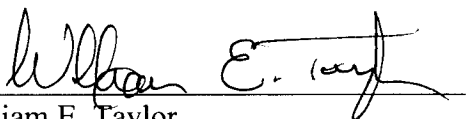# AFFIDAVIT

STATE OF MASSACHUSETTS

COUNTY OF MIDDLESEX

BEFORE ME, the undersigned authority, duly commissioned and qualified in and for the State and County aforesaid, personally came and appeared William E. Taylor, BellSouth Telecommunications, Inc., being by me first duly sworn deposed and said that:

He is appearing as a witness before the Kentucky Public Service Commission in "Investigation Concerning the Propriety of InterLATA Services by BellSouth Telecommunications, Inc. Pursuant to the Telecommunications Act of 1996," KY PSC Case No. 2001-105, and if present before the Commission and duly sworn, his testimony would be set forth in the annexed transcript consisting of _//_ pages and _0_ exhibit(s).

_____
William E. Taylor

SWORN TO AND SUBSCRIBED BEFORE ME this
6th day of Sept. , 2001.

_____
NOTARY PUBLIC

# COMMONWEALTH OF KENTUCKY

## BEFORE THE PUBLIC SERVICE COMMISSION

| | | |
|---|---|---|
| IN RE: INVESTIGATION CONCERNING THE | ) | |
| PROVISION OF INTERLATA SERVICES BY | ) | |
| BELLSOUTH TELECOMMUNICATIONS, INC., | ) | CASE NO. 2001-105 |
| PURSUANT TO THE TELECOMMUNICATIONS | ) | |
| ACT OF 1996 | ) | |

## SURREBUTTAL TESTIMONY

## OF

## WILLIAM E. TAYLOR, Ph.D.

## ON BEHALF OF

## BELLSOUTH TELECOMMUNICATIONS, INC.

## SEPTEMBER 10, 2001

ON BEHALF OF BELLSOUTH TELECOMMUNICATIONS, INC.

SURREBUTTAL TESTIMONY OF WILLIAM E. TAYLOR, Ph.D.

BEFORE THE PUBLIC SERVICE COMMISSION OF KENTUCKY

DOCKET NO. 2001-209-C

SEPTEMBER 10, 2001

1   I.   **INTRODUCTION AND SUMMARY**

2   **Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND CURRENT**

3   **POSITION.**

4   A.   My name is William E. Taylor. I am Senior Vice President of National Economic

5   Research Associates, Inc. ("NERA"), head of its Communications Practice, and head of its

6   Cambridge office located at One Main Street, Cambridge, Massachusetts 02142.

7   **Q. HAVE YOU TESTIFIED PREVIOUSLY IN THIS PROCEEDING?**

8   A.   Yes, I filed rebuttal testimony in this proceeding on July 30, 2001.

9   **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

10   A.   At BellSouth's request, I respond to the surrebuttal testimony of Robert M. Bell (witness

11   for AT&T Communications of the South Central States, Inc. and TCG Ohio, Inc.). In that

12   testimony, Dr. Bell addresses various issues I had raised in my prefiled rebuttal testimony.

13   **Q. DR. BELL CLAIMS [AT 2-3] THAT YOU HAVE MISUNDERSTOOD THE**

14   **NATURE OF THE TRUNCATED Z-STATISTIC BECAUSE YOU BELIEVE IT TO**

15   **FAVOR CLECS ASYMMETRICALLY. DO YOU AGREE?**

16   A.   No. First, it is important to note that the "built-in asymmetry" that I had referred to in my

1    rebuttal testimony was a property I ascribed to the truncated z-statistic *when comparing it*

2    *to* the conventional z-statistic. The asymmetry is obvious: by construction, only negative

3    values of the statistic are intended to be employed for conducting tests of performance

4    disparity. Should the truncated z-statistic, *as calculated*, turn out to be zero or negative, it

5    would have no further role in assessing BellSouth's performance in providing wholesale

6    services to CLECs with which it competes at the retail level. Naturally, BellSouth would

7    then receive no credit for having delivered performance at or above par. Dr. Bell himself

8    appears to misunderstand the distinction I had made in this regard. He believes that any

9    credit that is owed to BellSouth is already factored into the calculated truncated z-statistic.

10   While that may be true for a credit arising from above-par performance at the *individual*

11   *cell* level, my concern was with the truncated z-statistic at the *aggregated* level. Dr. Bell

12   does not address what would happen if the truncated z-statistic at the aggregate level were

13   to turn out to be zero or positive.[1] Indeed, the very fact that the statistic in question is

14   labeled "truncated" makes it obvious that positive and negative values of that statistic are

15   not intended to be treated symmetrically, as *would* indeed be the case with the conventional

16   z-statistic. This is not necessarily an indictment of the truncated z-statistic, although it is

17   important to recognize that the built-in asymmetry exists. It is equally important to

18   remember that this asymmetry means that only worse-than-expected performance outcomes

19   (which may result in payments of penalties to CLECs) would remain of interest, while

20   better-than-expected performance outcomes would be disregarded.

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[1] Indeed, Dr. Bell's detailed explanation of how an above-par performance by BellSouth on any particular cell
would, to some degree, mitigate sub-par performance on other cells is really beside the point.

1    Second, AT&T's own witness Cheryl Bursh has recently expressed the opinion that

2    giving BellSouth credit for better-than-expected performance would enable BellSouth to

3    "game the system." I reproduce below a section from Exhibit CLB-1 [at 39-40] of Ms.

4    Bursh's direct testimony of March 1, 2001, in Florida Public Service Commission Docket

5    No. 000121-TP, a proceeding analogous to the present proceeding.

6    **a. Credits for "Better than Required" Performance Permit Gaming**

7    This approach to mitigation is misguided and has the potential to cause extreme
8    harm with little upside potential. In this flawed approach to mitigation,
9    consequences for failed performance could be negated if the incumbent provides
10   "better than required" performance at a different time (or for a different
11   measurement) and thus earns a "credit." For example, the incumbent could
12   deliver bad performance in one area and offset the consequence through
13   performance credits "earned" in a separate but unrelated area or through credits
14   for compliant performance previously (or subsequently) delivered. In all cases,
15   such credits provide incumbents extensive opportunities to "game the system."
16   Credits give ILECs the opportunity to deliver highly variable results that swing
17   between very good and extremely poor performance and still be absolved of any
18   consequence. Likewise, incumbents have the opportunity to temporarily provide
19   compliant performance and then discriminate with impunity. In either case, the
20   CLECs' position in the marketplace compared to the incumbent is harmed.
21   Moreover, because CLECs only learn of "better" performance after the fact (in a
22   performance report), they cannot take practical advantage of such performance.
23   Thus they get no benefit that offsets the real harm they and their customers have
24   actually suffered.

25   From this, it appears that Ms. Bursh too was referring to credits for better-than-

26   expected performance at the aggregate, rather than the individual cell, level. Needless to

27   say, I disagree strongly with Ms. Bursh's analysis of BellSouth's (or ILECs') incentives in

28   this matter. It is not readily evident how BellSouth could extract a competitive advantage

29   *only for itself* from delivering above-par wholesale service quality to a competitor.

30   Nevertheless, AT&T is on record as having expressly opposed any credit being awarded

31   for better-than-expected performance.

1   Q.   DO YOU ACCEPT THAT DR. BELL'S COUNTER-EXAMPLE BASED ON THE

2        ORDER COMPLETION INTERVAL [AT 4-5] DISPROVES YOUR LARGER

3        POINT THAT CONCLUSIONS DRAWN BY HIM ABOUT MATERIALITY ARE

4        AT LEAST PARTLY DRIVEN BY HIS ASSUMPTIONS ABOUT THE STANDARD

5        DEVIATION?

6   A.   No. Dr. Bell's "counter-example," apparently based on actual BellSouth data, represents a

7        specific case that is, on its face, favorable to the case he wishes to make. My point was a

8        more general one: that, in any given instance, the size of the standard deviation can clearly

9        affect the size of the disparity and, therefore, the apparent materiality of that disparity.

10       Even if one were to accept Dr. Bell's argument that the standard deviation should be at

11       least as large as the mean for the specific case of the Order Completion Interval, the

12       inferences he draws about the competitive significance of observed performance disparities

13       from that single example are indisputably selective and possibly misleading. To complete

14       the picture, Dr. Bell should then conduct the same analysis for all other measurements or

15       metrics, not just the Order Completion Interval. It is conceivable that the respective

16       standard deviations for at least some of those other metrics are not as large in relation to

17       their respective means and, therefore, inferences about materiality for BellSouth's

18       performance on those metrics would be quite different from those drawn by Dr. Bell for a

19       specific case.

20            The larger point is that judging the competitive significance of an observed disparity

21       is—and should be—an economic or commercial, not statistical, exercise. When that

22       judgment is clearly influenced by the values of certain statistical parameters—regardless of

1    their actual economic or commercial consequences—it is necessary, at the very least, to

2    recognize that fact.

3  **Q.  DR. BELL DISAGREES [AT 5-6] WITH THE ARGUMENT IN YOUR REBUTTAL**

4      **TESTIMONY THAT IT IS MORE MEANINGFUL TO EXPRESS THE CLEC**

5      **CUSTOMER SATISFACTION RATE AS A PERCENT OF THE BELLSOUTH**

6      **CUSTOMER SATISFACTION RATE, RATHER THAN COMPARE THE**

7      **RELATIVE PERCENTAGES OF CUSTOMERS WHO RECEIVE SUB-PAR**

8      **SERVICE.  HOW DO YOU RESPOND?**

9  A.  My disagreement with Dr. Bell on this point goes beyond the proverbial "glass is half

10     empty or half full" argument.  First, I note that he concurs with me that any difference

11     between the percent of BellSouth and CLEC customers receiving sub-par service should be

12     judged in economic terms (or by the "seriousness of the event").  By so doing, the actual

13     percentage difference will cease to be as important an indicator of the competitive

14     significance of performance disparities as the economic value forgone by either BellSouth

15     or CLECs when their respective customers receive sub-par service.

16         Second, the counter-example Dr. Bell provides about the cigarette advertisement is,

17     while amusing, utterly irrelevant to the point being made here.  The concern should be

18     primarily with the economic significance of performance disparities, and less so with the

19     disparity percentage itself.  In Dr. Bell's example, if reducing the lung cancer rate by even

20     four percentage points has enormous economic consequences (such as savings on

21     hospitalization, treatment, and other costs), then that relatively minor disparity percentage

22     would have to be taken very seriously.

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1  Finally, when the size of the customer base differs significantly between BellSouth

2  and the CLECs, comparing disparity percentages as Dr. Bell does conveys little about the

3  actual magnitude of customers affected adversely. To take a simple example, if BellSouth

4  has 100,000 customers and the CLECs have only 7,000 (figures that imply market shares

5  fairly representative of the current market), then the 1 percent of BellSouth's customers

6  that receive sub-par service amount to 1,000 customers, while the 5 percent of the CLEC

7  customers that receive sub-par service amount to only 350 customers. Clearly, many more

8  of BellSouth's customers stand to be disaffected by poor quality service than CLEC

9  customers, even though the percentages appear to tell a different story. From a competitive

10  standpoint, the consequences for BellSouth could be enormous even if that tiny percentage

11  of its customers were to defect to CLECs because of poor quality service.

12  **Q. PLEASE RESPOND TO DR. BELL'S ASSERTION [AT 6] THAT THE**

13  **BALANCING CRITICAL VALUE METHODOLOGY WAS NEVER INTENDED**

14  **TO LOCATE A VALUE OF DELTA THAT BALANCES BELLSOUTH'S**

15  **COMMERCIAL GAIN FROM DISCRIMINATION AGAINST ITS RISK OF**

16  **PAYING PENALTIES WHEN IT DOES NOT DISCRIMINATE.**

17  A. It is very important to reflect first on what a performance assessment plan ("PAP") for

18  BellSouth is supposed to achieve. As I stated in my rebuttal testimony [at 38], a PAP

19  should ideally be designed to create the right balance of economic incentives for BellSouth.

20  From an economic standpoint, that is likely to be best achieved by a PAP that induces

21  BellSouth to *voluntarily* deliver wholesale service to its competitors at the desired level of

22  quality. This form of self-policing—driven entirely by BellSouth's own economic or

1    commercial self-interest—is preferable to any compliance system that requires

2    considerable monitoring, testing, and enforcing penalties.

3    In this proceeding, there is consensus that any PAP for BellSouth should be based on

4    a balancing critical value methodology. Under this methodology, two risks are sought to

5    be equalized: (1) the risk that BellSouth will be penalized when it does not, in fact,

6    provide sub-par performance, and (2) the risk that BellSouth will fail to be penalized when

7    it does, in fact, deliver sub-par performance (and reaps the commercial gains therefrom).

8    Achieving this balance while minimizing both types of risk is likely to be a considerable

9    feat, one critically dependent on the value of delta that is chosen. For the PAP to be

10   commercially fair to all parties (BellSouth and the CLECs), however, balancing the two

11   types of risk can only be the first objective. An equally, if not more, important objective

12   must be to balance those risks by choosing the value of delta that best reflects the level of

13   performance disparity that would be considered economically or commercially material.

14   **Q. DR. BELL TAKES ISSUE [AT 8-9] WITH YOUR STATEMENT THAT HE**

15   **IGNORES THE SALIENT CHARACTERISTIC OF TESTING WITH**

16   **BALANCING, NAMELY, THAT LARGER VALUES OF DELTA CAN LOWER**

17   **BOTH TYPE I AND TYPE II ERROR RATES AND SIMULTANEOUSLY**

18   **BENEFIT BOTH THE ILEC AND THE CLECS. DO YOU AGREE?**

19   A.   No. Dr. Bell appears to take issue with my statement only because he looks at the

20   performance disparity test with a *fixed* alternative hypothesis in mind. By its very nature,

21   however, the balancing critical value methodology does *not* look at fixed alternative

22   hypotheses. Indeed, two things are clear: (1) the balancing critical value methodology

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1    equalizes the Type I and Type II error rates for *all* choices of delta, and at *any* sample size,

2    and (2) as delta increases, for given sample size, the balancing critical value increases as

3    well, while the (equalized) Type I and Type II error rates fall.[2] These properties flow

4    directly from the manner in which the balancing critical value is calculated, i.e., the

5    formula that links it to the value of delta and the sample size (number of ILEC and CLEC

6    transactions).

7          Dr. Bell faults my apparent inference that larger delta values are simultaneously

8    beneficial to both the ILEC and the CLECs:

9        The absurdity of Dr. Taylor's analysis is made evident by his parenthetical
10       phrases, which say that a large delta favors BellSouth *and* favors CLECs. If that
11       were the case, both sides would be asking for a delta value of 20. [at 8-9,
12       emphasis in original]

13   The fact is, with the balancing critical value methodology (as opposed to one that employs

14   a fixed critical value), the Type I and Type II error rates are not only equalized, they also

15   move together. Therefore, if one falls (because of the choice of delta or the sample size, or

16   both) then so must the other. As BellSouth or any ILEC benefits from a lowering of Type I

17   error, CLECs also benefit from the concurrent lowering of Type II error. Thus, it is true

18   that larger values of delta that lower both error rates would, on their face, appear mutually

19   beneficial. This does not mean, however, that both parties would necessarily *want* higher

20   delta values. As I noted in my rebuttal testimony [at 57], the sample size (or the number of

21   transactions) matters too. For any *fixed* value of delta, the number of transactions tested

22   has a direct bearing on the proportion of performance disparities that is found material and

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[2] It is easy to demonstrate that the increase in the balancing critical value and decrease in the two error rates are

(continued...)

1    eligible for penalty payments. For example, when the sample size is small to moderate (the

2    situation likely to arise in the early stages of competition), even "small" values of delta

3    could lead to findings of material disparity and trigger penalty payments. In contrast, as the

4    sample size gets larger and a "large" value of delta is chosen, the risks of Type I and Type

5    II error may fall but fewer findings of material disparity will result in comparatively little

6    payment of penalties. The importance of these two contrasting situations is unlikely to be

7    lost on CLECs eager to receive penalty payments from BellSouth.

8    **Q. DID YOU, AS DR. BELL CLAIMS [AT 9] "GO OVERBOARD" IN CRITICIZING**

9    **THE CLEC PLAN TO BASE REMEDY PAYMENTS ON THE SAME**

10   **TRUNCATED Z-STATISTIC THAT IS USED TO ESTABLISH A**

11   **STATISTICALLY SIGNIFICANT PERFORMANCE DISPARITY?**

12   A. Not at all. Dr. Bell's comments in this regard notwithstanding, the only proper use of a

13   statistical decision rule (such as the truncated z-statistic) is to determine whether a

14   particular statistical hypothesis is true or false, and decidedly *not* to determine how true or

15   how false that hypothesis may be. The economic or commercial significance of a given

16   deviation from the null hypothesis is not necessarily proportional to—or a simple function

17   of—that deviation. While Dr. Bell is correct that, for a fixed sample size, the z-statistic for

18   a mean is proportional to the observed difference between means, that does not *per se*

19   establish the logic for determining the severity (particularly in economic or commercial

(...continued)
both accelerated as sample size increases.

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*Consulting Economists*

1    terms) of that difference. Besides, sample size is *not* fixed in different tests.

2       It is theoretically possible for different disparities of means to result in exactly the

3    same z-statistic *even when* the underlying sample sizes are different. However, in most

4    situations, differences in sample size can produce differences in the z-statistic *even when*

5    the disparities in means are exactly the same. To demonstrate the first possibility, suppose

6    the sample size for metric A is 100, and that for metric B is 25. Ignoring for simplicity the

7    standard deviation for the two metrics, the z-statistic for those two metrics will be

8    functions solely of their (1) observed differences of means and (2) the square root of the

9    sample size. The square root of the sample size for metric A would be 10, and twice as

10   large as the square root of the sample size of metric B. Thus, if the observed means for

11   metric B differ by twice as much as the observed means for metric A differ, then the z-

12   statistic for the two metrics would be identical. This shows why the z-statistic depends so

13   importantly on the sample size for which the test is conducted.[3]

14       Finally, it makes no sense to judge the severity of an observed performance disparity

15   in purely statistical terms, i.e., without any reference whatsoever to the actual economic or

16   commercial significance of that disparity. Certain disparities may appear statistically

17   "severe" by Dr. Bell's criterion, yet be of minimal economic or competitive significance.

18   On the other hand, some relatively innocuous or barely statistically significant observed

19   disparities may have considerable economic or competitive significance. Penalties must be

20   designed to fit the level of compensation to the level of economic or commercial damage

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[3] The z-statistic is also likely to be influenced by the standard deviation.

1    done to competitors, not based solely on a mechanical or statistical rule that only

2    establishes whether such damage occurred in the first place.

3    **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

4    A. Yes.