BEFORE THE
STATE CORPORATION COMMISSION
OF THE COMMONWEALTH OF VIRGINIA

ESTABLISHMENT OF A	**:**	
COLLABORATIVE COMMITTEE	**:**	**Case No. PUC000026**
TO INVESTIGATE MARKET	**:**	
OPENING MEASURES	**:**	

VERIZON VIRGINIA INC.
COMMENTS ON PERFORMANCE ASSURANCE PLANS

Verizon Virginia Inc. ("Verizon VA") submits the following comments with regard to the Performance Assurance Plans that have been proposed by Verizon VA and AT&T for Virginia.

A. The Commission Should Adopt the Performance Assurance Plan Proposed by Verizon VA.

Verizon VA has offered a self-executing financial incentive plan ("VA Plan") that will ensure that Verizon VA provides quality wholesale services to competitive local exchange carriers ("CLECs"). The Commission should adopt the VA Plan.[1]

The proposed VA Plan has numerous important features that warrant its adoption by the Commission. First, the VA Plan establishes financial incentives for 222 of the measures and standards set out in the proposed "Virginia Carrier-to-Carrier Guidelines Performance Standards and Reports" ("VA Guidelines"). These 222 measures and standards cover every significant aspect of the services provided by Verizon VA to CLECs, including Pre-Ordering, Ordering,

[1] Performance Assurance Plans have been submitted for both Verizon Virginia Inc. and Verizon South Inc. in a common document. However, it is Verizon's understanding that at this point in time the Collaborative Sub-Committee is reviewing only the Performance Assurance Plan for Verizon VA. Accordingly, the comments here are limited to the Performance Assurance Plan for Verizon VA. (The comments here in support of the Verizon VA Performance Assurance, though, are for the most part also applicable to the Performance Assurance Plan for Verizon South. For the reasons advanced here, the Commission should also adopt the Performance Assurance Plan proposed by Verizon South.)

Provisioning, Maintenance and Repair, Network Performance, Collocation and Billing. By providing financial incentives for this broad range of measurements and standards, each CLEC, regardless of the nature of its business, can have the confidence that Verizon VA will have strong reasons to provide that CLEC with a quality of service that will allow the CLEC to pursue its business plan.

Second, the VA Plan places at risk amounts that will provide Verizon VA with a strong incentive to meet the VA Guidelines standards. The VA Plan places at risk a total of $31,100,000 per year. This amount is of a sufficient size that it will compel Verizon VA to meet the VA Guidelines standards.

Moreover, the individual "per measure" and "per unit" incentive amounts are sufficient to ensure that Verizon VA will meet the VA Guidelines standards. The amounts of the "per unit" incentives (which apply to most measures) were set at a level that will deprive Verizon VA of the net revenue that it would obtain by retaining a retail customer as a result of providing a CLEC with sub-standard service. Because of this, it will be in Verizon VA's best financial interest to provide a CLEC with service that meets applicable standards.

Third, the VA Plan provides for financial incentives that are measure specific and in most instances CLEC specific. Each performance measure that is subject to the VA Plan has a separately assessed financial incentive. Financial incentives are not computed by aggregating and averaging the results of multiple measures. As a result, a substandard performance on one measure is not masked by an above standard performance on other measures.

Similarly, except for the few metrics that are measured on only a CLEC aggregate basis (such as some of the Pre-Ordering metrics), financial incentives are computed separately for each individual CLEC, not for CLECs in the aggregate. As a result, substandard performance for one

CLEC will not be masked by above standard performance for other CLECs. Therefore, Verizon VA will have a strong incentive to provide performance that meets applicable standards for each individual CLEC, not just for CLECs as whole.

Fourth, under the VA Plan, the financial incentives increase as Verizon VA's performance declines. Failures to meet performance standards are graded as "Minor," "Moderate" or "Major," and the amount of the financial incentive increases as the degree by which a performance standard is missed increases. In addition, if a standard is missed for two or more consecutive months, the amount of penalty is multiplied, by 1.5 times for a miss for two consecutive month and by 2 times for a miss for three or more consecutive months. As a consequence, there is an increasing cost to Verizon VA as the quality of service declines and a corollary increasing incentive to Verizon VA to improve its performance.

Fifth, the amount of the incentives provided under the VA Plan is proportionate to the volume of service that a CLEC receives from Verizon VA. For "per unit" metrics, the amount of the incentive is based on the number of units of service for which Verizon VA's performance fell below the required standard. For "per measure" metrics, the amount of the incentive is divided among the affected CLECs based on the relative volume of service that they take from Verizon VA. Unlike performance plans suggested in some jurisdictions that have flat incentive amounts per measure without regard to the volume of service the CLEC receives, the VA Plan helps assure that CLECs with large volumes of transactions do not receive too little, and that CLECs with small volumes of transactions do not receive too much.

Finally, the VA Plan uses statistically valid methods for determining incentive amounts. In particular, the VA Plan uses the appropriate statistical methodology for determining whether a

"Parity" standard has not been met and, if the "Parity" standard has been missed, for computing the degree by which the standard has been missed.

Consistent with the VA Guidelines, the VA Plan uses the modified Z or t statistic to determine whether a "Parity" standard has been met. This methodology provides a 95% level of confidence that a "Parity" standard has not been met.

If a "Parity" standard has not been met, Verizon VA then uses the actual difference between Verizon VA's performance for Verizon retail customers and Verizon VA's performance for the CLEC to determine the degree by which the performance standard has been missed. Verizon does not use the size of the Z or t-score as a measure of the degree of difference in performance between the performance for Verizon VA retail customers and the performance for the CLEC.

In both this proceeding and in other jurisdictions, AT&T has proposed using the size of the Z or t-score as a measure of the difference in performance between the performance for Verizon retail customers and the performance for the CLEC. However, such a use of the Z or t-score is statistically invalid and was expressly rejected in proceedings before the Pennsylvania Public Utility Commission because the size of the Z or t-score can be directly affected by factors other than a difference in performance.[2] In particular, the size of the Z or t-score will vary depending on the size of the measured number of instances of performance. The actual difference in performance may remain the same, but the Z or t-score will increase as the measured number of instances of performance increases.

The VA Plan also deals appropriately with the statistical problem of "Type I Error." Because the modified Z or t-statistic used in the VA Guidelines for determining whether Verizon VA has failed to meet a "Parity" standard provides only a 95% confidence level, there is a 5%

potential that Verizon VA will be found to have failed to meet a "Parity" standard, when Verizon VA in fact actually met the standard. The VA Plan therefore includes a methodology, referred to as the "K Factor," to offset the risk that Verizon VA will be found to have failed to meet a "Parity" standard when in fact it did meet the standard.

Because of all of these strengths of the Verizon VA Plan, the Commission should adopt the VA Plan.

B. The Commission Should Reject the Performance Assurance Plan Proposed by AT&T.

The Commission should reject the AT&T plan. The AT&T plan would impose penalties that have no economically rational basis and that are far in excess of the amount needed to provide Verizon VA with the necessary incentive to provide service to CLECs that meets applicable performance standards. Moreover, the AT&T plan is based on statistically invalid methodologies that result in the operation of the plan being fundamentally flawed.

1. The Penalty Amounts Proposed by AT&T are Grossly Excessive and Have No Rational Basis.

AT&T's penalty proposal is basically unsound. It imposes penalty amounts that are punitively excessive and have no rational economic basis. AT&T's plan will undermine the public interest without significantly advancing the legitimate goals of an incentive plan.

In establishing any incentive plan, it is critical to set the amount of dollars at risk at an appropriate level. Setting the level of incentive payment too high will result in "over-deterrence." That is, a level set too high will force Verizon VA to make huge investments in wholesale systems and personnel in an effort to avoid incentive payments, without

[2] *Joint Petition of Nextlink Pennsylvania, Inc., et al*., Pa. P.U.C., P-00991643, pp. 140-141 (12/31/99).

commensurate benefit to CLECs, the public, or competition. If Verizon is required to pay more than the amount reasonably necessary to induce it to provide the CLECs with the appropriate level of service quality, Verizon will be compelled to provide wholesale service that is better than its retail service in order to avoid those payments. Verizon will be forced to under-invest in retail service and over-invest in wholesale service, shift its personnel away from efforts to serve retail customers, and delay the introduction of new technologies or systems for both retail and wholesale service.

These anti-consumer effects will be exacerbated if CLECs are permitted to receive large payments for performance standard "misses" that are of small magnitude and minor competitive impact. In such circumstances, the CLECs will have no incentive to work with Verizon to prevent operational problems or to report problems quickly. CLECs also will be discouraged from investing in their own systems and facilities. Instead of facilitating competition, excessively large incentive amounts will create inducements for companies to go into business simply to receive payments or to engage in conduct designed to cause Verizon to fail to meet performance standards, rather than to provide end users with a competitive alternative for local service. This result would directly undermine this Commission's objective of encouraging local competition.

The penalty amounts proposed by AT&T on their face are grossly excessive. Under Tier I of AT&T's two-tier remedy plan, the penalties can range up to $25,000 per measure per month for each CLEC.

If Verizon VA missed just ten of the hundreds of measures included in the VA Guidelines in a month (an amount less than five percent of the measures) by a moderate amount, so that a penalty of "only" $12,500 per measure applied (one-half of AT&T's proposed

maximum penalty), Verizon VA would owe $125,000 per CLEC. If just ten CLECs were doing business in Virginia, this would be $1.25 million dollars per month.[3] Over the course of a year, this would $15 million. If thirty CLECs were doing business in Virginia, the penalties would total $45 million per year. If fifty CLECs were doing business in Virginia, the penalties would total $75 million per year. These huge amounts would apply if even just a very small percentage of the total number of metrics were missed for each CLEC.[4]

Moreover, AT&T proposes not just one, but two tiers of penalties. Under its plan, it would provide incentive payments not only for failures in the performance for each CLEC individually, but also for failures in performance for CLECs in the aggregate. Clearly, such double-dipping is unnecessary and simply punitive. If the financial incentives paid to each CLEC individually are set at the correct level, as they are in the Verizon VA Plan, Verizon VA will already have a proper level of incentive to meet applicable standards for each CLEC. If a proper incentive exists to meet standards for each CLEC individually, then a proper incentive will exist to meet standards for all CLECs and additional CLEC aggregate based penalties will be wholly unnecessary.

AT&T's plan is also without any sound economic underpinnings. AT&T provides no explanation of how it arrived at its penalty amounts. It provides no support for why its proposal is economically rational, that is, why it meets the objective of providing Verizon VA with an adequate incentive to meet performance standards, but at the same time does not impose penalties that simply confiscate Verizon VA's financial resources for minor failures to meet standards, with the attendant anti-consumer consequences of over-deterrence discussed above.

[3] The Commission's web site indicates that over 200 applications have been submitted by persons seeking CLEC status in Virginia (although some of these applications have been withdrawn or cancelled).

2. AT&T's Plan Relies on Invalid Statistical Methodologies.

AT&T's plan should also be rejected because it is built on a foundation of invalid statistical methodologies.[5] First, for "Parity" metrics, AT&T incorrectly states that incentives should be increased "as the confidence in a "Non-Parity" conclusion increases,"[6] that is, that the incentives should increase as the size of the Z or t-statistic increases. This approach is both bad public policy and bad statistics.

AT&T's proposal is similar to a motor vehicle law that states that if a police officer's vehicle speed radar device is 80% accurate, the fine for speeding will be $100, but if the device is 95% accurate, the fine will be $1000. Such an approach clearly would not be an acceptable public policy. Penalties should not be assessed at all unless there is an adequate basis for concluding that the applicable standard has been violated. If the standard has been violated, the amount of the penalty should depend on the gravity of the misconduct (the number of miles per hour that the motorist was over the speed limit), not the degree of certainty that the standard was violated.

AT&T's approach is also statistically invalid. The Z or t-score is an inappropriate measure of the severity of the performance standard miss because an increase in the size of the score can be the result simply of an increase in the number of instances of measured performance. The Z or t-score, for a given difference in means, will increase over time if the number of orders (sample size) increases – not simply because the miss is becoming more

---

[4] AT&T's proposed penalty amounts are particularly egregious when it is considered that for measures with "Parity" standards, statistical randomness alone, unless properly compensated for (which AT&T's plan does not do), will result in five percent of the measures being missed.

[5] A summary of the "Statistical Myths" that underlie AT&T's plan is attached.

[6] AT&T Plan, at 10.

severe. Thus, a large Z or t-score may not reflect a large difference between performance for Verizon VA retail customers and performance for a CLEC, but simply a large number of measured instances of service being provided.

The following table shows why the Z or t-statistic cannot be used to quantify differences in performance. The actual performance by Verizon for its retail customers and for CLECs remains constant, with the difference in performance being 5%. However, as the measured volume of CLEC transactions increases from 50 to 1000, the Z-statistic increases from –1.62 to –7.22.

Performance			Volume		Z-Statistic
VZ Retail	CLEC	Difference	VZ Retail	CLEC	
95%	90%	5%	100,000	50	-1.62
95%	90%	5%	100,000	100	-2.29
95%	90%	5%	100,000	500	-5.12
95%	90%	5%	100,000	1,000	-7.22

A proposal by AT&T to use the size of the Z or t-statistic as a measure of severity of the miss of a performance standard was rejected by the Pennsylvania Public Utility Commission as a statistically invalid approach.[7] It should also be rejected by this Commission.

In addition to proposing an indirect and convoluted method for computing severity, AT&T has also introduced a complex formula for computing the actual dollar amount for Tier I payments.[8] Incentive systems, though, function better when the incented party is able to predict the consequences of its behavior. The complexity of the AT&T approach does not adhere to this precept.

The AT&T Plan also incorrectly tries to balance Type I and Type II statistical error. As noted above, Type I error is the error of finding that Verizon VA has failed to meet a standard,

5 *Joint Petition of Nextlink Pennsylvania,Inc., et al.*, Pa. P.U.C., P-00991643, pp. 140-141 (12/31/99).
8 See AT&T Plan, at 11, Table 1.

when it actually has met the standard. Type II error is the error of finding that Verizon VA has met a standard, when it actually has not met the standard.

AT&T's own expert statistician, Dr. Colin Mallows, has said that a 95% confidence level (a 5% alpha value), correctly accounts for Type I and Type II error. In 1998, in an affidavit filed in a proceeding before the FCC, Dr. Mallows stated:

> "If we apply a large number, several hundred, perhaps, of tests of individual performance measurement comparison, each test having a Type I error rate of 5%, then we would expect, on average, about 5% of these tests to indicate non-compliance even when the ILEC is actually fully in compliance. Thus the fact that this many tests indicate non-compliance does not give conclusive evidence that the ILEC is not in compliance with its Section 251 nondiscrimination obligations. The number of tests that erroneously indicate non-parity will vary randomly about this average number. We need to derive some threshold number of failed parity tests such that if more than this number are observed to fail, then non-compliance can be deduced. This threshold number of tests must be determined in such a way as to control the probability of an overall, or aggregate, Type I error."[9]

> "If we choose to make the Type I error small, then the Type II error will be large; and conversely. AT&T proposes to set the Type I error at no more than the conventional level of 5%. This controls the frequency of false alarms to be at most 5% *while making the probability of Type II errors small for violations that are of substantial size*. *Using a one-tailed test for Type I error at about the 5% level thus strikes a reasonable balance* (emphasis added)."[10]

Verizon VA has proposed using the standard accepted 95% confidence level (5% significance level) that is commonly found in statistical texts and that was accepted by Dr. Mallows.[11] Accordingly, under the Verizon VA Plan there is no need to engage in Type I/Type II error balancing.

---

[9] "Affidavit of Dr. Colin Mallows" before the Federal Communications Commission in CC Docket No. 98-56, RM 9101.

[10] "Affidavit of Dr. Colin Mallows" before the Federal Communications Commission in CC Docket No. 98-56, RM 9101.

[11] See, for example, Bradley Efron and Robert J. Tibshirani, *An Introduction to the Bootstrap*, Chapman & Hall, International Thomson Publishing, p.204 (1993).

In contrast, AT&T unnecessarily attempts to balance Type I and Type II error by selecting the significance level of the test (of parity), an approach that its own expert did not see as necessary. The asserted rationale for this approach is that the probability of making a false detection of "out-of-parity" (Type I error) against the probability of making a false detection of "in parity" (Type II error) balances the risk faced by Verizon VA and CLEC. However, AT&T has not demonstrated that such error balancing is a statistically valid approach. The Commission should not abandon a well-tested, consistent and commonly applied statistical methodology in favor of an untested error balancing methodology. Error balancing has not undergone peer review and should be viewed with considerable skepticism until it has successfully undergone rigorous academic critique.

3. AT&T's Plan Includes Other Inappropriate Provisions.

Rather than attempting at this juncture to discuss all of the other deficiencies in the AT&T plan, Verizon VA will simply note only four more of its larger problems.

First, the AT&T plan fails to identify the measures and standards from the VA Guidelines to which the AT&T plan would apply. To the extent that AT&T proposes to apply its plan to every measure with a standard, this would be inappropriate because many of the measures are overlapping and duplicative, measuring the same conduct in different ways or from different perspectives. Verizon VA should not be subject to duplicative penalties for the same conduct.

Second, in addition to Tier I and Tier II payments, AT&T proposes yet more layers of incentives, purportedly to enforce the operation of the plan.[12] For instance, AT&T recommends that substantial financial penalties be imposed on Verizon for late, incomplete, or revised performance reports. These kinds of penalties are unnecessary and counterproductive. There is

[12] AT&T Plan, at 27.

no basis for an assumption that Verizon will hide bad reports. Moreover, while Verizon VA will strive to reduce technical problems in generating reports, Verizon VA should not be subject to penalties if it occasionally experiences such problems. Finally, it would create perverse incentives to impose penalties on Verizon VA for correcting performance reports to ensure their accuracy. This Commission should reject such counterproductive and unnecessary penalties.

Third, AT&T fails to recognize the necessity for a pre-set overall cap on Verizon VA's liability and instead proposes only a "procedural cap." Verizon VA has proposed high caps that will allow substantial incentives to be paid to CLECs, but at the same time will protect Verizon VA's retail customers from the service disruptions that could result if unlimited amounts of penalties could be assessed. Penalty caps are a common feature of incentive plans. They should be set in advance so that Verizon VA does not have to rely on subsequent proceedings to assess whether it may be subject to penalties that could deprive it of the resources that it needs to serve its customers.

Finally, the AT&T plan sets out a very elaborate process for Verizon VA to claim relief from the effects of a Force Majeure event. While Verizon VA agrees that there is a need for a process for Verizon VA to claim relief from the effects of a Force Majeure event or similar problem, the process laid out in Exhibit 1 of Verizon VA's proposed VA Guidelines is simpler and more likely to result in an expeditious resolution of Force Majeure and similar issues.

Conclusion

The Commission should adopt the Performance Assurance Plan proposed by Verizon VA.

Statistical Myths

- Z Scores
- Error Balancing

Z-Statistic

Myth:

The Z-statistic indicates the severity by which the level of service provided has missed its standard.

Truth:

The Z-statistic indicates the level of confidence that the the difference in results between two samples are due to different levels of service provided and not random variation.

Z-Statistic

The table below demonstrates how the Z-statistic can vary significantly from -1.62 to -7.22 for the same performance difference of 5%. The Z-statistic increases due to its dependence on growing CLEC volume.

Performance			Volume		
VZ	CLEC	Difference	VZ	CLEC	Z-Statistic
95.00%	90.00%	5.00%	100,000	50	-1.62
95.00%	90.00%	5.00%	100,000	100	-2.29
95.00%	90.00%	5.00%	100,000	500	-5.12
95.00%	90.00%	5.00%	100,000	1,000	-7.22

Z-Statistic

The table below demonstrates how the Z-statistic remains the same despite the significant improvement in the level of service provided from a 5.09% difference to a 0.37% difference. The Z-statistic does not decrease due to its dependence on growing CLEC volume.

Performance			Volume		
VZ	CLEC	Difference	VZ	CLEC	Z-Statistic
95.00%	89.91%	-5.09%	200,000	50	-1.65
95.00%	93.86%	-1.14%	200,000	1,000	-1.65
95.00%	94.49%	-0.51%	200,000	5,000	-1.65
95.00%	94.63%	-0.37%	200,000	10,000	-1.65

Z-Statistic

- We use the Z-statistic to “test” if the numbers are really different.
- To see how much they are different we do not need to “test” - we can look at the actual data.

Key Problems with Error Balancing Theories

- Statistical
  - General
  - Technical
- Economic

Statistical Problems: General

- Error balancing is not found in the statistical literature, and thus, has not undergone academic scrutiny in the same manner as the scientific ‘fixed alpha’ approach.
- If two CLECs receive the same mean performance from the ILEC, one could fail a test when the other could pass… *Solely due to differences in sample size!*

Statistical Problems: Technical

- Error balancing is heavily dependent upon an unstable parameter, delta, which in turn, is dependent on sample size
- Type II error is given unnecessary attention. As Type II error increases, performance can actually improve!
- The balancing critical value formula yields extremely small values such that a test is effectively a *stare-and-compare* process. Consequently, it is extremely difficult to pass any test even if alpha is large and performance is good!

Economic Problems

- The economic harm caused by the presence of Type II error is non-quantifiable. As such, fines for Type II error are inappropriate.
- Balancing errors does not imply that financial risks are balanced. Alpha and Beta are artifacts of a statistical test, NOT of the marketplace.
- Error balancing does not provide a stable performance target for the ILEC operations from month to month due to changes in sample size.