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SUITE 500
WASHINGTON, D.C. 20036

(202) 955-9600

FACSIMILE
(202) 955-9792
www.kelleydrye.com

DIRECT LINE (202) 887-1209
E-MAIL: mhazzard@kelleydrye.com

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Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Re: Docket No. T-00000A-97-0238

To the Commission:

Enclosed for filing with the Arizona Corporation Commission, please find an original and fifteen (15) copies of Z-Tel Communications, Inc.'s Second Supplemental Filing on the Zone Parity Plan in the above-referenced proceeding. Please date-stamp the additional copy, and return it to me in the enclosed self-addressed, stamped envelope.

Respectfully submitted,

Michael B. Hazzard
Counsel to Z-Tel Telecommunications, Inc.

cc: Service List

DC01/HAZZM/126897.1

BEFORE THE
ARIZONA CORPORATION COMMISSION

CARL J. KUNASEK
Chairman
JAMES M. IRVIN
Commissioner
WILLIAM A. MUNDELL
Commissioner

IN THE MATTER OF US WEST COMMUNICATIONS, INC.'S COMPLIANCE WITH SECTION 271 OF THE TELECOMMUNICATIONS ACT OF 1996	DOCKET No. T-00000A-97-0238 **US WEST'S PROPOSAL FOR ASSURANCE PLAN**

Z-TEL COMMUNICATIONS'S INC.'S SECOND SUPPLEMENTAL FILING ON THE ZONE PARITY PLAN

Z-Tel Communications, Inc. ("Z-Tel"), by its attorneys, hereby submits this Second Supplemental Filing, attached hereto as Attachment I, in response to the Commission's request in the above-captioned proceeding at its Third Workshop, on August 22 and 23, 2000. This filing updates Z-Tel's previously submitted Supplemental Filing On The Zone Parity Plan of August 9, 2000.

GENERAL COMMENTS

Z-Tel respectfully requests that the Arizona Corporation Commission ("Commission") consider that the Zone Parity approach to performance measurement surpasses the objectives set forth by this Commission and the participants in this proceeding for a successful Arizona performance incentive plan. This non-statistical plan is easy to understand, to implement and its results are easy to interpret; it provides a useful indicator of disparity that can be used to set penalties and does not fail to detect absolute reductions in quality. It not only provides a set of penalties which effectively discourages discriminatory performance, but Zone Parity also offers a deterrent to repeated performance misses and misses of increased duration by raising the severity of applicable penalties.

Further, Z-Tel concurs with the list of performance measurements which have been submitted as part of The Joint CLEC Proposal for a Performance Incentive Plan. Z-Tel submits, therefore, that this Commission should adopt the Zone Parity Plan structure and the performance measurements that have been submitted as part of The Joint CLEC Proposal for a Performance Incentive Plan as the appropriate Performance Assurance Plan for Arizona.

Respectfully submitted,

Jonathan E. Canis
Michael B. Hazzard.
Kelley Drye & Warren, LLP
1200 19th Street, NW, Fifth Floor
Washington, DC 20036
(202) 955-9600

Counsel To Z-Tel Communications, Inc.

Donald C. Davis
Janet S. Livengood
Z-Tel Communications, Inc.
601 South Harbour Island Blvd.
Tampa, Florida 33602
(813) 273-6261

Dated: September 22, 2000

BEFORE THE
ARIZONA CORPORATION COMMISSION

IN THE MATTER OF US WEST COMMUNICATIONS, INC.'S COMPLIANCE WITH SECTION 271 OF THE TELECOMMUNICATIONS ACT OF 1996	))))	Docket No. T-00000A-97-0238

ORIGINAL

ATTACHMENT 1

ZONE PARITY PLAN
SUBMITTED ON BEHALF OF
Z-TEL COMMUNICATIONS, INC.

Zone Parity: A Non-Statistical Approach to Performance Measurement

George S. Ford, Ph.D., Chief Economist, Z-Tel Communications, 601 S. Harbour Island Blvd, Suite 220, Tampa, FL, 33635, gford@z-tel.com.

I. Introduction

The goal of an enforcement program is to ensure compliance with particular rules that are, absent the program, contradictory to the self-interest of the regulated entity. Establishing a set of rules, however, is only the first step in effective enforcement. After the rules are established, the regulated entity will choose whether or not to comply with those rules. Once the regulated firm makes this decision and acts, the enforcement agency must be able to accurately assess whether or not compliance has occurred. Finally, if a determination of non-compliance is reached, a fine or remedy that extracts the entire reward from non-compliance must be assessed. Through an effective enforcement program, the steps of which were just described, the incentives of the regulated entity are altered by making the expected value of non-compliance zero (or negative). With nothing to gain from breaking the rules, compliance is encouraged.

Successful implementation of the pro-competitive elements of the Telecommunications Act of 1996 necessitates the development and implementation of an effective enforcement program. The 1996 Act requires Incumbent Local Exchange Carriers (ILECs) to provide interconnection and unbundled elements to Competitive Local Exchange Carriers (CLECs) in a manner that is "just, reasonable, and nondiscriminatory (§251(c)(3))." Because interconnection and unbundling are extremely important to the development of competition in local exchange telecommunications markets, and because the ILECs have no incentive to promote competition in their presently monopolized local markets, it is imperative that a methodology be established to evaluate whether the ILEC's provision of interconnection and unbundled elements to the CLECs is of sufficient quality to satisfy the "just, reasonable, and nondiscriminatory" standard of the Act and insure the evolution of competition is unimpeded. If the ILEC's service fails to meet this standard (or standards), then penalties should be levied to counterbalance the ILECs' incentive to deter competition through discriminatory service provision.

This document outlines a performance plan that will promote the "just, reasonable, and nondiscriminatory" provision of interconnection and unbundled elements by the ILEC to the CLECs. This methodology is called *Zone Parity* and is based on the *Zone Parity Benchmark*. These benchmarks encourage the ILECs to provide service that is "just, reasonable, and nondiscriminatory" and does so through the use of quality of service standards that are both within the capabilities of the ILEC and of sufficient quality to facilitate the evolution of competition in local exchange telecommunications markets.[1] These service standards, based in many cases on observed ILEC performance, provide CLECs with fixed expectations as to what level of service they should receive from the ILEC and provides the ILEC with certainty as to the level of service required to avoid penalties. Virtually every transaction between a buyer and seller places some bounds on the timing of the transaction, particularly when timing is as an important element of the transaction as in the provision of telecommunications service. If CLECs cannot inform potential customers of expected service provisioning or repair intervals, competition in local exchange markets will be substantially impeded.

The purpose of this document is to outline the fundamental features of Zone Parity and illustrate how the approach readily lends itself to a sensible and effective penalty structure. The document is outlined as follows. First, a description of Zone Parity and the Zone Parity Benchmark are provided in Section II. The Zone Parity Benchmark is a quality of service standard that is the core measurement tool of the performance plan.[2] This discussion includes an application with real world performance data and a comparison between Zone Parity and the LCUG Z-Test. Second, in Section III, a general discussion of how the "output" of the Zone Parity test can be used to establish the level and structure of penalty payments. With Zone Parity it is easy to incorporate per-occurrence and per-measure penalties as well as account for the severity and duration of discrimination in the penalty structure. Conclusions are provided in the final section.

II. Zone Parity

Zone Parity is based on a few guiding principles. First, the performance plan should ensure that the quality of service provided to the CLECs by the ILEC is "just, reasonable, and nondiscriminatory" and "... at least equal in quality to that

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[1] Zone Parity satisfies the "nondiscriminatory" (or parity) standard of the 1996 Act because it is based, when feasible, on observed ILEC performance. Zone Parity establishes a "parity" standard for performance.

[2] Unlike other proposals, the Zone Parity Benchmark can be applied uniformly to all performance measures.

provided by the local exchange carrier to itself or to any subsidiary, affiliate, or any other party to which the carrier provides interconnection (§251(c)(2)(C))" as required by the Telecommunications Act of 1996. Second, the measurement procedures of the performance plan should be easy to understand, calculate and interpret and should minimize administrative cost.[3] Third, the plan should be competition- or customer-focused. Reliability is a highly desirable characteristic of telecommunications services and consumers demand expedient repair and provisioning of service, often within specified time intervals. Thus, the formation of reasonable expectations about the quality of service the ILEC will provide CLECs is fundamental to the evolution of competition. Fourth, the measurement procedures should be credible, and based on accurate and reliable data. An ideal measurement procedure allows CLECs to compare (or audit) their own data with that provided by the ILEC.[4] Finally, to the extent possible, the plan should be broadly consistent with the plentitude of underlying principles offered by the various participants to the performance plan proceedings including the ILECs, CLECs, Public Service Commissions, and the Federal Communications Commission. For example, the plan should ensure that a) service that meets the parity standard is not penalized; b) remedies and penalties are based on the severity of discrimination; and c) remedies and penalties are large enough and structured properly to induce compliant behavior.

1. MEASURING ILEC PERFORMANCE

Imagine a situation where the ILEC provides a service to itself at a fixed interval. For example, assume that if dialtone is lost for a residential customer, that dialtone is repaired in exactly 24 hours, every single time it happens. In other words, the mean time to repair is 24 hours and the data has no variation. In this scenario, it is easy to define and measure discriminatory service. If the CLEC gets dialtone repair service that is longer than 24 hours, then the service is discriminatory.

What is actually observed is that repair intervals (or any other service) vary from event to event. The average repair interval may be 24 hours, but many

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[3] Transparency and simplicity are not excuses for a lack of robustness or accuracy in the measurement procedures. Elements of any plan that can be made less complex without a loss of accuracy, or without a substantial loss of accuracy (subject to a cost-benefit analysis), are preferred.

[4] The CLECs should be able to compare their own internal data on service provision intervals with the provided them by the ILEC. Today, some CLECs must trust the calculations of the ILEC because the existing performance plans are too complex to accurately assess proper penalty payments.

customers will get repair in less than 24 hours and some in more than 24 hours. Consider the scenario where dialtone is restored for 70 percent the customers in less than 24 hours and 30 percent in more than 24 hours. If a CLEC's customers had repair intervals of the same distribution -- 70 percent less and 30 percent more than 24 hours -- then the conclusion would be that parity service has been provided. This simple example (loosely) illustrates the fundamental premise of Zone Parity.

Unlike other approaches to performance measurement, but like the vast majority of contractual arrangements between firms that relate to performance levels and remedies, Zone Parity does not rely on statistical tests to assess the relative quality of performance between the ILEC and the CLEC(s). This non-statistical approach greatly simplifies the interpretation of performance measurements and its use of a quality standard is consumer (and thus competition) friendly. While no statistical test is performed, Zone Parity does consider both the mean and distribution of the performance data. Abandoning the standard statistical approach to performance measurement makes Zone Parity an *outcome*-based approach to performance measurement. In other words, failure to meet the specified quality standard is interpreted as a failure. Statistical approaches, on the other hand, are process-based measurement schemes. It is possible for a statistical test to be incorrect, indicating discriminatory service where service is in-parity when CLEC and ILEC processes are indeed identical or nondiscriminatory service when discrimination is in fact present when the ILEC process provides performance superior to that of the CLEC process. These mistakes are described as Type I and Type II error and have been the source of substantial debate in performance proceedings. Zone Parity, because it is outcome-based, requires no adjustment for Type I or Type II error.

The simple structure and interpretation of Zone Parity is an important improvement over statistical approaches to performance measurement. Statistical procedures, while routine and comprehensible to statisticians, are inordinately complex for the statistical layperson. Seemingly trivial assumptions about the properties of a statistical test can have enormous consequences in the measurement of performance. The requirement that every participant in the performance proceedings, including the regulatory commissions, retain a skilled statistician to actively participate is unreasonable. Those CLECs that cannot employ a near full-time statistician, or panel of statisticians to cover concurrent proceedings across multiple states, must put their fate in the hands of their rivals or potential rivals that can maintain a staff of statisticians. This situation is neither "just" nor "reasonable." Smaller CLECs are not the only entrants that are resource constrained. In Arizona, AT&T chose not participate in the performance plan proceedings because of a lack of resources.[5]

Additionally, Zone Parity is not plagued by a potentially serious shortcoming of the statistical approach to performance measurement. A statistical approach to performance measurement assumes that "nondiscriminatory" service (i.e., statistically identical) is also "just" and "reasonable" service. Put another way, the statistical approach considers only relative performance and not absolute performance. As long as the ILEC is providing the same level of service quality to itself and the CLECs, performance is deemed adequate under the statistical approach. Clearly, statistically identical service may be neither "just" or "reasonable." If the ILEC's service quality is reduced the statistical approach will not detect it as long as everyone receive the same poor service. Zone Parity, alternatively, can detect absolute quality reductions and (as a consequence) allows regulators to balance the elements of the multidimensional standard of the Act.

The inability of the statistical approach to capture absolute performance is a serious shortcoming because CLECs are harmed relatively more than ILECs for a given "parity" reduction in the quality of service. The CLEC business plan relies on convincing customers to switch from the services of the ILEC to those of the CLEC. A customer chooses to patronize a CLEC based on the relative benefits of the CLEC and ILEC services and the cost of switching. Today, the ILEC provides service to virtually every customer, so the ILECs revenue source is not dependent on switching costs. Alternately, every customer of the CLEC must incur switching costs. Because disconnection and provisioning are fundamental elements of switching carriers, elements of the switching cost are affected by ILEC behavior. The lower the quality of disconnection and provisioning service, the greater the cost of switching. In turn, the greater the cost of switching, the less likely a consumer will choose to do so.[6] Because the cost of switching (or migration) is relevant only to the CLEC's ability to generate revenues, a statistical test approach to performance testing may conclude falsely that service is in parity when, in fact, it is discriminatory.

Benchmarks, including the Zone Parity Benchmarks, do not suffer from this flaw. By setting an absolute level of quality, the ILEC is unable to increase the

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[5] See letter from Richard S. Wolters, AT&T, to Maureen Scott dated July 27, 2000.

[6] Let the utility of ILEC's and the CLEC's service be U service U', respectively. The cost of switching is C. A customer switch will occur only if $(U' - U - C) > 0$. Clearly, increases in C reduce the likelihood this relationship will hold.

costs of switching with a "parity" reduction in quality. The Zone Parity Benchmarks, because they are based on actual performance data, consider both the relative and absolute quality dimensions of performance. Absolute levels of quality are not new to the performance measurement debate; the concept already exists in benchmarks that account for roughly half of all performance measures.

2. SETTING THE ZONE PARITY BENCHMARK

When an ILEC provides a service, whether to itself or to a CLEC, each observation of that service provision can be characterized according to a scale of quality. In this previous hypothetical example, the scale of quality is defined in terms of "time to repair" or "time to completion." For a given set of performance data the individual observations of the service provision can be grouped into categories along a quality scale. Within the context of Zone Parity, these groupings are called Zones and each Zone has a Zone Parity Benchmark that establishes the number or percentage of CLEC observations in each Zone that is consistent with "just, reasonable, and nondiscriminatory" service. The *Zone Parity Benchmark* consists of three categories of service provision: Zone 0, Zone 1, and Zone 2. These percentage benchmarks are *absolute* upper bounds; exceeding the benchmarks in Zone 1 or 2 by any amount is a failure to provide the established level of acceptable service quality.[7] In this sense, the Zone Parity Benchmark is much like the benchmark measure common to existing performance plans. Zone Parity is not a radically new concept.

It is perhaps easiest to describe the zone benchmark approach by looking at some *hypothetical* data. Because the Act requires that the ILEC provide the CLEC service that is "... at least equal in quality to that provided by the local exchange carrier to itself or to any subsidiary, affiliate, or any other party to which the carrier provides interconnection (§251(c)(2)(C))", the Zone Parity Benchmarks can be established using historical ILEC or CLEC performance data. Actual data is evaluated in the next section. In Figure 1, we illustrate graphically a hypothetical set of ILEC data from the provision of "dialtone repair" service to itself (consistent with the earlier example).[8] The (hypothetical) distribution is not symmetric (it is lognormal), with 70 percent of the observations being smaller

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[7] When these percentage benchmarks are multiplied by the number of CLEC observations, they become observation benchmarks.

[8] The distribution of observations illustrated in Figure 1 if purely hypothetical and for illustrative purposes only. When actually setting the Zone Parity Benchmarks, the values of the distribution - including $\bar{x}$, x^*, and the percent of observations in each Zone -- are derived from actual ILEC or CLEC data.

than the mean ($\bar{x}$), and 30 percent larger than the mean.[9] The data points lying above the mean can be split into two parts, the five percent of the largest observations (those above x^*) and the remaining observations lying between the mean and the five percent critical value (x^*).[10]

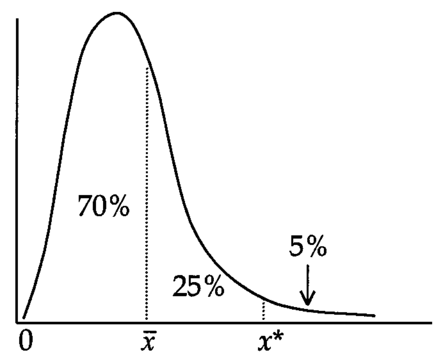

Figure 1.

This partitioning of the data produces three Zones. **Zone 0** includes all observations that are less than or equal to the mean of the actual data. **Zone 1** includes all observations that are above the mean but less than the critical value x^*. **Zone 2** includes the largest five percent of the observations and is bounded by x^* and $2x^*$.[11] Recall that the value x^* is set such that only five percent of the observations are allocated to Zone 2.

Once the Zones are established (or bounded by $\bar{x}$, x^*, and $2x^*$), benchmarks are set for Zone 1 and Zone 2 that define the acceptable level of ILEC performance. The benchmarks are defined in terms of the "percent of observations" allowable in each Zone. These percentages are then multiplied by

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[9] Lognormal distributions are probably the most common distributional form of the performance measure data.

[10] Other percent values could be used to specify the critical value.

[11] An analysis of the actual data may indicate the upper boundary of Zone 2 could be greater or less than $2x^*$. However, the maximum acceptable quality of service should not be set too high. Quality service to consumers should be a priority and long intervals unacceptable, particularly in the case of few CLEC orders. Unlike the Zone Parity Benchmark, statistical testing does not allow a Public Service Commission to establish limits on acceptable levels of service.

the total observations of a given CLEC resulting in an acceptable number of observations in each Zone.

For example, assume that the Zone Parity Benchmarks are set based on the hypothetical "time to repair" data previously discussed. As illustrated in Figure 2, for this hypothetical data the Zone 1 and Zone benchmarks are set at 25 percent and five percent, respectively.[12]

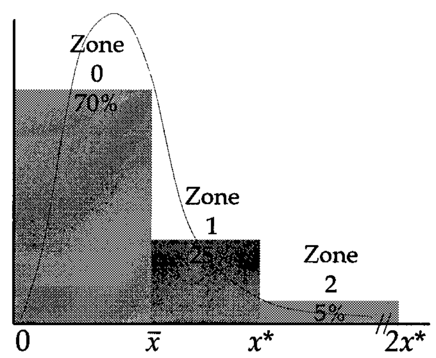

Figure 2.

The Zone Parity Benchmarks define the level of performance that meets the "just, reasonable, and nondiscriminatory" standard.[13] If the ILEC provides service within the bounds of the benchmarks, then no incentive payment is due. To reiterate the point made previously, Zone Parity is an output-based, rather than a process-based, performance measurement tool. If the ILEC provides worse than benchmark service to the ILEC during the specified measurement interval, the ILEC is "out of parity" and an incentive payment is prescribed. No consideration is given to the process from which the service provision data is generated because below benchmark service is harmful to the CLECs,

[12] Note in Figure 2 how the Zones mimic the actual distribution, albeit in a discrete fashion. Further, unlike the Z-test, the Parity Benchmarks consider properties of the distribution other than its mean and standard deviation such as skewness.

[13] Note the similarity between the current form of the benchmark and the Zone Parity Benchmark. In present day parlance, we would call the Zone Parity Benchmark a "stare-and-compare" benchmark approach (in this example) with 25 percent and 5 percent benchmarks.

consumers, and (consequently) the entire competitive process.[14] As such, worse than benchmark service, for whatever reason it occurs, is defined to be discriminatory and unreasonable.

Considering the outcome-based nature of Zone Parity, it is reasonable to allow for some "slack" in the benchmarks to account for small variations in service provision. Further, it may be necessary to adjust some of the benchmarks for seasonality. As discussed later, these adjustments can be easily accommodated with Zone Parity. It is important to keep in mind that "slack" relaxes the quality of service standard and that any reduction in service quality has the potential to harm consumers, CLECs, and impede the development of competition. A careful balancing of the "strictness" of the benchmark and its role of insuring quality service is required.

Again, note the similarities between the standard benchmark measure of other performance plans and Zone Parity. The benchmark measures in the other performance plans are typically "stare-and-compare" benchmarks just like the Zone Parity Benchmark. The basis for the stare-and-compare nature of benchmarks is that the benchmarks contain "fudge factors" or "slack," allowing for a modicum of variation in performance levels. This slack makes benchmarks limits, not targets. To perform statistical tests on established benchmarks, therefore, is double counting variation. Consistency with the earlier interpretations of benchmarks and the desire to avoid monthly statistical tests, therefore, requires that "slack" be added to the Zone Parity Benchmarks.

Adding Slack

The Zone Parity plan adds slack to the benchmarks in two ways. First, when the benchmarks are set from actual historical ILEC or CLEC data, a ten-percent slack factor is added to the observed percentages in each Zone. Under a ten-percent rule, the benchmarks for the above illustration would be 27.5 percent (25 + 2.5) for Zone 1 and 5.5 percent (5 + 0.5) for Zone 2. The "slacked" Zone Parity Benchmarks (ZPB) are illustrated in Figure 3.

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[14] This conclusion is implicit in the definition of the benchmark.

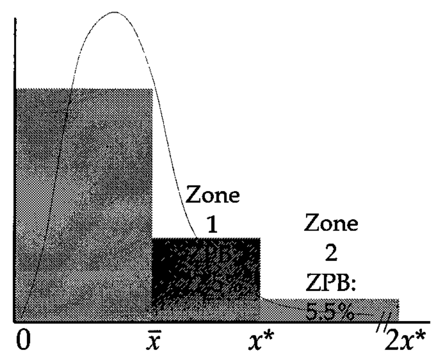

Figure 3.

Additional slack is incorporated into the Zone Parity Benchmark by adopting a "greatest integer" approach when calculating the number of benchmark observations. This greatest integer approach is particularly important for small order counts. For example, consider a CLEC with ten orders in a given month. Because the Zone 2 benchmark is 5.5 percent, then the acceptable number of CLEC observations in Zone 2 is 0.55 observations. Thus, if any of the CLEC orders are in Zone 2, a penalty is due. By adding slack through rounding, this one CLEC observation is within the bounds of benchmark (the next greatest integer of (0.05)(1+0.10) is 1). For this *small* sample, the ILEC is allowed two times (100%) the number of observations in Zone 2 than a "slackless" benchmark requires. Table 1 illustrates the magnitudes of slack for the five percent benchmark level across a range of sample sizes. Note that the addition of slack at a five percent benchmark level is very generous particularly for very small order counts. For order counts between five and one-hundred orders, the average percentage slack is 77 percent. Slack is never less than 10 percent of the benchmark.

Table 1.

CLEC Observations	*Observations at 5% Benchmark*	*Observations with Slack*	*Slack in 5% Benchmark*
5	0.25	1	300%
10	0.5	1	100%
20	1	2	100%
50	2.5	3	20%
100	5	6	20%
500	25	28	12%
1,000	50	55	10%
10,000	500	550	10%

Adjustments for Seasonality

For a few of the performance measures, the Zone Parity Benchmarks will need to be adjusted for seasonality or inclement weather.[15] The required adjustments for systematic changes in performance should be set *ex ante* using historical data. Whether the adjustments require shifting the distribution (i.e., the x's) or increasing slack should be determined by evaluating actual data. Seasonality adjustments should be made during the implementation (*ex ante*) phase and, as a consequence, will not complicate unnecessarily the monthly administration of the plan.

One possible method to adjust for seasonality is to shift the distribution by altering the x's by some pre-specified value. For example, in winter months, measurements capturing outside repair work may have the distribution shift by 10 percent so that the new Zone breakpoints are $1.1\bar{x}$ and $1.1x^*$. Alternately, the x's can remain the same, but slack can be increased. For example, an additional 10% slack can be added to the existing Zone Parity Benchmark. In either case, the adjustments for seasonality do not add much complexity to performance measurement. Generally, adjustments for seasonality should be restricted to "outside work" requiring manual intervention. Performance measures capturing electronic processes should not require seasonality adjustments.

Zone 2 Credits

In order to ensure that improvements in service are not penalized, any under-population of Zone 2 offsets over-population of Zone 1. For example,

[15] Which measures are subject to seasonal variation can be determined from an analysis of historical data.

assume the Zone Parity Benchmarks are 27.5 for Zone 1 and 5.5 for Zone 2. A review of a CLEC's 100 orders reveals that 30 orders are in Zone 1 whereas none of its observations are in Zone 2. While the ILEC over populated Zone 1 by two observations, it under populated Zone 2 by 6 observations. The ILEC has, in effect, provided better than benchmark service for these 6 orders; the 6 Zone 2 observations received Zone 1 level service. In this scenario, the under-population of Zone 2 offsets the over-population of Zone 1 so that the ILEC satisfies the benchmark for both Zone 1 and Zone 2.

Absence of Historical ILEC Data

For measures where historical data is not available, or if historical service provision is simply below what is deemed by the State Commissions as "reasonable" service, the zone benchmark values must be determined by means similar to the determination of present day benchmarks (e.g., negotiation). Or, historical provision of service to CLECs might be used to set the Parity Benchmarks if that service has been acceptable.[16] Using CLEC data to establish benchmark levels is not prohibited by the Act. Ideally, we could use the observed properties of actual distributions from similar processes or a portfolio of processes to allocate observations to each zone. Certainly, information gathered over time should be used to improve the specification of the Parity Benchmarks.

Updating with Regulatory Lag

The Zone Parity Benchmarks can be updated as frequently as desired to account for improvements in service provision over time. Only improvements in service should be automatically incorporated in the benchmarks. The advantages and disadvantages to more or less frequent updates should be considered when specifying the update intervals. An evaluation of historical data may provide some indication of appropriate update intervals. Monthly monitoring of ILEC service data going forward also may indicate the appropriate update intervals. Further, some measures may warrant more frequent updates while others may warrant less frequent updates.

Including some lag in the update process may be desirable. By allowing the ILEC short intervals of better-than-benchmark service to itself, the ILEC may be

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[16] For current benchmark measures, the cutoff between Zone 0 and Zone 1 must be determined as well as the benchmark percentage of observations in Zone 1. If too costly to redefine the benchmark measures, then the current levels could remain implying that only Zone 2 failures are relevant.

incented to improve its processes. These improvements then are passed on to the CLECs in the near future when the benchmarks are adjusted. This lag in updating the benchmarks provides incentives similar to those provided by price-caps, where short-term profits lead the regulated firm to increase productivity. The benefits of the productivity are passed on to consumers (at some later date) when the productivity factor is applied and rates are recalculated. In fact, regulatory Commissions may choose to employ productivity factors as a basic feature of the Zone Parity approach.

Price-Quality Tradeoffs

Under Zone Parity, it also is possible for an individual CLEC to contract (subject to regulatory approval) with the ILEC for lower quality service in return for a discount on service rates (e.g., interconnection, non-recurring charges). This feature of Zone Parity is important. Competitive markets typically offer consumers a range of price-quality combinations and strict "parity" service restricts such options. An example of such price-quality tradeoffs is similar to the ability to purchase interruptible power from an electric utility. When CLEC data is aggregated, those CLECs that have negotiated different performance levels can either be removed from the sample or their observations can be scaled for consistency with the standard benchmarks.

3. AN EXAMPLE OF THE ZONE PARITY BENCHMARK

To illustrate the interpretation of Zone Parity, assume that the CLEC has 100 orders of "repair service." The Zone Parity Benchmarks are 27.5 for Zone 1 and 5.5 for Zone 2 (28 orders in Zone 1 and 6 orders in Zone 2 are acceptable under the benchmarks). Assume the observed CLEC data indicates that 35 observations are in Zone 1 and 10 observations are in Zone 2. In this hypothetical scenario, we would conclude that there are 6 observations too many in Zone 1 and 3 observations too many in Zone 2. How penalties are assessed on the missed benchmarks is discussed in Section III.

A few illustrations of the interpretation of Zone Parity are provided in Table 2. Note that the CLEC may have this same data in its own systems, so Zone Parity allows for CLECs to audit ILEC data. For Measure 1, the Zone 1 benchmark for 100 observations is 28 observations and the Zone 2 benchmark is 6 observations. Actual performance is observed to be 32 observations in Zone 1 and 10 observations in Zone 2. Both Zones are overpopulated by four observations each. For Measure 4, the benchmarks are met exactly.

Table 2.

Measure	*CLEC Orders*	*Benchmark Zone 1 (27.5%)*	*Benchmark Zone 2 (5.5%)*	*Actual Zone 1*	*Zone 1 (+ , -)*	*Actual Zone 2*	*Zone 2 (+ , -)*
1	100	28 Obs.	6 Obs.	32 Obs.	+4	10 Obs.	+4
2	100	28 Obs.	6 Obs.	30 Obs.	+2	4 Obs.	-2
3	100	28 Obs.	6 Obs.	25 Obs.	-3	6 Obs.	0
4	100	28 Obs.	6 Obs.	28 Obs.	0	6 Obs.	0

Obs. = Observations

Measure 2 in Table 2 illustrates how the under-population of Zone 2 can credit the over-population of Zone 1. For Measure 2, Zone 1 performance is two observations above the benchmark, but the ILEC satisfies the benchmark because it is below the Zone 2 benchmark by two observations. Because the over-population of Zone 1 is the result of the under-population of Zone 2, credit is given to the ILEC. For those two observations absent from Zone 2, better service was given by the ILEC than required and, as a consequence, no penalty should apply to those observations.

Note that credits are across Zones only and are not transferable across months (or whatever period is used to measure performance) or CLECs. The service standards of the plan are for a specified time interval (typically one month) and if the ILEC fails to meet the standard in that time period, then the CLEC has received below benchmark service for that interval.

4. An Illustration with Real World Data

In this section, the implementation and interpretation of Zone Parity is illustrated using actual CLEC and ILEC data on "Order Completion Intervals." To establish the Zones, we need to know the mean of the ILEC data and the critical value that cuts-off 5 percent of the tail. From a sample of 167,533 ILEC observations, the average order completion interval was 1,692 minutes (28 hours or about one day).[17] The completion interval that cuts-off the largest 8,376 observations (five percent of the total) is about 5,808 minutes (x^*; 97 hours or 4 days). About 71 percent of the total observations are below the mean. The remaining 29 percent of observations are split between Zone 1 with 24 percent and Zone 2 with five percent (by definition). The upper bound on Zone 2 is 11,616 ($2x^*$).[18] The Zone 1 benchmark (after ten percent slack is added) is 26.4

[17] The standard deviation of the ILEC data is 3,237.

[18] Only five of 983 total CLEC observations exceeded this value. Not all CLECs included in the data are presented in Table 2.

percent and the Zone 2 benchmark is 5.5 percent. All the Zone Parity Benchmarks are established; all that remains is to compare the CLEC data to these benchmarks.

For reference, the Zone Parity Benchmarks for the 167,533 ILEC observations were calculated using SAS. The calculations required only 6.1 seconds to complete.[19] Difficult, time-consuming calculations are not characteristic of Zone Parity.

Table 3 illustrates the performance differences between the ILEC and a number of CLECs. As just described, the Zone Parity Benchmarks are 26.4 percent for Zone 1 and 5.5 percent for Zone 2. These Parity Benchmark percentages are multiplied by the CLEC order count then rounded up to produce the benchmark number of observations for each Zone.

Table 3.

CLEC	*CLEC Orders*		*Zone 1 (26.4%)*			*Zone 2 (5.5%)*	
		Parity	Act.	+ -	**Parity**	Act.	+ -
1	337	**89**	111	+22	**19**	17	-2
2	131	**35**	21	-14	**8**	1	-7
3	56	**15**	6	-9	**4**	1	-3
4	37	**10**	10	0	**3**	0	-3
5	24	**7**	4	-3	**2**	0	-2
6	5	**2**	2	0	**1**	0	-1

PB: Parity Observations; Act.: Actual Observations

The examples presented in Table 2 show that the ILEC provides discriminatory service to CLEC 1; the ILEC's service in Zone 1 was above benchmark by 22 observations (111 - 89). The ILEC does, however, receive two credits from Zone 2 for a total of 20 observations above the Zone 1 benchmark. Overall, the ILEC is a nontrivial 6 percentage points above benchmark for CLEC 1 in Zone 1 [(111 - 2)/37 - 0.264]. The ILEC is below benchmark for all the other CLECs in the table.

[19] The computer used was a 450Mhz Pentium III with 128MB Ram. Time is measured in SAS's "real time" not "cpu time." Improved programming may reduce the computation time.

Table 4.		
CLEC	CLEC Mean	LCUG Z
1	1,927	1.34
2	1,233	-1.62
3	938	-1.34
4	1,132	-1.05
5	1,305	-0.54
6	2,251	0.38

Z Critical Value = 1.28 at $\alpha(0.10)$.

For comparison, the LCUG Z for each of the six CLECs is supplied in Table 4.[20] Note that the LCUG-Z indicates discriminatory service (at an α level of 10 percent) only for CLEC 1 - the same overall conclusion regarding discrimination as Zone Parity.

III. The Structure and Level of Remedies and Penalties

Because Zone Parity provides "counts" of discriminatory occurrences, a variety of remedy and penalty schemes are possible under this approach. Measuring the extent of discrimination as the number of above-benchmark observations makes linking the incentive payments, whether per-occurrence or per-measure, to severity a straightforward process. In the following text, a general outline of the penalty structure is provided. Of course, other structures are possible.

1. A Proposal for Penalty Structure

The purpose of a penalty payment is to extract the financial gain to the ILEC from deterring competitive entry by providing discriminatory service. In this section, the structure and size of the penalties is discussed. It is important to keep in mind that no matter how good the discrimination detection procedure is, remedies and penalties that are set too low will not induce the ILEC to provide just, reasonable, and nondiscriminatory service. Generally, *the size of the remedies and penalties should be sufficiently large so that the ILEC prefers to provide at least the benchmark quality of service rather than frustrating the competitive process by providing poor quality or discriminatory service.*

[20] The LCUG Z values are from the simple LCUG Z formula, regardless of sample size, and are not based on permutation analysis.

It is also important for decision makers to recognize that the ILEC will prefer to be completely free of financial liability. For the same reasons an ILEC has no incentive to offer CLECs quality service in the provision of unbundled elements (which is why a performance plan is needed in the first place), the ILEC has no incentive to propose a performance plan that encourages it to offer CLECs quality service in the provision of unbundled elements. Thus, any proposal by the ILEC regarding the level of penalties, or any aspect of the performance plan for that matter, should be viewed with a healthy degree of skepticism.

2. ECONOMICS AND THE PENALTY LEVEL

In a standard cost-benefit framework, an enforcement program will alter the benefits of non-compliance by extracting any gain to the regulated firm from the offending action through a fine or remedy.[21] For example, if the expected value of breaking a rule is \$50, then a fine of \$50 or more would make non-compliance an unprofitable action. This \$50 fine would be an effective deterrent, however, only if the regulated firm knows that it will be detected and punished with 100% certainty. If there is only a 50% probability of being detected *and* punished, then the expected value of the fine is only \$25 [i.e., $0.5 \cdot \$50 + (1 - 0.5) \cdot \$0$], which is well below the \$50 benefit from non-compliance. Thus, in this scenario, compliance is not expected.

Within the standard economic framework of crime and punishment, the optimal remedy for noncompliance is

$$F^* = \frac{\text{Increased Profits}}{\text{Probability of Detection}} = \frac{\delta\pi}{\phi} \qquad (1)$$

where the optimal fine (F^*) is (at least) equal to the financial gain of non-compliance ($\delta\pi$) divided by the probability of being detected and punished for the particular violation (ϕ). If the firm expects to gain \$50 from non-compliance, and has a 50% chance of being detected and punished, then the optimal fine will be no less than \$100 (= \$50/0.50). For some fixed expected gain ($\delta\pi$), the optimal fine will be a declining function of the probability of detection (ϕ).

[21] For a detailed exposition on the economics of crime and punishment, see Gary S. Becker, "Crime and Punishment: An Economic Approach," *Journal of Political Economy*, Vol. 76 (1968).

~~A.~~A Simple Example

Parking a car in downtown Washington, D.C., provides a simple but effective example of the economics of crime and punishment. Assume that an individual plans to be in a shop for about an hour. The car can be parked in a parking deck for $5 an hour or free on the street. Street parking is forbidden, however, and a fine of $20 is levied for the offense. If there is only a 20% probability of being ticketed for illegal parking, then a rational individual will choose to park illegally since the expected "cost" of doing so is less than the $5 parking lot fee (0.20 · $20 = $4). If the parking authority could increase the fine to $30, however, illegal parking would be discouraged because the expected cost of doing so is $6. Alternatively, holding the fine at $20, the parking authority could hire more officers and increase the probability of detection. If the probability of detection and punishment can be increased to 50%, then the expected cost of illegal parking will be $10 and the offensive activity deterred.

This simple parking example illustrates the fact that in order to establish a remedy structure that encourages individuals or firms to comply with particular rules of conduct, we need to approximate $\delta\pi$ and ϕ. Generally, we expect $\delta\pi > 0$ and $0 \leq \phi < 1$. If there is nothing to gain from non-compliance (i.e., $\delta\pi = 0$), then compliance is expected and no enforcement program is required. For a number of reasons, including the cost of implementation and administration, a perfect record of detection and punishment ($\phi = 1$) is an unrealistic expectation.

Intertemporal Gains

In the parking example, the cost and benefits of the illegal activity are action specific. That is, there are few long-term consequences associated with the offending action. In the context of performance standards for the ILECs, the exact opposite is true. In general, the expected benefits of discriminatory treatment against CLECs are neither case nor time specific. Rather, this discrimination would likely constitute a systematic attempt by the ILEC to slow the growth of competition in local exchange markets and to expand its own market share in long distance by disadvantaging its rivals. As a consequence, constructing punishment schemes on an occurrence specific basis will most likely be ineffective at deterring the discriminatory conduct of the ILECs.

Discrimination against CLECs provides three potential sources of economic gain for the ILEC. First, the customer may view the CLEC (or the aggregation of CLECs) as offering sub-standard service and decide not to switch to the CLEC and to remain a customer of the ILEC. In this case, the ILEC will reap not only the benefit of keeping the customer for a few extra days or months, but potentially many years. For example, assume that non-compliance with a particular rule allows an incumbent firm to keep a single customer from defecting to an actual or potential rival. For simplicity, also assume that this customer generates $1 per month ($12 per year) in profits for the regulated firm. The size of $\delta\pi$ depends, of course, on how long the incumbent will be able to keep the customer and extract that $1 per month in profits. Assume that the non-compliant action ensures the incumbent will keep the customer for 5 more years. The discounted present value of the expected value of that customer over the next 5 years is $45.50.[22] Thus, with 100% probability of detection and punishment, F^* is $45.50 ($45.50/1). If the probability of detection and punishment falls to 75%, then the optimal fine is $61 ($45.50/0.75). If the customer remains with the incumbent for 10 years, then $F^* = \$98$ ($73.7/0.75).

The second potential source of economic gain for the ILEC is the systematic deterrence of competitive entry in the local exchange market. For example, assume that the non-compliant action of the incumbent diminished the good reputation of the actual or potential rival. As a consequence, this single act of non-compliance protects, say, ten customers from defecting to the rival. If each customer generates $1 per month in profit, and remains with the incumbent for five years, then the optimal fine is $455 if detection and punishment is certain. If the probability of detection is 0.75, the fine is $607. What is important here is that the fine, while levied against a single act of discrimination, is based on the more widespread effects of the discriminatory act. In this simple example, a single act of discrimination is more appropriately viewed as ten acts of discrimination.

A simple figure helps illustrate the point. In Figure 2, the increase in CLEC market share in the local exchange market is measured along the vertical axis and time (*t*) is measured on the horizontal axis. If the ILEC provided parity service to the CLECs, then the growth in CLEC market share is measured by the line **0X**. Alternatively, if the ILEC discriminates in the quality of service provided to CLECs, the market share of rivals follows path **0Z**.[23] The benefit to the ILEC from discriminating against the CLEC can be measured at some arbitrarily chosen time in the future (say *t**). At *t**, if parity service is provided, CLEC market share has risen by an amount **0a**. If the ILEC discriminates against the CLEC, then the market becomes less conducive to competition and the CLECs

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[22] Assumes an annuity of five-year length, a 10% discount rate compounded annually.

[23] With extremely poor performance, it is possible that CLECs will choose to exit the market so that CLEC market share actually declines over time rather than increasing at a slower rate than without discrimination.

gain only **0b** market share. In this case, the benefit to the ILEC of discrimination (at time t^*) against the CLEC is the financial value of the market share (**a** - **b**).

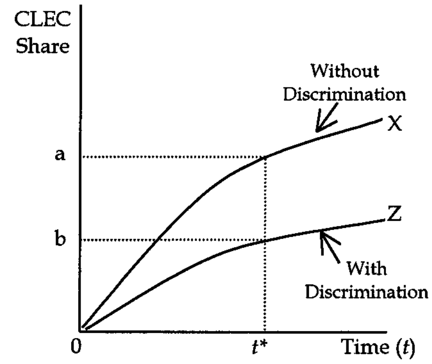

FIGURE 2.

Even if the discriminatory actions frustrate the competitive process only in the year in which the actions occur, the benefits are long lived. In Figure 3, the growth rate of CLEC market share with or without discrimination is assumed to be identical, but the growth in market share is postponed (or shifted) one year into the future. Again, the effects of a single year delay in competition are felt far into the future. At time t^*, for example, the ILEC receives the profits associated with (**a** - **c**) market share retained through discriminatory actions in Year 1.

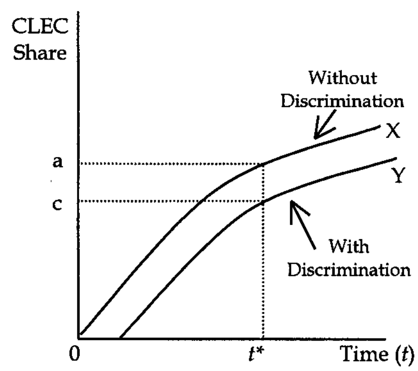

FIGURE 3.

As illustrated by the two figures above, providing poor service to CLECs in the earliest stages of competitive evolution, the ILEC may be able to extend the benefits of a few acts of discrimination to perhaps thousands of customers (or customer months). For example, assume a CLEC, attempting to assess the ability of the ILEC to provision customers, orders 100 loops in a single month. If the

ILEC successfully provisions the loops in a reasonable time frame, then the CLEC may increase its order next month to 1,000 loops. If the service remains acceptable, then 10,000 loops may be ordered the next month. Continued quality service from the ILEC may eventually allow the CLEC to mass market its competitive local exchange service using television, radio, and print ads. With mass marketing, the CLEC may be able to increase its customer base by 100,000 loops in a given month.

This chain of events is broken, however, if the ILEC provides poor service to the CLEC on the first order of 100 loops. The CLEC, concerned about its reputation, will be reluctant to increase its loop orders by large amounts for fear of continued service problems. What could be an order of 100,000 loops in a few months shrivels into a few hundred. In the end, the ILEC will have retained thousands of customers by discriminating against fewer than one hundred. Under a case-specific enforcement approach, the ILEC will pay fines only for the twenty or so customers that received poor service in the first month. Yet, the economic gain from that discriminatory act was the profits from hundreds of thousands of customers.

A third source of financial reward for the ILEC is increased market share in the long distance and xDSL business. If the ILEC has received long distance entry approval under Section 271, then by reducing the quality of its rivals' local exchange services it may be able to acquire the local and long distance business of its rivals' disgruntled customers. Frustrating xDSL entrants with poor service may allow the ILEC to acquire market share in the high margin xDSL market at the expense of its rivals. Thus, in addition to remedies based on protected market share in local exchange services, the established remedies must be high enough to extract the full financial reward to the ILECs of gains in the long distance and xDSL markets acquired through discrimination against the ILECs' extant and potential rivals.

The gains in long distance and xDSL markets are not trivial. The potential gains to USW in the market for new services, such as long distance and DSL are sizeable. If we assume, for example, that the profit margin on the average long distance bill of $25 is approximately 20%, then the ILEC could increase its annual profit by $6.75 per customer acquired or retained by discrimination. Assuming a 38.5% profit margin on DSL service and an average price of $40, USW could increase its annual profit by $15.40 per customer acquired or retained by discrimination.[24] Across millions of access lines, the gains from discrimination in these markets can be substantial.

3. STRUCTURE

If discrimination is severe, the negative effects of the discrimination will not be restricted to the customers receiving the poor performance. Alternately, small deviations from parity may have only customer specific effects. Thus, both per-occurrence and per-measure penalties are appropriate. For small deviations from parity, only a per-occurrence penalty – reflecting the financial gain from a single customer -- should be levied. For larger deviations, per-measure penalties are more appropriate in that the penalty level will more accurately measure the true impact of the discrimination. In addition, small samples will never produce much in the way of penalties although discrimination against small samples may be a potent impediment to competition.[25] A simple (and conceptually appropriate) solution to this problem is to incorporate a per-measure penalty into the penalty structure.

Per-Occurrence Penalty

Because the output of Zone Parity is count data, a number of penalty structures are possible including both per-occurrence and per-measure penalties. A per-occurrence penalty structure is easily implemented, with a penalty of f for each above benchmark observation. For n above-benchmark observations, the per-occurrence penalty is nf. For example, consider the actual service provision data presented in Table 3. For CLEC 1, there are (a net) 20 above-benchmark observations in Zone 1. Thus, the total penalty will be $20f$ under a simple per-occurrence penalty structure. The Zone 2 penalty should be larger than the Zone 1 penalty, say $2f$. Thus, if there were a 10-observation overpopulation of Zone 2, the penalty would be $10 \cdot 2f$.

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[24] Margin assumption is provided by *Broadband*, Stanford C. Bernstein & Co., Inc. and McKinsey & Company, Inc., Exhibit 63 (January 2000).

[25] Remember that the goal of the penalty is to extract the financial gain from the act of discrimination and that gain may not be highly correlated with sample size (especially for small samples).

Per-Measure Penalty

Establishing a structure for the per-measure penalty is equally straightforward. The per-measure penalty will apply when an above-benchmark threshold is surpassed. For example, assume the per-measure threshold is set at 5 percentage points above the Zone benchmark (for either Zone 1 or Zone 2, though different per-measure penalties may apply to each zone). If the observed performance of the ILEC exceeds the 5 percent threshold across both Zone 1 and 2, then the per-measure penalty F will be added to the per-occurrence penalties (f in Zone 1 and $2f$ in Zone 2). As an example, consider the performance to CLEC 1 from Table 3. This level of performance would invoke a penalty of $F + 20f$, because the 20 above-benchmark observations in Zone 1 (adjusted for Zone 2 underpopulation) make the ILEC 6 percentage points above benchmark (128/337 = 0.38 versus 108/337 = 0.32).

Severity and Duration

Incorporating into the penalty structure adjustments for severity and duration is accomplished easily. A basic "factor approach" can be used. For example, a per-measure penalty of F is invoked at a 5 percentage point threshold; a per-measure penalty of $2F$ is invoked at a 10% threshold; $3F$ at a 15% threshold and so forth. These thresholds and penalty levels are hypothetical, but illustrate the simple way in which penalties for severity can be structured under Zone Parity.

Duration is another important dimension of discriminatory behavior. As with severity, a simple factor-based penalty structure can be designed to handle repetitive discrimination. As a theoretical matter, repetitious failure indicates that the penalty level is set too low. Thus, increasing the penalty in response to repetitious discrimination is appropriate. One potential penalty structure requires that when the per-measure penalty is invoked for two concurrent months, then the base per-measure penalty should be doubled (a factor of 2). In other words, exceeding the 5 percent threshold two months in a row increases the per-measure penalty of $2F$.

While the base penalty may be reduced back to F upon a few months of benchmark service, if the per-measure penalty is increased above the base level more than once (say, in a twelve month period), then the higher per-measure penalty should become the base penalty. Obviously, if this occurs, the base penalty is not adequate. If the higher penalty does not produce benchmark quality service, then the penalty will be doubled again (say, to $4F$). The goal is to set the penalty so that poor performance is not an acceptable option for the ILEC.

Notice that the effective penalty (the one that ensures compliance) will be reached iteratively using the factor approach. The size of the factors and the initial base penalty will determine how much iteration is required to reach the effective penalty.

Table 5. Proposed Penalty Structure

Per-Occurrence Penalties					
	Observations > ZPB (Zone 1)		Observations > ZPB (Zone 2)		
	f		2·*f*		
Per-Measure Penalties					
Severity†	≥ 1.05·ZPB	≥ 1.10·ZPB	≥ 1.15·ZPB	≥ 1.20·ZPB	≥ 1.25·ZPB
Penalty	*F*	2·*F*	3·*F*	4·*F*	5·*F*
Duration‡	1 month	2 month	3 month	4 month	*N* month
Penalty	*F*	2·*F*	3·*F*	4·*F*	*N*·*F*

† Severity penalties increase to 6·*F* at 1.30·ZPB, and 7·*F* at 1.35·ZPB, and so forth.
‡ Duration factors return to 1 after 2 months of compliance. If duration factor exceeds 1 for a second time, then the increased penalty becomes the base penalty.

4. INITIAL PENALTY LEVELS

In theory, the ILEC will choose not to discriminate if its expected financial gain from doing so is extracted by a penalty. Thus, in order to discourage discrimination, the financial gain must be estimated. If the penalty is below the financial gain, discrimination is profit maximizing and (as such) expected. If the initial penalty levels do not produce a benchmark level of quality, then the penalties are too low and should be increased.[26]

The initial penalty levels are nothing more than "best guesses" of the financial gain from discrimination. Setting aside (for now) state specific calculations, a general framework for the "best guess" of the per-occurrence penalty (*f*) is set forth in the following text. Put simply, the financial gain from discrimination is the retention of profit. A single act of discrimination may allow the ILEC to retain the profit from that particular customer or all customers affected by that act. A single act of discrimination also may reduce the perceived quality of a CLEC or all CLECs, thus reducing the number of customers switching to a CLEC. The purpose of the per-occurrence penalty is to penalize

26 See In the Matter of Bell Atlantic-New York Authorization Under Section 271 of the Communications Act to Provide In-Region InterLATA Service in the State of New York, Order, FCC 00-92 (March 9, 2000) and Order Directing Market Adjustments And Amending Performance Assurance Plan, New York Public Service Commission Cases 00-C-0008 et al. (March 23, 2000).

the per-customer effects of discrimination whereas the per-measure penalty is intended to penalize the far-reaching implications of discriminatory conduct.

Generally, the per-occurrence penalties for Zone 2 failures should be based on the following formula:

$$2f = \frac{\pi \cdot A_{r,t}}{\phi} \tag{2}$$

where π is the annual profit protected by the act of discrimination and A is the present value of a $1 annuity at discount rate r for t years, and ϕ is the probability of detection and punishment.[27] The numerator of Equation (2) is the expected profit from discrimination and is an estimate of the numerator in Equation (1). The relevant time horizon of the annuity (t) should equal to the expected number of years the customer will be retained by the ILEC because of the discriminatory performance. Recall that the Zone 2 penalty is twice the Zone 1 penalty. Thus, the per-occurrence penalty for Zone 1 failures is

$$f = \frac{1}{2} \cdot \frac{\pi \cdot A_{r,t}}{\phi} \tag{3}$$

which is equal to half the Zone 2 penalty. The Zone 1 penalty is below the full value of the expected gain because the failure is based on service quality that is better than Zone 2 quality.

The per-occurrence penalty can be specified as a percentage of total annual retail revenue for the ILEC service in question by rewriting Equation (2) as

$$f = R\left(\frac{m \cdot A_{r,t}}{2\phi}\right) = kR \tag{4}$$

where R is annual retail revenue for the ILEC for the service in question (e.g., POTS, xDSL, etc.), m is the profit margin on that service, and k is the term in parenthesis. The FCC's "Net Return" calculations from the NY 271 Order

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[27] At a 10 percent discount rate and discounting annually, A is $3.79 for 5 years and $6.14 for 10 years. The FCC's "net return" calculation in the NY 271 Order indicates that the average margin (a reasonable measure of π) is about 25 percent. At this margin, annual revenues closely approximate the numerator of Equation (2) for a 5-year time horizon.

indicate a profit margin on local service of about 22 percent (although the return varies considerably by ILEC). Using the 22 percent margin, the per-occurrence penalties (*f*) - expressed as a percentage of annual retail revenues -- are provided in Table 6 for various assumptions regarding t and ϕ.[28]

Table 6. Zone 2 Per-Occurrence Penalties as a Percent of Annual Revenues (Margin = 0.22)

t (Years)	$A_{r,t}$ (r = 10%)	k (ϕ = 1.0)	k (ϕ = 0.75)	k (ϕ = 0.50)
1	0.91	20%	27%	40%
2	1.74	39%	51%	77%
3	2.49	55%	74%	110%
4	3.17	70%	94%	140%
5	3.79	84%	112%	168%
10	6.14	136%	181%	272%

The per-occurrence penalty is equal to k multiplied by total annual revenue for the service being "measured."

The table is interpreted as follows. Assume the annual revenues per switched access line are $500 year. Setting r, t, and ϕ at 0.10, 1, and 0.75 (respectively), the per-occurrence penalty for measures affecting switched access lines would be $133 (27 percent of $500; numbers in table are rounded) for Zone 2 failures and $67 for Zone 1 failures. Alternately, setting r, t, and ϕ at 0.10, 5, and 0.75 (respectively), the per-occurrence penalty for measures affecting switched access lines would be $560 for a Zone 2 failure and $280 for Zone 1 failure.

The revenue factor approach is a convenient method for establishing per-occurrence penalties. Per-occurrence penalties should not be identical across all measures, because a single per-occurrence penalty cannot accurately capture the expected financial gain from discrimination across a wide range of measures covering services of different revenues and profit margins. Because annual revenues are measured easily, establishing different per-occurrence penalties for different measures is not a difficult process.

Conceptually, the per-measure penalties should be computed using the formula

[28] Equations (2) and (3) are based on the assumption that discrimination is an attempt to retain the customer and, therefore, the expected financial gain is based on retention. It seems reasonable to assume that retention is more likely with a Zone 2 failure than a Zone 1 failure. Implicit in the proposed calculation of the Zone 1 penalty is a 50% probability of retention.

$$F = N \cdot \frac{\pi \cdot A_{r,t}}{2\phi} \qquad (5)$$

where N is the number of customers indirectly affected by the discrimination.[29] Considering only those indirectly affected is appropriate because the profits from those directly affected are captured by the per-occurrence penalty. Equation (5) also can be rewritten for easier calculation. Letting w equal the number of customers indirectly affected by a single act of discrimination and n be the number directly affected, the per-measure penalty can be written as

$$F = w \cdot nf \qquad (6)$$

where nf is the Zone 1 penalty multiplied by the number of above benchmark observations (in either Zone 1 or Zone 2). If w is equal to 1, for example, the per-measure penalty is equal to the sum of the per-occurrence penalties ($F = nf$). Equation (6) implies that the per-measure penalty will vary directly with the total per-occurrence penalty.[30] This relationship is sensible because severe discrimination experienced by a large number of consumers likely will have more widespread effects than severe discrimination against a few. This relationship, however, does not always hold. Discrimination that occurs early in the competitive process can have substantial negative effects despite low order counts. Because the per-measure penalty will be small for smaller samples (the n will be small), a minimum per-measure penalty should be established that applies to above threshold discrimination (i.e., severe discrimination) unless the value from Equation (6) exceeds this minimum penalty level.

In setting a value for w the relevant question is how many consumers are indirectly affected by a single act of discrimination (defined as above benchmark observations). Indirect effects of discrimination include scaling back entry efforts due to poor performance, reputation effects, word-of-mouth, and so forth. An initial value for w can be established by evaluating the FCC's penalties for slamming in the long distance industry. Using slamming penalties to establish a first approximation of w is sensible given that the FCC has found it reasonable to apply these penalties when a telecommunications firm interferes with a customer's decision to choose its telecommunications carrier (a situation all but

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[29] Because the per-measure penalty is invoked for both Zone 1 and Zone 2 failures, the Zone 1 penalty is used as a basis for the per-measure penalty.

[30] In fact, absent the minimum per-measure penalty, the calculation described in Equation (6) implies that all penalties are "per-occurrence."

identical to one dealt with in the performance plans). In June 2000, the FCC imposed a $3.5 million dollar penalty on long distance carrier Worldcom for slamming. The penalty was based on 2,900 slamming complaints filed against the company during the year 1999. The per-complaint penalty approximately equals $1,200. The average revenue per long distance subscriber is about $300 annually (or $25 per month). So that Table 6 can be used, assume that the long distance margin is 22 percent, which is consistent with estimates of the margin in the long distance business.[31] Further, assume that the typical customer life in the long distance industry is two years and that the probability of detecting and punishing slamming is 75 percent. From Table 6, the expected profit per customer from slamming is $152.73 (0.51 multiplied by $300). Assuming slamming is equivalent to a Zone 2 offense, the $1,200 per-compliant penalty imposed by the FCC implies a value for w of 6.86:

$$\$1{,}200 \cong \$152.73 + 6.86 \cdot \$152.73. \tag{7}$$

A number of other proposals for penalties for slamming have w values as high as 261, 653, and 981.[32]

Considering the enforcement experience against slamming, two approaches to setting w come to mind. First, the value for w could be set to 6.86 as calculated above. Alternately, the value of w could be set so that some predetermined specification of a severe failure (a slamming equivalent level of service) invokes a penalty of $1,200 per occurrence. Because Zone Parity produces counts of disparity, this latter approach easily is incorporated into the plan (unlike statistical approaches that do not produce disparity counts). Simulations can estimate the proper value of w given the choice of the time horizon and discount rate (from Table 6). For example, assume $A_{0.1,1}$ is the chosen specification for the annuity value (A). Also assume that the "slamming equivalent" disparity level is 100 percent (about 36 percentage points using the actual data summarized in

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[31] For the average long distance bill, see George S. Ford, "An Economic Analysis of the FCC's Notice of Inquiry on Flat Rate Charges in the Long Distance Industry?," Table 1, filed in CC Docket No. 99-249, In the Matter of Low-Volume Long-Distance Users, Notice of Inquiry, July 20, 1999 (Average long distance bill = $27.45). Assumed margin is taken from Communications Daily, SNET Said to Have Won 30% of IXC Business in Conn., GTE Gains Nationwide, December 3, 1996.

[32] See, e.g., Governor Pataki Introduces Bill To Halt Telephone Slamming, (June 18, 1997: www.state.ny.us/governor/press/june18_97.html) and Carolyn Hirschman, "Congress to Get Tough on Slammers," *Policy & Regulation* (July 27, 1998; www.internettelephony.com/archive/7.27.98/PRnews.htm).

Table 3 above) over the Zone Parity Benchmark. The estimated value for w using an average of ILEC data on revenue and profit margin per access line is 4. This estimate of w, of course, is highly dependent on a number of assumptions such as those in Tables 5 and 6 and should be computed for the Commission approved set of assumptions.

IV. Review Threshold

For both the states of New York and Texas, the State Commission and the FCC approved remedy plans that included an annual cap on remedy amounts. In general, remedy caps are undesirable in that once the cap is reached, there is nothing to offset the incentives of the ILEC to provide disparate service unless the cap is raised (making the initial cap irrelevant) or other drastic remedial actions such as withdrawing interLATA authority or an antitrust suit. The presence of these more costly remedial measures does not justify designing failure into a performance plan. If the penalties are properly sized and levied, costly proceedings and lawsuits can be avoided.

A more desirable approach to overall penalty payments is to establish a review threshold. If an ILEC reaches the review threshold, then a proceeding is initiated to investigate the causes of such sizeable penalty payments. Unlike the cap, however, penalties are levied while this review is underway so the threat of penalties for poor performance is intact.[33] Further, the review threshold is not arbitrary allocated across months to limit monthly liability as is the case in Texas.

Whether a cap or review threshold is included in the enforcement plan, the value of that threshold should be based on a sound economic analysis of the value to the ILEC of providing discriminatory service. The cap should not be set arbitrarily, as in the case of New York and Texas where no analysis was performed to evaluate the reasonableness of the proposed cap (set at 36% of "Net Return" as calculated by the FCC). The only evidence we have to date is that the 36% annual cap failed to provide sufficient incentive to Bell Atlantic - New York, requiring the FCC and New York Commission to raise the penalty cap. In the following section, a simple economic framework is developed to estimate the financial gain to an ILEC from impeding competition by providing discriminatory service (or no service at all).

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[33] Rather than halting penalty payments at the cap, the penalties should be increased if it is indeed poor performance that brought the ILEC to the cap. Obviously, if performance is so poor that the cap is reached, the penalties are too low.

1. ESTIMATING ANNUAL FINANCIAL LIABILITY

There are a number of conceivable methods that can produce estimates of the potential social cost and/or financial gain from discrimination. All of these methods require a number of assumptions. The requirement to make assumptions, some of which are more fact-based than others, should not deter us from doing so. Regardless of the enforcement scheme, the remedies must be sized. This task will either be methodological or arbitrary, the latter of which - by ignoring the basic economics of enforcement discussed above - offers little hope of effective enforcement. So that all parties can contribute to the debate and adjustments to the penalties can be made in the future as market conditions change, my estimation approach is clearly set forth in the following text. Because my estimation approach is rather straightforward, other scenarios are easily considered. It is important to realize that my chosen scenarios assume rather severe discrimination and, as a consequence, severe impacts. This assumption is compatible with the goal of determining either a review threshold or a cap. Only if the ILEC engages in severe discrimination will these liability limits be reached. As long as service is provided on reasonably non-discriminatory basis, actual remedies or penalties will be far below the review threshold.

2. ECONOMIC MODEL

In this economic model, financial liability is measured by the change in consumer welfare caused by discriminatory service where the effect of discriminatory service is less competition and, as a consequence, higher prices. For simplicity, I assume the demand curve takes the form $Q = S/p$, where Q is quantity demanded, p is market price, and S is market size (pQ; i.e., total revenue). The specification of the demand curve is isoelastic meaning the demand curve has constant unit elasticity.[34] Note that the estimates of financial liability using this demand model will be conservative because the elasticity of demand for telecommunications services typically is found to be less than one.[35] The change in consumer welfare for a price increase is maximized when demand is perfectly inelastic (a zero elasticity).[36] The choice of this demand model is

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[34] Data for all three of these variables is available in ARMIS reports that can be downloaded at no charge from the FCC web site.

[35] See Lester D. Taylor, *Telecommunications Demand in Theory and Practice*, Kluwer Academic Publishers (1994).

[36] Changing the assumption to zero elasticity will increase the estimated financial liability by about 1.5%.

based on the ease of computation, the available of data, and the conservative nature of the estimate.

For the isoelastic demand curve, the change in consumer welfare for a price change, which will include and consist primarily of the change in ILEC profit, is

$$\Delta CW = S \cdot \ln(p_h / p_l) \qquad (8)$$

where the change in consumer welfare (*CW*) is equal to the market size multiplied by the natural log of the ratio of the higher price (p_h) to the lower price (p_l). The shaded area in the Figure 4 below illustrates the change in consumer welfare (or surplus) computed by the model.

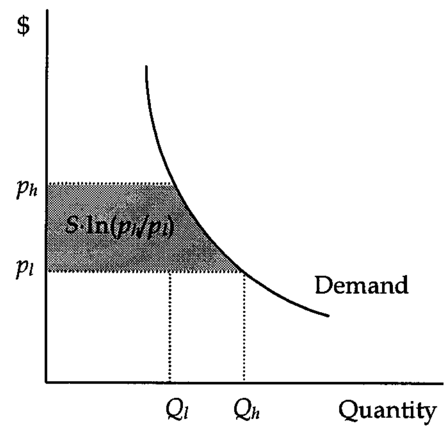

Figure 4.

For illustrative purposes, the financial liability for the state of Florida is computed. Summing revenues from rows 5001 (Basic Area Revenue), 5060 (Other Local Exchanges), 5081 (End User), 5082 (Switched Access), and 5084 (State Access) from the 1999 ARMIS form 43-03, the market size for Florida is determined to be $3.2 billion. All revenues included in the model are essentially revenues from local exchange and local access services; all toll revenues are excluded from the calculations. ARMIS form 43-08 indicates BellSouth-Florida operated 6.55 million switched access lines in FL in 1999. Dividing revenues by lines produces an average revenue per line of $41.25.[37]

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[37] Note that market size and the percent price change are the primary determinants of financial liability, not average revenue per line. The natural log of the ratio of two numbers that

As illustrated in Figures 2 and 3, discrimination has lasting effects, so a few assumptions about what happens over time are required. Access lines are assumed to grow exogenously (without respect to price) at 4.5% per year, which is the growth rate of lines in FL over the time period 1995 to 1999. The discount rate is assumed to be 10%.

As a benchmark case, assume that without discrimination, BellSouth loses 3 percentage points of market share per year over the next 10 years. This share loss is roughly equivalent to the share loss of AT&T following divestiture where AT&T lost 30% market share over a 10-year period.[38] In this benchmark case, price is assumed to fall by 10% over the 10 year time period. This price change is based on the experience in the long distance industry and is roughly equivalent to $0.14 per percentage point of market share (=0.10·41.25/30).[39]

While it is nearly impossible to get a precise estimate on the probability of detection and punishment, an assumption of 75% probability probably is conservative. As discussed previously, the adjustments for the probability of detection are required because no PAP will achieve 100% detection and punishment. Ignoring the impossibility of capturing every potential form of discrimination in performance metrics, statistical testing alone can reduce the probability of detection to 75%. Dr. Collin Mallows has presented evidence that Type I and Type II errors are balanced (for actual ILEC performance data) at a critical value of 15%. Thus, statistical testing based on a critical value of 15% reduces the probability of detection by about 15% (the probability of Type II error).[40] For a critical significance (alpha) value of 5% (which is equal the probability of Type I error), Type II error will exceed 15% and alone could account for a 25% reduction in the probability of detection because decreases in Type I increase Type II error.

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differ by a constant percentage is a constant (it does not change with the absolute value of the numbers).

[38] According to the 1994/5 SOCC, Table 8.12, AT&T had a market share of 70% of presubscribed lines.

[39] This assumption is based on the reduction in long distance average revenue per minute (adjusted for access charge reductions) over the 10 years following divestiture. See Trends in Telephone Service, Tbls. 1.2, 14.6, and 14.7 (May 2000).

[40] AT&T has performed a statistical analysis that suggests Type I and Type II error are balanced at 15%. At a alpha level of 0.15, the probability that BellSouth will discriminate and not be detected is approximately 15%. At smaller alpha levels, the probability of Type II increases.

The effects of discrimination in my simulations are captured in market share loss and prices. In my first scenario, I assume that BellSouth blocks the growth of competition completely in Year 1 but CLECs resume the 3 percentage point annual growth in market share over the remainder of the time period. As shown in Attachment A, the estimated effective financial liability for BellSouth in this scenario is $286 million that when adjusted for a 75% probability of detection and punishment is $381 million. Alternately, assume that discrimination postpones share loss in Year 1 as before, but increases to 2% for Years 2 and 3% thereafter. In other words, it takes some time for the competitive process to recover from the severe discrimination in Year 1. The estimated effective financial liability in this scenario is $369 million or $492 million adjusted for the probability of detection and punishment. The probability adjusted review thresholds are 44% and 57% of BS-FL's "Net Revenue" as calculated by the FCC's methodology set forth in the *BA-NY 271 Order* (See Attachment B for the FCC calculations). Note that the 44% of "Net Revenue" is consistent with the financial liability of Bell Atlantic New York after both the New York Commission and FCC's adjustments to the initial cap of 36% of "Net Revenue." In Attachment C, the estimates of financial liability for the 48 contiguous states and the District of Columbia are summarized.

3. Long Distance and Data Services

It is important to note that the above-described scenarios include only profits from current services provided by BellSouth - Florida. Profits from long distance, DSL, and other new services are not included, demonstrating that my approach is conservative. The FCC in the *BA-NY 271 Order* noted that profits from these services are important in determining the review threshold. The FCC stated:

> While we are using net local revenue as a reference point or yardstick for comparison purposes, we do not suggest that local revenues constitute the only relevant figure. We recognize that Bell Atlantic may also derive benefits in other markets (such as long distance) from retaining local market share.[41]

Thus, any estimate of the review threshold based on local profits alone should be viewed as a lower bound of the threshold.

The potential gains to BellSouth in the market for new services, such as long distance and DSL are sizeable. If we assume, for example, that the profit margin on the average long distance bill of $25 is approximately 20%, then BellSouth –

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[41] *BA-NY 271 Order*, n. 50.

Florida could increase its annual profit by $4.7 million by increasing its market share through discrimination by only 1.2%.[42] Assuming a 38.5% profit margin on DSL service, where BellSouth's monthly price for DSL is $40, BellSouth could increase its annual profit by $12 million for every 1% market share it gains from discrimination.[43] Clearly, the gains from discrimination in these markets can be substantial.

4. FCC 271 ORDERS

In the *BA-NY 271 Order*,[44] the FCC indicated that BA-NY's proposed remedy cap was sufficient because it represented 36% of BA-NY's annual net income.[45] To my knowledge, no economic or financial analysis was performed by the FCC to support this figure. However, both MCI Worldcom and AT&T filed affidavits with the FCC asserting that the proposed remedy cap for BA-NY was too low.

The 36% of Net Income standard has proven ineffective in New York. The performance of BA-NY following its 271 approval demonstrates that the initial maximum remedy payment of 36% of net income was insufficient to ensure ongoing adequate performance by BA-NY, *despite of the initial findings of the New York Public Service Commission ("NYPSC") and the FCC.* As a result, the NYPSC and FCC raised the remedy payments in New York to a maximum potential

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[42] According to the ARMIS data (Report 43-08), BS-FL operated 6.55 million switched access lines as of December 1999. Multiplying 1.2% of the 6.55 million access lines by the long distance profit margin of $5 per month produces the increased profit figure of $393,000 per month, or about $4.7 million annually. For the average long distance bill, see George S. Ford, "An Economic Analysis of the FCC's Notice of Inquiry on Flat Rate Charges in the Long Distance Industry?," Table 1, filed in CC Docket No. 99-249, In the Matter of Low-Volume Long-Distance Users, Notice of Inquiry, July 20, 1999 (Average long distance bill = $27.45). Assumed margin is taken from Communications Daily, SNET Said to Have Won 30% of IXC Business in Conn., GTE Gains Nationwide, December 3, 1996.The 1.2% market share figure is based on BellAtlantic-New York's average growth in market share (see "Verizon Wins One Million New York Long Distance Customers; Hits Target Five Months Earlier Than Expected," Verizon News Release: August 3, 2000).

[43] The calculation is $40·0.385·6.55·12·0.01 = 12 million. For price information, see https://fast1.corp.bellsouth.net/adsl/index.jsp?NoAnimation=1. Margin assumption is provided by *Broadband*, Stanford C. Bernstein & Co., Inc. and McKinsey & Company, Inc., Exhibit 63 (January 2000).

[44] See Application by Bell Atlantic New York for Authorization Under Section 271 of the Communications Act To Provide In-Region, InterLATA Service in the State of New York, Memorandum Opinion and Order, CC Docket No. 99-295 (rel. Dec. 22, 1999) ("BA-NY 271 Order").

[45] BA-NY 271 Order, ¶ 436.

liability of 44% of annual net income.[46] This 44% liability figure is more consistent with the analysis prepared by MCI WorldCom and AT&T as part of the BA-NY 271 proceeding, which recommended to the FCC that the minimum financial liability for BA-NY should be no less than 40% of net income.[47] I believe the recent modifications made by the NYPSC and the FCC support the use of economic and financial models to determine liability.

5. Zone Parity Penalties with Statistical Testing

It is possible to incorporate the principles of Zone Parity penalties into the more traditional, statistics based performance plan. The key to merging Zone Parity penalties with statistics is to somehow convert the output of the statistical procedure into 'count data,' which is the output of the Zone Parity measurement approach. The link between the statistical performance measurement tool and the penalty can be nearly as direct as Zone Parity, but the statistical approach requires an additional step to determining whether discriminatory service is provided. Specifically, a means difference test (the z-test) is applied to the data to determine whether or not there is a statistically significant means difference. If there is a significant means difference, then penalties are levied based on Zone Parity. If no significant means difference is found, then no penalty is levied.

Benchmark Measures

For those metrics defined as benchmarks, the application of Zone Parity penalties is straightforward. In fact, it is possible to use the more traditional benchmark (as opposed to the Zone Parity Benchmark) in the Zone Parity Plan. In essence, a 95% traditional benchmark is a Zone Parity Benchmark with a (unslacked) Zone 1 benchmark of 95% (allowing 95% of the observations below x^* and 5% above).[48] The degree of disparity is measured as with Zone Parity – each CLEC order exceeding the allowable benchmark invokes the per-occurrence

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[46] The NYPSC added an additional $34 million dollars to the original $269 million cap. *New York Market Adjustment Order*. In the *Consent Decree* between the FCC and BA-NY, a "voluntary contribution" of $3 million was assessed upon BA-NY with the potential for another $24 million if substandard performance continued. *See Consent Decree* at ¶¶ 16-17. It remains unclear whether or not the BA-NY PAP will be effective at the current, higher remedy payments.

[47] Joint Declaration of Dr. George S. Ford and Dr. John D. Jackson, CC Docket No. 99-295 at 16; and Affidavit of R. Glenn Hubbard and William H. Lehr on Behalf of AT&T Communications of New York, Inc., CC. Docket No. 99-295.

[48] Adding slack to the traditional benchmarks is "double counting" slack. A 95% benchmark already includes 5% slack.

penalty $2f$. All the severity and duration factors apply in the same manner (although the percentages may be adjusted to account for only one Zone being penalized).

For example, consider a traditional benchmark requiring 95% of orders to be "completed" in 24 hours. Assume a CLEC places 100 orders of which 95% are completed in 24 hours. In this case, no penalty is due. Another CLEC places 100 orders but only 92% are completed in the required interval. Thus, 3 orders took "too long" to complete and the penalty is $3 \cdot 2f$. If only 90% of the orders are completed in the required interval, the first level of severity thresholds is reached and the penalty is $(5 \cdot 2f + F)$ – the per measure penalty (with Factor 1) is levied given the 5 percentage point disparity level (see Table 5). If performance is only 80% in 24 hours, the penalty is $(15 \cdot 2f + 2 \cdot F)$ where the severity factor is 2 because of the 15 percentage point disparity level (again, see Table 5).

To summarize, the count of disparate acts for benchmark measures is

$$n = N_C(b - p) \qquad (9)$$

where n is the count of disparate performance, N_C is the number of CLEC orders, b is the benchmark performance level (e.g., 95% of observations in the interval), and p is the observed performance level to the CLEC (i.e., 80% of observations in the interval). With n determined, the application of the Zone Parity penalties is straightforward.

Statistical Measures

The statistical tests employed in performance plans are used to detect statistically significant means differences. In order to create a "count" of disparate performance, a two-step procedure is recommended. First, the z-test is performed to test for statistically significant differences between the ILEC and CLEC mean service levels. Assume for present purposes the critical z value is 1.65 ($\alpha = 5$ percent). If the z-score of the means tests indicates a statistically significant means difference (the computed z exceeds the critical z), then proceeding to step two is required. If the z score is less than 1.65, then the service is deemed non-discriminatory.[49]

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[49] As mentioned above, the z-test is not capable of determining whether or not the service is "just" or "reasonable."

Assuming a statistically significant means difference is detected, the "count" of discriminatory acts proceeds exactly as with Zone Parity. Two zones are defined, Zone 1 and Zone 2, where the zones are bounded by $\bar{x}$ (the mean), x^* (the 5% 'critical' value), and $2x^*$. The application of this two-step procedure is illustrated in Table 9 under a Zone Parity Benchmark (including slack) of 25% for Zone 1 and the standard 5.5% for Zone 2. For CLEC 1, the z-test does not indicate discriminatory service so no penalty is due. For CLEC 2, the z-test does indicate a lower quality of service for the CLEC than the ILEC. The ILEC exceeds by one [=(0.26 - 0.25)·100] the acceptable number of observations in Zone 1 and by three [=(0.09 - 0.055)·100] the acceptable number of observations in Zone 2.[50] The penalty paid by the ILEC for performance to CLEC 2 is $f + 3{\cdot}2f$. Overall, the ILEC is 3.5 percentage points over the allowed observations for CLEC 2 so no severity penalties are applied. For CLEC 3, the ILEC is 9 observations over in Zone 1 [=(0.34 - 0.25)·100], but 2 observations under in Zone 2 [=(0.04 - 0.055)·100]. Overall, the ILEC is 7.5 percentage points over the non-discriminatory level of performance so the severity penalty with Factor 1 applies (see Table 5). The penalty paid by the ILEC for performance to CLEC 3, therefore, is $7f + F$. For CLEC 4, the ILEC is 13.5 percentage points above the Zone Parity Benchmarks, so a severity factor of 2 applies to the per-measure penalty so that the penalty is $7f + 4{\cdot}2f + 2F$.

Table 9. Zone Parity Penalties with Statistical Tests

CLEC	Orders	Z-Score (z^* = 1.65)	Zone 1 Observations (%)	Zone 2 Observations (%)	Penalty
1	100	0.18	26%	3%	None
2	100	1.90	26%	9%	$f + 3{\cdot}2f$
3	100	3.00	34%	4%	$7f + F$
4	100	1.69	34%	10%	$7f + 4{\cdot}2f + 2F$

Either the historical or the month-to-month distribution of ILEC data can be used to specify the Zone Parity Benchmarks under the statistical approach. Contemporaneous data may be more compatible with the statistical approach, but using historical data has the benefits discussed above. One approach to statistical testing that will have the benefits of regulatory lag described above (i.e., quality control, incentives to improve, fixed expectations) is to use the mean and standard deviation from historical data to compare to contemporary CLEC data. In other words, the modified z-statistic is computed using

[50] For 100 observations, the Zone 2 benchmark is 6 observations due to the 'round up' rule.

$$z = \frac{\bar{x}_t^C - \mu_{t-i}^I}{\sigma_{t-i}^I \sqrt{1/n_{t-i}^I + 1/n_t^C}} \qquad (10)$$

where n is sample size, the subscript t indicates time periods, i is the specified monthly lag in Zone Parity Benchmark updates, and superscripts I and C indicate ILEC and CLEC. The only difference between Equation (10) and the standard modified z-test is that the ILEC and CLEC data are from different time periods.

V. Conclusion

The purpose of this document is to outline the major features of the Zone Parity approach to performance measurement. This plan represents an alternative, non-statistical approach to performance measurement that is easy to understand, provides a useful indicator of disparity that can be used to set penalties, and does not fail to detect absolute reductions in quality. Zone Parity promotes "just, reasonable, and nondiscriminatory" service provision through the use of quality of service standards that are both within the capabilities of the ILEC (satisfying parity) and of sufficient quality to facilitate the evolution of competition in local exchange telecommunications markets. Moreover, these service standards, based in many cases on observed ILEC performance, provide CLECs with certainty as to what level of service to expect from the ILECs and provides the ILECs with certainty as to the level of service required to avoid penalty payments.

Unlike statistical plans, designing effective penalty structures is straightforward with the Zone Parity approach to performance measurement. Duration and severity adjustments to the plan relax (somewhat) the necessity to be extremely accurate in setting initial penalty levels. If the initial values for penalties are set too low, the severity and duration adjustments to the per-measure penalties will (over time) bring the per-measure penalty level to its effective level. Application of the Zone Parity penalties to the output of a statistical measurement approach is possible and discussed in the text. An alternate formulation of the modified z-test is proposed that offers some of the benefits of Zone Parity typically not characteristic of the more traditional statistical approach.

Parts this document appeared as the joint work product of Drs. John D. Jackson and George S. Ford on behalf of MCI-Worldcom. This document is the sole responsibility of the author.

Attachment A. Calculation Details for BellSouth-Florida

SCENARIO 1

Year	Switched Access Lines	Share Loss Benchmark	Share Loss Scenario	Price Benchmark	Price Scenario	ΔCW	ΔCW: Net Present Value (10%)
	6,551,570			$41.25	$41.25		
1	6,849,444	3.0%	0.0%	$40.84	$41.25	34,076,815	34,076,815
2	7,160,861	3.0%	3.0%	$40.43	$40.84	35,987,845	32,716,223
3	7,486,436	3.0%	3.0%	$40.01	$40.43	38,009,964	31,413,193
4	7,826,815	3.0%	3.0%	$39.60	$40.01	40,149,927	30,165,234
5	8,182,669	3.0%	3.0%	$39.19	$39.60	42,414,925	28,969,964
6	8,554,702	3.0%	3.0%	$38.78	$39.19	44,812,613	27,825,107
7	8,943,650	3.0%	3.0%	$38.36	$38.78	47,351,143	26,728,486
8	9,350,283	3.0%	3.0%	$37.95	$38.36	50,039,200	25,678,022
9	9,775,403	3.0%	3.0%	$37.54	$37.95	52,886,035	24,671,726
10	10,219,851	3.0%	3.0%	$37.13	$37.54	55,901,510	23,707,697
							285,952,468
				With 75% Probability Adjustment =			381,269,958

SCENARIO 2

Year	Switched Access Lines	Share Loss Benchmark	Share Loss Scenario	Price Benchmark	Price Scenario	ΔCW	ΔCW: Net Present Value (10%)
	6,551,570			$ 41.25	$ 41.25		
1	6,849,444	3.0%	0.0%	$40.84	$41.25	34,076,815	34,076,815
2	7,160,861	3.0%	2.0%	$40.43	$40.98	47,903,058	43,548,234
3	7,486,436	3.0%	3.0%	$40.01	$40.56	50,593,810	41,813,066
4	7,826,815	3.0%	3.0%	$39.60	$40.15	53,441,306	40,151,244
5	8,182,669	3.0%	3.0%	$39.19	$39.74	56,455,106	38,559,597
6	8,554,702	3.0%	3.0%	$38.78	$39.33	59,645,386	37,035,092
7	8,943,650	3.0%	3.0%	$38.36	$38.91	63,022,982	35,574,830
8	9,350,283	3.0%	3.0%	$37.95	$38.50	66,599,436	34,176,041
9	9,775,403	3.0%	3.0%	$37.54	$38.09	70,387,045	32,836,076
10	10,219,851	3.0%	3.0%	$37.13	$37.68	74,398,917	31,552,404
							369,323,400
				With 75% Probability Adjustment =			492,431,200

Attachment B: FCC Calculations of Net Return

Data for Florida from ARMIS 43-01 (1999)

(Downloaded from FCC Web Site: http://www.fcc.gov/ccb/armis/)

Year	Company Name	Row_#	Row_Title	Total_b	State_g	Interstate_h
1999	BellSouth	1090	Total Operating Revenues	4,211,854	2,876,616	1,074,227
1999	BellSouth	1190	Total Operating Expenses	2,743,616	1,785,836	649,943
1999	BellSouth	1290	Other Operating Income/Losses	-2,071	-1,534	-520
1999	BellSouth	1390	Total Non-operating Items (Exp)	373,725	8,819	-905
1999	BellSouth	1490	Total Other Taxes	259,794	199,244	59,871
1999	BellSouth	1590	Federal Income Taxes (Exp)	361,807	268,010	113,841
1999	BellSouth	1915	Net Return	N/A	N/A	250,957
1998	BellSouth		Access Lines (ARMIS 43-08)	6,551,570		

FCC's Net Return Calculation*

		Net Return	36% Net Return	44% Net Return
BellSouth	"Net Return"	864,130	311,087	380,217
BellSouth	75% Probability Adjustment		414,782	506,956

*Calculations in testimony based on FCC NY 271 Order at ft. 1332: "To arrive at a total "Net Return" figure that reflects both interstate and intrastate portions of revenue derived from local exchange service, we combined line 1915 (the interstate "Net Return" line) with a computed net intrastate return number (total intrastate operating revenues and other operating income, less operating expenses, non-operating items and all taxes).' Access line data is from the Federal Communications Commission's Local Competition Report (August 1999)." Following the FCC's guidelines, the 'Net Return' is [250957+2876616+-1534 - (1785836+8819+199244+268010)]= $864130.

Attachment C: Estimates of Financial Liability by State

State	*Scenario 1*	*Percent of Net Return*	*Percent of Market Size*	*Scenario 1*	*Percent of Net Return*	*Percent of Market Size*
Alabama	98 M	33%	11%	126 M	43%	14%
Arizona	185 M	71%	13%	240 M	92%	17%
Arkansas	61 M	51%	12%	79 M	66%	15%
California	782 M	58%	12%	1009 M	75%	15%
Colorado	189 M	66%	13%	245 M	85%	16%
Connecticut	112 M	81%	11%	145 M	105%	15%
Delaware	24 M	55%	12%	31 M	71%	15%
DC	38 M	42%	11%	49 M	54%	15%
Florida	381 M	44%	12%	492 M	57%	15%
Georgia	294 M	39%	12%	380 M	50%	15%
Idaho	31 M	45%	12%	39 M	58%	15%
Illinois	366 M	36%	11%	472 M	47%	14%
Indiana	114 M	33%	11%	147 M	42%	14%
Iowa	53 M	63%	11%	69 M	81%	14%
Kansas	77 M	60%	12%	99 M	78%	15%
Kentucky	67 M	37%	11%	87 M	48%	14%
Louisiana	105 M	29%	11%	135 M	37%	14%
Maine	38 M	39%	12%	49 M	50%	15%
Maryland	200 M	48%	12%	259 M	62%	16%
Massachusetts	228 M	58%	11%	295 M	75%	14%
Michigan	260 M	28%	11%	335 M	36%	14%
Minnesota	130 M	53%	11%	168 M	68%	15%
Mississippi	65 M	25%	11%	84 M	32%	15%
Missouri	143 M	54%	11%	184 M	70%	15%
Montana	25 M	57%	11%	32 M	73%	15%
Nebraska	32 M	39%	10%	42 M	50%	13%
Nevada	17 M	241%	13%	22 M	312%	16%
New Hampshire	44 M	47%	12%	57 M	61%	15%
New Jersey	297 M	80%	12%	385 M	104%	16%
New Mexico	52 M	58%	11%	67 M	75%	15%
New York	724 M	111%	11%	933 M	143%	14%
North Carolina	156 M	39%	12%	202 M	50%	15%
North Dakota	14 M	39%	11%	18 M	51%	14%
Ohio	200 M	41%	11%	257 M	53%	14%
Oklahoma	86 M	70%	11%	111 M	91%	15%
Oregon	83 M	63%	12%	108 M	81%	15%
Pennsylvania	270 M	65%	11%	349 M	84%	15%
Rhode Island	33 M	45%	11%	42 M	58%	15%
South Carolina	88 M	34%	11%	113 M	44%	15%
South Dakota	16 M	39%	11%	21 M	50%	14%
Tennessee	139 M	37%	11%	179 M	47%	14%
Texas	586 M	73%	12%	757 M	94%	15%
Utah	68 M	53%	13%	88 M	69%	16%
Vermont	22 M	48%	11%	29 M	62%	14%
Virginia	208 M	41%	12%	270 M	53%	16%
Washington	136 M	61%	12%	176 M	78%	15%
West Virginia	56 M	48%	11%	73 M	62%	15%
Wisconsin	99 M	34%	10%	127 M	43%	13%
Wyoming	17 M	52%	11%	23 M	67%	15%

98/1357

SKADDEN, ARPS, SLATE, MEAGHER & FLOM LLP

1440 NEW YORK AVENUE, N.W.

WASHINGTON, D.C. 20005-2111

TEL: (202) 371-7000

FAX: (202) 393-5760

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TORONTO

DIRECT DIAL
202-371-7209
DIRECT FAX
202-371-7978
EMAIL ADDRESS
cronis@skadden.com

September 11, 2000

BY HAND DELIVERY

Honorable Janet Deixler
Secretary
New York State Public Service Commission
Three Empire State Plaza
Albany, New York 12223

Re: Case 98-C-1357, Module 3

Dear Secretary Deixler:

Enclosed are an original and 25 copies of the *Supplemental Testimony of Verizon New York Inc. on Costs and Rates for Collocation,* as well as associated cost studies and work papers.

Please call with any questions.

Respectfully submitted,

Catherine Kane Ronis/rr

Catherine Kane Ronis
Counsel for Verizon New York Inc.

cc: Honorable Joel A Linsider
All Active Parties (via e-mail and U.S. mail)

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission to Examine New York Telephone Company's Rates for Unbundled Network Elements	Case 98-C-1357 Module 3

SUPPLEMENTAL TESTIMONY OF VERIZON NEW YORK INC. ON COSTS AND RATES FOR COLLOCATION

Members of the Panel:
Dinell Clark
Kim Wiklund

September 11, 2000

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I. INTRODUCTION OF THE PANEL AND PURPOSE OF THE TESTIMONY

Q. PLEASE IDENTIFY THE MEMBERS OF THE PANEL.

A. This Panel consists of Ms. Dinell Clark and Ms. Kim Wiklund. Ms. Clark is a Staff Director of Service Costs for Verizon Services Corp., formerly Bell Atlantic Network Services, Inc. Her business address is 125 High Street, Boston, Massachusetts. Ms. Wiklund is the Senior Specialist of Collocation Product Development. Her business address is 2980 Fairview Park Drive, Falls Church, Virginia.

Q. HAS THIS PANEL SUBMITTED TESTIMONY IN THIS PROCEEDING?

A. Yes. This Panel submitted direct (October 1, 1999), responsive (November 15, 1999) and rebuttal (December 22, 1999) testimony in the collocation module of this case. The witnesses' backgrounds and qualifications are described in the October 1, 1999 testimony.

Q. WHAT IS THE PURPOSE OF THIS TESTIMONY?

A. In its ruling in Module 2 (Collocation) of this proceeding,[1] the Commission disallowed 25% of Verizon New York Inc.'s ("Verizon NY") proposed security costs and invited parties to propose alternative security costs in this module using the hypothetical central office configuration developed in the AT&T/WorldCom Collocation Cost Model ("CCM"), which was adopted in the Phase III proceeding

[1] Case 98-C-1357, "Opinion and Order in Module 2 (Collocation)" (Op. No. 00-08) (issued and effective June 1, 2000) (the "Order").

as the starting point for collocation costs.[2] This testimony introduces the costs associated with securing a cageless collocation arrangement located in the CCM's hypothetical central office.[3]

In addition, in the same ruling, the Commission ordered Verizon NY to submit an adjacent collocation cost study in Module 3 of this proceeding. This testimony introduces rates associated with adjacent on-site collocation.

Verizon NY specifically reserves its objections to the Commission's adoption of the CCM's hypothetical central office approach (and to cost studies based on hypothetical network constructs in general) and reserves the right to amend these studies at the appropriate time. *See, e.g., Iowa Utils. Bd. v. FCC*, 219 F.3d 744 (8th Cir. 2000). However, in view of the Commission's prior orders, we nevertheless present these studies, which are fully compliant with those orders and with all aspects of the FCC's TELRIC construct.

Q. ARE THERE ANY EXHIBITS TO THIS TESTIMONY?

A. Yes. Filed with this testimony are Exhibit parts AE and AF, which include details of the cost studies associated with cageless security costs and adjacent collocation.

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[2] Order at 30. Verizon NY has filed a petition for reconsideration of this ruling. *See Bell Atlantic – New York's Petition for Reconsideration*, Case 98-C-1357 (July 7, 2000).

[3] Verizon NY notes that the FCC is currently reviewing, among other things, whether ILECs should be permitted to place CLECs in separate rooms and whether the ILECs should be permitted to charge CLECs for partitioning. *Order on Reconsideration and Second Further Notice of Proposed Rulemaking in CC Docket No. 98-147 and Fifth Further Notice of Proposed Rulemaking in CC Docket No. 96-98*, FCC 00-297, ¶97(Aug. 10, 2000).

II. SECURITY COSTS BASED ON A HYPOTHETICAL BUILDING

Q. HOW DID VERIZON NY DEVELOP THE COSTS TO SECURE A HYPOTHETICAL CENTRAL OFFICE BUILDING?

A. Verizon NY's Module 3 security cost study uses many of the same assumptions contained in the security cost study Verizon NY introduced in Module 2 of this proceeding. For example, Verizon NY assumed the same 166 square foot cageless collocation – open environment ("CCOE") area and cageless collocation forecast used in the Module 2 security cost study. *See* Rebuttal Testimony at 15-16 (December 22, 1999). The Commission accepted this forecast.

Q. WHERE HAS VERIZON NY PLACED THE CAGELESS COLLOCATION AREA IN THE CCM'S HYPOTHETICAL CENTRAL OFFICE?

A. Verizon NY assumed that the cageless collocation area would be located on the second floor of the CCM's hypothetical central office, where the toll equipment is located. This assumption is reasonable because placing the CCOE area on the toll floor reduces the length of cables needed to connect to Verizon NY's network. Moreover, the toll area generally has the necessary grounding requirements for the CLEC's collocated equipment.

Q. WHAT SECURITY METHODS ARE INCLUDED IN VERIZON NY'S COST STUDY?

A. As with Verizon NY's Module 2 security cost study, the new study assumes a cost efficient mix of wire mesh partitioning, security cameras and security card access readers. Wire mesh partitioning provides a low cost solution for physical security, while security card readers help to control access.

Wire mesh partitioning, however, has limitations. The panels are only 10 feet high because of the dense grid of cable racking and HVAC ducts present in equipment rooms. As a consequence, Verizon NY must also install security cameras in certain locations to provide adequate security. Security cameras would also allow Verizon NY to match the CLEC employee with his/her access card and capture (after the fact) if the employee should enter unauthorized areas of Verizon NY's central offices.

Q. HOW DID VERIZON NY DEVELOP THE SECURITY INVESTMENTS?

A. Verizon's Corporate Real Estate ("CRE") organization used the CCM's hypothetical central office layout to determine the configuration of the cageless collocation area. For example, Verizon NY determined the location of the collocation equipment, stairwells, elevators, and space necessary for toll equipment.

Next, Verizon NY assumed that each central office will require 166 square feet of CCOE space and determined the appropriate location on the second floor of the CCM's hypothetical central office to place this cageless collocation area.

Finally, based on the CCOE area's location in relation to hypothetical restrooms and collocation common areas, and allowing for safe egress and ingress, Verizon NY's CRE department determined the security measures necessary to protect Verizon NY's equipment. Verizon NY used the same installed investments for these security measures it used in its Module 2 security cost study.

Q. DOES VERIZON NY'S SECURITY COST STUDY INCLUDE THE COSTS FOR CARD READERS?

A. No. Verizon NY did not include costs for card access readers and control panels because AT&T/WorldCom alleged in the Phase III proceeding that these costs were already included in the CCM's hypothetical land and building rate. The CCM, however, understates card reader costs; Verizon NY therefore reserves the right to amend these costs at a later time.

Q. HOW DID VERIZON NY DETERMINE THE SECURITY COST PER CAGELESS COLLOCATION EQUIPMENT BAY?

A. As in Verizon NY's Module 2 security cost study, Verizon NY divided the security investments provided by the CRE department by the CCOE forecast of 166 square feet, and then multiplied by the appropriate annual carrying charge factors. It converted the resulting figure into a monthly recurring cost and multiplied by 11.6 square feet (the amount of floor space occupied by each cageless collocation equipment bay) to arrive at a cost of $174.59. (Part AF, Workpaper 1.0, page 1, Line 11).

Q. DO YOU AGREE THAT EACH CAGELESS COLLOCATION EQUIPMENT BAY OCCUPIES 11.6 SQUARE FEET OF FLOOR SPACE?

A. No. As Verizon NY argued in Module 2, a cageless collocation equipment bay occupies 15 square feet. Nevertheless, Verizon NY has used the 11.6 square foot footprint ordered by the Commission in Module 2.[4] This assumption reduces the CLECs' security costs. If Verizon NY had used the 15 square foot assumption, the cost would have been $221.18.

III. COSTS, TERMS AND CONDITIONS FOR ADJACENT COLLOCATION

Q. WHAT IS ADJACENT COLLOCATION?

A. Adjacent collocation provides CLECs an alternative method of collocating on an ILEC's premise when physical space within the central office has been exhausted. As described in greater detail below, where technically feasible, adjacent collocation permits CLECs to place a structure on Verizon NY's central office property to house their equipment and connect to Verizon NY's network.

Q. WHY DID VERIZON NY DECLINE TO INTRODUCE A STUDY IN THE COLLOCATION PHASE OF THIS PROCEEDING?

A. As noted in previous testimony, "[a]djacent collocation arrangements will vary with the physical make-up and location of each central office as well as with the amount of central office space available for adjacent collocation, the distance from BA-NY's network, and the CLEC's specifications." Rebuttal Testimony at 36. Further, Verizon NY has never provisioned an adjacent arrangement. To comply with the Commission's order, however, Verizon NY compiled a study which best approximates the costs associated with adjacent collocation.

Q. DID VERIZON NY USE INPUTS ALREADY APPROVED BY THIS COMMISSION?

[4] Order at 36.

A. Yes. Verizon NY's adjacent collocation cost study uses labor rates and carrying charge factors ("CCFs") already approved by this Commission.

A. Terms and Conditions

Q. PLEASE DESCRIBE AN ADJACENT COLLOCATION ARRANGEMENT.

A. In a central office where space for physical collocation has been exhausted, a CLEC will be allowed to construct (or otherwise procure) a controlled environment vault ("CEV") (for placement underground), or a hut or similar structure (for placement aboveground) on Verizon NY's premises, where technically feasible.

Q. PLEASE DESCRIBE GENERALLY THE ADJACENT COLLOCATION APPLICATION PROCESS.

A. If a CLEC desires to collocate in a central office that has no space available for physical collocation, it may submit an application for an adjacent arrangement. Upon receipt of the application (and application fee), Verizon NY will perform a preliminary site survey to determine whether such an arrangement is technically feasible. If such an arrangement is feasible, Verizon NY will sketch it out, denoting the location of gas, sewer and water lines. As described in more detail below, Verizon NY will work with the CLEC, where necessary, to obtain the requisite permits for the adjacent structure from the appropriate authorities.

If the arrangement is not technically feasible, the CLEC will forfeit the application fee, but will incur no further charges.

Q. WHY DOES THE CLEC FORFEIT ITS APPLICATION FEE IF IT CANNOT OBTAIN AN ARRANGEMENT?

A. Verizon NY must perform a feasibility study to determine if it is possible to accommodate a CLEC's request for adjacent collocation. Verizon NY incurs these costs regardless of the study's outcome. In fact, the application fee recovers only a portion of the cost of performing this site survey.

Q. PLEASE DESCRIBE THE PARTIES' RESPONSIBILITIES IN CONSTRUCTING AN ADJACENT COLLOCATION ARRANGEMENT.

A. Verizon NY has summarized below the major responsibilities of each party. Of course, Verizon NY's adjacent collocation tariff contains additional non-price terms and conditions, such as terms governing inspections, compliance with technical specifications, indemnification from lawsuits, and so forth.

First, the CLEC must ensure that the arrangement complies with zoning requirements and state and local regulations, and must obtain any and all associated permits. Verizon NY will, where required, participate in the zoning approval and permit acquisition process; the CLEC will be responsible for reimbursing Verizon NY for any expenses incurred. As explained below, this cost will be charged on a time and materials basis.

Second, Verizon NY will determine the appropriate location for the adjacent collocation arrangement. Among other things, Verizon NY must consider: (i) the location of gas, sewer, water, and electrical entrances; (ii) the appropriate cable and conduit paths to the vault; (iii) the location of future/prospective building expansions, and so forth.

Third, the CLEC is responsible for all work related to constructing the adjacent structure itself. The construction must comply with Verizon NY's environmental, safety and grounding requirements, as set forth in Verizon technical specifications and Telcordia documentation.

Fourth, the CLEC is responsible for constructing and placing the conduit from the adjacent structure to Verizon NY's entrance facility. Verizon NY will be responsible for breaking out the manhole for the entrance facility and for connecting the CLEC's conduit structure to Verizon NY's manhole.

Fifth, the CLEC is responsible for terminating the cross connect facilities (described below) on a CLEC provided point of termination located within the adjacent structure. Verizon NY will place the cabling from the CLEC's structure through the CLEC's conduit to manhole '0' and through the vault to the Company's designated termination inside the central office.

Finally, the CLEC is responsible for converting AC power to DC power (as required) within its own structure. Verizon NY will assist the CLEC, if necessary, in contracting with the local power company for AC power.

B. Costs for Adjacent Collocation

Q. PLEASE GENERALLY DESCRIBE THE COSTS ASSOCIATED WITH ADJACENT COLLOCATION.

A. Because the CLEC does much of the work that occurs outside the central office, the costs for the adjacent structure are largely within the CLEC's control. Verizon NY's rates for adjacent collocation are similar to those for other forms of physical collocation, and include an engineering and administration fee, an outside plant ("OSP") entrance facility fee, a corporate real estate fee, a service access charge ("SAC") , and a contract work inspector charge.

1. Engineering and Administration Fee

Q. PLEASE DESCRIBE THE ENGINEERING AND ADMINISTRATION FEE.

A. The engineering and administration fee recovers Verizon NY's costs for processing and implementing the CLECs' request for adjacent collocation. These activities include:

- Reviewing the application for completeness and determining/clarifying the CLEC's requirements;
- Distributing the application to the CRE organization;
- Establishing a project tracking record;
- Recording the required information and determining the timeline required for the feasibility site survey;

- Determining feasibility and restrictions/constraints on feasibility;
- Conducting pre-site survey tasks, *i.e.*, reviewing building plans, determining bay availability and new bay location, developing a list of feasible locations, and coordinating and arranging the site survey, etc.;
- Conducting the site survey, *i.e.*, traveling to and from the site, evaluating all potential locations, determining the final solution for accommodating the structure and cable terminations, and developing a rough sketch of the arrangement;
- Reviewing and approving the CLEC's easement or right-of-way;
- Finalizing bay assignments;
- Updating databases with new termination information;
- Sending assignments to the OSP engineer;
- Developing formal documentation for communication to stakeholders;
- Providing the results of the site survey to the CLEC;
- Arranging for final billing; and
- Inputting billing data for bill issuance.

As with all other forms of collocation, when the CLEC submits its application, it must pay a fee. The application fee is simply a portion of the engineering and administration fee ($2,500), due when the CLEC submits its application.

Q. WHICH VERIZON NY ORGANIZATIONS ARE INVOLVED IN THIS PROCESS?

A. The Wholesale Network organization (formerly TIS) is involved in reviewing and distributing the application and establishing the project record, as well as in the billing process. Verizon NY's CRE organization is also involved in implementing adjacent collocation, including the site survey and determination of feasibility and location. Finally, the central office engineer reviews the application and conducts pre-site survey activities as well as the survey itself.

The engineering and administration fee ($3,571.27) is derived by multiplying the appropriate labor rates for these organizations with the number of hours required by each group to process and implement adjacent collocation. (Workpaper 1.0, Line 22.) Again, a portion of this ($2,500) will be assessed up-front as an application fee, due at the time the CLEC files its application for adjacent collocation.

Q. HOW DID VERIZON NY DETERMINE APPROPRIATE WORK TIMES?

A. The organizations involved in provisioning adjacent collocation supplied the appropriate work times using experience with other forms of collocation. With respect to the work times for the Wholesale Network organization, Verizon NY used the times provided in the Phase III cost study and eliminated those activities not necessary to provision adjacent collocation. For example, this organization will not need to coordinate with the Local Collocation Coordinator when provisioning adjacent collocation, as they must with physical and virtual collocation. For the central office engineering ("COE") work times, four central office engineers located in three distinct locations supplied their best estimates of the relevant work times. The CRE group based their estimates on the times required for similar activities, *i.e.*, obtaining rights-of-way and easements for Verizon NY's own use.

2. Outside Plant Entrance Facility Fee

Q. PLEASE DESCRIBE THE OUTSIDE PLANT ENTRANCE FACILITY FEE.

A. The OSP Entrance Facility fee recovers three costs. First, this fee recovers the cost of breaking out the manhole so the CLEC may establish a connection from its adjacent structure to the central office. Verizon NY must break the concrete casting on the manhole to allow the CLEC's conduit and new ducts to access the manhole. After the ducts are connected to the manhole, additional cement is poured to encase the new area to prevent leakage. This cost ($350) is based on the charge Verizon NY has negotiated with its vendors for the Company's own manhole break-out activities. *See* Workpaper 2.0, Line 1.

Second, this charge recovers the costs for a contract work inspector ("CWI") to ensure that the vendor complies with safety requirements, restoration and construction standards. *See* Workpaper 2.0, Lines 2-4. As described below, a similar but separate fee is assessed for a CWI's supervision of CLEC work.

Third, the OSP entrance facility fee recovers costs associated with designing, issuing, distributing, and posting a work order detailing the work activities required for breaking out manhole '0' and connecting the CLEC's conduit from the adjacent structure to Verizon NY's entrance facility. As shown on Workpaper 2.0, Line 9, the total cost for these services is estimated at $941.50. This fee is recovered on a nonrecurring basis.

3. Corporate Real Estate Fee

Q. WHAT IS THE PURPOSE OF THE CRE FEE?

A. This fee recovers the time Verizon NY spends assisting the CLEC in obtaining the appropriate zoning approval and permits. This charge is assessed on an hourly basis at a rate of $40.93, determined on a case-by-case basis. Assessing this charge on a case-by-case basis is reasonable because the CLEC may not require Verizon NY's involvement at all, and because any necessary involvement will depend on each localities' zoning approval process. This charge is shown at Workpaper 7.0, Line 14.

4. Service Access Charge

Q. PLEASE DESCRIBE THE SERVICE ACCESS CHARGE ("SAC") – CABLE AND FRAME TERMINATIONS.

A. The SAC, or cross connect, provides the physical connection between the collocator-provided demarcation within the on-site adjacent structure and Verizon NY's network. It consists of cabling, protection, and terminations on Verizon NY's frames. The SAC for voice grade elements terminates on a main distribution frame; the SAC for DS1 and DS3 services terminate on a digital cross-connect bay. The fiber termination SAC terminates on a Fiber Distribution Frame. Because of the different types of protection that Verizon NY must provide when bringing cables from outside the central office into its vault, the adjacent collocation SAC is different from the traditional physical collocation SAC.

Specifically, the SAC cabling will come from Verizon NY's frames and go through the vault to manhole '0' and follow a route through the CLEC connection to the demarcation point within the adjacent structure. Verizon NY must determine where to terminate the CLEC's cable based on the services ordered. An OSP engineer must determine the path the SAC cables will take from the adjacent structure to Verizon NY's network. The OSP technicians will also place and splice the associated SAC cables.

Verizon NY is responsible for all of this required work, with the exception of terminating the connection within the CLEC's structure. The CLEC will be responsible for the demarcation termination, as well as terminating the SAC cables to this termination.

Q. HOW WERE THE SAC COSTS CALCULATED?

A. Verizon NY surveyed five central offices representing the different New York density zones– two for the Major Cities – Not Manhattan category and three for the Rest of State category.[5] For each offering (voice grade, DS1, DS3, and fiber), Verizon NY's engineering organization provided SAC lengths for each office between the relevant points within the office – MDF to the vault and the vault to manhole '0' – and outside the office – from manhole '0' to the hypothetical adjacent structure located outside the central office.

[5] Verizon NY did not to include SAC lengths from Manhattan because it is unlikely that a CLEC will opt for adjacent collocation in this zone given Manhattan's lengthy zoning approval process, even assuming there is adjacent space available. Verizon NY therefore felt it would be inappropriate to increase the average SAC lengths, and thus costs, based on this improbable scenario.

The information was input into the Verizon NY's ECRIS system to yield the installed costs associated with these cross connects, including costs for OSP construction and the associated engineering and material costs.

Using these installed costs, Verizon NY developed a single statewide average for each service (voice grade, DS1, DS3, and fiber) by weighting the costs for the various density zones. Verizon NY then added the installed costs for the associated termination panels and frames. (Installed costs equal the material costs multiplied by the approved EF&I factor). Finally, Verizon NY applied the appropriate CCFs to these installed costs. *See* Workpapers 5.0, 6.0 and 7.0.

Q. WHAT IF THE CROSS CONNECTS FROM THE ADJACENT STRUCTURE TO VERIZON NY'S FRAME REQUIRE REGENERATION?

A. Regeneration is required if cable lengths exceed a certain distance. It is unlikely that the cross connects for an adjacent collocation arrangement will ever exceed these distance limitations. In the unlikely event that they do, Verizon NY will provide the necessary regeneration and will assess the appropriate charge on a case-by-case basis.

5. Contract Work Inspection Fee

Q. PLEASE DESCRIBE THE CONTRACT WORK INSPECTION FEE.

A. As noted above, a Contract Work Inspector must monitor all construction work performed on Verizon NY premises, whether Verizon NY or the CLEC performs the work. While the CLEC (or its vendor) digs the hole for the CEV, places the CEV, digs the trench for the conduit from the CEV to manhole '0' and lays the conduit, a CWI must periodically inspect the construction work for safety reasons. This charge is assessed on an hourly basis, at a rate of $62.20 per hour, determined on a time and materials basis. Assessing this charge on a time and materials basis is reasonable because the time will vary greatly with each arrangement. More importantly, the amount of time the CWI spends monitoring the construction work is controlled by the CLEC, *i.e.*, when their vendors are available, whether they perform activities concurrently or successively, and so forth. This rate is shown at Workpaper 7.0, Line 17.

Q. DOES THIS CONCLUDE THE PANEL'S TESTIMONY?

A. Yes.

ON-SITE ADJACENT COLLOCATION
Verizon - New York

ENGINEERING AND ADMINISTRATION FEE

	A	B	C	D	E	F
LINE NO.	WORK OPERATION	TIS HRS	CRE CLERICAL HRS	CRE ENGINEER HRS	CRE MANAGER HRS	CO ENGINEER HRS
1	REVIEW APPLICATION AND REQUIREMENTS OF CLEC	0.50	-	-	-	-
2	REVIEW APPLICATION ON RECEIPT FOR COMPLETENESS AND CLARIFICATION OF REQUIREMENTS	1.00	-	-	-	-
3	DISTRIBUTION OF APPLICATION TO CRE	0.50	-	-	-	-
4	ESTABLISH PROJECT TRACKING RECORD	0.50	-	-	-	-
5	REVIEW APPLICATION AND DETERMINE REQUIREMENTS	-	-	0.50	-	0.25
6	RECORD REQUIRED INFORMATION AND DETERMINE CRE REQUIRED TIMELINE FOR FEASIBILITY SITE SURVEY	-	0.25	0.25	-	-
7	COORDINATE INVESTIGATION TASKS	-	-	1.00	1.00	-
8	INVESTIGATE RESTRICTIONS AND CONSTRAINTS ON FEASIBILITY					
	A. RESEARCH DEED AND ZONING REQUIREMENTS FOR SITE RESTRICTIONS	-	-	-	15.00	-
	B. DETERMINE IF EASEMENT OR RIGHT-OF-WAY (ROW) IS REQUIRED	-	-	-	1.00	-
	C. REVIEW BUILDING RECORDS FOR THE DEVELOPMENT OF POTENTIAL SOLUTIONS	-	-	3.00	-	-
	D. REVIEW PROPOSED WORK PLANS / PROPOSALS FOR POTENTIAL CONFLICTS	-	-	3.00	-	-
9	CONDUCT PRESITE SURVEY TASKS					
	A. PULL CO BUILDING PLANS FOR LOCATIONS OF EXISTING BAYS	-	-	-	-	0.25
	B. DETERMINE MDF/LGX/DSX BAY CAPACITY/AVAILABILITY	-	-	-	-	0.75
	C. MARK UP BUILDING PLANS WITH NEW BAY ASSIGNMENTS	-	-	-	-	0.50
	D. DEVELOP PRELIMINARY LIST OF FEASIBLE SITE LOCATIONS	-	-	3.00	-	-
	E. COORDINATE AND ARRANGE SITE SURVEY FIELD VISIT W/ CRE	-	-	1.50	0.25	-
	F. COORDINATE SITE SURVEY W/ OSP ENGINEER	-	-	-	-	0.25
10	CONDUCT SITE SURVEY					
	A. TRAVEL TIME TO AND FROM SITE	-	-	4.00	4.00	1.50
	B. REVIEW ALL POTENTIAL SOLUTIONS FOR FEASIBILITY	-	-	2.00	2.00	0.75
	C. DETERMINE FINAL SOLUTION FOR ACCOMMODATING THE STRUCTURE OR CABLE TERMINATIONS	-	-	1.00	1.00	0.75
	D. DEVELOP ROUGH SKETCH OF SITE ILLUSTRATING THE LOCATION OR CABLE TERMINATIONS AND ASSIGNMENTS	-	-	0.50	-	0.50
11	REVIEW AND APPROVE CLEC'S EASEMENT OR ROW	-	1.00	-	3.00	-
12	FINALIZE MDF/LGX/DSX BAY ASSIGNMENTS AND DEVELOP RECORD	-	-	-	-	0.50
13	UPDATE DATABASE WITH NEW TERMINATION INFORMATION	-	-	-	-	0.75
14	SEND ASSIGNMENTS TO OSP ENGINEER	-	-	-	-	0.25
15	DEVELOP FORMAL DOCUMENTATION AND COMMUNICATE TO STAKEHOLDERS	-	1.00	1.00	-	-
16	PROVIDE RESULTS OF SITE SURVEY TO CLEC	1.00	-	-	-	-
17	ARRANGE FOR FINAL BILLING - NOTIFICATION TO BILLING STAFF	0.50	-	-	-	-
18	INPUT OF BILLING DATA FOR BILL ISSUANCE	1.00	-	-	-	-
19	TOTAL HOURS (SUM OF LINES 1 THRU 18)	5.00	2.25	20.75	27.25	7.00
20	LABOR RATES:					
	A. TIS (PART AE, WP 7.0, PG 1 LN 12)	$40.93	-	-	-	-
	B. CRE CLERICAL (PART AE,WP 7.0, PG 1, LN 13)	-	$45.56	-	-	-
	C. CRE ENGINEER (PART AE, WP 7.0, PG 1, LN 14)	-	-	$40.93	-	-
	D. CRE MANAGER (PART AE, WP 7.0, PG 1, LN 15)	-	-	-	$49.44	-
	E. CO ENGINEER (PART AE, WP 7.0, PG 1, LN 18)	-	-	-	-	$152.51
21	TOTAL COSTS BY FUNCTION (LINE 19 X LINE 20)	$204.65	$102.51	$849.30	$1,347.24	$1,067.57
22	**ENGINEERING AND ADMINSTRATION FEE** (SUM OF LINE 21)	**$3,571.27**				

ON-SITE ADJACENT COLLOCATION
Verizon - New York

OSP ENTRANCE FACILITY FEE

	A	B	C
LINE NO.	**ITEM**	**SOURCE**	**DATA**
1	MANHOLE PENETRATION & RESTORATION (1-6 DUCTS)	ENGINEERING ESTIMATE	$350.00
2	HOURS FOR SAFETY CONTRACT WORK INSPECTION	ENGINEERING ESTIMATE	4
3	CONTRACT WORK INSPECTOR (OUTSIDE PLANT TECHNICIAN) LABOR RATE	PART AE, WP 7.0, PG 1, LN 17	$62.20
4	CONTRACT WORK INSPECTION INVESTMENT	LINE 3 X LINE 4	$248.80
6	HOURS REQUIRED FOR OSP ENGINEERING DESIGN	ENGINEERING ESTIMATE	5
7	OSP ENGINEERING LABOR RATE	PART AE, WP 7.0, PG 1, LN 16	$73.54
8	OSP ENGINEERING DESIGN INVESTMENT	LINE 6 X LINE 7	$367.70
9	TOTAL OUTSIDE PLANT ENTRANCE FACILITY FEE	LINE 1 + LINE 4 + LINE 8	**$966.50**

ON-SITE ADJACENT COLLOCATION
Bell Atlantic - New York

VG - SERVICE ACCESS CHARGE (SAC)

	A	B	C
LINE NO.	ITEM	SOURCE	DATA
1	TOTAL NRC CABLE PULL & SPLICE PER 100 PR	PART AE, WP 3.0, PAGE 2, LINE 11C	$408.41
2	TOTAL NRC VG FRAME & TERMINATION PER 100 PR	PART AE, WP 3.0, PAGE 3, LINE 5	$1,337.91
3	TOTAL VG NRC INVESTMENT PER 100 PR	LINE 1 + LINE 2	**$1,746.32**
4	CIRCUIT DIGITAL - ANNUAL COST FACTOR	PART AE, WP 7.0, PG 1, LN 5	0.0478
5	CIRCUIT DIGITAL - ANNUAL COST	LINE 3 X LINE 4	$83.55
6	BUILDING - INVESTMENT FACTOR	PART AE, WP 7.0, PG 1, LN 10	0.2140
7	BUILDING INVESTMENT	LINE 3 X LINE 6	$373.71
8	BUILDING - ANNUAL CARRYING CHARGE FACTOR	PART AE, WP 7.0, PG 1, LN 9	0.2324
9	BUILDING - ANNUAL COST	LINE 7 X LINE 8	$86.85
10	TOTAL ANNUAL COSTS (CKT EQPT + BLDG)	LINE 5 + LINE 9	$170.40
11	TOTAL MONTHLY COST PER 100 VG	LINE 10 / 12	**$14.20**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

VOICE GRADE CABLE PULL & SPLICE (CLEC STRUCTURE TO VAULT)

LINE NO.	A CENTRAL OFFICE	C EST TOTAL COST	SOURCE	D DENSITY WEIGHTING	SOURCE	F = B X D WEIGHTED AVG
1	HICKSVILLE	$15,064	ECRIS	0.6312	PART AE, WP 8.0 PG 1, LN 1D	$9,509
2	MID-NASSAU	$14,127	ECRIS	0.3688	PART AE, WP 8.0 PG 1, LN 2D	$5,210
3	MAJOR CITIES NOT - MANHATTAN WEIGHTED AVG					$14,718
4	AMHERST	$14,785	ECRIS	0.8445	PART AE, WP 8.0 PG 1, LN 4D	$12,486
5	PALMYRA	$14,445	ECRIS	0.1096	PART AE, WP 8.0 PG 1, LN 5D	$1,583
6	MARION	$13,041	ECRIS	0.0459	PART AE, WP 8.0 PG 1, LN 6D	$599
7	REST-OF-STATE WEIGHTED AVG					$14,668
	STATE WIDE AVERAGE					
8	MAJOR CITY - NOT MANHATTAN	$14,718	LINE 3F	0.6933	PART AE, WP 8.0 PG 1, LN 3E	$10,204.31
9	REST-OF-STATE	$14,668	LINE 7F	0.3067	PART AE, WP 8.0 PG 1, LN 7E	$4,498.58
10	TOTAL STATEWIDE COSTS PER 3600 PAIR		LINE 8 F + LINE 9F			$14,703
11	**TOTAL NRC CABLE PULL & SPLICE PER 100 PAIR**		LINE 10F / 36 (3600 / 36)			**$408.41**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

VG FRAME AND TERMINATION

	A	B	C
LINE NO.	ITEM	SOURCE	DATA
1	MAIN DISTRIBUTION FRAME (MDF) INVESTMENT PER 100 PR	VENDOR MATERIAL PRICE	$113.00
2	100 PR FRAME BLOCK W/ PROTECTION & STUB	VENDOR MATERIAL PRICE	$698.15
3	TOTAL MATERIAL INVESTMENT PER 100 PAIR	LINE 1 + LINE 2	$811.15
4	CIRCUIT DIGITAL INSTALLATION FACTOR	PART AE, WP 7.0, PG 1, LN 11	1.6494
5	TOTAL VG FRAME AND TERMINATION PER 100 PR	LINE 3 X LINE 4	**$1,337.91**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

DS1 - SERVICE ACCESS CHARGE (SAC)

	A	B	C
LINE NO.	ITEM	SOURCE	DATA
1	TOTAL NRC DS1 CABLE PULL & SPLICE	PART AE, WP 4.0, PG 2, LN 11C	$494.51
2	TOTAL NRC DS1 FRAME & TERM 28 DS1s	PART AE, WP 4.0, PG 3, LN 6	$1,202.01
3	TOTAL DS1 NRC INVESTMENT	LINE 1 + LINE 2	**$1,696.52**
4	CIRCUIT DIGITAL - ANNUAL COST FACTOR	PART AE, WP 7.0, PG 1, LN 5	0.0478
5	CIRCUIT DIGITAL - ANNUAL COST	LINE 3 X LINE 4	$81.17
6	BUILDING - INVESTMENT FACTOR	PART AE, WP 7.0, PG 1, LN 10	0.2140
7	BUILDING INVESTMENT	LINE 3 X LINE 6	$363.06
8	BUILDING - ANNUAL CARRYING CHARGE FACTOR	PART AE, WP 7.0, PG 1, LN 9	0.2324
9	BUILDING - ANNUAL COST	LINE 7 X LINE 8	$84.37
10	TOTAL ANNUAL COSTS (CKT EQPT + BLDG)	LINE 5 + LINE 9	$165.55
11	TOTAL MONTHLY COST PER 28 DS1s	LINE 10 / 12	**$13.80**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

DS1 CABLE PULL & SPLICE (CLEC STRUCTURE TO DSX BAY)

	A	B	C	D	E	F = B X D
LINE NO.	CENTRAL OFFICE	EST TOTAL COST	SOURCE	DENSITY WEIGHTING	SOURCE	WEIGHTED AVG
1	HICKSVILLE	$2,854	ECRIS	0.6312	PART AE, WP 8.0 PG 1, LN 1D	$1,802
2	MID-NASSAU	$3,655	ECRIS	0.3688	PART AE, WP 8.0 PG 1, LN 2D	$1,348
3	MAJOR CITIES NOT - MANHATTAN WEIGHTED AVG					$3,149
4	AMHERST	$2,579	ECRIS	0.8445	PART AE, WP 8.0 PG 1, LN 4D	$2,178
5	PALMYRA	$2,459	ECRIS	0.1096	PART AE, WP 8.0 PG 1, LN 5D	$269
6	MARION	$2,340	ECRIS	0.0459	PART AE, WP 8.0 PG 1, LN 6D	$107
7	REST-OF-STATE WEIGHTED AVG					$2,555
	STATE WIDE AVERAGE					
8	MAJOR CITY - NOT MANHATTAN	$3,149	LINE 3F	0.6933	PART AE, WP 8.0 PG 1, LN 3E	$2,183.47
9	REST-OF-STATE	$2,555	LINE 7F	0.3067	PART AE, WP 8.0 PG 1, LN 7E	$783.58
10	TOTAL STATEWIDE COSTS		LINE 8F + LINE 9F			$2,967.05
11	**TOTAL NRC CABLE PULL & SPLICE PER 28 DSIs**		(LINE 10F / 2) / 3 (200PR / 2 = 100 4W) (100 / 28 DS1s = 3)			**$494.51**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

DS1 FRAME AND TERMINATION

	A	B	C
LINE NO.	**ITEM**	**SOURCE**	**DATA**
1	DSX 1 BAY - FRAME INVESTMENT	VENDOR MATERIAL PRICE	$810.30
2	DS1 CAPACITY OF DSX BAY FRAME	MATERIAL SPECIFICATION	1,008
3	DSX FRAME - MATERIAL INVESTMENT PER 28 DS1's	(LINE 1 / LINE 2) X 28	$22.51
4	DS1 X-CONNECT PANEL AT DSX BAY	VENDOR MATERIAL PRICE	$706.25
5	CIRCUIT DIGITAL INSTALLATION FACTOR	PART AE, WP 7.0, PG 1, LN 11	1.6494
6	TOTAL DS1 FRAME & TERMINATION PER 28 DS1s	(LINE 3 + LINE 4) X LINE 5	**$1,202.01**

ON-SITE ADJACENT COLLOCATION
VERIZON - NEW YORK

DS3 - SERVICE ACCESS CHARGE (SAC)

	A	B	C
LINE NO.	ITEM	SOURCE	DATA
1	TOTAL NRC DS3 CABLE, FRAME & TERMINATION	PART AE, WP 5.0, PG 2, LN 15	**$1,321.79**
2	CIRCUIT DIGITAL - ANNUAL COST FACTOR	PART AE, WP 7.0, PG 1, LN 5	0.0478
3	CIRCUIT DIGITAL - ANNUAL COST	LINE 1 X LINE 2	$63.24
4	BUILDING - INVESTMENT FACTOR	PART AE, WP 7.0, PG 1, LN 10	0.2140
5	BUILDING INVESTMENT	LINE 1 X LINE 4	$282.86
6	BUILDING - ANNUAL CARRYING CHARGE FACTOR	PART AE, WP 7.0, PG 1, LN 9	0.2324
7	BUILDING - ANNUAL COST	LINE 5 X LINE 6	$65.74
8	TOTAL ANNUAL COSTS (CKT EQPT + BLDG)	LINE 3 + LINE 7	$128.98
9	TOTAL MONTHLY COST PER DS3	LINE 8 / 12	**$10.75**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

DS3 DSX FRAME AND TERMINATION

	A	B	C
LINE NO.	ITEM	SOURCE	DATA
1	DSX 3 BAY - FRAME INVESTMENT	VENDOR MATERIAL PRICE	$775.69
2	DS3 CAPACITY OF DSX BAY FRAME	MATERIAL SPECIFICATION	240
3	DSX FRAME - MATERIAL INVESTMENT PER DS3	LINE 1 / LINE 2	$3.23
4	DS3 X-CONNECT PANEL AT DSX BAY	VENDOR MATERIAL PRICE	$6,595.32
5	NUMBER OF DS3 TERMINATIONS	MATERIAL SPECIFICATION	24
6	DS3 INVESTMENT PER TERMINATION PER T & R PAIR	LINE 4 / LINE 5	$274.81
7	BNC CONNECTORS FOR 734A CABLE	VENDOR MATERIAL PRICE	$1.85
8	INVESTMENT FOR TRANS & REC BNC CONNECTORS	LINE 7 X 2	$3.70
9	AVERAGE DS3 CABLE LENGTH FT	PART AE, WP 5.0, PG 3, LN 11	565
10	CABLE INVESTMENT - 734A SWBDCA 20 GA PER FT	VENDOR MATERIAL PRICE	$0.46
11	CABLE INVESTMENT PER PAIR	LINE 9 X LINE 10	$259.82
12	CABLE INVESTMENT PER T & R PAIR	LINE 11 X 2	$519.64
13	TOTAL MATERIAL INVESTMENT PER DS3	LINES 3 + 6 + 8 + 12	$801.38
14	CIRCUIT DIGITAL INSTALLATION FACTOR	PART AE, WP 7.0, PG 1, LN 11	1.6494
15	TOTAL FRAME AND TERMINATION PER DS3	LINE 13 X LINE 14	**$1,321.79**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

DS3 CABLE (CLEC STRUCTURE TO DSX BAY)

LINE	A CENTRAL OFFICE	B EST CBL LENGTH	C SOURCE	D DENSITY WEIGHTING	E SOURCE	F = B X D WEIGHTED AVG
1	HICKSVILLE	420	ECRIS	0.6312	PART AE, WP 8.0 PG 1, LN 1D	265
2	MID-NASSAU	945	ECRIS	0.3688	PART AE, WP 8.0 PG 1, LN 2D	348
3	MAJOR CITIES NOT - MANHATTAN WEIGHTED AVG					614
4	AMHERST	470	ECRIS	0.8445	PART AE, WP 8.0 PG 1, LN 4D	397
5	PALMYRA	415	ECRIS	0.1096	PART AE, WP 8.0 PG 1, LN 5D	45
6	MARION	265	ECRIS	0.0459	PART AE, WP 8.0 PG 1, LN 6D	12
7	REST-OF-STATE WEIGHTED AVG					455
	STATE WIDE AVERAGE					
8	MAJOR CITY - NOT MANHATTAN	614	LINE 3F	0.6933	PART AE, WP 8.0 PG 1, LN 3E	425
9	REST OF STATE	455	LINE 7F	0.3067	PART AE, WP 8.0 PG 1, LN 7E	139
10	TOTAL STATEWIDE		LINE 8F + LINE 9F			565
11	**TOTAL STATEWIDE LENGTH PER DS3**		LINE 10F			**565**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

FIBER - SERVICE ACCESS CHARGE (SAC)

	A	B	C
LINE NO.	**ITEM**	**SOURCE**	**DATA**
1	TOTAL NRC FIBER CABLE PULL & SPLICE	PART AE, WP 6.0, PG 2, LN 11F	$2,377.25
2	TOTAL NRC SFDF & TERMINATION	PART AE, WP 6.0, PG 3, LN 10	$646.20
3	TOTAL NRC FIBER CA, SFDF & TERMINATION	LINE 1 + LINE 2	**$3,023.45**
4	CIRCUIT DIGITAL - ANNUAL COST FACTOR	PART AE, WP 7.0, PG 1, LN 5	0.0478
5	CIRCUIT DIGITAL - ANNUAL COST	LINE 3 X LINE 4	$144.66
6	BUILDING - INVESTMENT FACTOR	PART AE, WP 7.0, PG 1, LN 10	0.2140
7	BUILDING INVESTMENT	LINE 3 X LINE 6	$647.02
8	BUILDING - ANNUAL CARRYING CHARGE FACTOR	PART AE, WP 7.0, PG 1, LN 9	0.2324
9	BUILDING - ANNUAL COST	LINE 7 X LINE 8	$150.37
10	TOTAL ANNUAL COSTS (CKT EQPT + BLDG)	LINE 5 + LINE 9	$295.03
11	TOTAL MONTHLY COST PER 12 FIBERS	LINE 10 / 12	**$24.59**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

FIBER CABLE PULL & SPLICE (CLEC STRUCTURE TO SFDF)

LINE NO.	A CENTRAL OFFICE	B EST TOTAL COST	C SOURCE	D DENSITY WEIGHTING	E SOURCE	F = B X D WEIGHTED AVG
1	HICKSVILLE	$5,118	ECRIS	0.6312	PART AE, WP 8.0 PG 1, LN 1D	$3,231
2	MID-NASSAU	$5,932	ECRIS	0.3688	PART AE, WP 8.0 PG 1, LN 2D	$2,188
3	MAJOR CITIES NOT - MANHATTAN WEIGHTED AVG					$5,418
4	AMHERST	$3,229	ECRIS	0.8445	PART AE, WP 8.0 PG 1, LN 4D	$2,727
5	PALMYRA	$3,378	ECRIS	0.1096	PART AE, WP 8.0 PG 1, LN 5D	$370
6	MARION	$3,424	ECRIS	0.0459	PART AE, WP 8.0 PG 1, LN 6D	$157
7	REST-OF-STATE WEIGHTED AVG					$3,254
	STATE WIDE AVERAGE					
8	MAJOR CITY - NOT MANHATTAN	$5,418	LINE 3F	0.6933	PART AE, WP 8.0 PG 1, LN 3E	$3,756
9	REST-OF-STATE	$3,254	LINE 7E	0.3067	PART AE, WP 8.0 PG 1, LN 7E	$998
10	TOTAL STATEWIDE COSTS - 24 FIBERS		LINE 8F + LINE 9F			$4,755
11	**TOTAL NRC FIBER CABLE PULL & SPLICE PER 12 FIBERS**		LINE 10F / 2			**$2,377.25**

ON-SITE ADJACENT COLLOCATION
VERIZON - NEW YORK

SHARED FIBER DISTRIBUTION FRAME AND TERMINATION

	A	B	C
LINE NO.	ITEM	SOURCE	DATA
1	SHARED FIBER DISTRIBUTION FRAME (SFDF) INVESTMENT	VENDOR MATERIAL PRICE	$2,539.97
2	SFDF INVESTMENT PER FIBER	LINE 1 / 864	$2.94
3	SFDF INVESTMENT PER 12 FIBERS	LINE 2 X 12	$35.28
4	72 FIBER TERMINATION EQUIPMENT SHELF	VENDOR MATERIAL PRICE	$2,139.00
5	NUMBER OF FIBER TERMINATIONS	MATERIAL SPECIFICATIONS	72
6	FIBER TERMINATION EQUIPMENT SHELF PER FIBER	LINE 4 / LINE 5	$29.71
7	FIBER TERMINATION EQUIPMENT SHELF PER 12 FIBERS	LINE 6 X 12	$356.50
8	TOTAL INVESTMENT PER 12 FIBERS	LINE 3 + LINE 7	$391.78
9	CIRCUIT DIGITAL INSTALLATION FACTOR	PART AE, WP 7.0, PG 1, LN 11	1.6494
10	TOTAL SFDF AND TERMINATION PER 12 FIBERS	LINE 8 X LINE 9	**$646.20**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

FACTORS

	A	B	C
LINE NO.	**ITEM.**	**SOURCE**	**DATA**
	ANNUAL CARRYING CHARGE FACTORS		
	CIRCUIT DIGITAL - ANNUAL COST FACTOR		
1	TELRIC ACCF (AD VALOREM)	OPINION 97-2	0.0029
2	REVENUE LOADING	OPINION 97-2	1.0157
3	DIRECTLY ATTRIBUTABLE JOINT	OPINION 97-2	0.0384
4	COMMON	OPINION 97-2	0.0065
5	CIRCUIT DIGITAL - ANNUAL COST FACTOR (W\Adjustment)	(LINE 1 X LINE 2) + LINE 3 + LINE 4	**0.0478**
	BUILDING		
6	TELRIC ACCF	OPINION 97-2	0.2259
7	DIRECTLY ATTRIBUTABLE JOINT	OPINION 97-2	0.0000
8	COMMON	OPINION 97-2	0.0065
9	BUILDING - ANNUAL CARRYING CHARGE FACTOR	LINE 6 + LINE 7 + LINE 8	**0.2324**
	OTHER FACTORS		
10	BUILDING - INVESTMENT FACTOR	OPINION 97-2	**0.2140**
11	CIRCUIT DIGITAL INSTALLATION FACTOR	OPINION 97-2	**1.6494**
	LABOR RATES AVERAGE 1995 (TRENDED TO 1/1/97)		
12	TIS	OPINION 99-4	**$40.93**
13	CORPORATE REAL ESTATE (CRE) - CLERICAL	OPINION 99-4	**$45.56**
14	CORPORATE REAL ESTATE (CRE) - ENGINEERING	OPINION 99-4	**$40.93**
15	CORPORATE REAL ESTATE (CRE) - MANAGER	OPINION 99-4	**$49.44**
16	OUTSIDE PLANT ENGINEER	OPINION 99-4	**$73.54**
17	OUTSIDE PLANT TECHNICIAN & CONTRACT WORK INSPECTOR	OPINION 99-4	**$62.20**
18	NETWORK AND CENTRAL OFFICE ENGINEER	OPINION 99-4	**$152.51**

ON-SITE ADJACENT COLLOCATION
Verizon - New York

OSP ACCESS LINE WEIGHTING

LINE NO.	A DENSITY ZONE	B SOURCE	C IN-SERVICE NAL's	D DENSITY WEIGHTING	E STATEWIDE WEIGHTING
	MAJOR CITIES - NOT MANHATTAN				
1	HICKSVILLE	MR-7	79,438	0.6312	N/A
2	MID-NASSAU	MR-7	46,408	0.3688	N/A
3	**ACCESS LINE WEIGHTING**		125,846	1.0	0.6933
	REST-OF-STATE				
4	AMHERST	MR-7	38,026	0.8445	N/A
5	PALMYRA	MR-7	4,934	0.1096	N/A
6	MARION	MR-7	2,067	0.0459	N/A
7	**ACCESS LINE WEIGHTING**		45,027	1.0	0.3067

CAGELESS COLLOCATION - OPEN ENVIRONMENT
(C C O E)
Verizon - New York

BUILDING SECURITY COST

	A	B	C
LINE NO.	**ELEMENT**	**SOURCE**	**MONTHLY RECURRING**
	BUILDING SECURITY CHARGE (PER EQUIPMENT BAY)		
1	REVISED SECURITY COST STUDY BASED OI HYPOTHETICAL AT&T MODEL CENTRAL OFFICE (11.6 SQ FT FOOTPRINT)	PART AF, WP 1.0, PAGE 1, LINE 11	**$171.05**
2	NOV. 15, 1999 REVISED CCOE SECURITY ST	REVISED PART B, EXHIBIT, PAGE 1, LINE	**$129.21**
3	JUNE 23, 2000 COMPLIANCE FILING (INCLUDES 25% REDUCTION & 11.6 SQ FT FOOTPRINT)	OPINION NO. 00-08, JUNE 1, 2000	**$74.94**

CAGELESS COLLOCATION - OPEN ENVIRONMENT
(CCOE)
Verizon - New York

BUILDING SECURITY CHARGE PER EQUIPMENT BAY

WITHOUT CARD READERS & WITH CAMERAS

	A	B	C
LINE NO.	**ITEM**	**SOURCE**	**DATA**
1	AVG CAMERA/SERVER SECURITY INVESTMENT PER CO FOR	PART AF, WP 2.0, PG 1, LN 1	$68,670.01
2	AVG BUILDING SECURITY INVESTMENT PER CO FOR CCOE	PART AF, WP 2.0, PG 1, LN 2	$39,767.29
3	CAGELESS SPACE FORECAST (SQ FT) PER CO	PART AF, WP 3.0, PG 1, LN 7	166
4	BUILDING SECURITY INVESTMENT PER SQ FT	LINE 1 / LINE 3	$239.48
5	CAMERAS/SERVER SECURITY INVESTMENT PER SQ FT	LINE 2 / LINE 3	$413.53
6	BUILDING ANNUAL CARRYING CHARGE FACTOR	PART AF, WP 4.0, PG 1, LN 8	0.2324
7	CIRCUIT DIGITAL ANNUAL CARRYING CHARGE FACTOR	PART AF, WP 8.0, PG 1, LN 4	0.2933
8	MONTHLY BUILDING SECURITY COST PER SQ FT	(LINE 4 X LINE 6) / 12	$4.64
9	MONTHLY CAMERAS/SERVER SECURITY COST PER SQ FT	(LINE 5 X LINE 7) / 12	$10.11
10	TOTAL MONTHLY SECURITY COST PER SQ FT	LINE 8 + LINE 9	$14.75
11	**MONTHLY SECURITY COST PER BAY (11.6 SQ FT PER BAY PER COMMISSION ORDER)**	LINE 10 X 11.6 SQ FT	**$171.05**

CAGELESS COLLOCATION - OPEN ENVIRONMENT
(C C O E)
Verizon - New York

BUILDING SECURITY INVESTMENTS FOR CCOE

	A	B	C	D
LINE NO.	**ITEM**	**SOURCE**	**ESTIMATED CCOE BUILDING SECURITY**	**ESTIMATED CCOE CAMERAS/SERVERS**
1	*VERIZON NY SECURITY INV.	PART AF, WP 2.0, PG 2, LN 8C		$68,670.01
2	*VERIZON NY SECURITY INV.	PART AF, WP 2.0, PG 2, LN 9C	$39,767.29	

*(USING AT&T MODEL CO
W/O CARD READERS)

**CAGELESS COLLOCATION -OPEN ENVIRONMENT
(CCOE)
Verizon - New York**

BUILDING SECURITY COST

	A	B	C
LINE NO.	ITEM	SOURCE	CCOE AREA
1A	GENERAL CONDITIONS	REAL ESTATE	$9,858.75
1B	CEILING INSERTS	REAL ESTATE	$0.00
1C	HARDWARE MODIFCATIONS	REAL ESTATE	$900.00
1D	WIRE MESH PARTITION WALL	REAL ESTATE	$12,500.00
1E	WIRE MESH DOOR/FRAME	REAL ESTATE	$1,650.00
1F	TOTAL GENERAL CONSTRUCTION	LINES 1A + 1B + 1C + 1D + 1E	$24,908.75
2A	LIGHTING	REAL ESTATE	$3,600.00
2B	LIFE SAFETY DEVICES	REAL ESTATE	$3,600.00
2C	WIRE MESH GROUNDING	REAL ESTATE	$4,375.00
2D	SECURITY W/O CARD READERS	REAL ESTATE	$0.00
2E	SECURITY W/O SYSTEM PANEL	REAL ESTATE	$0.00
2F	SECURITY CAMERA SERVER	REAL ESTATE	$23,000.00
2G	SECURITY CAMERAS	REAL ESTATE	$40,000.00
2H	TOTAL ELECTRICAL W/O CARD READERS	NES 2A + 2B + 2C + 2D + 2E + 2F + 2	$74,575.00
3A	A/E FEES	REAL ESTATE	$4,974.19
3B	PERMITS	REAL ESTATE	$1,989.68
3C	BA-RE FEES	REAL ESTATE	$1,989.68
3D	TOTAL MISCELLANEOUS	LINE 3A + 3B + 3C	$8,953.55
4	TOTAL SECURITY COST W/O MISCELLANEOUS	LINE 1F + LINE 2H	$99,483.75
5	TOTAL SECURITY COST WITH MISCELLANEOUS	LINE 4 + LINE 3D	$108,437.30
6	CAMERAS AND SERVERS	LINE 2F + LINE 2G	$63,000.00
7	% OF BA-RE FEES FOR CAMERAS & SERVERS	LINE 3D / LINE 4	0.09
8	TOTAL PER FLOOR CAMERAS AND SERVERS W/ FEI W/O CARD READERS	LINE 6 + (LINE 6 X LINE 7)	**$68,670.01**
9	TOTAL PER FLOOR SECURITY W/O CAMERAS & SEF W/O CARD READERS	LINE 5 - LINE 8	**$39,767.29**

CAGELESS COLLOCATION - OPEN ENVIRONMENT
(CCOE)
Verizon - New York

CCOE SPACE FORECAST

	A	B	C
LINE NO.	**ITEM**	**SOURCE**	**DATA**
1	TOTAL ASSIGNABLE SQUARE FEET	REAL ESTATE	13,186,219
2	% COLLOCATION SPACE REQUESTED	TIS	0.011019
3	FORWARD LOOKING TOTAL SPACE REQUESTED	LINE 1 X LINE 2	145,299
4	% TOTAL CCOE SPACE FORECASTED	TIS	0.60
5	TOTAL SQUARE FEET CCOE SPACE FORECASTED	LINE 3 X LINE 4	87,180
6	TOTAL NUMBER OF CENTRAL OFFICES (COs)	REAL ESTATE	525
7	AVERAGE SQ FT OF CCOE SPACE PER CO	LINE 5 / LINE 6	**166**

CAGELESS COLLOCATION - OPEN ENVIRONMENT
(C C O E)
Verizon - New York

FACTORS

	A	B	C
LINE NO.	**ITEM**	**SOURCE**	**DATA**
	ANNUAL CARRYING CHARGE FACTORS:		
	CIRCUIT DIGITAL		
1	TELRIC ACCF	OPINION 97-2	0.2484
2	DIRECTLY ATTRIBUTABLE JOINT	OPINION 97-2	0.0384
3	COMMON	OPINION 97-2	0.0065
4	DIGITAL CIRCUIT - ANNUAL CARRYING CHARGE FAC	SUM (LINES 1+ 2 +3)	**0.2933**
	BUILDING		
5	TELRIC ACCF	OPINION 97-2	0.2259
6	DIRECTLY ATTRIBUTABLE JOINT	OPINION 97-2	0.0000
7	COMMON	OPINION 97-2	0.0065
8	BUILDING - ANNUAL CARRYING CHARGE FACTOR	SUM (LINES 5 + 6 + 7)	**0.2324**

ORIGINAL

CERTIFICATE OF SERVICE

I, Charles M. Hines III, hereby certify that a true and correct copy of the foregoing **"Z-Tel Second Supplemental Filing on the Zone Parity Plan; AZ Docket No. T-00000A-97-0238"** was delivered by overnight delivery or first-class mail this 22nd day of September, 2000 to the individuals on the following list:

Andrew D. Crain
Steven R. Beck
Qwest Communications, Inc.
1801 California Street, # 5100
Denver, Colorado 80202

Maureen Arnold
U S WEST Communications, Inc.
3033 N. Third Street, Room 1010
Phoenix, Arizona 85012

Timothy Berg
Fennemore Craig
3003 N. Central Ave., Suite 2600
Phoenix, Arizona 85016

Richard S. Wolters
AT&T Communications of the Mountain States, Inc.
1875 Lawrence Street, Room 1575
Denver, Colorado 80202

Joan Burke
Osborn Maledon
2929 N. Central Avenue, 21st Floor
P.O. Box 36379
Phoenix, Arizona 85067-6379

Michael M. Grant
Gallagher and Kennedy
2600 N. Central Avenue
Phoenix, Arizona 85004-3020

Mark Dioguardi
Tiffany and Bosco PA
500 Dial Tower
1850 N. Central Avenue
Phoenix, Arizona 85004

Joyce Hundley
United States Department of Justice
Antitrust Division
1401 H Street NW, Suite 8000
Washington, D.C. 20530

Karen Johnson
Penny Bewick
Electric Lightwave, Inc.
4400 NE 77th Avenue
Vancouver, Washington 98662

Jeffrey W. Crockett
Thomas L. Mumaw
Snell & Wilmer
One Arizona Center
Phoenix, Arizona 85004-0001

Darren Weingard
Stephen H. Kukta
Sprint Communications Company, L.P.
External Affairs, Western Region
1850 Gateway Drive, 7th Floor
San Mateo, Claifornia 94404

Carrington Phillips
Cox Communications
1400 Lake Hearn Drive, N.E.
Atlanta, Georgia 30319

Thomas H. Campbell
Lewis & Roca
40 N. Central Avenue
Phoenix, Arizona 85007

Bill Haas
Richard Lipman
McLeodUSA
6400 C Street, SW
Cedar Rapids, Iowa 54206-3177

Richard Smith
Cox California Telecom, Inc.
Two Jack London Square
Oakland, California 94697

Richard M. Rindler
Morton J. Posner
Swidler Berlin Shereff Freidman, LLP
3000 K Street, N.W., Suite 300
Washington, D.C. 20007

Michael W. Patten
Brown & Bain
2901 N.Central Avenue
P. O. Box 400
Phoenix, Arizona 85001-0400

Charles Kallenbach
American Communications Services, Inc.
131 National Business Parkway
Annapolis Junction, Maryland 20701

Karen L. Clauson
Thomas F. Dixon
MCI WorldCom, Inc.
707 17th Street, #3900
Denver, Colorado 80202

Scott Wakefield
RUCO
2828 N. Central Avenue, Suite 1200
Phoenix, Arizona 85004

Daniel Waggoner
Davis Wright Tremaine
2600 Century Square
1501 Fourth Avenue
Seattle, WA 98101-1688

Alaine Miller
NEXTLINK Communications, Inc.
500 108th Avenue NE, Suite 2200
Bellevue, WA 98004

Douglas Hsiao
Rhythms NetConnections
7337 S. Revere Pkwy, Suite 100
Englewood, CO 80112

Jim Scheltma
Blumenfeld & Cohen
1615 Massachusetts Ave., Suite 300
Washington, DC 20036

Raymond S. Heyman
Randall H. Warner
Roshka Heyman & DeWulf
Two Arizona Center
400 N. Fifth St., Suite 1000
Phoenix, AZ 85004

Mark N. Rogers
Excell Agent Services, LLC
2175 W. 14th St.
Tempe, AZ 85281

Mark P. Trinchero
Davis Wright Tremaine
1300 SW Fifth Ave., Suite 2300
Portland, OR 97201-5682

Bradley Carroll
Cox Arizona Telecom, LLC
1550 W. Deer Valley Rd.
Phoenix, AZ 85027

Diane Bacon
Communications Workers of America
Arizona State Council
District 7 AFL-CIO, CLC
5818 N. 7th St., Suite 206
Phoenix, AZ 85032

Robert S. Tanner
Davis Wright Tremaine LLP
17203 N. 42nd St.
Phoenix, AZ 85032

Gena Doyscher
Global Crossing Local Services, Inc.
1221 Nicollet Mall, Suite 300
Minneapolis, MN 55402

Karen L. Clauson
Eschelon Telecom, Inc.
730 2nd Ave. S., Suite 1200
Minneapolis, MN 55402

Janet Livengood
Z-Tel Communications, Inc.
601 S. Harbour Island Blvd.
Tampa, FL 33602

Deborah Scott
Utilities Division
Arizona Corporation Commission
1200 W. Washington St.
Phoenix, AZ 85007

Jerry Rudibaugh
Hearing Officer
Arizona Corporation Commission
1200 W. Washington St.
Phoenix, AZ 85007

Mark A. DiNunzio
Arizona Corporation Commission
1200 W. Washington St.
Phoenix, AZ 85007

Christopher Kempley
Legal Division
Arizona Corporation Commission
1200 W. Washington St.
Phoenix, AZ 85007

Maureen Scott
Legal Division
Arizona Corporation Commission
1200 W. Washington St.
Phoenix, AZ 85007

Charles M. Hines III