CWA Statement 2

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of Communications Workers of America for a Public, On-the-Record Commission Investigation of the Safety, Adequacy, and Reasonableness of Service Provided by Verizon Pennsylvania, LLC	:	P-2015-2509336

TESTIMONY OF
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ON BEHALF OF THE COMMUNICATIONS WORKERS OF AMERICA

Filed: September 29, 2016

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I. INTRODUCTION

Qualifications

Q: Please state your name, position, and business address.

A: My name is Susan M. Baldwin. I am a consultant, and my business address is P.O. Box 392, Newburyport, Massachusetts, 01950. Since 1984, I have been specializing in the economics, regulation, and public policy of utilities, with a long-standing focus on telecommunications and with a more recent focus on consumer issues in electric and gas markets. Since 2001, I have been consulting to public sector agencies, consumer advocates, Communications Workers of America ("CWA"), and others as an independent consultant.

Q: Please summarize your educational background and professional experience.

A: I have prepared a Statement of Qualifications, which is included as Attachment A.

Q: Ms. Baldwin, have you previously testified before the Pennsylvania Public Utilities Commission ("PUC" or "Commission")?

A: Yes. In 2011, I testified on behalf of the Pennsylvania Office of Consumer Advocate ("OCA") in Docket No. P-2009-2112925 (Petition of the North American Numbering Plan Administrator on behalf of the Pennsylvania Telecommunications Industry for Approval of Numbering Plan Area Relief Planning for the 814 NPA). In 2012, I submitted an affidavit on behalf of OCA in Docket No. P-2012-2323362 (Verizon Pennsylvania Inc. Has Not Met Its Legal Obligation to the Greensburg Bona Fide Retail Request Group Pursuant to Its Chapter 30 Plan). In 2014, I testified on behalf of CWA and the International Brotherhood of Electrical Workers in Docket Nos. P-2014-2446303

and P-2014-2446304 regarding the Joint Petition of Verizon Pennsylvania LLC and Verizon North LLC for Competitive Classification of All Retail Services in Certain Geographic Areas and for a Waiver of Regulations for Competitive Services.

Q: Have you testified previously before the Pennsylvania State Legislature?

A: Yes. On December 13, 2013, I testified before the House Consumer Affairs Committee on behalf of AARP regarding House Bill 1608.

Assignment

Q: On whose behalf is this testimony being submitted?

A: This testimony is being submitted on behalf of CWA.

Q: What is the purpose of your testimony at this time?

A: CWA asked me to analyze the quality of the service offered by Verizon Pennsylvania LLC ("Verizon" or "Company") and other data, and, if so warranted, to recommend remedies. My testimony should be considered with that of James Gardler, President of CWA Local 13000.

Q: Have you analyzed service quality issues previously?

A: Yes, I have analyzed service quality data and remedies on many occasions, including in regulatory proceedings that have been focused specifically on service quality matters as well as in those that addressed service quality concerns in the context of alternative forms of regulation and proposed transfers of control. I estimate that I have reviewed service quality information for at least a dozen telecommunications utilities in about nine states, and, when incumbent local exchange carriers ("ILEC") were required to submit service quality information to the Federal Communications Commission ("FCC") through the

Automated Reporting Information System, I conducted detailed analyses of their performance relative to service quality metrics.

Summary of Testimony

Q: Please summarize your findings and recommendations.

A: Verizon is obligated to maintain good service quality for all of its Pennsylvania customers, regardless of the technology platform on which it provides service and whether or not the customers have competitive alternatives. The persistence of high trouble report rates, high repeat trouble report rates and extraordinarily slow repair times in many Pennsylvania communities suggests that Verizon is not investing sufficient resources in the maintenance and repair of its network. I am concerned that an essential service is being provided without sufficient accountability for its adequacy. I conclude that Verizon's unilateral decisions about when and where to invest in maintaining its network are not in the public interest. Verizon's apparent neglect of its copper network jeopardizes the safety and adequacy of the public switched telecommunications network, and underscores the importance of regulatory oversight and remedies.

The non-FiOS communities in Pennsylvania are most at risk of being served by unsafe and inadequate outside plant. Also, I understand that CWA's Petition focused on "non-FiOS" communities, but, based on my detailed analysis of Verizon's responses to discovery, I recommend that the Commission assess the adequacy of Verizon's voice service throughout its Pennsylvania service territory, albeit with a particular focus on the non-FiOS parts of the state. (In my comments, I use "FiOS" as a reference to Verizon's

fiber-to-the-premise (FTTP) network, rather than any particular service provided over those facilities). Communities that are vulnerable to Verizon's neglect of outside plant are not only those in non-FiOS areas, but also include FiOS areas where Verizon retains copper plant that it has not yet formally designated for retirement. In rural areas, Verizon seems to lack the economic incentive to do more than short-term band-aid fixes to its copper outside plant. In FiOS areas, where Verizon serves some customers with fiber and others with copper, plans for copper retirement in the future could cause Verizon to skimp at present on the maintenance or repair of its copper plant. If the duration of the transitional period from copper to fiber spans many months or even years, then regulatory attention is essential to safeguard customers against conditions that result in unsafe and inadequate service. Even within areas considered to be "FiOS" communities, there may be portions of the community where fiber-based services are not available (or planned for the foreseeable future).

I urge the Commission to reject any efforts by Verizon to justify long repair times and high trouble reports as insignificant on the grounds that customers can use their cell phones or alternative providers' services. The persistent patterns of abysmal service quality indicate the need for regulatory remedies to ensure that Verizon offers adequate and safe service. I recommend various remedies for the Commission's consideration.

II. REGULATORY FRAMEWORK

Q: Is Verizon obligated to maintain good service quality for all of its Pennsylvania customers, regardless of the technology platform on which it provides their service and whether or not the customers have competitive alternatives?

A: Yes. Counsel advises me that pursuant to 66 Pa. C.S. § 1501, the Commission has a statutory mandate to enforce a utility's obligation to provide "safe, adequate, and reasonable" service. Service quality has been a core component of Verizon's alternative regulation plan, adopted pursuant to Chapter 30.[1] In addition, the Commission's Regulations, Chapter 63, subpart E, set service quality standards that apply to Verizon's services, along with reporting and investigation procedures to ensure that remedial measure are taken promptly whenever the company fails to meet these standards.[2]

Q: For what areas of the ILEC's service quality do the regulations in Chapter 63, subpart E set specific metrics, and what is the required follow-up should the ILEC fail to meet those metrics?

A: Specific metrics include trouble reports (both out-of-service and "other") (§ 63.57), installation intervals (for primary and nonprimary service) (§ 63.58), response time for repair service calls (§ 63.59)[3], dial tone speed (§ 63.61), and call completion rates (§§ 63.61, 63.62). Section 63.55 puts the onus on the utility to monitor its performance

[1] See, Joint Petition of Verizon Pennsylvania LLC and Verizon North LLC for Competitive Classification of all Retail Services in Certain Geographic Areas and for a Waiver of Regulations for Competitive Services, P-2014-2446303, P-2014-2446304, Opinion and Order, entered March 4, 2015 ("2015 Reclassification Order") at 86, citing Verizon St. 1.0 at 41.

[2] See 52 Pa. Code § 63.55.

[3] This section also covers response time for operator service calls and calls "to the business during normal working hours."

relative to these metrics and if, "for a period of 3 consecutive months," the public utility's "level of operation … fails to meet a state average level of operation" to "immediately" "(1) [i]nitiate an investigation into the cause of the inadequate performance" and (2) "[i]nform the Commission of the substandard performance and of steps, studies and investigations commenced and undertaken by the public utility to determine the cause and to remedy the inadequate performance."

Q: Is there any required follow-up after that initial notification?

A: Yes. Section 63.55 provides that "a public utility shall file with the Commission, within 5 working days from its initial contact with the Commission as provided for in subsection (a)(2), a report which contains information regarding the nature, cause, and duration of the problem, "the results of [any] studies and investigations," and "the remedial action taken." Moreover, the public utility is required to "monitor the stated service problem area for a period of 1 month" and, at the end of this time, to file an updated status report with the Commission.

Q: In what respects, if any, did the Commission's authority over service quality change as a result of the Commission's 2015 Reclassification Order, in which it reclassified 153 of Verizon's 504 Pennsylvania wire centers as "competitive"?

A: Observing that the statutory authority with respect to competitive classification pertained directly to rate regulation and tariffing,[4] the Commission specifically noted that other statutory jurisdiction – including powers related to service quality – was unaffected:

[4] *2015 Reclassification Order* at 63, citing *See*, 66 Pa. C.S. § 3019(b)(2); *see also*, 66 Pa. C.S. § 1501.

> With the exception of rate regulation and tariffing, the Commission's authority under the Public Utility Code is retained over landline telecommunications services determined to be competitive. This includes retaining jurisdiction over quality of service standards that address the safety, adequacy, reliability, and privacy of telecommunications services and the ordering, installation, suspension, termination, and restoration of any telecommunication service.

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Moreover, in seeking a waiver of regulations relating to service quality in certain exchanges, Verizon affirmatively acknowledged that "the waiver does not (and cannot) remove the Commission's authority over Verizon's service quality under 66 Pa. C.S. § 1501." After reviewing Verizon's request, the Commission granted a waiver of the regulations in Chapter 63, Subchapter E (Service Quality)[5] with respect to the wire centers classified as competitive, for a period not to exceed five years (Verizon had asked for a ten-year waiver).[6] However, these service quality regulations continue in full effect with respect to the 351 wire centers not reclassified as competitive.

Q: Was the status of service quality and fiber deployment a direct consideration for the Commission in classifying certain wire centers as competitive?

A: No. The focus was on direct evidence of available alternative services (i.e., a showing that 97% of customers in the affected wire center could obtain a alternative service that

[5] The Commission specifically waived the following Subchapter E regulations: Section 63.51 (Purpose); Section 63.52 (Exceptions); Section 63.53 (General provisions); Section 63.54 (Record retention); Section 63.56(a)-(e) (Measurements); Section 63.58 (Installation of service); Section 63.59 (Operator-handled calls);[5] Section 63.60 (Automatic Dialing Announcing Devices (ADAD)); Section 63.61 (Local dial service); Section 63.62 (Direct distance dial service); Section 63.63 (Transmission requirements and standards); Section 63.64 (Metering inspections and tests); and Section 63.65 (Safety). *Id.* at 85. Verizon also requested that the Commission waive regulations in these additional Chapter 63 subparts: B (Services and Facilities); C (Accounts and Records); F (Extended Area Service); and G (Public Coin Services). *Id.* at 67.

[6] The Commission indicated that during those five years, it would engage in "data collection and a rulemaking to address the status of these chapters for noncompetitive and competitive services on a permanent and industry-wide basis." *Id.* at 76.

was sufficiently "like" Verizon's basic voice service). CWA asked the Commission to consider the fact that poor service quality and Verizon's failure to deploy fiber were evidence that competition was not working to the benefit of Verizon customers in many of the exchanges covered by Verizon's petition; however, the Commission found that these were not criteria specifically delineated by the section of Chapter 30 that dealt directly with competitive reclassification.[7]

Q: Is there evidence of poor service quality being provided by Verizon to its Pennsylvania customers, both in wire centers classified as "competitive" and elsewhere in the state?

A: Yes. As I discuss in detail in the following sections of my testimony, Verizon's performance relative to service quality metrics, Verizon's widespread VoiceLink deployment, numerous pending work orders to remedy defective cable, aging plant, and consumer complaints are among the many indicators of inadequate and unsafe service levels.[8] Mr. Gardler also describes numerous examples of Verizon's poor service quality. Moreover, if the Commission were to require the in-depth audit that CWA requests in its Petition, and that I fully support, such audit might well uncover more evidence of poor service quality.

Q: In your expert opinion and in your experience, when a regulatory commission has previously expressed the opinion that competition would provide incentives for the

[7] *Id.* at 47. "[W]e conclude that evidence of, alleged, poor service quality in the service territory or particular geographic areas encompassed by Verizon's Petition and evidence depicting the lack of fiber deployment are not probative of the statutory standard for reclassification pursuant to Section 3016(a)(3) of the Code."

[8] I include numerous tables in Confidential Exhibit SMB-1, which summarize my analysis of this information.

incumbent utility to maintain adequate customer service levels should the commission continue to monitor service quality?

A: Yes. The decision to waive service quality regulation in wire centers classified as "competitive" was in many ways a "predictive judgment." With all due respect to the Commission, experience has shown that regulators' predictive judgments can be wrong. This is not a failing by the regulator; economics is an inexact science and we cannot always predict how the presence (or absence) of competition in a market will affect service providers and consumers. I strongly recommend that the Commission take notice of a recent decision by the New York Public Service Commission ("NYPSC") regarding perceived competition and actual service quality trends. As of 2010, the NYPSC had greatly reduced its service quality oversight on Verizon, based on competitive trends. In March 2016, however, the NYPSC concluded that this decision needed to be carefully reexamined in light of both competitive trends and evidence of significant service quality degradation. Among the changed conditions that the NYPSC considered relevant to a reconsideration of the "regulatory balance" were the following:

- Verizon's line loss had largely stabilized, suggesting that those customers who had chosen to remain with Verizon were, for various reasons, less likely to defect to competitive services or providers;[9]
- Verizon had publicly stated that it did not intend to expand its FiOS footprint (but might increase fiber within the existing footprint);

[9] In fact, it is possible that many of these customers lack competitive options.

- A recent service quality proceeding was "replete with comments, both anecdotal and supported by statistics, stating that Verizon's copper service quality for non-Core customers does not meet Commission standards, and that Verizon's unwillingness to expand its FiOS service any further has created two classes of customers, those with access to an FTTP network and those without it."
- Customers "without access to Verizon's modern fiber network lack the same competitive choices as those in areas where FiOS has been deployed."[10]

Q: Should the Commission be deterred from examining whether Verizon's service in wire centers subject to the Part 63 waiver is not meeting the benchmarks set for service quality in non-competitive wire centers?

A: No. These are still valid benchmarks, and if Verizon isn't meeting them despite the alleged presence of competition, the Commission should be concerned and investigate.

Q: What about the balance of Verizon's wire centers, i.e., the 351 that are still classified as non-competitive?

A: Of course, where there is even less evidence of competition and where Verizon has declined to upgrade its facilities to fiber, a focus on service quality is especially important to ensure that Verizon's customers are receiving safe, adequate and reasonable service. The Commission should rely on both its statutory authority and the tools provided in its regulations to make sure that this happens.

[10] *Proceeding on Motion of the Commission to Consider the Adequacy of Verizon New York Inc.'s Retail Service Quality Processes and Programs*, 2016 N.Y. PUC LEXIS 119, Case 16-C-0122 (NY PSC Mar. 21, 2016).

Q: Are the concerns you identify about Verizon's service quality, particularly in locations where it does not offer FiOS services, ones that have been raised in other states as well?

A: Yes. As one notable example, the condition of Verizon's copper network and its impact on service quality came up frequently in the public hearings of the California proceeding to approve the transfer of Verizon's California operations to Frontier.[11]

[11] See, In the Matter of the Joint Application of Frontier Communications Corporation, Frontier Communications of America, Inc. (U5429C), Verizon California, Inc. (U1002C), Verizon Long Distance LLC (U5732C), and Newco West Holdings LLC for Approval of Transfer of Control Over Verizon California, Inc. and Related Approval of Transfer of Assets and Certifications, Application 15-03-005 (Filed March 18, 2015), Decision Granting Application Subject to Conditions and Approving Related Settlements, Decision 15-12-005 December 3, 2015, at 49-50.

III. METRICS CONVEYING INFORMATION ABOUT THE CONDITION OF VERIZON'S NETWORK

Q: In its Petition, CWA has raised concerns that Verizon is failing to provide "safe, adequate, and reasonable" service over the Company's network in Pennsylvania. How might the Commission gain familiarity with the condition of Verizon's network?

A: There are several ways that the Commission can gauge the condition of Verizon's network, including the following:

- The Commission can turn to CWA for its members' first-hand experience repairing and maintaining Verizon's networks as well as their direct experience responding to customers' requests for repair. Mr. Gardler's testimony provides this invaluable perspective.
- Traditional service quality metrics (such as the number of troubles that customers report about their basic dial tone lines, the timeliness of repair, and the speed of answer at call centers) can inform the Commission's assessment of the adequacy of Verizon's network.[12]
- The Commission can assess the numbers and locations of suggested work orders to replace defective cable.

[12] Confidential Exhibit SMB-2 reproduces one of Verizon's proprietary attachments to its response to CWA-68 (Verizon's 2015 Reclassification Report), which shows the number of lines encompassed by Verizon's service quality monitoring, disaggregated among four categories (by residence and business customers as well as separately for those served by competitive and non-competitive wire centers). The service quality data that Verizon has provided in this proceeding correspond with these lines, which are the "non-FiOS" lines. The Reclassification Report also shows service quality levels for certain metrics separately for competitively classified central offices and all other central offices. In response to CWA-63, which I reproduce as Confidential Exhibit SMB-3, Verizon provides internal statewide targets for the trouble report rate (residence and business combined); percent of out-of-service cleared within 24 hours and within 48 hours; and installation timeliness. As I discuss earlier, the Pennsylvania code includes several service quality performance standards.

- Data about the age of poles and aerial metallic cable (both facilities with limited useful lives and that are very susceptible to deterioration from weather and animal activity) can be evaluated to determine if Verizon is properly replacing equipment as it wears out.
- Verizon's deployment of VoiceLink (which Verizon deploys in response to persistent troubles on customers' lines) provides useful information for identifying geographic areas where Verizon may not be maintaining its network adequately.
- Verizon's copper retirement plans (explicit or *de facto*), which are indicative of locations where it lacks the incentive to repair or maintain the copper in its outside plant), also can provide useful information about the condition of its network.
- Consumer complaints (which provide perspective on customers' experiences with the quality of their dial tone lines) can serve as an indicator of serious, localized problems with the network.
- A more comprehensive approach for assessing the condition of Verizon's network would be through an independent audit or infrastructure evaluation.

I will provide analyses, conclusions, and recommendations based on all of these sources of information, except for the last, a comprehensive audit.

Q: Do you analyze service quality data throughout Verizon's footprint?

A: Yes, but he vast majority of my analyses in Confidential Exhibit SMB-1 focus on the non-FiOS part of Verizon's territory because those are the areas most vulnerable to inadequate network maintenance. I do, however, also analyze separately the service

quality for copper-based phone service in FiOS Areas. Verizon has unilateral control over the timing of its fiber deployment and where and when it chooses to retire copper, subject to compliance with the FCC's copper retirement rules (which require 90 days' notice for retail customers and 180 days for wholesale customers).[13] Customers living in areas where Verizon has not deployed fiber (including within some FiOS wire centers where there is not complete fiber coverage) may have complained about poor service related to the neglect of the outside plant that serves them. For this reason, although my testimony and exhibits focus on the non-FiOS parts of Verizon's service territory, I also examine service quality data in those areas where FiOS has been deployed, but where many customers continue to be served over copper lines.

The trouble report rate is a well-accepted barometer of the condition of networks.

Q: Does Verizon monitor and track customers' reports of troubles with their basic local dial tone lines?

A: Yes. Verizon tracks troubles that it classifies as "out-of-service" ("OOS"), which means that the dial tone line does not function; Verizon also tracks troubles that it classifies as "service affecting" ("SA"), which encompasses concerns such as cross-talk, static, and humming on the dial tone line. Rainy weather can cause problems with copper dial tone lines, when moisture is allowed to enter poorly maintained outside plant.[14] Verizon, as do many incumbent local exchange carriers ("ILEC"), tracks trouble reports per hundred lines ("RPH") (also referred to as the trouble report rate or "TRR"), inclusive of both OOS and SA troubles. For Pennsylvania, Verizon tracks this data monthly on a central

[13] 47 CFR § 51.332, Notice of network changes: Copper retirement.
[14] See also Mr. Gardler's testimony.

office basis.

For example, if, in an exchange with 1000 lines, 28 customers report that they lack dial tone and 22 customers report static, cross-talk, and other service-affecting troubles during a month, the TRR (trouble report rate) for that exchange for that month would be 5.0 (that is 5 total troubles for every hundred lines served).[15] The TRR of small communities may be "lost" in statewide TRR averages, and, for this reason, it is important to examine this metric on a central office basis, so that the Commission can detect any communities of particular neglect.

Q: Does the trouble report rate reflect all troubles that all customers are experiencing in any given month?

A: No. The trouble report rate encompasses only the troubles actually reported by Verizon customers. Other customers with long-lasting and recurring problems (for example, weather-caused static and cross-talk) may have given up, particularly if past attempts to get their service repaired have been unsuccessful. Another condition that will suppress the trouble report rate is when customers who call the repair bureau are unable to get through or experience long delays (and thus abandon their calls), because the repair bureau is not staffed adequately.[16] For these reasons, the trouble report rate likely understates the actual number of troubles customers are experiencing.

Q: Recognizing some of the limitations with the information, please summarize the

[15] In its confidential response to CWA-33, Verizon provides the relative percentages of 2015 troubles that were OOS and SA. I include this response as part of Confidential Exhibit SMB-3.
[16] Table 1 in Confidential Exhibit SMB-1, which is based on Verizon's response to CWA-68, shows that there is substantial room for improvement in the timeliness of Verizon's handling of calls to the repair bureau.

TRR data that Verizon has submitted in this proceeding.

A: In response to CWA's discovery, Verizon provided 42 months of TRR (and other service quality) data (spanning January 2013 through June 2016) for each of its central offices (including copper lines served in "FiOS" central offices), shown separately for residence customers, business customers and total customers. In my analysis, in most instances, I compute annual averages based on the most recent 12-month period for residence lines. Moreover, the vast majority of my calculations and analyses focus on the quality of service in the areas served by non-FiOS central offices.

Q: Based on your review of the TRRs, do you have any observations?

A: Yes. I am distressed by the large number of central offices with very high trouble report rates. Table 2 in Confidential Exhibit SMB-1 ranks the non-FiOS central offices by trouble report rate. Table 3 in Confidential Exhibit SMB-1 tallies these results and shows the numbers of non-FiOS central offices with average trouble report rates disaggregated among various ranges of TRRs.

Q: Why do these high trouble report rates concern you?

A: I have analyzed trouble report rates in many states for many years and have also analyzed regulatory standards for trouble report rates. Verizon's trouble report rates for many of its central offices are simply out of the ballpark. In my view, the prevalence of central offices with high trouble report rates suggests that the network has not been adequately maintained.

Q: The Commission's standard in Section 63.57(f) of the Commission's service quality regulations is 5.5 trouble reports per hundred lines. If the Company were to achieve this level, averaged across its footprint, would that be adequate?

A: No. I am not certain from reviewing the Subpart E rules what level of aggregation Verizon is permitted to use. Section 63.53 (b) states that the rules are triggered when "a public utility fails to meet a standard service surveillance level in a reporting entity as described in this subchapter." I did not find a definition for the term "reporting entity." However, in Section 63.56, "Measurements," the regulations require that: "(f) A public utility shall establish and maintain a performance record for each central office or other appropriate entity which shall be kept current and shall show applicable service results hourly, daily, monthly, as appropriate." Verizon does, in fact, record trouble report performance on a central office basis – a recognition that this information is directly pertinent to network performance at the local level.

However, if one were to conclude that the rules apply merely to the utility's entire service area, I would note two important concerns. First, as I note above, a metric such as trouble reports becomes largely meaningless when it is based on a statewide average, precisely because extremely poor service quality that is localized can be masked by only slightly above-standard service quality in other portions of the utility's service territory. Second, a 5.5 trouble reports per hundred lines standard is quite a bit more lenient than what I have encountered in many other states. I do not know how long this particular metric has been in effect in Pennsylvania, but it strikes me as unrepresentative of the expectations that should pertain to modern telecommunications network operations. Even so, if the metric is applied on a central office basis, Verizon's performance is extremely substandard in many parts of its service territory.

Q: Did Verizon also provide data for repeat trouble reports?

A: Yes. Repeat troubles are troubles that customers report after a dial tone line trouble has been purportedly resolved, typically within a certain time period (e.g., a week, a month).[17] The fact that Verizon's repeat trouble report rates are extremely high provides compelling evidence of a network that has had a series of "band-aid" short-term fixes, if that.

VoiceLink is a barometer to potential problems with the condition of Verizon's network

Q: What is your understanding of how Verizon addresses situations with repeat trouble reports?

A: When confronted with repeat troubles, Verizon may suggest that a customer subscribe to VoiceLink, a service that replaces the customer's copper with a fixed wireless connection. In response to discovery, Verizon states that: "VoiceLink may be offered as a repair solution to voice-only customers who have experienced repeated service trouble. VoiceLink is an *optional* service, customers are not required to migrate to VoiceLink."[18]

Q: Are you persuaded that VoiceLink is an optional service?

A: No. VoiceLink cannot be considered "optional" if the only other option is a non-functioning dial tone line. Moreover, despite Verizon's assurances to the contrary, it is not clear that Verizon will repair customers' dial tone lines when they decide they do not want VoiceLink.[19]

[17] Confidential Exhibit SMB-4 reproduces Verizon's responses to CWA-42 and 43, and shows the twenty central offices with the highest repeat trouble report rates, and the twenty central offices with the highest absolute numbers of repeat troubles, respectively.
[18] Verizon response to CWA-56.a (emphasis added).
[19] Verizon states that "[i]f a customer declines the use of VoiceLink, Verizon will make repairs to the copper facilities." Verizon response to OCA-16.

Mr. Gardler's testimony describes Verizon's actual VoiceLink policy, as it is communicated to its service technicians. Verizon's response to discovery, suggesting that VoiceLink is optional, is inconsistent with the directives that its technicians are receiving.

Q: What happens after a customer subscribes to VoiceLink service?

A: After a customer "accepts" VoiceLink Service, Verizon designates the copper facility as "defective" within Verizon's systems. Verizon indicates that "[t]here are certain circumstances where Verizon PA will undertake additional effort to repair defective copper facilities including: i. When the copper facility is included in a PPMT [Proactive Preventive Maintenance Tool] package (as outlined in Verizon's response to CWA 7) ii. If the facility can be used to support a customer closer to the central office before the location of the fault condition, a field technician may perform functions to make the facility functional. iii. Conducting plant rehab projects to address identified problem terminals or sections of cable and/or bulk pair recovery."[20]

Q: Is there sufficient information in this proceeding to conclude that Verizon is taking the appropriate steps to repair defective cable in areas where it is deploying VoiceLink?

A: No. An independent audit would provide the Commission with the information necessary to assess whether Verizon is repairing outside plant in VoiceLink communities sufficiently to provide safe and adequate service.

Q: Have you analyzed VoiceLink deployment as it relates to central offices' repeat trouble report rates?

[20] Verizon response to OCA-16.

A: Yes. In Table 4 in Confidential Exhibit SMB-1, I rank central offices based on the number of repeat trouble report rates for residential customers and also show Voice Link installations.[21] Table 5 tallies central offices, showing the numbers of central offices in various ranges of repeat trouble report rates.[22] I recommend that the Commission direct Verizon to discontinue its deployment of VoiceLink unless Verizon has obtained FCC and Commission authorization permitting discontinuance of the existing TDM-based wireline voice service in an affected area. In the absence of such explicit authorization, the existence of deteriorated copper should not be deemed to permit Verizon to effectively coerce a customer into accepting VoiceLink.

Q: Have you attempted to identify those non-FiOS central offices that may be experiencing the most outside plant deterioration?

A: Yes, however, I recommend that the Commission start with the assumption that the entire non-FiOS areas are at risk of outside plant deterioration, leading to unsafe and inadequate conditions. Nonetheless, by ranking central offices based on various metrics from worst to best as well as by including other relevant information such as engineering work requests (discussed below) I have attempted to pinpoint certain areas where service appears to be particularly terrible.

The Commission should examine whether Verizon is pursuing copper maintenance projects in a sufficiently timely and comprehensive

[21] My analysis in this table and other tables in Confidential Exhibit SMB-1 covers the 12-month period spanning July 2015 through June 2016 and analyzes data for residential customers.

[22] Table 14 in Confidential Exhibit SMB-1 compares the monthly trouble report rate data for 2015 that Verizon provided in response to CWA-89 with the data that Verizon provided for the same time period in response to CWA-65, -66 and -67.

manner.

Q: Did CWA seek information about Verizon's efforts to maintain its copper network?

A: Yes. In response to CWA discovery, Verizon indicates that it "undertakes extensive efforts every day to operate and maintain its core copper network," which "include dispatching on customer trouble reports, proactive maintenance efforts, cable rehab, air pressure and cable replacement through engineering work orders that include IIP."[23] Verizon states further regarding its Infrastructure Improvement Program ("IIP"):

> The program functions based on input from the field operations teams which becomes a request or a potential job. The request is evaluated and, often times, addressed through a solution other than a cable replacement work order. There is no decision to address each request through an engineered replacement until the request is investigated and assessed. In 2014, 247 requests were submitted, 48 of which were addressed as replacement projects through Engineering and completed. In 2015, 60 requests were submitted, 4 of which were addressed as replacement projects through Engineering and completed. In 2016, 53 requests have been submitted, 3 of which are currently being addressed through a replacement project.

Verizon also states:

> Verizon PA does not specifically track all of its efforts to replace defective cable. The Infrastructure Improvement Program (IIP) does address certain cable replacement projects. For 2015 and 2016, the IIP included 113 potential cable replacement jobs: 60 for 2015 and 53 for 2016.[24]

Q: Did Verizon provide information about the locations associated with the 60 work orders for 2015 and the 53 work orders for 2016?

[23] Verizon response to CWA-77.
[24] Verizon revised response to CWA-15.

A: Yes. Exhibit SMB-5, which reproduces Verizon's response to CWA-75, shows, by central office, the numbers of "cable requests submitted" and the "cable replacement engineering in progress" separately for these two years. Although 60 work orders were submitted in 2015, only 4 are being undertaken (in areas served by the following wire centers: Ambridge, Bethel Park, Cannonsburg, and Washington). Similarly, for 2016, although 53 work orders had been submitted as of time of Verizon's response, only 4 are scheduled to actually be addressed (in areas served by the following wire centers: Aliquippa, Warren and Washington).

Q: Do you understand why there is such a large gap between the numbers of potential cable replacement jobs and jobs actually in progress?

A: No. I recommend that the Commission seek a detailed explanation from Verizon for this substantial discrepancy between work that seemingly should be done to maintain the network and the work that is actually being undertaken. Whether or not each of these recommended replacement jobs passes a strict cost-benefit analysis (in terms of producing a return to Verizon's shareholders), if they are necessary in order to ensure that Verizon maintains a safe and adequate network,[25] then they should be completed in a timely fashion. Jobs that don't get done lead to non-functioning or poorly functioning phone service for customers. Defective cable is not going to self-repair, and, therefore if it needs to be fixed, this should happen in a timely manner.

[25] See e.g., confidential attachment to CWA 1-7, "Proactive Cable Maintenance Process," pp. 7, 8, 11. I reproduce these pages in Confidential Exhibit SMB-6. See also Verizon's confidential response to CWA 1-17, which I reproduce as Confidential Exhibit SMB-7, for the amounts that Verizon spent in 2014 and 2015 for repairing defective cable.

Q: Are there many customers who continue to rely on Verizon's copper network?

A: Yes. Confidential Exhibit SMB-8 reproduces Verizon's response to CWA-84, in which Verizon has reported the number of customers served by copper and fiber, respectively, in 2014 and in 2015. From this, it is evident that a substantial number of customers continue to rely on Verizon's copper network, and, therefore, are directly affected by Verizon's outside plant practices. Given the many thousands of customers in hundreds of communities that continue to rely on Verizon's copper network for voice service, it is clear that Verizon's actions regarding maintenance have far-reaching consequences for public safety, welfare, and economic development throughout the state.[26]

Q: Is it reasonable to associate Verizon's rather spotty approach to fulfilling cable replacement orders with the evidence showing high trouble report and high repeat trouble report rates?

A: Yes. I include three tables in Confidential Exhibit SMB-1 that analyze this relationship: Table 6 lists all non-FiOS central offices alphabetically, and shows the trouble report rate, the repeat trouble report rate and the numbers, if any, of work orders for 2015 and 2016. Table 7A and 7B show the trouble report rate and repeat trouble report rate for only those 43 central offices with engineering requests (in either 2015 or 2016), and shows the numbers of requests by central office: Table 7A displays the information alphabetically by central office and Table 7B ranks the central offices by trouble report rate.

[26] Small businesses may rely on digital subscriber line service ("DSL"), and point-of-sale transactions, which require a reliable dial tone line.

Q: What concerns are raised by seeing such high rates of trouble reports and repeat trouble reports?

A: They raise a serious concern that Verizon is neglecting outside plant repairs, particularly in areas where the profitability of serving customers is lower, typically the areas outside of its FiOS footprint.[27] Of course, while Verizon is earning substantial profits from its FiOS-based services, Verizon's ability to launch and expand was rooted in long-standing incumbency advantages, which enabled it to deploy a ubiquitous network with guaranteed rates of return serving a then largely captive customer base. Some aspects of the social compact that underlay the original deployment of the public switched telephone network have been altered by the presence of competition, and ILECs have not been compelled to deploy fiber as ubiquitously as they deployed their copper networks. Nonetheless, so long as Verizon maintains its carrier of last resort obligation, it should be compelled to expend sufficient amounts of money to provide all of its customers with safe, adequate, and reasonable service, regardless of the type of facilities used. My detailed review (which I discuss further below) of Verizon's performance relative to the Commission's service quality metrics suggests that greater regulatory oversight is

[27] In Confidential Exhibit SMB-9 I reproduce Verizon's response to CWA-44, which includes information about Verizon's capital expenditures, operating expenses, asset costs, depreciation, depreciation reserve and lines served in 2014 and 2015. The response corresponds with Verizon's entire territory. In response to CWA-45 and CWA-46, Verizon indicated that it does not track this information separately for FiOS and non-FIOS areas. I compute the operating expense per access line (including all lines) for 2014 and 2015. I also compute the operating expense expressed relative to copper lines (recognizing that the expenses cover all lines but as a way to gauge the magnitude of the expenses relative to the number of copper lines in service -- that is copper lines are more likely to require operating expenses than are fiber lines). See Table 8 in Confidential Exhibit SMB-1. I recommend that the Commission consider this information as part of its assessment of whether Verizon is allocating sufficient resources to plant maintenance. Confidential Exhibit SMB-10 reproduces Verizon's response to CWA-47, and shows total revenues and intrastate revenues for 2015. It is not readily apparent to me whether these revenues include the likely substantial revenues that Verizon derives from its FiOS products.

urgently needed. The rationale for having a statutory mandate about a utility's service quality is precisely to provide an independent check that ensures that the ILEC provides adequate service to all of its customers, not just those that generate the highest profit margins.

Q: What then do you recommend?

A: I recommend that the Commission direct Verizon to complete all of the suggested cable replacement jobs within 12 months of the Commission's Order in this case.

Transducers and remote terminals are essential elements of the outside plant

Q: Please explain the significance of transducers to the safety and reliability of the public switched telephone network that Verizon operates.

A: Transducers help Verizon assess the condition of its cable. As explained by Verizon:

> Transducers are devices that are used in Verizon's cable air pressure systems to monitor air flow and changes in pressure. Alarms are generated when the readings from a transducer (or multiple transducers) fall outside of certain parameter settings for air flow and changes in pressure.[28]

In its proprietary response to CWA-23, which I include as Confidential Exhibit SMB-11,[29] Verizon shows the number of its transducers, the number of transducers indicating an alarm condition in 2015 and the number of transducers not communicating (i.e., out of

[28] Verizon response to CWA-22.

[29] Verizon indicates that the data provided in response to CWA-23 are a "snapshot" of the transducers as of December 31, 2015. Verizon response to CWA-78.a.

service[30]). In response to CWA-78, Verizon indicates that there are over 15,000 transducers across all of the air pressure systems in Pennsylvania, and states that "[g]enerally, the performance of the air pressure systems has not varied dramatically over the recent years and can be expected to be similar to the answer provided in CWA-23: typically between 30-40%."

Q: Please explain further.

A: Verizon indicates that air pressure systems are deployed when they are needed to support underground cables exiting a central office, and further explains that central offices without air pressure systems "would typically be small offices serving a limited number of customers and where the cables leaving the central office are aerial or where they are underground for a short section.[31] Verizon describes the role of transducer alarms as follows:

> Within Verizon's cable air pressure systems, transducers generate alarms when conditions fall outside of established parameters, most commonly for air flow or changes in air pressure. Alarms can be generated for a number of reasons such as changes in pressure (increase or decrease) or changes in air flow. When a single transducer alarm is received, the PPM center will acknowledge and record the alarm and then begin a one hour observation period where it will retest the alarm at the end of the hour. If the device is still in alarm, the PPM center will dispatch a technician to investigate and repair as appropriate. If multiple alarms are received for the same cable run, the PPM center will group the alarms immediately and dispatch a technician to investigate and resolve. The one hour retest period does not apply to grouped (or correlated) alarms.[32]

[30] Verizon response to CWA-78f.
[31] Verizon response to CWA-73-b.
[32] Verizon response to CWA-24.

Q: Is an alarm rate of between 30 and 40 percent to be expected in a well-maintained copper network?

A: I do not believe so. Although, according to Verizon, the performance of the air pressure systems has not varied dramatically over the recent years, that "status quo" is irrelevant. An alarm rate of between 30 and 40 percent may be the "new normal" that corresponds with an overall deteriorating level of plant, but the Commission should determine that the alarm rate is much too high.

Q: How can the Commission simply conclude that an alarm rate between 30 and 40% is too high?

A: The alarm is signaling a problem with the cable. Well-maintained cable should not set off alarms. When a transducer is not working, it means that the cable is likely to get wet which will both deteriorate the cable and impair service to customers. First, the Commission should direct Verizon to repair its out-of-service transducers. Second, the alarm rate could be examined as part of an independent audit. And most important, Verizon should be directed to fix its outside plant so that the alarm goes off less than 5% of the time.

Q: Please describe the function of remote terminals in Verizon's outside plant.

A: As described by Verizon:

> A remote terminal provides telephone exchange-like telephone interface functionality. Remote terminals are typically located in an area with a high density of telephone subscribers, such as a residential neighborhood, that is remote from the telephone company's central office. Copper T1 circuits or fiber connect the remote terminal to the central office.[33]

[33] Verizon response to CWA-80.

Verizon states that it is not possible to obtain information about the ages of the batteries in the remote terminals.[34]

Q: Why might the ages of the batteries be relevant to the Commission's assessment of the condition of Verizon's network?

A: If batteries are old, they may need to be replaced so that the remote terminals can function properly. Verizon indicates that it schedules maintenance twice yearly, but Verizon does not describe the scope of such maintenance (i.e., are all terminals inspected?).[35] Verizon does not track the number of batteries replaced, but does track the number of battery-replacement jobs and the dollars spent on battery replacement.[36] Based on the limited information that Verizon was able to provide, it does not seem possible for the Commission to conclude that old batteries are being replaced in a sufficiently timely and comprehensive manner.

Q: What then do you recommend?

A: I recommend that Verizon compile a complete list of the dates that batteries were most recently replaced in its remote terminals, including the corresponding locations. Maintenance should be preventative rather than after-the-fact.

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[34] Verizon response to CWA-26.

[35] Verizon response to CWA-81. Verizon provides the number of remote terminals in its confidential response to CWA-25, which I include as Confidential Exhibit SMB-12. Verizon also states: "If a battery is found to be in need of replacement during the regular maintenance schedule, the battery is updated accordingly. In addition, there are certain sites (State Police, Police, Fire, EMS, State Govt. County Govt, etc.) that are prioritized for replacement." Verizon response to CWA-28.

[36] Verizon response to CWA-27. The proprietary response includes information about the numbers of jobs and dollars spent in 2014 and 2015.

Verizon's failure to maintain its network is leading to consumer complaints about inadequate service.

Q: Earlier you mentioned that consumer complaints can provide a barometer of the network's condition. Have you examined information about consumer complaints regarding Verizon's telephone lines?

A: Yes. Complaints regarding Verizon's repair and provisioning increased between 2014 and 2015, although the number of access lines served by Verizon declined during this same time period.[37] Also, on April 26, 2016, pursuant to the Right to Know Law, the Pennsylvania Public Utility Commission provided CWA with 29 complaints (30 if a repeat complaint is included) that the PUC received between June 29, 2015 and March 23, 2016. My review of these complaints suggests that in several instances, if consumers had not submitted formal complaints, certain outside plant issues would have been left unaddressed. As is generally the case with consumer complaints, they are illustrative of larger problems that may exist. It takes effort to submit a formal complaint, and it seems reasonable to assume that there are many problems that exist that are not brought to the attention of the PUC.

Q: Please provide some examples of consumer complaints that you reviewed that relate to the condition of Verizon's network.

A: I summarize illustrative complaints below, and, in some instances, include my observations (in italics) about the complaints:

- **Non-functioning line; failed use of VoiceLink; Docket No. C-2015-2491855: 6/29/15, Washington, 15301.** "Service is provided on an antiquated line that is under constant repair. Complete loss of service for days at a time." The

[37] See Confidential Exhibit SMB-13, which reproduces Verizon's response to CWA-69 for data regarding complaints and see Confidential Exhibit SMB-8, which summarizes access line data provided in response to CWA 1-84.

complaint includes more details, and the description that the consumer provides indicates that perhaps customer was given VoiceLink. The requested relief is "reliable service that works even when it rains." VZ Response (Suzan Paiva, Counsel for Verizon Pennsylvania LLC), August 19, 2015: Among other things: "An attempt to provide dial tone with wireless facilities did not work in Mr. Reynolds' location." Verizon is moving his wireline service to different facilities "that should provide more reliable service than the present configuration." Construction was anticipated to be completed by September 1, 2015.

- **Unreliable small business line service, especially during bad weather, Docket No. C-2015-2508898, 10/13/15, Paxinos, 17860,** seeking repair to business line and requesting reduction in bill due to service problems, Verizon promised a call from a supervisor, which never happened, some credits were provided but "this is not enough to offset the cost of paying for terrible service over the years that continue to this day. How much should anyone be paying for a phone line that only works reliably when the weather is dry and calm." "As rural Verizon customers we deserve the same quality service that urban customers receive since we have been charged the same fee." But Verizon contends that "on 8 of the 14 repair calls since 2012 the responding technicians could find no problems, although they did perform many preventative measures such as changing cable pairs, changing a card in the remote terminal and swapping a buried service wire pair." Verizon adds, "Most recently, a new underground conduit was installed last week and is due to be completed by the splicer early this week." *Phone lines should work in rainy weather.*

- **Well-documented, well-articulated complaint suggesting Verizon promised but failed to fix outside plant, Docket No. C-2015-2516623, Williamsport, 17701.** The consumers (a couple) listed 15 different dates between 4/3/14 and 11/19/15 that they made calls to Verizon. Among other things, the consumer reports about one "time when the technician came out" and told them "that they were going to replace the underground line that runs from the nearest pole into our house" and then "spray painted marks from the pole through" the consumers' "yard and said they would be back to replace the line." Verizon "never came back!!!" The bad phone lines affect their DSL. According to a technician who spoke with them, apparently the issue is with a line that runs under the Route 15 highway, Verizon is aware of the issue but the lines are not going to be fixed. "We are paying them for services and we feel we should be getting up to par services for our money." Verizon responds that it reviewed thoroughly the facilities that serve the consumers' residence, that "[a]ll facilities tested good" and "[a]s a precautionary measure, the buried service wire that provides service to the [ ] residence was replaced." *This may be an example of the squeaky wheel getting the grease. If the customers had not complained, would Verizon have replaced the wire? Also why does it take so long to get a resolution?*

- **Humming on phone, phone dead, phone ringing into house down the road, Docket No. C-2016-2528207, 2/2/16, Columbus, 16405.** "My phone wires are in the swamp in the water. I've sent photos to Verizon years ago." "I've been getting the run around for over 15 years." Verizon states that "many actions were taken to repair her phone service," and also states, "[h]owever, on March 14, 2016 it was discovered that there were two pedestals that were submerged due to beavers building a dam in that area." Repair technicians removed the beavers and "deconstructed the dam so they could complete the repairs." *So it sounds as if the problem is likely solved (though the beavers may be unhappy). The larger issue is that Verizon neglected for many years to take steps to "discover" the submerged pedestals until the consumer made a formal complaint.*
- **Equipment and box need to be replaced, Docket No. C-2016-2533010, 3/7/16, Marion Center, 15759.** "The techs from Verizon have told me that the box and everything in it needs to be replaced and made weather tight." Consumer kept a log between August 22, 2015 and February 16, 2016 of when the phone did not work or had other troubles (DSL down, no dial tone, noise on line) and also provided the name, address, and phone number of a neighbor who also called the PUC to complain about phone service on Pinevale Road. Verizon responds that "Verizon has performed repairs and her service should not be resolved" and also states that Verizon "responded to prior repair requests and has performed considerable work on the serving facilities, including changing the line feeding the remote terminal from copper to fiber." *This seems to be another instance where Verizon eventually fixed an ongoing problem but perhaps only because the consumer filed a formal complaint.*
- **3/16/16, Washington, 15301.** Consumer states that the when the electricity goes out the phone goes out sometimes for 5 to 7 days, and he lists three dates spanning 10/28/15 to 3/2/16 of such times. The consumer wants the phone to be fixed "for good." *This sounds like it may be a customer served by a remote terminal with a failed battery.*

Q: Is there other information about consumer complaints that also shed light on the communities where outside plant problems may exist?

A: Yes. In response to OCA's discovery, Verizon provided information about consumers' informal and formal complaints. The Commission can analyze the various locations of consumers who have raised concern about the quality and reliability of their voice

services as a strong indicator of where there may be serious problems with Verizon's outside plant.[38]

Q: Did you analyze the age of any components of Verizon's network?

A: Yes. I analyzed the age of Verizon's poles and its aerial metallic cable, the former because of the public safety concerns that CWA has raised regarding Verizon's pole inventory, and the latter because aerial cable is exposed to the weather, and so the older it is, the more likely that it has deteriorated, especially if it has not been well-maintained.

Q: What does your analysis show?

A: Verizon's poles and cable are extremely old. In Table 9 of Confidential Exhibit SMB-1, I compute the average age of Verizon's poles by county and the average throughout Verizon's service area (based on the numbers of poles installed each year beginning 1981).[39] The overall percentage of poles that are between 30- and 35-years old is substantial and should be of concern to the Commission.

In Table 10 in Confidential Exhibit SMB-1, I compute the feet of metallic aerial cable by age, separately by county. The total percentage of cable feet that is older than 30 years is

[38] See Verizon's "PROPRIETARY Supplemental Response OCA I-2 2014" and "PROPRIETARY Supplemental Response OCA I-2 2015." See also Verizon response to OCA 1-3. I include these three responses as Confidential Exhibit SMB-14. Verizon's response to OCA 1-2 lists informal repair-related complaints for 2014 and 2015, including the associated addresses, resolution by Verizon, and central offices. In its response to OCA 1-3, Verizon provides a list of formal complaints filed in 2014 and 2015 that had corresponding informal complaints, and the proprietary portion of its response shows the addresses associated with the complaints.

[39] My analysis encompasses the Verizon PA service area. My calculations likely underestimate the ages of Verizon's poles because it seems unlikely that there are not any poles or cable remaining that were installed prior to 1981 (the first year for which Verizon provided data for these accounts in its Continuing Property Records in response to CWA-2). Thus, it appears likely that the entries in the records as being *installed* in January 1981 actually refer to plant that was *in service* as of January 1, 1981. Thus, the average ages shown in Tables 9 and 10 of Confidential Exhibit SMB-1 understate the true age of the plant in these accounts.

also substantial. The age of the cable combined with the apparent prolonged neglect of cable maintenance likely contribute to the high trouble report rates and repeat trouble report rates in many central offices.

Copper-served customers in areas with fiber facilities are also vulnerable to neglect.

Q: Does the fact that a customer's premise is located within a FiOS area necessarily mean that the customer is served over fiber?

A: No. As I understand it, the fact that Verizon offers FiOS to customers in an area served by a particular central office does not mean (a) that fiber has been deployed to every premise served from that central office or (b) that every customer that has the option for FiOS service has chosen it over TDM-based service, typically provisioned over copper (although they may in some instances be provisioned over fiber loops, subject to the FCC's copper retirement rules).

Q: Are there reasons to be concerned about service quality in FiOS areas?

A: Yes. The record shows that there are many FiOS communities with high repeat trouble report rates. In Table 11 in Confidential Exhibit SMB-1, I examine various service quality barometers for the subset of central offices corresponding to those central offices where there are FDV (FiOS Digital Voice)[40] customers. It is my understanding that

[40] FiOS Digital Voice (FDV) refers to voice service that Verizon provides over fiber lines connected to Internet Protocol ("IP") softswitch equipment. It does not, so far as I can determine, include any TDM-based voice service that Verizon may provision over fiber (switched fiber voice service). The record does not indicate how many customers receive their TDM-based voice service over a fiber loop, but my understanding is that this is relatively uncommon.

Verizon tracks troubles only from its non-FiOS voice customers.[41] Within FiOS communities, there is a substantial number of customers served over copper, whom I refer to as "vulnerable" customers.

Q: What is the basis of your assertion that there are substantial numbers of such vulnerable customers?

A: In Table 11 in Confidential Exhibit SMB-1, I show the number of customers, by central office, that are served by copper from central offices where Verizon also offers FDV – Verizon labels these customers "Verizon retail residential" and describes these data as "the total quantity of Verizon residential lines with voice service that is not FiOS-based."[42] For each of these offices, I also show the trouble report rate and the repeat trouble report rate. Taken together, this analysis shows that there are many customers located in FiOS areas who are vulnerable to receiving substandard service resulting from insufficient maintenance of their copper facilities.

Q: Is there other evidence that sheds light on this situation?

A: Yes. Verizon's own internal communications refer to "chronic repair clusters," a term which it uses to refer to "customers served on copper facilities who are part of a group of customers that have experienced service problems and who live in an area where fiber facilities are present."[43] In Table 11 in Confidential Exhibit SMB-1, I also show the

[41] Verizon response to CWA-42 (the data in the response are considered confidential) is reproduced as Confidential Exhibit SMB-4.
[42] Verizon response to CWA-52 e. Verizon's response to CWA-52 h shows the numbers of households, by wire center, that are passed by FiOS (of course in any given wire center, some households subscribe to a Verizon voice service, whether copper- of fiber-based, and others do not).
[43] Verizon response to OCA-1.

number of number of chronic repair customers by wire center (as well as cable replacement requests).[44] A "chronic repair customer" is a customer "served on copper facilities in areas where fiber is available who have experienced two or more outside plant dispatches in 16 months."[45] I include Verizon's listing of chronic repair customers, provided in response to OCA II-6, as Confidential Exhibit SMB-15.

Q: But isn't Verizon migrating these customers to fiber, which would make copper repair superfluous?

A: The record does not clearly support the conclusion that there is a timely and transparent plan for copper retirement. If copper replacement is planned and customers receive adequate notice and education about the consequences for their voice services (e.g., the need for back-up power), then Verizon certainly can proceed to replace customers' copper loops in a designated area. What the record suggests, however, is that Verizon is not proceeding with plans, at least in the foreseeable future, to replace a substantial portion of active copper loops in these central offices. In Confidential Exhibit SMB-8, I show the number of lines that Verizon says that it has scheduled for migration from copper to fiber in 2016,[46] and that number nowhere begins to approach the number of vulnerable customers.[47]

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[44] Verizon response to OCA-6.
[45] Verizon response to OCA-4.
[46] Verizon response to CWA-84b.
[47] On September 15, 2016, Verizon filed its copper notifications with the Federal Communications Commission for 2017. The list of Verizon PA wire centers is as follows: Allentown (Pittsburgh), Dormont, Glenolden, Jefferson, Jenkintown, Knights Road, Mayfair, Mechanicsburg, Pilgrim, Turtle Creek and Wilkinsburg. Verizon SUPPLEMENTAL RESPONSE to CWA 84. b.

Q: Have you reviewed documents that suggest that Verizon perhaps is subverting the intended process of customer notification for copper retirement by waiting until a customer in a chronic repair cluster complains about service problems and responding with fiber as the only option for getting the line into good working order?

A: Yes. CWA has raised concerns with the FCC about Verizon's Fiber-is-the-Only Fix policy.[48]

Q: If Verizon chooses to retire all of the copper within a wire center, does this automatically convert all of the customers to FDV service?

A: No. Verizon still has to do the physical work of connecting each customer to the fiber cable, including any changes required at each customer's premises. This work is time-consuming and Verizon usually does not do it for voice-only customers, allowing them to remain on deteriorating copper plant until the customer experiences enough problems with service or Verizon completely abandons copper in the area. Under Verizon's approach, the overall process of moving all customers from copper to fiber can take years to complete.

Q: What would improve the Commission's ability to safeguard service quality for customers served out of a "FiOS" wire center but who continue to receive their service over copper facilities?

A: Verizon should be required to be much more transparent; to this end, the Commission should require Verizon to submit a report that 1) describes the actual extent of fiber

[48] http://cwafiles.org/national/issues/PolicyIssues/Telecom/CWAComments/20160502-FCC-Complaint-Verizon.pdf

coverage within existing wire centers; 2) details its plans (location and timing) for copper retirement (including de facto retirement and designation of certain areas with chronic copper repair problems as fixable only by means of replacing copper with fiber); and 3) identifies streets, neighborhoods or other such areas within "FiOS" wire centers where it has no specific plans to replace copper with fiber (whether pursuant to copper migration or full technology transition [i.e., discontinuing TDM-based voice service in favor of FiOS Digital Voice]). For those areas that are not slated for migration to fiber-based services within the next six months, Verizon should be directed to fix copper plant.

There is substantial work to be done to replace or remove hazardous poles and to eliminate double poles.

Q: Did Verizon provide data regarding its poles?

A: Yes. Confidential Exhibit SMB-16 reproduces Verizon's response to CWA-9, which shows the numbers of poles in the following categories:

- Poles that Verizon owns;
- Poles to which Verizon attaches but does not own;
- Poles that Verizon owns jointly with another public utility that is regulated by the Commission; and
- Poles that Verizon jointly owns with another entity that is not regulated by the Commission.

Q: How is Verizon ensuring that its poles are in safe and adequate condition?

A: Verizon has jointly engaged with PECO to inspect poles and through that process has inspected 34% of its poles in PECO's service territory (19,499 poles) since the commencement of its program.[49] The process has located 437 hazardous poles. Extrapolating from that pattern, I estimate that there may be another 858 hazardous poles among the 38,276 poles still remaining to be inspected.[50] It is not clear if and how Verizon is inspecting poles in the remainder of its service area. I would note, though, that much of the service in PECO's area is underground, which is why there are apparently fewer than 60,000 poles in included in this inspection program. This compares to the roughly 1,000,000 poles that Verizon uses statewide.[51]

Q: How is Verizon addressing double poles, and how many double poles does it have?

A: Verizon describes its process for removing old poles in its response to CWA 1-11 which I include as Exhibit SMB-17. Also, Confidential Exhibit SMB-18 reproduces Verizon's response to CWA 1-12, which shows the numbers of double poles (including power company poles) as of January 1 and December 31, 2015, respectively, and also shows "completions" and "additions."

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[49] Verizon does not indicate when the program commenced and, therefore, the pace of the inspection is unclear. Verizon response to CWA 1-13. In its Attachment A to its response to CWA 1-13, Verizon includes an un-dated portion of an agreement ("Article 9 – Maintenance; Pole Inspection"), which states: "Each Owner will implement and maintain an annual pole inspection program providing for pole inspections in accordance with each Owner's pole inspection practices. Each Owner's inspection program shall provide that a minimum average of ten percent (10%)of its joint use poles will be inspected per year commencing on the Effective Date until such time as all of its joint use poles are inspected over a ten (10) year period, with a minimum of twenty-five percent (25%) of the joint use poles inspected within the first three (3) years after the Effective Date." The agreement also states: "In March 2012 and every subsequent year thereafter, the Designated Representatives shall meet to discuss the scope of each Owner's pole inspection program for the then current year." From this language I infer that the program may have commenced in either March 2011 or March 2012.

[50] Verizon response to CWA 1-13.e.

[51] Verizon Answer to CWA Petition, November 10, 2015, page 6.

Q: Do the numbers that you review cause you to be concerned about the pace of Verizon's removal of double poles?

A: Absolutely. Verizon has a long way to go to eliminate double poles and the problem is getting worse. As I describe earlier in my testimony, Verizon has hundreds of thousands of poles that have reached the end of their useful life. It is imperative that Verizon begin to take its responsibilities seriously and devote sufficient resources to the inspection and replacement of aged and dangerous poles. As Verizon's allegedly confidential data show, double poles are the "tip of the iceberg" representing the worst of the worst, but problems with dangerous poles will increase significantly as the pole inventory continues to age, weather, and deteriorate. Verizon must take immediate action to avoid much more serious problems in coming years.

Q: Do consumers ever complain about the condition of poles?

A: Yes. I am aware of a complaint about poles in South Williamsport, 17702.[52] The consumer raised concerns about lines from poles resting on trees, referring to them as pole nos. 412 and 418. The consumer also described pole no. 180, which "is leaning about three feet out from the bottom to the top of the pole" and states that his "neighbors fear it could come down in a heavy snow storm."

[52] This was one of the complaints that the PUC provided to the CWA in response to the Right to Know Law.

IV. TIMELINESS OF REPAIR

Verizon's repair of dial tone lines is so slow as to render the network unsafe and inadequate.

Q: Should the Commission consider the timeliness of Verizon's repair of its basic phone service as part of its overall assessment of the safety and adequacy of its network?

A: Yes. In its assessment of whether Verizon's service is adequate, the Commission should consider the timeliness of Verizon's repair as well as the analysis in Mr. Gardler's testimony regarding numbers of outside plant technicians (which provide the critical resource necessary for providing adequate service).[53] If a dial tone line is not functioning or if cross-talk is so severe as to make it difficult to carry on a conversation, the line cannot be considered safe and adequate.

Q: In your view, is the timeliness of Verizon's repair service acceptable?

A: No. My analysis, which I discuss below, shows that it is entirely unacceptable.

Q: What is the basis of your assertion that Verizon's repair of phone service is too slow?

A: Verizon provided detailed data showing the timeliness of its repair of dial tone lines measured by the following: percent of lines repaired within 24 hours, 48 hours, and 72 hours, respectively; and the mean average time to repair lines. I analyzed this

[53] See also Verizon's revised response to OCA-6, in which it provides the numbers of field technicians separately for three field division director regions for 2014 and 2015, and which shows that, in total, the number of field technicians decreased from 2290 in 2014 to 2224 in 2015.

information for the non-FiOS areas in Verizon's territory.[54] In various states that I am familiar with, PUCs set an objective in terms of percentage of out-of-service trouble reports cleared within a specified interval of time (e.g., 90% within 24 hours for repairing out of service troubles). There does not appear to be a similar "percentage-within-x-time" metric under the Pennsylvania regulations, but the ILEC is required to "respond and take substantial action to clear out-of-service trouble of an emergency nature whenever the outage occurs, within 3 hours of the reported outage consistent with the needs of customers and personal safety of utility personnel." For "other" out-of-service troubles (distinguished from those "of an emergency nature"), the benchmark is 24 hours.[55]

Q: Does the timeliness of repair relate to the adequacy of the network?

A: Yes. If dial tone lines do not function, the network cannot be considered adequate and safe. The timeliness of Verizon's repair of dial tone lines is a barometer of whether the Company is allocating sufficient staffing resources to the maintenance of its network. The timeliness also indirectly reflects on the network's condition - all else being equal, the higher the number of trouble reports, the greater the volume of work orders for repair. As the volume of work orders increases, absent a corresponding increase in resources (staffing, vehicles), the likelihood of customers needing to wait for repair increases.

Q: Please describe your analysis of this aspect of the Company's quality of service.

[54] Table 15 in Confidential Exhibit SMB-1 summarizes Verizon's performance relative to several service quality metrics throughout its service territory, including non-FiOS and FiOS areas. Exhibit SMB-19 reproduces a map that shows the FiOS and non-FiOS areas, provided by Verizon in response to CWA-38.

[55] "Except for isolated weekend outages affecting fewer than 15 customers in an exchange or where the customer agrees to another arrangement." § 63.57(b).

A: Tables 12 and 13 in Confidential Exhibit SMB-1 analyze Verizon's timeliness of repair: Table 12 ranks non-FiOS central offices from worst to best based on the percent of out-of-service troubles cleared within 24 hours and also shows the mean time to repair for each central office. Customers are waiting too long to have their troubles cleared. Table 13 shows the worsening repair times between 2013 and 2015.

Q: Do you have any general observations about your analysis?

A: Yes. As is the case with the Company's high trouble report rates, I am very concerned by the Company's slow repair of lines, and the apparent lack of consequences for this inadequate level of service.

Q: Given that most people have a cell phone in addition to their landline, is it really all that important how quickly Verizon repairs its basic dial tone lines?

A: Yes. A substantial group of customers, who don't perceive an important and distinct benefit in having a landline, have already "cut the cord." Conversely, customers who continue to pay for a landline phone often do so to preserve capabilities unique to their wired telephone service. Some customers simply do not have good cell phone reception inside their homes. Others may use the landline as their primary Internet connection (i.e., DSL) or to support an alarm system, health monitor, or other specialized equipment. For some, the landline is important because it protects the customer from being reliant on battery back-up during a power outage. Whatever the reason, if the customer is paying for a Verizon landline and Verizon retains carrier of last resort obligations in their service area, Verizon should not be permitted to offer an inferior service (i.e., one that is

unreliable due to a prolonged repair interval) just because the customer might have access to an alternative service that they could use to “make do” in an emergency.

V. REMEDIES

Q: Do you have any suggestions for the Commission for remedies to address the problems that you have described and to improve the adequacy and safety of the public network?

A: Yes. In some past proceedings, I have recommended that ILECs give customers credits when they fail to meet specific service quality metrics. One rationale for customer credits is that they provide some direct compensation to consumers whose service is impaired by non-functioning or poorly functioning dial tone lines. However, I have come to doubt that having to make such payments does much to change the provider's behavior, when it has a far larger economic incentive to cut back on repair and maintenance expenses for its copper network. For this reason, the PUC should consider other measures to address the apparent failure by Verizon to invest adequately in maintaining its copper network.

Service quality reporting: Verizon should be accountable to the public and to regulators. Regulators should be able to make informed policy and be able to monitor the impact of Verizon's service quality on public safety and service adequacy. I recommend that Verizon submit a monthly service quality report to the Commission that is publicly available. The data should be disaggregated by central office and, within each central office, by residence, business, and total customers (as it is in the information provided in response to CWA 1-65 through CWA 1-67). The metrics should include trouble report rates and repeat trouble report rates; percentage of OOS troubles cleared within 24 hours;

mean time to repair OOS troubles; average installation period; and metrics regarding the speed of answer by the repair bureau. To be effective, this reporting needs to be coupled with specific financial consequences for Verizon for failure to meet specific standards with milestones set for 6 months, 12 months, 18 months and 24 months from the date of the PUC's Order.[56]

Direct Verizon to repair copper rather than steering customers to VoiceLink. I recommend that the Commission direct Verizon to discontinue its deployment of VoiceLink unless Verizon has obtained FCC and Commission authorization permitting discontinuance of the existing TDM-based wireline voice service in an affected area. In the absence of such explicit authorization, the existence of deteriorated copper should not be deemed to permit Verizon to effectively coerce a customer into accepting VoiceLink.

Defective Cable, Air Pressure, and Batteries: I recommend that the Commission direct Verizon to complete all 113 engineering recommendations within 12 months of any final order being issued by the Commission. Moreover, the Commission should direct Verizon to pre-emptively assess the condition of any cable of a vintage greater than twenty or thirty years. The Commission should direct Verizon to replace its out-of-service transducers and to take steps to reduce the alarm rate on its transducers from the present level of between 30 and 40% to less than 5%. Finally Verizon should be required to compile a complete list of the dates that batteries were most recently replaced in its

[56] I do not offer an opinion as to whether the Commission needs additional legislative authority in order to impose financial sanctions as a consequence for a utility's provision of inadequate service quality. If it does, the Commission should promptly seek to obtain such authority.

remote terminals, including the corresponding locations, and submit the list to the Commission.

Independent audit of outside plant: Verizon has provided some information about possible cable repair projects but its plans to undertake only a paltry number of them, coupled with the age of Verizon's aerial metallic cable (discussed above), underscore the need for a disinterested party to assess Verizon's network maintenance in its non-FiOS areas. The critical criterion is *not* whether particular projects are profitable for Verizon to pursue but rather whether particular projects are essential to provide safe and adequate service. Therefore, I recommend that there be a third-party evaluation of Verizon's copper network and that the Commission direct Verizon to establish an escrow fund so that the key recommendations of the audit can be implemented in a timely manner because Verizon's financial incentives do not mesh with larger public interest objectives. The audit could begin by concentrating on communities served by central offices with high trouble report rates, high repeat trouble report rates, VoiceLink deployment, suggested work orders for repairing defective cable, and old plant. The problems, however, appear to be ubiquitous in Verizon's non-FiOS network and the Commission should ensure that no Verizon customer will be abandoned. I also recommend that Verizon should be required to pay for the audit.[57]

Speed of answer for calls to repair bureau: The Commission should enforce the current standard for speed of answer for calls to the repair bureau (85% answered within

[57] Counsel advises that Verizon would be required to pay for the costs of an independent audit under Section 516 of the Public Utility Code, 66 Pa. C.S. § 516(c).

20 seconds, pursuant to § 63.59(b)(2)). As with other service quality metrics, there should be financial sanctions for failure to meet this standard.

Smooth and safe transition from copper to fiber: The Commission should direct Verizon to submit a detailed five-year plan setting forth the timing, location, scope (number of customers encompassed) for copper retirement.

Conclusion

Q: Does this conclude your testimony?

A: Yes.

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of Communications Workers of America for a Public, On-the-Record Commission Investigation of the Safety, Adequacy, and Reasonableness of Service Provided by Verizon Pennsylvania, LLC	:	Docket No. P-2015-2509336

VERIFICATION

I, Susan M Baldwin, hereby state that the facts above set forth in my Direct Testimony are true and correct and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

Susan M. Bald

Dated: 9/29/16