLink 911 Network During the December 2018 Outage.

24. While this multi-million dollar complaint is focused on 911 service interruptions, the outage did not affect or impair any portion of CenturyLink's 911 network. Looking at Figure 1, CenturyLink's 911 network at the time consisted of the Intrado gateway (where calls were received from OSPs), transport to the Intrado selective router, the Intrado selective router, transport to the CenturyLink-PSAPs and transport (in the case of Comtech-destined calls) from the Intrado selective router to the Intrado gateway.

25. Staff has not alleged any failure of *any* of those component parts of the 911 system, and at hearing could not identify any.[40] Likewise, Public Counsel admits that there is no evidence of 911 network impairment.[41]

26. Instead, Staff and Public Counsel take aim at CLC solely in its capacity as a wholesale transport provider, specifically regarding the provision of *interstate* transport services used by Comtech as signaling links in support of ESInet 1 to ESInet 2 interconnection. With regard to those interstate circuits, CLC was (unknown to it) Comtech's vendor. Relevant here, those transport circuits were not a component of CenturyLink's 911 network in Washington.

C. MOST WASHINGTON PSAPS HAD TRANSITIONED TO COMTECH BY DECEMBER 2018.

1. Transition Timeline

27. Prior to WMD putting out a request for proposal ("RFP") in 2015, CenturyLink (CLC and affiliates) and its predecessor had been the exclusive 911 provider in Washington for many

---

[40] Hawkins-Jones, Tr. 104:10-108:12 ("Q. Ms. Hawkins-Jones, you understand that this complaint addresses not an outage on CenturyLink's 911 network, but on an outage affecting one of CenturyLink's national transport networks; is that correct? A. Correct.").

[41] Exs. BR-46X – 50X.

years. WMD and CenturyLink signed their most recent 911 service contract in 2009.[42] The 2009 contract attached a statement of work ("SOW"). The Introduction to the SOW summarized CenturyLink's NG911 solution as including "network, transport, PSAP interfaces, 911 trunk support, selective routing and ALI interfaces."[43] The 2009 contract/SOW did not contemplate 911 services being transitioned to a successor provider, as would happen beginning in 2016. To that end, it contains no provisions expressing or even suggesting that CenturyLink would remain legally and operationally liable for a successor's network operations should WMD award the contract to another provider in the future.

28. In responding to the RFP, Comtech promised to deliver a 911 solution that "eliminates all single points of failure," was "highly redundant" and utilized "network" and "carrier diversity."[44] WMD awarded the RFP to Comtech in 2016. The WMD-Comtech contract required that Comtech avoid single points of failure and provide critical network diversity, and held Comtech responsible for outages that occurred due to a single point of failure that could have been avoided.[45] It even contains a service level agreement ("SLA") requiring Comtech to ensure redundancy and to avoid single points of failure.[46] The accompanying SOW explicitly reinforced the critical importance of redundancy: "In summary, TCS implements local redundancy with separate entrance facilities, redundant local area network (LAN) links between functional elements, and redundant hardware and software components. TCS implements geographic redundancy by deploying geographically diverse data centers and by employing carrier diversity, where available, between the MPLS network that

---

42 Ex. BR-4.

43 *Id.* at 15.

44 Ex. JDW-75X at 161-163.

45 Ex. JDW-74X at 38 (§ 11.5); Tr. 141:8-142:5. At hearing, Public Counsel's witness Mr. Rosen admitted that placing all signaling links on the same network created a single point of failure (Rosen, Tr. 277:2-278:2), and that Comtech's decision should have never occurred (Rosen, Tr. 294:9-13). Mr. Rosen has made clear that the 911 calls in Washington failed because of this lack of diversity. *See* Attachment 2C.

46 Ex. JDW-74X at 58-59 (SLA 6.4).

provides call and data delivery to PSAPs and the MPLS network that provides the network and system monitoring."[47]

29. The transition from CenturyLink to Comtech was a three-phase process. The December 2018 outage occurred during Phase 1, when individual PSAPs were migrated one by one from CenturyLink to Comtech. During Phase 1, all Washington 911 calls were initially routed through CenturyLink's 911 network, with calls being forwarded to Comtech if the call was destined for a Comtech PSAP.[48] Figure 1 above provides a simplified summary of the Phase 1 call flow. Mr. Klein provided a more detailed version of Figure 1 that shows the redundant connections and circuit-specific information.[49] As of December 27, 2018, 47 of 62 PSAPs had been transitioned to Comtech.[50]

2. CenturyLink, Intrado, Comtech and WMD Collaborated and Cooperated to Develop the 911 Transition Design.

30. The transition design was a collaboration among CenturyLink, Intrado, Comtech and WMD. Comtech, as successor 911 provider, was the project manager, but all elements of the transition were discussed and negotiated. Contrary to Public Counsel's unsupported narrative that CenturyLink dictated design decisions[51]—most notably the selection of SS7 interconnection for the two ESInets—the parties worked collectively.[52] WMD confirms that design decisions were collective and cooperative. See paragraph 13 above. WMD's

---

47 Ex. JDW-75X at 163. "MPLS" is "multiprotocol layer switching."

48 Klein, Ex. CDK-1TC at 5:10-6:12.

49 Id. at 10:7-12; Ex. CDK-4C.

50 Ex. JHJ-3C at 10.

51 *See* Lobdell, Ex. VL-1TC at 5:12-7:9 (summarizing Public Counsel testimony). Further confirming CenturyLink's lack of dictatorial authority in this process, CenturyLink initially opposed the three-phase transition design, and expressed concerns about the implications of being in the call flow for Comtech-destined 911 calls. Lobdell, Ex. VL-1TC at 4:1-5:3; Ex. VL-2. Ultimately, the three-phase approach was reasonable, but its adoption over the concerns of CenturyLink demonstrates that CenturyLink did not unilaterally control the transition process or design.

52 Lobdell, Ex. VL-1TC at 7:10-9:15.

explanation refutes concerns raised by Public Counsel[53] that CenturyLink was uncooperative and disengaged. Mr. Klein reasonably explained that he was concerned about CenturyLink designing Comtech's 911 network for Comtech, but that concern does not indicate a lack of participation or cooperation by CenturyLink.[54] Indeed, the record is replete with detailed correspondence and planning documents corroborating CenturyLink and Intrado's engagement and participation.[55]

31. As to the specific type of interconnection (IP vs. SS7), WMD confirms that no specific technology was required by the contract[56] The record also confirms that while Comtech initially requested a basic IP form of interconnection, it eventually *recommended* SS7 interconnection.[57] Public Counsel argues that SS7 was Comtech's second choice; that it really wanted SIP signaling.[58] The record disproves this. On February 7, 2017, Comtech sent CenturyLink an email stating: "our recommendation at this time is to pursue ESInet to ESInet connections … using standard ISUP/TDM… Our second preference is to use Basic SIP as described in the West NNI document."[59] Thus, Comtech made SIP signaling—the very type of signaling that Public Counsel says should have been used[60]—its second choice. It remains a mystery why Public Counsel insists upon fabricating a narrative of unilateral

---

53 *See* Rosen, Tr. 291:14-25 [redacted]).

54 Klein, Tr. 454:8-12 [redacted]).

55 *See e.g.,* JDW-20C, version 14 of Comtech's transition project management tracking sheet identifying numerous areas of negotiation and collaboration.

56 Ex. SJH-4 at 3 ("In fact, RFP-16-GS-NG911, in part, says, '. . . it is not the intent of this RFP to provide implementation details that would limit the BIDDER's solution to one particular technology.').

57 Ex. SJH-5C at 3-5.

58 Rosen, Ex. BR-1CT at 21:11-22:7; Rosen, Tr. 320:13-323:10.

59 Ex. SJH-5C at 3-5. ISUP messages are those sent in SS7 signaling. "NNI" is a "network-to-network interface"

60 Rosen, Tr. 317:21-318:3.

decision making by CenturyLink, and in particular that it mandated SS7 signaling. This is especially curious given that the type of interconnection was not the primary cause of 911 calls failing; Comtech's faulty network design was.[61]

3. Call Routing and Regulatory Responsibility Shifted to Comtech for Transitioned PSAPs.

32. Upon awarding the 911 contract to Comtech, WMD amended the 2009 CenturyLink contract via Amendment M, which specifies that responsibility for calls to Comtech-served PSAPs would shift to Comtech.[62] Amendment M states in relevant part: "Upon the Department's cut over of one or more PSAPs to ESlnet II ("Migrated PSAPs"), the Department's successor provider [Comtech] shall be a Covered 911 Service Provider for such Migrated PSAPs *and shall be solely responsible for routing calls from the Demarcation Point between ESlnet I and ESlnet II to such Migrated PSAPs*."[63] Notwithstanding Public Counsel taking the position that CenturyLink retained responsibility for all aspects call completion for 911 calls to Comtech PSAPs,[64] even Mr. Rosen acknowledges that Amendment M transitions Covered 911 Service Provider responsibility to Comtech.[65]

4. Demarcation Point on Signaling Network

33. Amendment M does not explicitly define the "Demarcation Point" between the CenturyLink

---

[61] Rosen, Tr. 324:20-25; see paragraphs 41-45 below. Public Counsel's witness theorizes that if SIP signaling would have been used, calls would have completed under the theory that IP calling finds a way. Rosen, Tr. 334:23-335:5. At hearing, Mr. Turner debunked this theory, explaining that SIP signaling using circuits deployed on the Green Network would have failed, just as they failed with SS7 signaling. Turner, Tr. 403:19-406:5.

[62] Ex. SJH-9C.

[63] *Id.* at 1 (emphasis added).

[64] *See* Ex. BR-54X.

[65] Rosen, Ex. BR-1CT at 16:9-12. Tellingly, Mr. Rosen argues that Comtech's status as the Covered 911 Service Provider was irrelevant. Rosen, Tr. 279:9-10 [redacted]). Mr. Rosen is wrong. FCC regulation defines numerous roles and responsibilities of a Covered 911 Service Provider, which Comtech assumed through Amendment M. *See, e.g.,* 47 C.F.R. § 9.19 (Reliability of covered 911 service providers). It is clear that Public Counsel would prefer that the Commission simply ignore Amendment M given that it indicates that responsibility for Comtech-served 911 calls shifted to Comtech. From a legal and regulatory perspective, Comtech's status as the Covered 911 Service Provider has great importance.

and Comtech networks during Phase 1. From this, Public Counsel contrives that there was no demarcation and that CenturyLink remained responsible for every aspect of call completion all the way to the Comtech PSAP. Public Counsel ignores the fact that CenturyLink had no visibility to, or control over, Comtech's network facilities or design on "Comtech's side of the network," using Comtech's own words.[66]

34. While Amendment M did not specify the precise physical location of the signaling demarcation point, its existence and location is plainly obvious. As Mr. Turner explains, "a demarcation point, or "demarc" in industry parlance, is a point where one party's responsibility ends and another's begins."[67] Public Counsel agrees with this definition.[68] As Figure 1 above indicates, the signaling network demarcation point was located at the point where the Intrado/TNS signaling transfer point ("STP") sent an initial address message ("IAM") to Comtech. This is obvious as a matter of party expectations, as well as simple logic. At this point, CLC's vendor would have sent an IAM to Comtech's vendor and received a confirmation message back. It is undisputed this happened.[69] That means, CLC's network performed its work, but Comtech's did not.

35. Mr. Turner explained that he spent years managing an SS7 call center, and routinely managed situations just like this:

[redacted]

[66] As Mr. Turner and Mr. Klein explain, there are actually multiple demarcation points in the Phase 1 transition call flow. There was also a demarcation point for the voice portion of the call and multiple demarcation points for the signaling network. Turner, Tr. 382:9-19; Klein, Tr. 425:8-426:18. However, none of these other demarcation points are relevant to this proceeding because everyone admits that the calls failed on the Comtech SS7 links. Rosen, Tr. 301:21-24 (Mr. Rosen admitted the following: [redacted]).

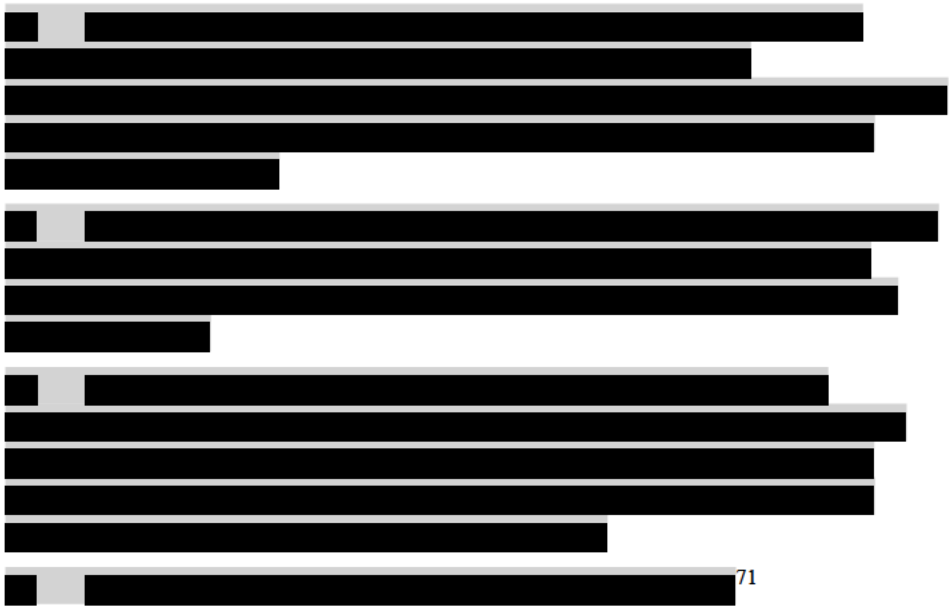
[67] Turner, Ex. SET-1TC at 40:1-2.

[68] Rosen, Tr. 296:20-297:2.

[69] Turner, Tr. 374:16-375-8; Rosen, Tr., 300:21-301:24.

[redacted][70]

36. Given this experience, there was no question about where the demarcation point lied on the SS7 network:



[71]

37. During the course of the transition network planning, Comtech identified the demarcation point where it would become responsible for the handling of SS7 messages. In its November 2016 proposal, one centered on basic IP interconnection, Comtech stated [redacted][72] The INVITE in IP parlance is identical to an SS7 IAM.[73] Thus, Comtech's own documentation identified the demarcation point at the exact location CLC identifies.[74] Public Counsel argues that this document relates

---

70 Turner, Tr. 383:8-21.

71 Turner, Tr. 407:13-408:7.

72 Ex. SET-7C at 1-2.

73 Turner, Ex. SET-1TC at 43:9-11.

74 Id.

to a proposal involving the parties exchanging calls with IP signaling and has no relevance for SS7 interconnection.[75] Once again, the record shows otherwise. Once Comtech decided upon SS7 signaling, it modified this document for its SS7 interconnection and utilized the exact same diagram using [redacted].[76] Thus, Comtech's own communication expressed its expectation as to the location of the handoff on the signaling network. That the particular design being described at the time contemplated IP rather than SS7 interconnection is of no moment; the INVITE and IAM are functional equivalents, as they both identify the point where CenturyLink relinquishes and Comtech takes control of the call set up messaging. While there was no written agreement precisely identifying the "Demarcation Point" for purposes of Amendment M, Comtech itself identified the only logical demarcation in its planning design communication.

38. On the location of the demarc, Comtech left no room for doubt. In September 2018—3 months before the outage—Comtech exchanged emails with its signaling provider TNS. In that exchange, Comtech admitted that all four of its signaling links were on the CLC network, and described this as "not an ideal situation" and importantly that these circuits were on Comtech's "side of the network."[77] This is an admission that the signaling links that failed during the Green Network outage were on its side of the demarcation point.[78]

39. In discovery, Comtech offered an alternative diagram allegedly depicting the Phase 1 transition network. Comtech identifies the demarc as being at the [redacted] Comtech's diagram depicts [redacted].[79] Comtech's design is inaccurate as there were only two STPs in the Phase 1 signaling network. If the extraneous STPs [redacted] are

---

75 Rosen, Tr. 309:5-15.

76 *See* Ex. BR-3C at 25-30.

77 Ex. JDW-41C at 2..

78 Turner, Tr. 408:8-410:6.

79 Ex. JDW-87CX at Depo Ex. 3.

REDACTED

Shaded Information is Confidential Per Protective Order in Docket No. UT-181051

removed, Comtech's and CLC's diagrams identify the exact same point of demarcation; namely, the one identified by Mr. Klein in the diagram above.[80]

40. Public Counsel argues that there was no demarcation point because the contract did not define one. Public Counsel puts forward no precedent for this proposition; it merely relies on the unsupported testimony of Mr. Rosen, a person who admits he has [redacted] experience with SS7 troubleshooting—the time when understanding where the demarcation point is on the network is essential.[81] This stands in stark contrast to Mr. Turner—who ran an SS7 call center for years—who said he had [redacted] about where the demarcation point was.[82] Public Counsel's position also stands in stark contrast to FCC precedent[83] and the parties' recognition that the demarcation point is where one parties' network stops and the others begins. There's simply no question that the demarcation point between CenturyLink and Comtech pinpoints to where control of the SS7 message is handed to the other. How could it be elsewhere? To find that the demarcation point between CenturyLink and Comtech's networks (a) sits on facilities Comtech designed and ordered (which Comtech itself describes as "Comtech's side of the network")[84] or (b) does not exist at all would be to place responsibility on CLC for design and other decisions, as well as facilities, it was unaware of and had no decision making authority over.[85]

---

80 *Id.* at Depo pp. 54-56, 78-83.

81 Rosen, Tr. 299:17-19.

82 Turner, Tr. 408:3-7.

83 See *In re Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98, 15 FCC Rcd. 3696, ¶ 169 (Rel. Nov. 5, 1999) ("our rules define the demarcation point as that point on the loop where the telephone company's control of the wire ceases"). See also Ex. JDW-89CX at depo p. 60 (industry defines demarcation point as the point where one provider's responsibility ends and the other's begins).

84 Public Counsel recognizes CLC's lack of visibility or control over Comtech's signaling facilities. Ex. BR-75X.

85 Public Counsel's argument that CLC should have been aware of the lack of diversity on SS7 circuits ignores the fact that the network was originally designed with supplier diversity ([redacted] had two SS7 circuits and CenturyLink had two), but when Comtech transitioned the [redacted] circuits, it did not tell anyone about the lack of diversity. Ex. SJH-12C at 7-8 (Comtech offers no information or documents

D. COMTECH KNOWINGLY VIOLATED REGULATORY STANDARDS AND INDUSTRY BEST PRACTICES IN DESIGNING AND MAINTAINING THE SIGNALING NETWORK IT CONSTRUCTED TO SUPPORT 911 CALLING IN WASHINGTON.

41. At the time of the December 2018 outage, Comtech lacked sufficient diversity on the signaling links being used to support 911 calling in Washington. Comtech was acutely aware of its flawed design, yet refused to take steps to remedy the situation in an effort to save money. As a direct result, thousands of 911 calls failed in December 2018.

1. Comtech's Original Design Featured Physical, Network and Supplier Diversity.

42. As initially designed by Comtech, the Comtech signaling links (Figure 1 step 7b) enjoyed geographic/physical, network and supplier diversity.[86] Comtech placed two of the links with [redacted] and two with CLC. This was the network the parties tested as part of the transition plan.[87] In the fall of 2017—months after the transition started—Comtech became aware that

---

suggesting it informed anyone that all four signaling links on the same CLC network). Staff argues that CLC should have been aware because the order form came from TNS (a known signaling provider) for "replacement" circuits. Webber, Ex. JDW-33CT at 40:14-41:7. As Mr. Turner explained, orders go to technicians who fill them. The technician would not be aware of the details, and TNS also uses circuits for many things not just SS7. Turner, Tr. 368:15-371:20. This is why CLC provides a formal process for ordering circuits with diversity. Id.; Valence, Ex. MDV-1TC at 20:15-24:9. Had Comtech simply told CenturyLink that it needed diversity, CLC could have provisioned diverse SS7 circuits on separate networks using separate suppliers all by itself. Valence, Ex. MDV-1TC at 7:2-7.

[86] During the course of this proceeding, Comtech has taken evolving views of the importance of supplier diversity. Despite touting and promising supplier diversity in its response to WMD's RFP, and despite initially designing its transition SS7 network with supplier diversity and expressing urgency when it was set to lose the same, Comtech's first assertion in this case was that supplier diversity is detrimental. Ex. SJH-10C (Comtech: "The intended redundancy was to have [redacted], which is the most certain using a single vendor since different vendors will not share information with one another about the physical paths they use."). Several months later, Comtech changed its story, arguing that it [redacted] Ex. SJH-12C at 1. Both explanations are at odds with Comtech's contemporaneous (late 2017-early 2018) awareness that having all four circuits with CenturyLink on "Comtech side of the network" was "obviously not an ideal situation, and was intended to be extremely temporary." It similarly ignores that TNS had expressly warned Comtech that having all four signaling links on a single network was "not a wise choice at all." *Id.* at 8-12.

[87] Rosen, Tr. 289:18-21 [redacted].

[redacted] was discontinuing T1 service and that Comtech would need to replace two of the four circuits.[88]

2. Following [redacted] Exit from the Market, Comtech Made a Series of Short-Sighted, Money-Saving Decisions that Led to the 911 Outage in December 2018.

43. Upon learning that [redacted] was exiting the T1 market, discussions ensued between Comtech and TNS, its SS7 provider. While Comtech initially indicated extreme urgency,[89] it took until [redacted] for Comtech to decide on a new provider for the t[redacted] circuits and those circuits were not transitioned until [redacted]. For months, Comtech intended to replace the [redacted] links with [redacted] links, but in January 2018 Comtech changed course [redacted]. On January 3, 2018, Comtech informed TNS: [redacted] [90] There is no indication before the December 2018 outage that Comtech followed through to replace the new CLC circuits (those that replaced the [redacted] circuits) with [redacted] circuits. At the time of the outage, all four circuits—all of which were interstate[91]—were still on the CLC Green Network. As both Public Counsel and Comtech admit, CLC was unaware (until the outage) that Comtech/TNS was utilizing the new CLC circuits as SS7 links in support of 911 calling in Washington.[92] Had Comtech informed CenturyLink that it lacked

---

88 Ex. SJH-12C at 20.

89 *Id*. at 18 [redacted]).

90 *Id*. at 12-13.

91 All parties agree that the DS-0 and DS-1 circuits leased by Comtech from CLC (all of which were on the Green Network) were interstate in nature and design, connecting Los Angeles, Las Vegas, Phoenix and Seattle. Stockman, Exs. JWS-1TC at 32:5-8, MDV-8C, JDW-77X at 5 (Comtech describes the DS-0s and DS-1s as "long-haul interstate circuits"; Chase, Tr. at 258:7-9 (Ms. Chase acknowledges "these were interstate circuits and not intrastate circuits."). None of these circuits – those that failed during the December 2018 network event – was intrastate in nature.

92 Valence, Exs. MDV-1TC at 23:1-24:1, MDV-8C, BR-73X; Rosen, Tr. 294:2-8 (Rosen [redacted]).

diversity, CenturyLink could have provided two of the signaling links on a different transport network thereby providing network and supplier diversity.[93] Comtech had every opportunity to advise CLC, and to seek network diversity from CLC, yet it did neither.

44. NENA standards governing the design of NG-911 networks specifically state that "Those involved in planning and design of an ESInet are urged to look beyond the cost of operations as a restriction to implementing as much diversity as possible in comparison to the costs of liability in the potential event of a service or system failure."[94] Making matters worse, despite Comtech's assertions that each of its signaling links had physical diversity, they did not. Multiple if not all of these circuits [redacted],[95] meaning that they were subject to a single point of failure. Public Counsel's expert witness agrees that DS-1s tied to the [redacted] lack even physical diversity.[96]

45. Between October 2017 and early 2018, TNS and Comtech conversed regarding the need to replace the [redacted] circuits. In August 2018, TNS once again revisited the subject, [redacted][97] Had Comtech availed itself of the

---

93 Valence, Ex. MDV-1TC at 7:2-7.

94 Ex. JDW-67CX p 40 of 92; Webber, Tr. 173:2-174:7 ([redacted]).

95 Ex. JDW-85CX. Staff propounded Data Requests to CLC seeking Design Layout Records ("DLRs"), which map circuits through the network. As Mr. Turner explained, engineers use DLRs to audit circuits to ensure physical diversity. Turner, Tr. 362:22-363:6. In 2022 when the Data Request issued, CLC only had DLRs on two of the four circuits in place in 2018, however, those two circuits—which Comtech thought were geographically diverse—muxed up (i.e., all sitting on) to the same OC 192. Ex. JDW-85CX ("[redacted]").

96 Ex. BR-66X; Rosen, Tr. 282:11-283:1.

97 Ex. SJH-12C at 8-10.

REDACTED

Shaded Information is Confidential Per Protective Order in Docket No. UT-181051

available alternative offered by TNS, Comtech's signaling network would have once again enjoyed physical, network and supplier diversity, and the 911 outage in Washington would not have occurred in December 2018.[98] It is clear that Comtech let cost dictate its design decisions to the detriment of thousands of Washington 911 callers.

3. By Contrast, CenturyLink Signaling Networks Ensured Physical and Network Diversity.

46. CenturyLink's 911 network also relied on SS7 connectivity both for OSP connections to the Intrado gateway (Figure 1, steps 1-3) and for the signaling messages needed for ITT call set up (step 7). CenturyLink's design included physical, network and supplier diversity. For example, for its SS7 functionality in Washington, [redacted][99] Similarly, "[t]he four SS7 links between the Intrado RCL and the Intrado SS7 STP utilized supplier diversity, meaning that Intrado did not place all four circuits on the same network."[100] Even Mr. Webber acknowledges that this design ensured diversity for CenturyLink's signaling network.[101]

47. By virtue of this physical, network and supplier diversity, 911 calls to CenturyLink-served PSAPs did not fail during the Green Network outage despite some of those circuits riding the Green Network. Comtech's failure to do the same led directly to thousands of Washington 911 calls failing in December 2018. This is absolute proof that the outage on the Green

---

98 Ex. BR-68CX; Rosen, Tr. 290:24-291:6 [redacted].

99 Klein, Ex. CDK-1TC at 10:12-16; Turner, SET-1TC at 46:3-15, SET-4C at 3 (CLC response to Staff data request 27c.).

100 Klein, Ex. CDK-1TC at 10:15-16.

101 Webber, Tr. 201:5-12 [redacted]

Network did not cause 911 calls to fail; they failed to complete because of Comtech's faulty network design. This is validated by the fact that both signaling networks and 911 networks are supposed to be designed to overcome network outages, exactly like that which occurred on the Green Network. This is why WMD's contract with Comtech specifically states that Comtech "shall design and provide the ESInet Services in a manner that ensures that there will be no single point of failure (*i.e.,* if any single part of the ESInet Services or supporting platform is unavailable, including as a result of a Force Majeure Event, the ESInet Services will continue to operate as set forth in this Contract)."[102]

E. LUMEN TRANSPORT OUTAGES

48. Ignoring the Comtech design flaws that caused 911 calls to fail, Staff focuses almost exclusively on two network outages that occurred on Lumen transport networks in 2018, specifically the February 2018 Red Network outage and the December 2018 Green Network outage. While Staff tries to conflate the two, the evidence shows that the two network events were very different.

1. The Red Network and Green Network Were Not Identical

49. Lumen operates six different transport networks, including the legacy Level 3 "Red Network" and the legacy CenturyLink "Green Network."[103] Both the Red and Green networks are designed and manufactured by Infinera Corporation. Infinera has developed optical switching equipment, which allows the construction of a single unified optical transport network that scales from metro to ultra-long haul applications, and provides near lossless transmission of signals at a wide range of frequencies.[104] In February 2018—at the time of the Red Network outage—the Red and Green networks utilized different software versions which incorporated different capabilities. [redacted]

[102] Ex. JDW-74X at § 11.5.

[103] Valence, Ex. MDV-1TC at 4:6-10.

[104] McNealy, Ex. TJM-1TC ¶ 7.

[redacted][105]

2. Red Network Outage (February 2018)

50. In February 2018, Level 3, which had just a few months earlier become part of the CenturyLink family, [redacted] the Red Network was using software version R-16.1.2 and was upgrading to R-16.3.3. [redacted][106]

51. [redacted][107]

52. After the packet storm, Infinera studied the root cause of the event and determined [redacted]

[105] McNealy, Tr. 487:18-488:13.

[106] McNealy, Ex. TJM-1TC ¶ 15.

[107] McNealy, Tr. 468:7-13.

[redacted][108][redacted][109].

53. [redacted][110][redacted].[111] Thomas McNealy, who testified before this Commission, was the Infinera employee meeting with CenturyLink. As he testified:

[redacted].[112]

Mr. McNealy further explained:

---

[108] McNealy, Ex. TJM-1TC ¶¶ 12-18.

[109] McNealy, Tr. 471:22-472:19; Ex. JDW-5C at 6/42, 8/42 & 20/42 (Infinera contemporaneous document stating [redacted]).

[110] McNealy, Tr. 478:2-480:13.

[111] McNealy, Tr. 469:3-18, 480:15-483:15.

[112] McNealy, Ex. TJM-1TC ¶ 19; McNealy, Tr. 477:16-25.

[redacted][113]

54. Mr. McNealy further explained that when evaluating the risks versus the reward, the Green Network had been [redacted][114] Moreover, the telecommunications industry is replete with examples of simple configuration changes that take down entire networks for extended periods.[115]

55. Given the risk reward analysis, Mr. McNealy concluded as follows:

[redacted]

---

[113] McNealy, Tr. 480:21-482:1. An "SEU" is a "single event upset."

[114] McNealy, Tr. 494:3-496:7. Note that the Red Network outage occurred during the time when Infinera was upgrading the network with a new software version; it did not spontaneously generate during normal usage like occurred on the Green Network.

[115] McNealy, Tr. 497:8-498:15.

[redacted][116]

56. Again, the outage on the Red Network was caused by [redacted]

Infinera concluded the Green Network was 100% safe from what had been experienced on the Red Network and, as a result, advised CenturyLink that it did not need to close the IGCC on the Green Network.

3. Green Network Outage (December 2018)

57. In the early morning of December 27, 2018, one switching node on the Green Network in Denver, Colorado spontaneously generated four malformed packets. The malforming caused the packets to combine and expand to be larger than 64-bytes, and at the same time retain fragments sufficient to satisfy each of the filter's conditions. [redacted][117]

58. When the December 2018 outage began, CenturyLink took exhaustive steps to isolate and identify the nature of the issue, and to take corrective action. As Ms. Stockman describes,

---

[116] McNealy, Tr. 498:16-499:2.

[117] McNealy, Ex. TJM-1TC ¶ 21. It is important to note that none of Staff or Public Counsel witnesses had first-hand knowledge of what occurred on the Green or Red networks leading to the outages. Their witnesses all rely on secondhand facts. Dr. Akl admits he has no evidence contrary to anything put forward by Mr. McNealy. Akl, Tr. at 221:17-228:13. In Mr. Webber's direct testimony, he brazenly speculated he thought CLC was lying when it said that Infinera had advised it to leave the IGCC open. Webber, Ex. JDW-1CT at 30:1-9. In stark contrast, CLC put forward the two witnesses—Mr. McNealy from Infinera and Mr. Valence from CenturyLink—who lived through the experience and were involved in the actual decision making.

Network Operation Center ("NOC") technicians, engineers and leadership were all working around the clock, many without sleep, to resolve the issue. Since this was a transport issue, all transport teams were engaged to correct the issue, but other teams were engaged because other services ride on top of transport. Other teams took on other work so the transport team could focus on restoring services. In addition to the NOC, Repair Center technicians and engineers were working trouble tickets, while Repair Center leadership remained fully engaged. All field operations were likewise engaged to troubleshoot nodes as an isolation methodology and then to physically reset cards and isolate suspected offending nodes. CenturyLink also engaged Infinera's technical, senior technical, and development engineers (i.e., the engineers who designed the equipment). Infinera personnel were deployed throughout the nation at virtually every Infinera node to take corrective action.[118] In addition to technicians, senior leadership—including CenturyLink's CEO and Infinera's CEO—were actively engaged.[119] CenturyLink also hosted a conference bridge to keep stakeholders informed.[120]

59. While both the Red and Green network outages involved a packet storm, the two events were dramatically different. As Mr. McNealy explained:[121]

[redacted]

[118] McNealy, Tr. 483:23-485:20.

[119] Stockman, Ex. JWS-1TC at 58:9-59:14.

[120] *Id*. at 59:3-14.

[121] McNealy, Ex. TJM-1TC ¶ 22.

[redacted]

60. [redacted][122] [redacted][123] Mr. McNealy could not have been clearer on this point:

[redacted][124]

61. The malformation experienced on the Green Network was so inexplicable that Infinera could not replicate the situation in laboratory conditions. For all of these reasons, the situation that created the Green Network outage was completely unforeseeable. As Mr. McNealy explained:

---

[122] Rosen, Tr. 186:24-187:6 (Rosen admission); Akl, Tr. 230:1-231:9 (Akl admission).

[123] Rosen, Tr. 181:1-182:6 (Rosen admits [redacted]).

[124] McNealy, Tr. 499:3-10.

REDACTED

Shaded Information is Confidential Per Protective Order in Docket No. UT-181051

[redacted][125]

62. Staff counters by arguing that because the IGCC was unused, Infinera should have closed it automatically, especially after the Red Network outage.[126] This argument fails for several reasons.[127] First, the standards in place at the time about closing unused channels concern data security issues—meaning someone hacking into the network—and the IGCC is not a public facing channel:

[redacted]

---

[125] McNealy, Tr. 502:2-503:12.

[126] Akl, Ex. RA-1CT at 4:12-10:21. Staff's witnesses have no real experiences with packet storms. Mr. Webber admitted this outright. Webber, Tr. 174:23-175:6. Dr. Akl's experience was purely theoretical based on discussing the subject with students. Ex. RA-13CX at depo pp. 55-57 [redacted]).

[127] In addition, the standards cited by Staff as requiring CenturyLink to close unused channels do not actually say that. The standards say companies should "control or disable" unused channels, and Infinera [redacted] Webber, Tr. at 193:10-195:23.

[redacted][128]

63. Second, this argument ignores the risk reward analysis described above, and the fact that there are many examples of networks going down during configuration changes.

64. Finally, a network outage should not impact 911 calling. As discussed above, the Green Network outage did not impair CenturyLink 911 operations. While CenturyLink utilized Green Network circuits as signaling links, CenturyLink's signaling network utilized appropriate geographic, network and supplier diversity. Even Staff admits this fact.[129] The FCC found that only eleven CenturyLink 911 calls were affected by the outage, all of those being in Arizona.[130]

65. After the Green Network outage, Infinera concluded that the risk/reward profile had changed. [redacted][131]

---

[128] McNealy, Tr. 499:15-500:18. A "VPN" is a "virtual private network."

[129] Webber, Tr. 201:5-12.

[130] Ex. SJH-14 at 4; Hawkins-Jones, Tr. 109:20-25.

[131] McNealy, Tr. 476:8-12; McNealy, Ex. TJM-1TC ¶ 25.

F. STAFF'S INFORMAL INVESTIGATION VIRTUALLY IGNORED COMTECH AND FOCUSED EXCLUSIVELY ON CENTURYLINK

66. While it is now clear that 911 calls failed in Washington in December 2018 *because of Comtech's signaling design*, the pre-complaint investigation largely ignored Comtech. Had Staff performed the investigation that was performed by CLC and others after Comtech intervened in this case in July 2021, it is hard to imagine that the complaint would not have focused on Comtech.

1. Staff Focused Almost All Inquiries on CenturyLink.

67. Over the two years preceding the formal complaint being filed December 20, 2020, Staff's investigation focused almost exclusively on CenturyLink. Staff sent five sets of data requests to CenturyLink between early 2019 through August 2020.[132] During the same time, Staff sent only two sets to Comtech, some initial requests in February 2019 and a follow-up set in August 2019[133] Despite multiple clear signals that Comtech's network design was implicated in the outage, no investigation (not a single question) of Comtech's network was conducted.

68. For example, in Comtech's January 11, 2019 root cause analysis, Comtech identified as a corrective and preventative action: [redacted][134] Despite being in possession of the document since January 2019, there was no follow-up about Comtech's network in the next two years.[135] Similarly, Comtech's responses to Staff's August 2019 follow-up requests suggested redundancy and resiliency issues: "During the forty-nine hours and thirty-two minutes period when TSYS experienced intermittent loss of circuit redundancy, at least one of such SS7 circuits were down."[136]

---

132 Ex. JHJ-3C, at 10; Hawkins-Jones, Tr. 89:11-90:19.

133 Exs. JHJ-24X, 25CX; Hawkins-Jones, Tr. 92:24-93:21.

134 Ex. JHJ-28CX at 6.

135 Hawkins-Jones, Tr. 101:6-102:25.

136 Ex. JHJ-25CX at PDF page 5.

Again, there was no follow-up to Comtech over the next fifteen months.[137]

69. Yet another opportunity to explore Comtech's network design was presented in the months preceding the complaint. In response to August 2020 data requests, CenturyLink provided granular 911 call logs (derived from CDR data) identifying separately for CenturyLink and Comtech PSAPs all attempted, successful and unsuccessful 911 calls by hour and by PSAP.[138] The logs made plain that each Washington 911 call that failed as a result of the Green Network outage was destined for a Comtech (not CenturyLink) PSAP. Yet, once again this did not prompt Staff to inquire further of Comtech.[139]

70. Had Staff investigated Comtech, it would have found volumes of documents directly implicating Comtech's penny-wise, pound-foolish design decisions as the direct and primary cause of the 911 outage. Those include Comtech's discussions with TNS between late 2017 and mid 2018 discussed at length in paragraphs 43-45 above.[140] Because there was no attempt to investigate Comtech, this critical information was missing at the time Staff filed this multi-million-dollar complaint against CLC.

2. Staff's Investigation Report Attaches Materials Demonstrating Comtech's Central Role in the 911 Outage, Yet the Narrative Report Ignores Comtech Altogether.

71. On the day the complaint was filed, Staff filed its Investigation Report, the narrative portion of which is attached to Ms. Hawkins-Jones's direct testimony[141] The ostensible scope of the investigation and report focused "on issues concerning the technical functionality of the statewide network, as well as CenturyLink's business practices prior to, during, and following the outage."[142] The report states that "Staff undertook this investigation to

---

137 Hawkins-Jones, Tr. 95:21-96:20.

138 Exs. JDW-27C-JDW-30C.

139 Hawkins-Jones, Tr. 90:21-92:18.

140 Ex. SJH-12C at 8-22.

141 Ex. JHJ-3C.

142 *Id*. at 2.

determine . . . [a] What caused the statewide E911 system outage . . . and . . . [b] Whether CenturyLink and CenturyLink's E911 vendor's facilities were adequate to provide service as required by state law."[143]

72. The intended scope of the investigation shows two things. First, it shows the purpose was to determine why 911 calls failed to complete. Second, it specifically named CenturyLink and its vendors as the focus of its investigation. This myopic focus on CenturyLink prevented Staff from determining why 911 calls failed complete. It is therefore not surprising that the Investigation Report accepts Comtech's assertions as true, including [redacted][144] and indicates no consideration of Comtech's role in or responsibility for 911 calls failing during the Green Network outage.

73. The Investigation Report's narrow focus belies the fact that it attaches numerous documents suggesting that Comtech was responsible for the failed 911 calls. Appendix F contains CenturyLink's September 2020 call logs demonstrating the thousands of failed calls to Comtech PSAPs.[145] Appendix G contains Comtech's January 11, 2019 root cause analysis which specifically identifies (two weeks after outage) as a corrective action that [redacted][146] Appendix M contains Comtech's informal data request responses, including Comtech's explanation that it "[redacted] * * *"[147] Yet, the report narrative

[143] *Id*. at 3.

[144] *Id*. at 15.

[145] Exs. JDW-29C, JDW-30C; Hawkins-Jones, Tr. 90:21-92:8.

[146] Ex. JHJ-28CX at 6.

[147] Ex. JHJ-25CX at PDF page 5

focuses exclusively on CLC and ignores even the possibility of Comtech's responsibility for the failed 911 calls.

3. Ignoring Comtech and Focusing Solely on CLC Defies Staff's and Public Counsel's Prior Advocacy.

74. In Dockets UT-140597 and UT-190209 (both Commission 911 outage complaints against CenturyLink), Staff and Public Counsel repeatedly asserted that CenturyLink was responsible and liable for the actions of Intrado, its 911 services vendor. Ms. Stockman[148] shares numerous examples of Staff and Public Counsel castigating CenturyLink due to Intrado's network/software outages.

75. For example, Staff 's witness testified: "The adequacy and sufficiency of a company's facilities are only as good as the company's procedures and its overall commitment to quality. CenturyLink's facilities, through its contractor Intrado, were not adequate nor sufficient and failed to provide reliable 911 service to Washington consumers."[149]

76. Even if Staff was correct that the Green Network outage was reasonably foreseeable and preventable (which it was not), one would expect Staff to have pursued penalties from the Covered 911 Service Provider whose 911 calls failed. Instead, Staff to this day seeks to deflect any criticism from Comtech and heap it all on to CLC, Comtech's vendor with regard to the impaired signaling links. Staff takes this to an extreme, transparently downplaying the importance of network and supplier diversity. For instance, Mr. Webber testifies "both Witness Turner and Witness Valence are mistaken in implying that carrier (also known as 'supplier') diversity is an industry requirement for SS7 link diversity in the design of E911 networks, and neither of them point to a Commission Order, Rule, or industry standards

---

148 *See* Stockman, Ex. JWS-1TC at 13:4-18:8.

149 Docket UT-190209, Turcott Rebuttal at 7. Public Counsel's witness testified in identical fashion: "As the sole provider of 911 service, CenturyLink is responsible for the 911 system in Washington. The outage resulted from a defect in a portion of the 911 system that CenturyLink's third-party vendor controlled, and as a result, the responsibility rests with CenturyLink." Docket UT-140597, Bergman Direct, at 17. *See* Stockman, Ex. JWS-1TC at 15:3-16:14.

document that binds TSYS to such a standard."[150] This is wrong and even controverted by Mr. Rosen, Public Counsel's expert. It is inconceivable that if CenturyLink had knowingly rejected the opportunity to create or maintain network diversity on critical circuits, and that decision led directly to thousands of failed 911 calls in Washington, Staff and Public Counsel would turn a blind eye and shrug it off.

4. During This Complaint Proceeding, Staff Resisted Third Party Discovery to Comtech.

77. Staff's cognitive dissonance concerning Comtech's responsibility persisted even after the complaint proceeding began. Given the need to explore Comtech's network and other information Comtech alone held, CLC filed a motion for third party discovery of Comtech and TNS in July 2021. Staff opposed the motion, arguing that it would be prejudiced due to the proximity of its direct testimony deadline.[151] CLC's motion was denied and Staff moved to suspend the schedule a week later on unrelated grounds, suggesting that its opposition to third party discovery had nothing to do with the proximity of its testimony deadline.[152] If Comtech had not intervened in the case in July 2021, the critical facts and communications uncovered by CLC and others in discovery in this case would have never come to light.

78. Overall, Staff's investigation was myopically focused on CenturyLink, and never allowed for any possibility other than that CenturyLink was responsible for the 911 outage. The record clearly indicates otherwise, but only thanks to CLC's persistence in demanding information from Comtech.

III. STATEMENT OF ISSUES

79. A. Whether the Commission has jurisdiction to scrutinize and regulate CLC's national transport network and, more specifically, the *interstate* transport circuits leased by Comtech.

---

[150] *See e.g.*, Webber, Ex. JDW-33CT at 14:12-16 (footnotes omitted).

[151] Commission Staff Response to Motion for Third Party Discovery at 2.

[152] Commission Staff Motion to Suspend Procedural Schedule.

80. B. Whether Staff and Public Counsel have even attempted to meet the Commission's standard of proof in this complaint proceeding.

81. C. Whether thousands of 911 calls failed in Washington in December 2018 primarily due to an outage on the Green Network or primarily due to Comtech's faulty signaling network design.

82. D. Whether there is sufficient evidence to support a finding that CLC violated RCW 80.36.080 (First Cause of Action) when the Green Network outage itself was neither reasonably foreseeable nor predictable, and when failed 911 calls were primarily the result of Comtech's network design (not the Green Network outage).

83. E. Whether there is there is sufficient evidence to support a finding that CLC violated RCW 80.36.220 (Second Cause of Action), a statute that bears no connection to the December 2018 outage, when there is no proof of discriminatory or neglectful refusal to transmit messages.

84. F. Whether there is sufficient evidence to support a finding that CLC violated WAC 480-120-412 (Third Cause of Action) when there was no "Major Outage" affecting any of the fifteen CenturyLink-served PSAPs.

85. G. Whether there is sufficient evidence to support a finding that CLC violated WAC 480-120-450 (Fourth Cause of Action) when there is no evidence that CLC (in its capacity as an OSP) failed to provide 911 dialing functionality to its local customers.

86. H. Whether, applying the Commission's enforcement guidelines, there is any basis for assessing penalties against CLC even should the Commission find technical non-compliance with any of the cited statutes or rules.

IV. DISCUSSION

A. THE COMMISSION LACKS JURISDICTION TO SCRUTINIZE OR REGULATE CLC'S PROVISION OF INTERSTATE SERVICES ON ITS NATIONAL TRANSPORT NETWORK.

87. Staff alleges that CLC violated Washington law by virtue of a packet storm that occurred in December 2018 on the Green Network, as Comtech was relying on four circuits riding the Green Network (one of six national transport networks operated by Lumen) as signaling links in support of its 911 network in Washington. Beyond any dispute (see footnote 91 above), those circuits were interstate, connecting locations in Los Angeles, Phoenix, Las Vegas and Seattle. Not only were they interstate, but CLC had no idea what Comtech planned to use the circuits for, let alone for SS7 to support 911 calling in Washington.

88. Through the complaint, Staff asks the Commission to scrutinize CLC's provision of interstate services on a national transport network. Staff does not address any intrastate services provided by CLC. Setting aside for a moment that Comtech made numerous questionable, short-sighted decisions that led directly to 911 call failures, the Commission lacks jurisdiction to regulate CLC's interstate services.

89. The Commission lacks jurisdiction over interstate services. *In Re AT&T Commc'ns of the Pac. Nw., Docket UT-033035, Order 04, ¶44* ("*AT&T's proposed language would encompass facilities-access purchased out of federal tariffs over which the Commission lacks jurisdiction*.") (*citing 34th Supplemental Order; Order Regarding Qwest's Demonstration of Compliance with Commission Orders, Investigation Into U S WEST Communications, Inc.'s Compliance With Section 271 of the Telecommunications Act of 1996; U S WEST Communications, Inc.'s Statement of Generally Available Terms Pursuant to Section 252(f) of the Telecommunications Act of 1996, Dockets UT-003022, UT-003040, ¶ 22* (*May 2002*) (*affirmed Docket UT-033035, Order 05, ¶19*); *MilleniaNet Corp. v. Pennsylvania Pub. Util. Comm'n*, No. 990 C.D. 2008, 2009 WL 9104922 (Pa. Commw. Ct. Apr. 30, 2009) (complaint dismissed because the "the PUC does not have jurisdiction over interstate

telecommunications services.").

90. Staff tries to boot-strap jurisdiction by claiming that when these circuits went down, so did 911 calling in Washington. This ignores the fundamental point that Comtech never informed CLC what is was going to use the circuits for. Staff and Public Counsel claim CLC "shown have known," but this ignores the fact that when these circuits were tested, [redacted] provided two of the SS7 signaling links thereby creating supplier and network diversity. One should not be able to buy a product off the shelf, use that product in violation of industry standards, and then argue that the Commission has jurisdiction to fine the unaware party based on another party's inappropriate use of the product.

B. STAFF AND PUBLIC COUNSEL DO NOT EVEN ATTEMPT TO MEET THE COMMISSION'S STANDARD OF PROOF IN THIS PROCEEDING.

91. Before initiating a complaint, WAC 480-07-307 requires the Commission have probable cause:

> "An administrative law judge will review the information or evidence supporting any complaint commission staff proposes to have the commission issue and will determine whether probable cause exists to issue the complaint. *Upon determining that the information would sustain the complaint if proved at hearing and not rebutted or explained*, the judge will sign the complaint on behalf of the commission. The existence of a finding of probable cause may not in any later stage of the proceeding be considered as support for the complaint." (emphasis added)

92. The bold language above contemplates that the substance of the Complaint must be proved at the hearing, and according to caselaw that burden is by a preponderance of the evidence. *Nguyen v. State, Dep't of Health, Med. Quality Assur. Comm'n*, 994 P.2d 216, 219 (Wash. Ct. App. 1999) ("The ordinary burden of proof to resolve a dispute in a civil administrative proceeding is by a preponderance of the evidence unless otherwise mandated by statute or due process."), vacated and remanded sub nom. *Nguyen v. State, Dep't of Health Med. Quality Assur. Comm'n*, 29 P.3d 689 (Wash. 2001) (en banc) (reversed for other reasons, while applying the preponderance standard). Because this proceeding was initiated by a

complaint recommended by the Staff pursuant to WAC 480-07-307, and given that the Staff seeks to punish CLC by issuing fines, the standard of proof is arguably by clear and convincing evidence. *See Nguyen*, 29 P.3d at 689 (citing *Mathews v. Eldridge*, 424 U.S. 319 (1976)).

93. Jurisdictional issues aside, Staff and Public Counsel are well aware that the statutes and rules they rely on in this case *do not impose strict liability*. Instead, there must be sufficient record evidence to establish that CLC violated RCW 80.36.080, RCW 80.36.220, WAC 480-120-412 and/or WAC 480-120-450.

94. In the most recent 911 outage complaint case, Docket UT-190209, the Assigned ALJ made this point crystal clear regarding RCW 80.36.080.

> "Staff and Public Counsel essentially argue that the mere existence of the outage is sufficient to prove the alleged violations and supports up to the maximum statutory penalty for each of the uncompleted calls. The Commission, however, has never interpreted the statute to impose strict liability for 911 call incompletion. Companies must adequately maintain their networks and make all reasonable efforts to provide safe, modern, and efficient service, minimize the risk of disruptions, and quickly detect and remedy any outages. *Failure to comply with those requirements results in liability. Meeting those obligations does not.*"[153]
>
> "The Commission, however, has never required perfection for a service provider to be in compliance with Commission rules. *Rather, a company is responsible for call failures only to the extent that it has not taken all reasonable measures to prevent, limit, and remedy them.*"[154]

95. Notwithstanding this very clear articulation that RCW 80.36.220 does not impose strict liability, Staff and Public Counsel continue to press strict liability theories in this case. Both argue that CLC *per se* violated RCW 80.36.220 by virtue of not closing the IGCC on the Green Network. Yet, neither addresses the reasonable foreseeability or preventability of the

[153] Docket UT-190209, Order 03 ¶28 (emphasis added) (Initial Order).

[154] *Id*. ¶29 (emphasis added) (Initial Order).

precursor packet malformation involving four packets combining, exceeding 64-bytes in size and retaining header information sufficient to allow the distorted packet to enter the IGCC.

96. That bizarre malformation—one that neither Infinera nor any other expert in this case has ever seen occur—was what led to the eventual packet storm. Yet, Staff and Public Counsel refuse to evaluate or assign significance to the unprecedented, one in a billion nature of the malformation. In fact, Staff expert Akl (despite being hired to provide an "independent evaluation of ... the causes of the outages on CenturyLink's Communications, LLC's (CenturyLink) Red Network in February 2018 and Green Network in December 2018, as well as the relationship between those two events" (*Ex. RA-1CT at 1*)) was tasked with only considering the propriety of keeping the IGCC open, and didn't (and refused to) consider the foreseeability of the precursor packet malformation.[155] At hearing, Public Counsel admitted that it is important and necessary for the Commission to consider the probability of the packet malformation,[156] yet neither it nor Staff did so at any point in this case. Instead, they focus solely on the company's decision to follow Infinera's guidance not to close the IGCC on the Green Network, and argue (in Mr. Rosen's terms) that "[b]ad packets happen" and thus the Commission need not evaluate whether the particular malformation was reasonably predictable.[157]

---

155 Ex. RA-13CX at 121-125.

156 Ms. Chase flatly acknowledged the importance of this determination. Chase, Tr. at 258:25-259:6 ("Q. Do you -- from your perspective, is it important for the Commission to evaluate the foreseeability of the particular packet malformation? A. Well, that is one of the Commission's enforcement criteria, is one of the 11 enforcement criteria, is to consider the foreseeability of the event.").

157 Rosen, Ex. BR-30CT at 16:17-18.

C. THOUSANDS OF WASHINGTON 911 CALLS FAILED IN DECEMBER 2018 DUE TO COMTECH'S SIGNALING NETWORK DESIGN.

97. Any incident—in this case thousands of uncompleted Washington 911 calls in December 2018—has numerous "causes," if causes are defined as the chain of events that occurred leading up to the incident. Taken to an absurd extreme, one "cause" of the December 2018 outage was WMD's selection of Comtech as CenturyLink's 911 provider. Had there been no transition to Comtech, the Phase 1 network would not have been in place and Comtech's signaling network (if it would have even operated one in support of Washington calling) would not have impacted 911 calling. Equally uncompelling as a direct "cause" is Public Counsel's assertion that the selection of SS7 interconnection of the two ESInets was to blame for the outage.[158]

98. One could list thousands of precursor events (individual dominos that had to fall to lead to the outage), but that exercise is largely pointless. Instead, the Commission should identify the *primary cause of the outage*.[159] *See Rose Monroe v. Puget Sound Power & Light Co.*, U-85-70, 1986 WL 1301221 (Wash. U.T.C. Mar. 6, 1986) (subjecting an electrical provider to penalties under RCW 80.04.380 for violations beginning on the date of the "proximate cause" of a wrongful power disconnection, despite prior events that could have also "caused confusion" to the complainant but were not the primary cause of the outage). In that case, the Commission sifted through numerous events and potential causes and concluded "[i]n this case it is important to focus on the incident which caused greatest prejudice to the

---

158 *See* Rosen, Ex. BR-1CT at 21:11-25:5. Setting aside the Mr. Rosen's unsupported claim that 911 calls failed *because* the ESInets were interconnected via SS7 rather than IP, Mr. Rosen ignores that Comtech ultimately recommended an SS7 solution Ex. SJH-5C. He also admits that none of the parade of horribles outlined in his testimony (regarding the added complexity of IP:TDM conversions) occurred during the December 2018 outage. Ex. BR-61X ("Does Mr. Rosen assert or believe that the 911 calls that failed during the December 2018 outage failed as a result an error in the conversion from IP to TDM, or from TDM to IP? * * * Response: No.").

159 As discussed in greater detail in the following section, the Commission views its role as determining "whether the 911 calls at issue in this proceeding failed *as a result of CenturyLink's noncompliance with the systemic requirements in RCW 80.36.080*. Only if we find such noncompliance could the Commission hold CenturyLink liable for * * * statutory violations." Docket UT-190209, Order 03 ¶¶24-25 (Initial Order) (footnotes omitted; emphasis added).

complainant… .” To that end, the record is clear that Comtech’s knowingly faulty signaling network design was the primary cause, the factor “which caused greatest prejudice.”

99. As described above, Public Counsel’s witness has already published an article on this exact outage and stated that “the root cause of CALL failures, which is what we and the FCC really care about, was lack of diversity. That was foreseeable, that was preventable, and that is almost universally a critical design fault of 9-1-1 networks, including NG9-1-1 networks today.” *See* paragraph 2 above.

100. Staff and Public Counsel ask the Commission to ignore the obvious and focus *only* on what caused the outage on the Green Network: the exact issue Staff asked Dr. Akl to opine about.[160] In fact, that’s generous, as they only want the Commission to examine half of even that question (the open IGCC), ignoring the unforeseeability of the particular packet malformation that preceded the packet storm. Respectfully, this is the wrong question. The question is not what caused the outage on the Green Network, but what caused 911 calls to not complete to Comtech-served PSAPs. Just as Mr. Rosen’s article argues, the Commission’s own decisions recognize that call completion is the issue: “*a company is responsible for call failures only to the extent that it has not taken all reasonable measures to prevent, limit, and remedy them.*”[161] Staff never considered this issue; indeed, Dr. Akl admitted that he was not retained to examine the question of why 911 calls did not complete.[162] Staff offers no insight as to whether Comtech’s actions may have been the reason why 911 calls did not complete. Public Counsel, which acknowledges that Comtech made serious errors, likewise asks the Commission to ignore Comtech. As recently as the evidentiary hearing, Public Counsel took the position that Comtech’s network design is

[160] Akl, Tr. 218:2-25.

[161] Docket UT-190209, Order 03 ¶ 29 (emphasis added) (Initial Order).

[162] Akl, Tr. 218:21-25.

entirely irrelevant to this case.[163] This notion was appropriately rejected by the ALJ.[164]

101. Their refusal to evaluate the bizarre nature of the precursor packet malformation aside, Staff and Public Counsel are still asking the wrong question. Had Comtech abided by its original dedication to physical, network and supplier diversity on *its signaling network* after [redacted] discontinued service, 911 calls would have completed during the Green Network packet storm. This is not self-serving speculation, but is borne out by the fact that CenturyLink-served PSAPs continued to receive 911 calls during the packet storm because CenturyLink's and Intrado's signaling networks utilized proper circuit diversity, as detailed in paragraphs 46-47 above.

102. Comtech's knowing, cost-savings choices[165] to (1) [redacted] (2) [redacted] and (3) [redacted] in August 2018 left Comtech's signaling network, and thus the 911 network it supported, vulnerable to a single point of failure.

D. THERE IS NOT SUFFICIENT EVIDENCE TO ESTABLISH THAT CLC VIOLATED RCW 80.36.080 (FIRST CAUSE OF ACTION).

103. Staff and Public Counsel seek millions of dollars in penalties from CLC based on alleged violations of RCW 80.36.080, which provides in relevant part that: "service by any telecommunications company shall be rendered and performed in a prompt, expeditious and efficient manner and the facilities, instrumentalities and equipment furnished by it shall be safe, kept in good condition and repair, and its appliances, instrumentalities and service shall

---

[163] Ms. Gafken (Public Counsel), Tr. 64:8-11 ("This proceeding is focused on CenturyLink, not ComTech. And as a result, Public Counsel objects to the exhibits that I've identified and asks that they be excluded.").

[164] ALJ Kopta, Tr. 65:6-7 ("I agree that ComTech's network is at issue in this proceeding.").

[165] *See* paragraphs 43-45 above.

be modern, adequate, sufficient and efficient."

104. In the prior two 911 outage cases, the Commission has explained the standard of proof to sustain a finding that a telecommunications company has violated the statute:[166]

> "The statute is framed in terms of system integrity: telecommunications company services must be rendered promptly, expeditiously, and efficiently; company facilities and equipment must be safe and in good condition and repair; and service must be modern, adequate, sufficient, and efficient. A deficiency on any of these grounds often will impact the completion or quality of customers' calls. Call incompletions, in and of themselves, are not necessarily statutory violations. But if a systemic company, service, or network deficiency results in uncompleted calls, each such call is a separate violation of applicable law.
> Accordingly, we must determine whether the 911 calls at issue in this proceeding failed as a result of CenturyLink's noncompliance with the systemic requirements in RCW 80.36.080. Only if we find such noncompliance could the Commission hold CenturyLink liable for 222 statutory violations. The Commission provided guidance on making this determination in its order approving the settlement agreement in Docket UT-140597:
>
> > No system is foolproof, whether it depends on computers, people, or a combination of both. Errors will inevitably occur in software coding, for example, both in its development and in its deployment in actual 911 operating systems. What is important for our review is to ensure that CenturyLink has adequate management and oversight systems in place to both reduce the risks of such errors occurring and also to have systems in place to provide awareness of outages and to restore 911 service as rapidly as possible.
> >
> > The Commission thus requires the Company to take all reasonable steps to reduce the foreseeable risks of a 911 outage and to deploy systems that will limit, detect, and immediately remedy whatever service interruptions occur."

105. Staff and Public Counsel, ignoring the Commission's clear guidance that RCW 80.36.080 does not impose strict liability simply by virtue of call incompletions, woefully fail to

[166] Docket UT-190209, Order 03 ¶¶ 24-25 (Initial Order) (footnotes omitted) (citing UT-140597 Order 03 ¶ 25).

establish that CLC violated the statute.

1. The Limited Scope of Staff's and Public Counsel's Allegations

106. Staff and Public Counsel limit the scope of their allegations to whether CLC acted with reasonable diligence in the management of its national transport network by not closing the IGCC on the Green Network. As an initial matter, it is important to note what is *not at issue* in this case. First, there are no allegations against Qwest Corporation or other ILEC affiliates. While Staff tried unsuccessfully to amend the complaint 16 months into the case, that attempt was rejected by the Commission.[167] Second, there are no allegations or evidence of any errors or failed calls on CenturyLink's 911 network. Every 911 call that failed during the Green Network outage was destined for a Comtech-served PSAP and failed because of signaling issues on "Comtech's side of the network."[168] Finally, there are no allegations or evidence of faulty equipment or practices by CLC. The only allegation underpinning this first cause of action is that CLC acted unreasonably by not closing the IGCC.

2. The Packet Storm on the Green Network Was Not Reasonably Predictable or Preventable.

107. As noted above, Staff and Public Counsel ask the Commission to ignore every fact in this case other than the Infinera-CLC decision not to close the IGCC on the Green Network. Attachment 1C presents a timeline of the critical events that led to the December 2018 outage, yet, as described above, Staff and Public Counsel focus exclusively on the two green shaded facts, both relating to the IGCC. Staff and Public Counsel have not established that the packet storm was reasonably foreseeable or preventable.

108. Staff and Public Counsel entirely ignore the bizarre and unprecedented nature of the Green Network packet malformation. Given that the Green Network was designed to block all messages 64-bytes in size or smaller, unless it was reasonably foreseeable that multiple

[167] *See* Order 05 (April 26, 2022).

[168] Ex. SJH-12C at 8.

packets could combine, grow in size (exceeding 64-bytes) and retain necessary header information, the Commission cannot find that CLC violated RCW 80.36.080.[169] While it is certainly true that hardware failures and software errors occur, every such occurrence does not create *per se* liability, as Staff and Public Counsel suggest. [redacted] Infinera has never (either before or since) seen a packet malformation like the one that occurred here,[170] and could not even replicate it in its laboratory after the event, demonstrating that such an event was not reasonably foreseeable. Neither Staff's nor Public Counsel's experts have ever seen a similar packet malformation, confirming that there was no basis for CLC to take extraordinary steps[171] to prevent the negative effects of such a one in a billion malformation. Moreover, the Red Network outage occurred while Infinera was performing a software upgrade, and Infinera was "100% confident" that the issue it experienced on the Red Network would not impact the Green Network. This is in addition to the risk/reward analysis that must be evaluated every time a network is modified. The Green Network had been operating flawlessly for years, and it was determined that instituting a configuration change would create more risk for outages than closing the IGCC. For that those reasons, after meeting multiple times each week for many weeks, Infinera advised CenturyLink to maintain the status quo with the Green Network. CenturyLink followed the advice of their equipment vendor after months of meetings. Staff and Public Counsel ask the Commission to apply a strict liability standard, ignoring the fluky and inexplicable nature of

---

169 Chase, Tr. 258:19-259:6.

170 McNealy, Ex. TJM-1TC at 9 [redacted] McNealy, Tr. 501:23-503:12.

171 In testimony and at hearing, Staff and Public Counsel seek to persuade the Commission that closing the IGCC on the Green Network was a cost-free and simple task, one that CLC was imprudent for having failed to perform. As Mr. Valence and Mr. McNealy (both experts on transport networks) explain, this is not the case. *See* paragraphs 53-54 above.

what actually happened and led to the packet storm. Neither bothered to analyze the malformation or proffered *any* evidence that it was reasonably foreseeable or predictable.

E. THERE IS NOT SUFFICIENT EVIDENCE TO ESTABLISH THAT CLC VIOLATED RCW 80.36.220 (SECOND CAUSE OF ACTION).

109. Staff and Public Counsel also demand millions of dollars in penalties from CLC for alleged violations of RCW 80.36.220, which provides in relevant part: "Telecommunications companies shall receive, exchange and transmit each other's messages without delay or discrimination, and all telecommunications companies shall receive and transmit messages for any person."

110. Aside from the demand for enormous penalties, neither Staff nor Public Counsel addressed this claim in pre-filed testimony or at hearing. There is simply no evidence that CLC delayed transmitting, discriminated in the transmission of or neglected to transmit the messages of another telecommunications company. In fact, Public Counsel witness Chase admitted each of these facts at hearing:[172]

> **Q. On page 18, you specifically, at line 10, you recommend that the Commission penalize CenturyLink Communications, as revised, $5,376,000 for violation of RCW 80.36.220; is that correct?**
>
> A. Yes, that's correct. * * *
>
> **Q. Do you or Mr. Rosen testify about the substance of that claim at all?**
>
> A. No. There is not anything in my testimony that addresses the -- or makes a legal conclusion about that statute. * * *
>
> **Q. Okay. Let me ask my question again because I think that may not have been clear. Do you have any evidence that CenturyLink discriminated in transmitting messages?**
>
> A. I do not have evidence of discrimination specifically.
>
> **Q. Okay. Any evidence that CenturyLink neglected to transmit message of another telecommunications provider?**
>
> A. I do not have evidence of neglect.

111. In addition to failing to proffer *any* evidence that CLC violated RCW 80.36.220, Staff and

[172] Chase, Tr. 264:9-265:23.

Public Counsel *fail to even explain* the relevance or application of the statute. As Ms. Stockman explains, their total silence on the cause of action prejudiced CLC's ability to defend against the demand for millions in penalties.[173]

112. This refusal to explain the relevance of RCW 80.36.220 likely stems from the fact that the statute bears no connection to the Comtech 911 outage. The statute, which dates back in Washington to 1890, has never been relied upon or applied in any reported Commission case that CLC could locate. The few reported Washington court cases mentioning the statute are over 100 years old and relate to the failure to deliver telegrams. *See Martin v. Sunset Tel. & Tel. Co., 18 Wash. 260 (1897); Norman v. Western Union Tel. Co., 31 Wash. 577 (1903); Corcoran v. Postal Telegraph-Cable Co., 80 Wash. 570 (1914)*. CLC could not find a single case decided by the Commission or a Washington court in which the statute was applied to a telecommunications outage. The Commission should reject Staff's unsupported and unexplained second cause of action.

F. THERE IS NOT SUFFICIENT EVIDENCE TO ESTABLISH THAT CLC VIOLATED WAC 480-120-412 (THIRD CAUSE OF ACTION).

113. Staff and Public Counsel allege fifteen violations for the alleged violation of WAC 480-120-412, which requires that "[w]hen a company receives notice of or detects a *major outage*, it must notify the commission and any PSAP serving the affected area as soon as possible." (emphasis added)

114. Succinctly put, the rule is inapplicable because there was not a "major outage" (as that term is defined by Commission rule) in any of the fifteen PSAPs CenturyLink was still serving. Absent a major outage, there was no notice obligation. "Major outage" is defined by WAC 480-120-021 as "a service failure lasting for thirty or more minutes that causes the disruption of local exchange or toll services to more than one thousand customers; *total loss of service to a public safety answering point or emergency response agency*; intercompany trunks or

[173] Stockman, Ex. JWS-1TC at 46:12-47:5.

toll trunks not meeting service requirements for four hours or more and affecting service; or an intermodal link blockage (no dial tone) in excess of five percent for more than one hour in any switch or remote switch." (emphasis added)

115. There is no record evidence that any of the "major outage" thresholds was exceeded in a manner affecting the fifteen CenturyLink-served PSAPs.[174] Most notably, no 911 calls to CenturyLink-served PSAPs failed as a result of the outage. As such, it is incontrovertible that there was not "total loss of service to a public service answering point or emergency response agency" being served by CenturyLink.

116. The analysis of this cause of action should begin and end here. Aware that the plain terms of WAC 480-120-412 are inapplicable, Staff and Public Counsel each take novel angles in a push for penalties. Staff posits "Given that the outage was intermittent, occurred over several days, and was state-wide, Staff maintains that CenturyLink should have notified all PSAPs that remained on its network during the outage. Furthermore, even if an area was not experiencing service impairment, the residents of that area may travel to other areas that were experiencing service impairment."[175] Public Counsel (through Mr. Rosen) likewise invents its own notification standard: "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. CenturyLink should have also notified every originating service

---

[174] Ms. Hawkins-Jones attempts to re-write the definition of "major outage": "Q. Was the December 2018 outage a major outage? A. Yes. The December 2018 outage was an outage of CenturyLink's local exchange services, lasting a total of 49 hours and 32 minutes, and affecting more than 7.4 million of residents in the state of Washington. Therefore, this outage meets the definition of a major outage as set forth in state rule." Hawkins-Jones: Ex. JHJ-1CT at 6:7-11. Respectfully, no part of that sentence is accurate. As all parties recognize, the network event impaired one of CLC's *national transport networks*, not "CenturyLink's local exchange services." Comtech's signaling was not impaired for 49 hours and 32 minutes, but for three shorter time frames. Ex. JDW-23C at 2-3. And finally, approximately [redacted] calls to Comtech PSAPs were affected during the Green Network outage as a result of Comtech's signaling network design; 7.4 million customers were not affected.

[175] Ex. JHJ-21X. At the risk of redundancy, the outage was not statewide, as Staff contends. It did not affect CenturyLink-served PSAPs.

provider that their calls might not go through during the incident."[176] The obligation to give notice to PSAPs, rests with the Covered 911 Service Provider, which was Comtech for the 47 PSAPs that experienced call completion issues.

117. These novel theories attempt to re-write WAC 480-120-412; the Commission should give them no weight. As a practical matter, notifying unaffected PSAPs would be confusing, and notifying PSAPs being served and notified by Comtech would be both confusing and duplicative. The Commission should reject Staff's unsupported third cause of action.

G. THERE IS NOT SUFFICIENT EVIDENCE TO ESTABLISH THAT CLC VIOLATED WAC 480-120-450 (FOURTH CAUSE OF ACTION).

118. Staff and Public Counsel also demand millions of dollars in penalties from CLC for alleged violations of WAC 480-120-450, which requires: "(1) Local exchange companies (LECs) must provide enhanced 9-1-1 (E911) services including: (a) For single line service, the ability for customers to dial 911 with the call and caller's ELIN transmitted to the E911 selective router serving the location associated with the ERL for that line."

119. The rule says nothing about outages and does not impose per-call penalties in the event of failed 911 calls. This is not merely CLC's position; it was stated clearly by the ALJ in Docket UT-190209 in the order rejecting Staff's claims based on the same rule: "[t]hat requirement, like the statute [RCW 80.36.080], is a general obligation that does not expressly require the LEC to complete each and every call."[177]

120. Much like the second cause of action, Staff and Public Counsel seek astronomical penalties, yet never proffered evidence, discussed or explained the claim in testimony or at hearing. They also fail to explain how the rule applies to CLC, which sits as a respondent in this case in its capacity as an *interexchange carrier* due to an outage on a national transport network, and *not in its capacity as a local exchange carrier*. The rule explicitly governs the conduct of

[176] Rosen, Ex. BR-1CT at 17:7-10.

[177] Docket UT-190209, Order 03 ¶29 (Initial Order).

"local exchange carriers" in their capacity as OSPs. There is not a single allegation or grain of evidence in this case that CLC failed to offer its local customers in Washington the capability or functionality of dialing 911 to reach emergency services. Ms. Chase admitted that, aside from demanding over [redacted] in penalties, Public Counsel did not submit testimony regarding this claim, that Public Counsel lacked any evidence that CLC (as an OSP) failed to provide 911 functionality to its local exchange customers and admitted that CLC's involvement in this case is as an IXC, not an OSP.[178] The Commission should reject this unsupported cause of action.

H. APPLYING THE COMMISSION'S ENFORCEMENT GUIDELINES, THERE IS NO BASIS TO PENALIZE CLC IN THIS CASE.

121. As discussed in sections IV.D-G above, CLC did not violate RCW 80.36.080, RCW 80.36.220, WAC 480-120-412 or WAC 480-120-450 in conjunction with the 911 call failures in December 2018. Most of those cited standards are facially inapplicable, and regardless there is insufficient record evidence of violation to require or permit penalties.

122. In her pre-filed testimony, Ms. Stockman walked through each of the Commission's ten enforcement factors identified in Docket A-120061.[179] CLC incorporates that discussion, and will address here only the most critical factors.

123. The Commission's second enforcement factor asks whether the violation was intentional. While Staff[180] and Public Counsel[181] admit that CLC did not intentionally violate Washington law, they both attempt to redefine the factor according to their own self-created criteria. They suggest that the outcome was foreseeable and/or or the natural consequence of design decisions by "CenturyLink." As discussed above, the Green Network outage was not reasonably foreseeable, but nevertheless that is not the standard considered by the

---

178 Chase, Tr. 265:24-267:21.

179 Stockman, Ex. JWS-1TC at 54:8-63:17.

180 Hawkins-Jones, Ex. JHJ-1CT at 15:14.

181 Chase, Ex. SKC-1T at 10:14-15.

Commission in evaluating this second enforcement factor. Moreover, CLC was not involved in any "design decision." It simply provided circuits to Comtech and TNS without any knowledge of how they would be used. The design decision was exclusively Comtech's. Staff's and Public Counsel's desire to reframe the factor to fit their version of the facts should be rejected, as should be their demand for penalties.

124. Perhaps the most important enforcement factor to be considered in the unusual circumstances of this case is the seventh, the likelihood of recurrence. This factor alone precludes the assessment of penalties against CLC. CenturyLink is no longer the 911 provider in Washington, and thus penalizing it in connection with the December 2018 outage (which was primarily caused by Comtech) would defy the Commission's stated scope and purpose of its penalty authority.

125. The ALJ in Docket UT-190209 made this exact point. In that order, the ALJ stated:

> "Even if we were to conclude that the outage violated RCW 80.36.080 and WAC 480-120-450(1), *we would not assess a penalty for the violations*. 'The Commission's ultimate objective in any enforcement action is to obtain compliance with applicable law.' [footnotes omitted] Penalties primarily provide an incentive to comply with legal requirements. * * * *CenturyLink no longer even provides 911 service under contract with WMD. Assessing penalties under these circumstances would provide no incentive whatsoever for CenturyLink to comply with applicable law.*"[182]

126. Neither Staff nor Public Counsel offers any intelligible explanation as to how CLC could be the primary cause of a future 911 outage when it and its affiliates are no longer the state's 911 provider. Ms. Chase gives it a try, claiming that "because the Company's underlying network supports emergency services in Washington, another outage remains possible."[183] She is fuzzy about what "Company" or what "underlying network" she is referring to. To the extent she is arguing that the Commission should closely scrutinize and micromanage CLC's national transport network(s) because Comtech may be using interstate circuits in support of

[182] Docket UT-190209, Order 03 ¶30 (Initial Order) (emphasis added).

[183] Chase, Ex. SKC-1T at 14:3-5.

a flawed network design, that position raises jurisdictional concerns and also inexplicably immunizes Comtech from responsibility for the design of its own network. Nevertheless, Ms. Chase does not offer enough detail for CLC or the Commission to understand Public Counsel's position. Absent the likelihood of recurrence, penalties are inappropriate. Ms. Chase's argument also ignores that CLC closed the IGCC on the Green Network following the December 2018 outage, thus eliminating a recurrence of the same type of network failure.

V. CONCLUSION

127. CLC recognizes that 911 calling is critical. Staff's attempt to blame CLC for the failed 911 calls in December 2018, however, is misplaced at every level. During the Green Network outage, 911 calls completed to CenturyLink-served PSAPs. There is no doubt whatsoever that the thousands 911 calls that failed to complete as a result of the transport outage failed because of Comtech's faulty network design, a design that ignored the most fundamental tenet of network design—true circuit diversity. The Commission should refuse Staff's request to blame CLC for Comtech's mistakes.

128. Beyond this, the Commission lacks jurisdiction over the interstate circuits at issue, and Staff did not even try to meet the requirements of the Washington statutes and regulations at issue. Staff has the burden to prove by at least a preponderance of the evidence that CLC failed to take all reasonable measures to prevent, limit, and remedy a reasonably foreseeable problem. Staff does not come anywhere close to meeting its burden. Regardless of the question of burden, there is insufficient record evidence to establish that CLC violated any of the cited statutes or rules. CLC therefore respectfully requests that the Commission deny the complaint.

Respectfully submitted this 17th day of January 2023.

CENTURYLINK

Adam L. Sherr (WSBA # 25291)
Assistant General Counsel
1600 – 7th Ave., Room 1506
Seattle, WA 98191
206 398 2507
adam.sherr@lumen.com

Charles W. Steese
Armstrong Teasdale LLP
4643 South Ulster Street, Ste. 800
Denver, Colorado 80237
(720) 200-0677 Ext. 3805
csteese@atllp.com