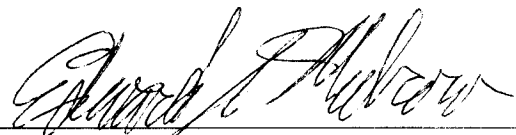# AFFIDAVIT

DISTRICT OF COLUMBIA

BEFORE ME, the undersigned authority, duly commissioned and qualified in and for the District aforesaid, personally came and appeared Edward J. Mulrow, 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 _7_ pages and _1_ exhibit(s).

_____
Edward J. Mulrow

SWORN TO AND SUBSCRIBED BEFORE ME this
5th day of SEPTEMBER, 2001.

_____
NOTARY PUBLIC
My Commission Expires MARCH 31, 2006

1		BELLSOUTH TELECOMMUNICATIONS, INC.
2		SURREBUTTAL TESTIMONY OF EDWARD J. MULROW, PH.D.
3		BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION
4		CASE NO. 2001-105
5		SEPTEMBER 10, 2001
6		
7	Q.	PLEASE STATE YOUR NAME, AND BUSINESS NAME AND ADDRESS.
8		
9	A.	My name is Edward J. Mulrow. I am employed by Ernst & Young LLP as a
10		Senior Manager in the Quantitative Economics and Statistics Group. I have
11		been retained by BellSouth as a statistical advisor. My business address is
12		1225 Connecticut Ave., NW, Washington, DC 20036.
13		
14	Q.	ARE YOU THE SAME EDWARD J. MULROW THAT FILED DIRECT
15		AND REBUTTAL TESTIMONY IN THIS DOCKET?
16		
17	A.	Yes. I filed direct testimony in this docket on May 18, 2001 and rebuttal
18		testimony on July 30, 2001.
19		
20	Q.	WHAT IS THE PURPOSE OF YOUR CURRENT TESTIMONY?
21		
22	A.	The purpose of my testimony is to respond to portions of the surrebuttal
23		testimony of Dr. Robert M. Bell, representing AT&T Communications of the
24		South Central States, Inc. and TCG Ohio, Inc., which deal with statistical
25		issues.

1   Q.   DR. BELL ARGUES THAT THE USE OF OTHER FORMS OF

2   STATISTICAL AGGREGATION IN SOME STATES IS IRRELEVANT TO

3   THE KENTUCKY PLAN BECAUSE BOTH BELLSOUTH AND THE

4   CLECS HAVE ACCEPTED THE PRINCLIPLE OF BALANCING TYPE I

5   AND TYPE II ERRORS. DO YOU AGREE?

6

7   A. No. Dr. Bell is trying to link the use of the Truncated Z statistic with the

8   concept of balancing, and there is no statistically compelling reason to do this.

9   Although I believe that balancing is an appropriate method to use in an

10   enforcement mechanism such as SEEM, balancing and the re-aggregation of

11   the results of many comparisons into an overall result, as done with the

12   Truncated Z statistic, are two statistical concepts that can be applied

13   independently of one another.

14

15   My rebuttal arguments pertain to the fact that AT&T is not endorsing the use of

16   an aggregated statistic such as the Truncated Z statistic. AT&T's own

17   statistical expert, Dr. Colin Mallows (now retired), suggested the use of

18   aggregation in his 1998 affidavit to the FCC (see "Affidavit of Dr. Colin L.

19   Mallows before the Federal Communications Commission," sworn May 29,

20   1998). Exhibit EJM-3 to my testimony is a Consensus/Open Issues Matrix that

21   was put together by the Ernst & Young statistical team and Dr. Mallows during

22   the early stages of our joint work that lead to the "Louisiana Statistician's

23   Report" (Exhibit EJM-1 of my direct testimony). BellSouth, AT&T, MCI

24   Worldcom, and Sprint jointly filed this matrix in the Louisiana docket. We can

25   see from Issue No. 2 that Dr. Mallows was in agreement with the Ernst &

1		Young team that aggregation should be used. In fact, Dr. Mallows developed
2		the Truncated Z statistic, as an alternative aggregation approach that he hoped
3		the Ernst & Young team would agree to use. Furthermore, Dr. Bell agrees that
4		the use of the Truncated Z statistic may be appropriate. On top of all this, we
5		have the FCC agreeing to the use of aggregate methods in all the states where it
6		has given 271 relief to an RBOC. Given all this, I have to question why AT&T
7		will not agree to an enforcement plan that uses an aggregate statistic to
8		determine parity.
9		
10	Q.	DR. BELL STATES THAT THE COMMISSION WOULD NEED TO
11		SPECIFY AN ODDS RATIO PARAMETER, IN ADDITION TO THE
12		DELTA PARAMETER, IF IT USES BELLSOUTH'S METHOD FOR
13		DETERMINING THE ALTERNATIVE HYPOTHSIS WHEN DEALING
14		WITH A PROPORTION MEASURE. IS THIS TRUE?
15		
16	A.	No. The "Louisiana Statistician's Report" provides relationships between the
17		alternative hypothesis parameters used for proportion and rate measures and
18		the delta parameter used for mean measures. In Appendix C of the report
19		(Exhibit EJM-1), page C-9, we state, "The three parameters are related
20		however. If a decision is made on the value of δ, it is possible to determine
21		equivalent values of ψ and ε. The following equations, in conjunction with the
22		definitions of ψ and ε, show the relationship with delta." The equations
23		referred to are on page C-10.
24		
25	Q.	DR. BELL STATES THAT HE BASES HIS DEFINITION OF

1   MATERIALITY ON THE PRINCIPLE BEHIND BALANCING, THAT THE

2   PROBABILITY OF A TYPE I ERROR ASSUMING PARITY SHOULD

3   EQUAL THE PROBABILITY OF A TYPE II ERROR ASSUMING A

4   MATERIAL DIFFERENCE. (BELL SURREBUTTAL P. 7) PLEASE

5   COMMENT?

6

7   A.   Materiality is not a statistical concept, yet Dr. Bell wants to link its meaning to

8   a statistical technique. Dr. Bell speaks of the "principle behind balancing," and

9   refers to the work that the Ernst & Young team did with Dr. Mallows to back

10   up his claim. He does this because there are no direct references in statistical

11   literature regarding balancing. In fact, we are in the process of documenting

12   our work on balancing, so it is a work in progress. Yet Dr. Bell speaks of

13   "proper balancing" as if it is a well-known concept in statistics.

14

15   The fact of the matter is that when one uses a balancing approach, the

16   statistical test treats a disparity (the difference in the CLEC-ILEC average

17   performance in terms of an ILEC standard deviation) that is less than one-half

18   delta as unnoticeable to the CLEC. That is, the disparity is immaterial. Both

19   Dr. Bell and I agree on this aspect of the test. On the other hand the statistical

20   test treats a disparity greater than one-half delta as noticeable to the CLEC.

21   However, the statistical methodology does not tell you what to do about this

22   noticeable effect. One needs to look at the penalty plans that the parties are

23   offering in the docket to determine whether or not disparities beyond one-half

24   delta are treated as material.

25

1   As I pointed out in my rebuttal testimony, all the penalty plans that are

2   proposed in this docket require that penalties be paid once the observed

3   disparity goes beyond one-half delta. In fact, AT&T's plan calls for large

4   penalty payments for observed disparities between one-half delta and delta.

5   According to Dr. Bell, such disparities are to be thought of as immaterial. In

6   my rebuttal testimony I state that AT&T's disparity classifications and penalty

7   amounts do not suggest that AT&T agrees with Dr. Bell that disparities less

8   than delta are immaterial. I provide calculations to show that AT&T's plan

9   could call for an $80,000 Tier II penalty for a disparity that Dr. Bell would

10   label immaterial. Dr. Bell does not refute my calculations, nor does he address

11   why the proposed AT&T plan is not consistent with his assertion that the

12   materiality threshold is only reached when disparities go beyond delta standard

13   deviations. All he does is rely upon a vague and self-serving notion of a

14   "principle behind balancing."

15

16   Q.   IN HIS TESTIMONY, DR. BELL, REFERRING TO THE LOUISIANA

17   STATISTICIAN'S REPORT, SAYS, "IF THE AUTHORS HAD INTENDED

18   FOR REMEDIES TO BEGIN WHEN THE OBSERVED DISPARITY

19   (WEIGHTED, IF NECESSARY) BECAME MATERIAL, THEY COULD

20   HAVE DONE THAT MUCH MORE SIMPLY, WITHOUT GETTING INTO

21   TYPE I AND TYPE II ERRORS." (BELL SURREBUTTAL P.8) IS THIS

22   TRUE?

23

24   A.   Yes. In fact the Ernst & Young team suggested a simpler approach. Issue No.

25   4a of the Consensus/Open Issues Matrix (Exhibit EJM-3), describes this

1   simpler procedure. We offered this up as an alternative to balancing in case the

2   balancing process was determined to be unworkable. It is clear from our

3   description of the process that we did not feel that a test failure should occur

4   for any disparity that was deemed to be immaterial.

5

6 Q.   WHY WASN'T THIS SIMPLER PROCEDURE USED?

7

8 A.   Let me first state that we really felt a balancing approach was the best way to

9   proceed, and in the end it turned out that it was an approach that the CLECs,

10   BellSouth, and the Louisiana staff were willing to support. With respect to our

11   alternative approach, Dr. Mallows rejected the idea. Once again, if we refer to

12   Issue No. 4a of the Consensus/Open Issues Matrix, we see that Dr. Mallows

13   did not believe that our alternative was feasible, in part because he did not feel

14   that the parties could agree on what constitutes a material difference.

15

16 Q.   DR. BELL ALSO SAYS "TO ME, THE ONLY LOGICAL EXPLANATION

17   IS THAT THE AUTHORS WERE BALANCING TYPE I ERROR UNDER

18   PARITY WITH TYPE II ERROR FOR A MATERIAL DISPARITY." (BELL

19   SURREBUTTAL P. 8) PLEASE RESPOND.

20

21 A.   It is clear that Dr. Bell has not reviewed our work leading up to the submission

22   of the "Louisiana Statistician's Report." I can speak for the Ernst & Young

23   statistical team, and the fact that Dr. Mallows stated in the Consensus/Open

24   Issues Matrix that he didn't believe that the parties could agree on what

25   constitutes a material difference is proof enough that the authors of the report

1   were not intending to balance Type I error under parity with Type II error for a

2   material disparity. The inherent nature of the balancing methodology,

3   however, treats disparities less than one-half delta as immaterial. So one

4   cannot divorce the materiality concept from balancing. As I have already

5   stated, the treatment of disparities between one-half delta and delta as material

6   is an artifact of the penalty plan, not the statistical methodology.

7

8   Q.   DR. BELL STATES THAT THE CONCEPT BEHIND THE CALCULATION

9   USED IN BELLSOUTH'S "EFFECTED VOLUME" CALCULATION IS

10   INAPPROPRIATE BECAUSE THE GOAL OF THE

11   TELECOMMUNICATIONS ACT IS PARITY SERVICE. PLEASE

12   RESPOND.

13

14   A.   The FCC has decided that a self-effectuating mechanism can determine

15   penalties based on the number of CLEC transactions that caused a parity test to

16   fail. Specifically, this concept is used in Southwestern Bell's Texas penalty

17   plan, and the FCC has approved that plan. The "effected volume" calculation

18   in BellSouth's SEEM plan is based on this very same concept. Dr. Bell may

19   disagree with the concept's appropriateness, but the FCC has deemed the

20   concept appropriate.

21

22   Q.   DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?

23

24   A.   Yes.

@ **BELL**SOUTH

BellSouth Telecommunications, Inc.   504 528-2050   **Victoria K. McHenry**
Suite 3060   Fax 504 528-2948   General Counsel – LA
365 Canal Street
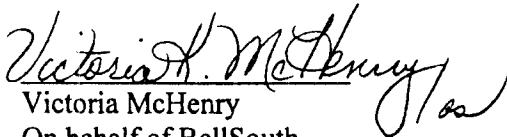New Orleans, Louisiana 70130-1102   **April 15, 1999**

VIA FEDERAL EXPRESS

Ms. Susan Cowart
Administrative Hearings Division
Louisiana Public Service Commission
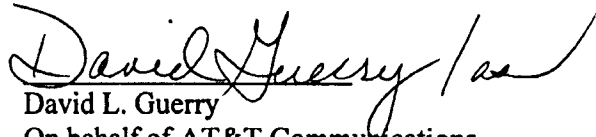One American Place – Suite 1630
Baton Rouge, LA 70821

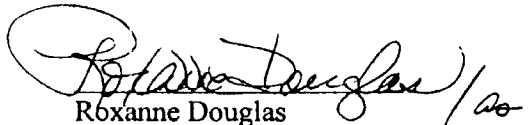   RE: <u>LPSC Docket Number U-22252-C</u>

Dear Ms. Cowart:

       Pursuant to the Notice issued in this matter on March 26, 1999, BellSouth Telecommunications, Inc., AT&T Communications of the South Central States, Inc., MCI WorldCom, and Sprint Communications, L.P. are jointly filing the enclosed Joint Comments on Statistical Issues, outlining areas of agreement and disagreement, and the positions of BellSouth and the CLECs on each of the areas of disagreement.
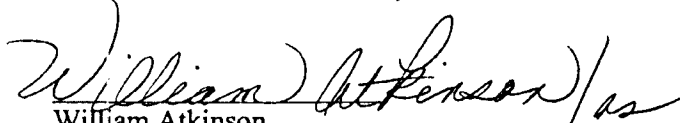
       We ask that you please file the original into the record and return a date-stamped copy to Vicky McHenry in the envelope provided.

Victoria McHenry
On behalf of BellSouth
  Telecommunications, Inc.

David L. Guerry
On behalf of AT&T Communications
  of the South Central States, Inc.

Roxanne Douglas
On behalf of AT&T Communications
  of the South Central States, Inc.

Dulaney L. O'Roark, III
On behalf of MCI WorldCom

William Atkinson
On behalf of Sprint Communications, L.P.

Encs.
cc: Official Service List (w/enc)(via Federal Express)

#159439

Statistical Procedure Off-Line Session
Consensus/Open Issues

Issue No.	Issue	Position
1	Comparing like-to-like	**Agreement:** In order to assure that like-to-like comparisons are made, the performance measure data must be disaggregated to a very deep level. This includes wire center and time of month, as well as SQM disaggregation levels defined by the Louisiana Public Service Commission.[①]
2	Performance measure test statistic	**Agreement:** Each performance measure of interest should be summarized by one overall test statistic giving the decision maker a rule that determines whether a statistically significant difference exists.
3	Methodology for obtaining the test statistic	**Dr. Mallows/LCUG:** In each cell, construct an indicator that is sensitive to absence of parity.. Make appropriate allowance for what would be the effect of random variation, assuming parity holds. The aggregate statistic should not allow consistent violations in any cell to go undetected. **BellSouth:** The overall service process is what defines parity. Testing measures at an aggregate level is sufficient to determine favoritism. Random failures at deeply disaggregated levels may exists but should not be overemphasized. SQM level disaggregation reports will be available to explore the data.
4	Type I and Type II errors	**Agreement:** The probability of a Type I error, concluding there is no BellSouth favoritism when there is, should be balanced with the probability of a type II error, concluding BellSouth favoritism exists when it does not. The balance of these two probabilities depends on 1. The effective number of BellSouth observations 2. The effective number of CLEC observations 3. The size of a specific alternative hypothesis, e.g., the CLEC mean value is larger than the BellSouth mean value by ten percent of a BellSouth standard deviation Using this information, a critical value for the test, or decision rule, is determined. This rule may be different for each performance measure in interest, and may also change over the months. However, a system can be devised to make this all transparent to the commission.

[①] Louisiana Public Service Commission Docket No. U-22252-Subdocket C. In Re: BellSouth Telecommunications Inc., Service Quality Performance Measurements, April 19, 1998 Order. Except that for provisioning measures order type was also included since there is a noticeable difference in their distributions.
Meeting between Dr Colin Mallows and Dr. Fritz Scheuren on April 7, 1999, supplemented by later discussions.

04/14/99

Issue No.	Issue	Position
4a	Type I and Type II errors	**Dr. Mallows/LCUG:** We do not agree that the following BellSouth alternative is either feasible (since it requires the parties to agree on what constitutes a material difference), or fair (since it uses a test procedure at a level (2 1/2%) that is biased in favor of BellSouth for all sample sizes below 1000).
		BellSouth: If the balancing procedure described in Issue Number 4 is determined to be unworkable, then a feasible alternative is to define the size of a difference between mean values which has no business impact (a rule of materiality). Any actual difference less than this will be considered insignificant. Differences greater than the materiality standard would be judged to be significant based on a statistical testing procedure. This should be a five percent (5%) significance level, two-sided test (a two and one half percent (2.5%) significance level, one-sided test).
5	Statistical paradigm	**Agreement:** The system must be developed so that it can be put into production (black box). Two statistical paradigms are possible for examining the performance measure data. In the exploratory paradigm, data are examined and methodology is developed that is consistent with what is found. In a production paradigm a methodology is decided upon before data exploration.
		While the exploratory paradigm provides protection against using erroneous data it requires a great deal of lead time and is unsuitable for timely monthly performance measure testing. A production paradigm will not only promptly produce overall test results but will also provide documentation that can be used to explore the data after the test results are released.
6	Trimming	**Agreement:** Trimming is needed but finding a robust rule that can be used in a production setting is difficult. Trimming of extreme observations from BellSouth and CLEC distributions is needed in order to ensure that a fair comparison is made between performance measures. However, trimmed observations should not simply be discarded. They need to be examined and possibly used in the final decision making process. Under a production paradigm this is very hard to do. Additionally, each performance measure may need to use a different trimming rule.
7	Independence of performance measure tests	**Agreement:** Correlation between the performance measures must be accounted for in aggregation over performance measures.

Meeting between Dr. Colin Mallows and Dr. Fritz Scheuren on April 7, 1999, supplemented by later discussions.