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Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, DC 20554

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SEP 23 1999

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matters of:

Ameritech Corporation Telephone Operating Companies' Continuing Property Records Audit	)	
Bell Atlantic (North) Telephone Companies' Continuing Property Records Audit	)	
Bell Atlantic (South) Telephone Companies' Continuing Property Records Audit	)	CC Docket No. 99-117
BellSouth Telecommunications' Continuing Property Records Audit	)	ASD File No. 99-22
Pacific Bell and Nevada Bell Telephone Companies' Continuing Property Records Audit	)	
Southwestern Bell Telephone Company's Continuing Property Records Audit	)	
US West Telephone Companies' Continuing Property Records Audit	)	

COMMENTS OF BELLSOUTH

BELLSOUTH CORPORATION AND
BELLSOUTH TELECOMMUNICATIONS, INC.

M. Robert Sutherland
Stephen L. Earnest

Suite 1700
1155 Peachtree Street, N.E.
Atlanta, GA 30309-3610

(404) 249-2608

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Date: September 23, 1999

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EXECUTIVE SUMMARY

The Commission has invested massive amounts of staff resources into an audit of BellSouth's Continuing Property Records. It is not at all apparent why. The audit examined compliance with rules that are vestiges of rate of return regulation that has not applied to BellSouth in the interstate jurisdiction for almost a decade. With all of the changes and challenges facing the Commission and the industry, this audit is at best a distraction and at worst a colossal waste of resources. The Commission should stop the bleeding and terminate this proceeding.

The focus of this Inquiry is whether the Commission should take some corrective or enforcement action based on the staff audit. The proposed corrective action, a write off of assets based on an extrapolation of the audit findings, would be entirely inappropriate. As shown herein, the audit was not designed to support an extrapolation to the asset base. By the staff's own admission, its attempt to extrapolate allegedly "missing" assets to the investment base has a huge 49 percent margin of error. BellSouth shows herein that even this estimate is grossly understated. This level of uncertainty simple will not support the imposition of corrective action.

The principal concern of the Commission should not be whether BellSouth's records are perfect. No record-keeping system is perfect, and perfection is not a permissible legal standard for the Commission to impose. The Commission's concern should be whether the inevitable errors in record keeping had any adverse impact on ratepayers. The answer to that question is an emphatic "No!" As shown herein, errors in failing to retire physical assets on a timely basis have no measurable impact on ratepayers, either now, in the past, or in the future. That should be the end of the Inquiry regarding corrective action or enforcement.

The other important question to be resolved in this Inquiry is whether to continue to maintain these record-keeping requirements. Again, the answer is an emphatic "No!" These rules are outdated vestiges of rate of return regulation that do not apply to any segment of the telecommunications industry other than the large LECs. Any such segment specific regulation, particularly regulation as meaningless and costly as these rules, are anticompetitive and wasteful. Congress has specifically mandated that the Commission identify and eliminate such regulation. These rules must be eliminated if the Commission is to comply with the mandate of Sections 10 and 11 of the Act.

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BELLSOUTH COMMENTS

BellSouth Corporation and BellSouth Telecommunications, Inc. ("BellSouth") by and through their attorneys submit the following comments in response to the Commission's *Notice of Inquiry* (FCC 96-69) ("*Notice*"), released on April 7, 1999, in the above captioned proceeding.

INTRODUCTION

The audit report ("Report") issued by the Common Carrier Bureau ("Bureau") regarding BellSouth's property records (referred to as continuing property records or "CPR" through these comments) is materially flawed and offers no reliable basis to support its proposed recommendations.[1] The Report is based on an improperly designed audit process that employed ineffective audit procedures. The audit design, for example, ignored basic audit standards and techniques as well as statistical requirements needed to obtain valid results. Moreover, the procedures used to test the flawed design, i.e., selection of sample assets for testing, auditors' attempt to find selected sample items and alternative procedures the auditors failed to perform, were improperly performed and completely inadequate for their intended purpose. While any one of the problems in the audit design or audit procedures by itself would have rendered the audit results unreliable, the combination of errors render the results so unquestionably suspect that BellSouth is disappointed that the Report and *Notice* were even released.[2]

Perhaps the most troubling part of the Report and *Notice* stems from the very purpose of the audit. The Bureau undertook the audits to test compliance with obsolete rules related to basic property records for plant assets. The fact that the Commission would expend significant resources by both its staff and the audited carrier to assess compliance with archaic rules such as the property rules continues to puzzle BellSouth.

The record keeping requirements being audited had absolutely no impact on rates or ratepayers.[3] These rules were created at a time when the rates that large local exchange carriers, such as BellSouth, charged customers were determined under rate-of-return regulation. The

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1 The *Notice* seeks comments on the audits of several Bell operating companies. Unless otherwise indicated, BellSouth's comments relate only to the audit and audit report of BellSouth.

2 *See* Commissioner Furchtgott-Roth separate statement at 9 ("I spent several years in private economic consulting. I have seen good cases; I have seen weak cases; but rarely have I seen numbers as indefensible as the extrapolations of missing equipment in these orders. I could not possibly defend them, and I therefore must respectfully dissent from their release.")

3 *See infra* Response to Issue 8 and Affidavit of William E. Taylor attached to Comments filed on behalf of the United States Telephone Association ("Taylor USTA Affidavit").

Commission, however, abandoned rate-of-return regulation for price-cap regulation in 1990.[4] The significance of the change to price-cap regulation cannot be overstated. Under rate-of-return regulation policy makers made decisions, including the setting of rates, based on a carrier's costs. Price-cap regulation, however, focuses on prices a carrier may charge for its services instead of the cost to provide the services.[5] The cost of the service is no longer the basis on which a price-cap carrier sets the price it charges its customers. Commissioner Furchtgott-Roth effectively underscored this point in his separate statement released with the *Notice* stating "I find it ironic that the Commission takes these actions in today's price-cap regime where it can be argued that the capital investment is irrelevant to prices, but never found it necessary to do so under a rate of return regulatory environment where capital investment is directly correlated to the rates charged to consumers."

Accordingly, the only issue in which policy makers should have a remaining interest is whether the investment for fixed assets is properly recorded. Compliance with the detailed record keeping requirements of Part 32.2000 *et seq.* is not needed for such a determination. Indeed, no carriers other than the large local exchange carriers have such onerous record keeping requirements.[6] These rules no longer serve any useful purpose but are mere vestiges of an outdated regulatory system.[7]

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4 In the Matter of Policy and Rules Concerning Rates for Dominant Carriers, *Second Report and Order*, CC Docket No. 87-313, 5 FCC Rcd 6786, 6792 (1990) ("*Price Cap Order*").

5 *Price Cap Order* ¶ 47.

6 *See Ex Parte,* filed July 15, 1998 in CC Docket No. 98-81 "Accounting Simplification in the Telecommunications Industry," prepared by Arthur Andersen LLP ("Arthur Andersen Report") at 25-37. *See also* "Supplement to July, 1998 Position Paper 'Accounting Simplification in the Telecommunications Industry'" ("Andersen Supplement"). Both the Arthur Andersen Report and Andersen Supplement are attached as Exhibit 1.

7 *See* Commissioner Furchtgott-Roth separate statement at 4 ("such comprehensive property records [are] only remnants of rate of return regulation ...").

Even if the auditors' estimate of missing investment were reliable, any write-off would have no impact on rates. A ratemaking impact would occur only if entries were made on the books reflecting the original cost of items that were not actually placed in service. While the Report specifically alleges no such conduct,[8] it remains ambiguous about the matter.[9] BellSouth proves herein that any such implication is farcical and should be completely dismissed. If any assets are listed in the Hard-Wired Equipment accounts CPR that are not in actual service, the only cause is a failure to properly retire the asset.

Under the methods of accounting prescribed by the Commission in Part 32, the timing of the retirement of assets has no impact on the net investment used to set rates under rate of return regulation (which formed the basis for the initial price cap rates in 1990), and certainly has no impact on rates under price cap regulation (with or without sharing). This is so because when plant is retired, there are equal and offsetting entries to the telephone plant in service and accumulated depreciation accounts. "Net Plant," the amount used to establish the rate base under cost of service regulation is unchanged. Thus, even if it could be demonstrated that BellSouth failed to retire certain assets on a timely basis prior to price cap regulation, the initial price cap rates would be unchanged. The same holds true for the application of the "sharing mechanism" or the "lower formula adjustment," both vestiges of rate of return regulation, under price caps.[10]

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8 To the contrary, the Report states: "For the purpose of this report, we assume the original costs recorded on its CPR are correct." Report at 9.

9 In the Conclusions and Corrective Actions section, the Report states that "failure to provide sufficient and convincing documentation for the acquisition of the assets in question and for their placement into regulated accounts raises doubts about whether policy makers can rely on these records." Report ¶ 36. BellSouth will address the issue in significant detail.

10 Financial results, regulated/nonregulated cost allocations, and jurisdictional separations are also based on "net plant." Accordingly, any evaluation of these items would not be affected by the failure to retire assets.

Nor does retirement accounting materially affect cost models used to price BellSouth's unbundled network elements, or its universal service support, which are based on forward looking economic costs, not historical costs. Forward-looking economic costs are not based on the company's historical CPR.[11]

Finally, any impact on the depreciation expense would be negligible. While it is true that depreciation expense is calculated on gross plant, depreciation rates are based on net plant. Retirements would not change the net plant amount; however, the depreciation reserve percent, which is used in the calculation of depreciation rates, does change. The change in the reserve percent would result in a higher depreciation rate being applied to a smaller gross plant amount. The higher depreciation rate would produce depreciation expense that is essentially the same as that already booked.[12] Moreover, productivity factors for price cap carriers would only be effected if depreciation expense changed substantially.[13] Because the depreciation expense impact is negligible there would be no impact on productivity factors. Under these circumstances, the Report provides no basis for a conclusion that BellSouth has at any time charged inflated rates.

The *Notice* invited public comment on ten issues. BellSouth will address each of these issues individually below. Before commenting on these issues, however, an understanding of the audit design and process is needed. The audit was designed to test compliance with the minutia

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11 The existing high cost fund, which does look at book costs, will not be used for non-rural local exchange carriers, like BellSouth, beyond 1999.

12 *See infra* Response to Issue 8, Number 1, Derivation of price cap rates and re-initialization of price caps.

13 In the 1998 Biennial Regulatory Review—Review of Depreciation Requirements for Incumbent Local Exchange Carriers, CC Docket No. 98-137, Professor Frank Gallop of Boston University filed an affidavit, which is attached as Attachment B to USTA's Comments, filed on November 24, 1998 concluding that moderate changes in the depreciation rates have no impact on the productivity factor ("Gallop Affidavit"). A copy of that affidavit is attached as Exhibit 2.

of rules established in Part 32.2000 *et seq.* It was not designed to test the dollar value of the assets as recorded in the financial accounts. That is, the audit was designed to test whether information such as location, identification number and quantity of the assets were recorded in the databases properly ("procedural compliance") and not whether the dollars attributed to each asset were accurately associated with the asset being used ("investment"). Thus, the auditors based their sample on a population of asset "line-items," not on investment dollars. In fact, the sample line items selected had no correlation to investment dollars.[14] By using a process designed to test procedural compliance, the audit was a completely ineffective tool to predict error in the investment accounts with any degree of certainty. Indeed, the Report itself admits to a whopping 49% statistical margin of error in the estimate of investment "not found."[15]

The audit focused on two categories of fixed assets, Hard-Wired Equipment and Undetailed Investment. For the Hard-Wired Equipment, which makes up approximately $8.8 billion out of a total $38.8 billion of BellSouth Telecommunications. Inc.'s fixed assets, the auditors used a statistical sampling method to select the sample size and extrapolate errors over the population. For the Undetailed Investment, the auditors merely performed random tests over a small number of items and did not base their sample or error extrapolation on any statistical basis.

1. Hard-Wired Equipment

a. Compliance with Part 32 Record Keeping Rules

As stated, the audit was designed to test compliance with procedural rules. Thus, for the Hard-Wired Equipment, the auditors used a statistical sampling method to select a test sample of

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14 In other words, the auditors did not attempt to select assets with high dollar values.

15 As discussed below, when errors in the Report are corrected, the actual "margin of error" exceeds 100%, thereby making it impossible to draw any statistically valid conclusions regarding

1,152 line items from the CPR, out of a total population of 754,181. The auditors' tests consisted of examining procedural information recorded for the assets in BellSouth's databases. Based on the result of the examination, the auditors "scored" the sampled item as either a 1 – found, 2 – found in another location, 3 – not found, or 4 – unverifiable. BellSouth disagrees with many of the scores that the auditors assigned to sample items. Many of these differences were caused by the auditors' inexperience with a very complex asset recording system. BellSouth specifically identified each scoring discrepancy in its response to the audit Report.

b. BellSouth's Investment in Hard-Wired Equipment is Accurate

Once the auditors had completed their scoring for compliance purposes, they took the items scored as 3 – not found, and attempted to use these items to extrapolate a total dollar amount of missing investment. Because the audit was not designed to test investment, the extrapolation contains an unacceptably high margin of error. According to the Report, the investment for BellSouth's Hard-Wired Equipment is overstated by an estimate of $291.7 million. However, the margin of error for their estimate is plus or minus $142.9 million, *49% of the estimate*. Thus, the auditors' own calculations estimate that the overstatement of investment, if any, could lie anywhere between $148.8 million and $434.6 million.[16] Such an imprecise estimate is simply inadequate to justify an adjustment to BellSouth's recorded investment.

BellSouth employed the services of the international accounting and consulting firm Ernst & Young ("E&Y") to review the audit design and findings. E&Y conducted an extensive analysis of the Report and concluded that in addition to the improper audit design, the auditors had: 1) failed to conduct a two-way audit, i.e., they only selected items from the records and

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"missing investment" dollars.

16 This range is calculated as $291.7 million ± $142.9 million.

traced them to the assets, they did not select an asset and trace it to the records; 2) used improper statistical calculations and therefore understated the margin of error in the estimate of missing investment; and 3) introduced bias into the sampling process.[17] Based on these findings, E&Y concluded that "*the conclusions in the report concerning the amount of overstated investment are unsound and cannot be fairly relied upon.*"[18]

2. Undetailed Investment

The Report recommends that BellSouth also "write–off" the entire amount in its Undetailed Investment account as of July 31, 1997, approximately $138.5 million. The auditors reached this conclusion based on a random sample of line items at *three* central office locations, and by reviewing the cost support documentation for a random sample of *25* entries in the Undetailed Investment account. The Undetailed Investment account at that time was made up of over 21,800 line items. There is little doubt that even if no other problems were associated with the staff's recommendation, a write-off of an entire account balance based on a few random samples is highly arbitrary and capricious.

BellSouth utilizes acceptable accounting practices, as defined in Part 32.2000, to account for the undetailed portion of its investment. A portion of the account is made up of investment that was in place prior to the transformation from a manual CPR system to the mechanized CPR system. Pursuant to a ruling by the Commission, which was documented in BellSouth's response to the Report, this investment is allowed to be maintained in this account until it is retired. The remaining portion of this account is made up of investment dollars that BellSouth has spent, but has not assigned, or classified, to a specific property record item. BellSouth

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17 A copy of E&Y's Report is attached as Exhibit 3 (hereinafter "E&Y Report").

18 E&Y Report at 6 (emphasis added).

maintains this investment by Part 32 account, location, and vintage. The account essentially acts as a temporary cost holder for current investment during reclassifications. Thus, the amount of current investment in the account relates directly to the timing of any reclassifications in progress. As such, it is a valuable internal control tool in the accounting process. There is absolutely no basis for the staff's apparent conclusion that these items are "missing" or not in service.

Having provided the above overview of the audit as a backdrop, BellSouth addresses the issues posed in the *Notice*. For organizational purposes, each issue is restated followed by BellSouth's comments.

ISSUE 1: The validity and reasonableness of the statistical sampling methodologies used by the auditors, including: sample design, the two-stage stratified sampling technique, balance and adjustments made to account for high-cost and lower-cost items, the audit procedures, extrapolation techniques, confidence intervals, and the application of Bayesian techniques

The sampling methodologies used by the Bureau lack creditability. This is evident by the supporting reports prepared by major accounting firms, which were filed by the Bell Operating Companies ("BOCs") in response to their respective audit reports. A brief synopsis of the auditors' statistical sampling design used and results reached regarding BellSouth is helpful to grasp the problems inherent within the sampling process.[19] The auditors determined the population for the sample to be the total number of line items, or records, in BellSouth's CPR. Applying the sample design, the auditors calculated a sample of 1,152 line items to test.[20] Based

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[19] Section IV. D., and the accompanying Appendix B, of the Report describe in detail the statistical sampling design used by the auditors to calculate a sample of CPR to test for the audit. The auditors used the results of their tests to estimate an error in the records and in the investment accounts.

[20] The Report states that during the testing of these records the auditors "encountered numerous problems in [their] attempt[] to verify the sample." The Report goes on to give details

on the number of errors the auditors claimed to have found in the CPR, they projected two estimates. The first was an estimate of the number of records or line items that did not comply with recordkeeping requirements. The second was an estimate of the dollar value of investment they contend is missing from BellSouth's plant assets. A standard error was computed for both estimates. The auditors then applied a normal distribution approximation for a 95% two-sided confidence level to both the line item and investment estimates to obtain confidence intervals for each estimate.

Applying this design to the auditors' sampling results for line items yielded an estimated number of line items that did not comply with recordkeeping requirements of 19.50% of the total population. The standard error for the line items was calculated to be .0153 which was multiplied by 1.96, the multiplying factor to obtain a 95% confidence level under a standard distribution, to yield a margin of error of 2.99%. This corresponded to a confidence interval of 16.51 to 22.49 (19.50 $\pm$ 2.99). Thus, the Report concludes that between 16.51% and 22.49% of the total line items do not comply with recordkeeping requirements.

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regarding the types of problems that were encountered and concludes that 215 line items had "serious problems." BellSouth disputes the characterization of these line items as having "serious problems" and further disputes the scoring the auditors assigned to these assets. Many of the problems the auditors encountered were the results of their misunderstanding and misinterpretation of the structure of the basic data for the Detailed Continuing Property Record ("DCPR") database and the supporting documentation relative to the recording of detailed hardwired equipment. This can be largely attributed to the large number of unique items in the DCPR, the potentially overlapping identification for some items, the different encoding interpretations applied by the numerous vendors supplying the equipment and associated DCPR load files, and the complex nature of how the investment is ascribed to the detailed property record items. BellSouth does not entirely fault the auditors because a significant amount of expertise and experience is needed to adequately interpret the varied permutations that can result from the presence of so many contingencies. BellSouth does note, however, that the audit teams were comprised of different persons and that this caused inconsistencies in the scoring of line items. This not only frustrated the audit process but caused the sampling results to be biased.

Applying the design, and the auditors' sampling results, to the dollar investment of plant assets, the auditors estimated that $291.7 million could not be located. The standard error for the dollar investment was calculated to be $72.9 million which was multiplied by 1.96, the multiplying factor to obtain a 95% confidence level under a normal distribution, to yield a margin of error of $142.9 million. This corresponded to a confidence interval of $148.8 million to $434.6 million ($291.7 million ± $142.9 million). Thus, the Report concludes that the estimated missing plant lies between $148.8 million and $434.6 million. They chose the midpoint of the range, or "$291.7 million as the amount of missing plant that should be written off ⋯."

1. E&Y Report Exposed the Sampling Methods To be Invalid and Unreliable

The conclusions reached by the Report are faulty because not only are the auditors' test results inaccurate, *see* note 16, *supra*, but also the statistical sampling methods and sampling procedures were flawed. BellSouth retained the international accounting and consulting firm of E&Y to conduct a review of the statistical sampling method[21] and the procedures the auditors used to calculate a sample and to extrapolate the results of their tests into their estimates of compliant records and missing dollar investment. Dr. Fritz Scheuren, a renowned statistician, directed this review.[22]

As discussed above, the auditors' statistical sampling method was used to produce the results for both the recordkeeping requirements and the dollar investment. E&Y noted that the design employed by the auditors could be used to calculate estimates of many different types of population quantities. It was designed, however, to produce precise estimates for the proportion

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[21] This included the review of the procedures the auditors used to pick the sample items and testing procedures when such procedures affected sampling results.

[22] E&Y Report at 1.

of compliant line items, not dollar investment. E&Y stated that "[a]s a general rule, the precision of dollar value estimates is more sensitive to design decisions than are proportion estimates. By this we mean that a design made for a precise dollar estimator will likely produce a proportion estimate with acceptable precision. The reverse of this is seldom true."[23] Accordingly, while the sample method could produce an acceptable degree of precision for the estimate for record compliance,[24] it contains major defects in producing an estimate with an acceptable degree of precision for the dollar investment. Accordingly, E&Y's Report focuses on the problems associated with the $291.7 million dollar investment estimate that the auditors contend should be written off.

E&Y determined that four major defects were inherent in the sample method and extrapolation procedures used for the dollar investment: (a) failure to conduct a two-way audit; (b) defective sample design; (c) bias; and (d) understated margin of error. Moreover, E&Y reviewed the audit's Bayesian analysis and determined that it did not support the audit's findings.[25] These defects render the sample results unreliable and E&Y concludes that the sampling results cannot be fairly relied upon to support an investment adjustment.

a. Failure to Conduct a Two-Way Audit

First, the auditors failed to conduct a two-way audit. The procedures used by the auditors only included selection of line items from the CPR and locating the physical assets associated with the line items. It did not include selecting a physical asset and locating the associated line item in the CPR. "If the intent of the audit was to attempt a quantification of 'missing'

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[23] E&Y Report, Appendix A, at 4.

[24] While E&Y believed the design for record compliance to be acceptable, a margin of error of 2.99% was far from acceptable. E&Y stated that the margin of error should be at most 0.25%.

[25] *See* Bayesian Analysis discussed *infra* at 18.

equipment, it would be necessary to conduct a two-way audit. ··· The only way to determine 'missing' equipment would be to take the results of the initial audit and net them against results of the reverse direction audit. The failure to conduct the reverse audit here means that the FCC quantification of 'missing' investment systematically overstates the actual value and cannot be relied on."[26]

b. Defective Sample Design

"Second, the sample design was intended to measure the *proportion of items* not found. It was not intended to measure the *dollar value* of missing items."[27] Because the auditors' intent was to estimate a dollar value of missing investment, they should have designed the sample differently. The sample design is the "plan for choosing the way in which records are selected from the CPR database so that fairly precise estimates can be obtained."[28] This means "that the sample should be planned so that resulting confidence intervals will not be too wide with respect to the estimate."[29] The estimates calculated by the auditors, however, demonstrate that the sample design was incapable of achieving such results for dollar investment.

The E&Y report presents this point forcefully:

> The audit report includes two estimates – one based on the proportion of the number of the line items that were or were not found to be in conformance with the rules; the other based on the dollar value of investment not located in the audit. In general, one can get reasonable precision for an estimate of proportion (as the audit report sought in the first estimate) using many different sample designs. Estimates of total dollar values (such as sought in the second estimate) are far more complex and difficult. Results may vary widely under different sample designs, so one should take care when designing for these estimates. Thus, an

[26] E&Y Report at 2.

[27] *Id.* at 1

[28] *Id.* at 2.

[29] *Id.* at 2.

> experienced statistician faced with estimating a proportion and a total dollar amount, would plan the sample to obtain a relatively precise estimate for the total dollar amount, and accept the precision that is obtained for the proportion estimate.
>
> The methods identified in the audit did the exact opposite. The audit sampling plan was designed to produce a precise estimate of the proportion, and accept a relatively imprecise estimate of the total dollar amount. Note, that the margin of error given for the proportion estimates are approximately 3% [2.99%] ⋯. However, the reported margins of the error for the total investment tied to the records of items that were not located are <u>approximately 49% of the estimated value</u> [$142.9 million of an estimate of $291.7 million]. These are imprecise estimates. Thus, even based on the ... Report's own calculations without our corrections (and ignoring the failure to conduct a two-way audit), we find the evidence very weak when making statements about dollar amounts.[30]

BellSouth finds it implausible that the Commission would consider an investment adjustment when so much uncertainty exists in the estimate. The Commission must recognize that a margin of error of 49% of the estimate clearly does not yield enough precision to form a rational basis for an adjustment. Moreover, the problem is exacerbated by the fact that the margin of error was miscalculated by the auditors and is actually <u>understated</u> in the Report.[31]

c. Bias

The third defect in the Report is bias associated with the sample. Bias can be both statistical and non-statistical. E&Y tested the statistical bias and found it to be negligible. E&Y, however, confirmed several forms of non-statistical bias. For example, "the audit staff did not use the same team of auditors to inspect each location."[32] This caused significant differences in the scoring of line items depending on the audit team doing the scoring. E&Y was unable to

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[30] *Id.* at 2-3 (emphasis in original).

[31] *See infra* Response to Issue 1, Number 3, E&Y's Recalculation using BellSouth Scoring and Categorization.

[32] E&Y Report at 4.

determine if the auditors corrected the discrepancies between audit teams' scoring through subsequent adjustments to the scoring process. None of the sites, however, were revisited to confirm the true state of the property records.

Another form of non-statistical bias occurred in the sample selection process. If the auditors selected a location they subsequently concluded was impractical to audit, they simply selected another location to audit. This effectively removed locations from the audit sample. The Report, however, draws conclusions for the entire population. Indeed, the auditors' extrapolated their sample results over the entire population, making no adjustment for excluded locations. A reverse form of this bias was the inclusion of a central office from North Carolina. When the original sample size was selected, no central office from North Carolina was included in the list of central offices to be tested. The auditors arbitrarily chose a location in North Carolina in order to have sample items from all of BellSouth's states. This made the probability of selection for the North Carolina central office different from all the others in the stratum to which it belonged. This caused further bias in the estimate.

Moreover, E&Y noted that the auditors substituted for "hard-to-get-to" line items by using the preceding line item on the population list. E&Y stressed that "this changes the probability of selection for certain items, and if this is not accounted for, the result is bias in the estimate."[33] E&Y suggests that because none of this bias was accounted for during the audit, the auditors should have used a higher confidence level to calculate the margin of error. This concept is discussed below.

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[33] *Id.* Appendix A at 14.

d. Understated Margin of Error

The fourth defect recognized by E&Y in its report is that the margin of error, even at 49%, was understated in the Report results. As indicated above, "[t]he larger the margin of error, the less reliable the results."[34] Little to no reliability can be placed on a 49% margin of error. When the Report results are modified to reflect the proper margin of error the results become even less reliable.

The auditors applied a standard (normal) distribution approximation, using a 95% two-sided confidence level, to obtain confidence intervals for the estimates. The sample size must be large enough to employ the standard distribution approximation in order to obtain the proper calculation for the confidence intervals. "The sample size used in the audit is not large enough to use the normal approximation. This leads the [Report] to systematically understate the margin of error in [the] dollar estimates."[35]

This concept is fully explained by E&Y in its report:

> For a simple random sample from the CPR, a sample size of 1152 (the number of items sampled in the audit) is likely to be large enough for a normal approximation to be appropriate. However, the FCC did not use a simple random sample. Instead central office locations were first randomly selected within groupings (or strata) that the audit staff defined, and then records were randomly selected within chosen locations. In statistical parlance, a two-stage, stratified, cluster design was used.
>
> For this type of design, the total sample size is not as important as the number of locations chosen within each stratum. There were 32 locations. Special advanced techniques need to be used for calculating confidence intervals for these more complex designs.[36]

34 *Id.* at 3.

35 *Id.*

36 *Id.*

In addition to improperly using the normal approximation to calculate the confidence intervals, the auditors performed the confidence interval calculation using two-sided 95% confidence levels. This raised two concerns with E&Y. The first is that a 99% confidence level should be used instead of 95%. As recognized above, non-statistical bias is pervasive throughout the audit. It is difficult to quantify these forms of error. Consequently, E&Y opined that it would be prudent to use a 99% confidence level to balance the bias that is inherent in the audit.

The second concern associated with the auditors' confidence interval calculation is that it uses two-sided confidence levels or bounds. E&Y contends "that a one-sided lower confidence bound should be used as the value assessed to be in error, e.g., the total in-place cost of non-locatable line-items, or the proportion of non-compliant records. This is because only values smaller than the lower bound are, statistically speaking, significantly different from values above the lower bound."[37] Additionally, E&Y reported that the IRS always uses this lower bound approach in its audit findings. "In fact, the IRS calculates estimates in three ways. The method that produces the smallest margin of error is used, and the... lower confidence bound is the amount assessed."[38]

Prompted by these issues, E&Y, using the auditors' own findings and correcting only for the calculation errors as discussed above, prepared its calculation of the margin of error. Because the normal approximation could not be used, E&Y used two advanced techniques to calculate confidence intervals. In the first technique, E&Y considered the "degrees of freedom" and used Student's t distribution to find a multiplying factor. In the second technique they conducted a simulation experiment that estimated the total in-place cost of the population. From

37 E&Y Report, Appendix A at 8.

38 E&Y Report at 2, n.1.

this simulation E&Y determined a multiplier. Both of these techniques are discussed in great detail in the E&Y Report.[39]

For the dollar investment, E&Y used the multiplier determined from the simulation, using a 99% one-sided confidence bound, to recalculate the auditors' results. Based on these recalculations E&Y concluded:

> **The estimate of BellSouth's total investment in error, using FCC scoring with partial credit, is $291.5 million. The one-sided 99% lower confidence bound is negative $32.6 million. Notice that the lower confidence bound goes beyond zero. This means that there is no statistically significant difference between the estimated total investment not found and zero.**[40]

Thus, the proper margin of error and the appropriate confidence level used with the auditors' own sample findings[41] yields an estimate so imprecise it cannot possibly be relied upon to make any form of an investment adjustment. An investment adjustment cannot be justified based on the results in the Report.

e. Bayesian Analysis

In an attempt to shore up its faulty sampling methods, the auditors performed a Bayesian model--based analysis on the data from the audit sample. The auditors claim that the "results achieved under the Bayesian analysis are very close to [their] findings and conclusions derived from using the classical statistical analysis under [their] random two-stage stratified sampling plan." The auditors imply that by producing these "close" findings the Bayesian analysis corroborates their statistical analysis. The results achieved by the Bayesian analysis, however,

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[39] *See id.* at 5-10.

[40] E&Y Report at 4 (emphasis in original). The only change that E&Y's calculation makes from the Report is that E&Y corrected the margin of error based on the simulation results.

[41] BellSouth disputes the auditors' findings, as discussed above; however, this conclusion is reached using the findings presented in the Report.

do not lend any support to the auditors sampling methods. In fact, E&Y reviewed the auditors' Bayesian analysis and stated:

> Underlying the [auditors'] Bayesian arguments is the claim that because the Bayesian approach puts all [the auditors'] statistical deficiencies into a Bayesian sampling model... the problems with the audit sample and the derived statistics go away. This, however, is not the case. Like any other model, the outputs are only as valid as the inputs and assumptions. The way in which the [auditors'] chooses to use the Bayesian methodology camouflages the flaws, but does not remove them.[42]

E&Y's evaluation of the Bayesian analysis is discussed in detail in its Report. This evaluation discloses that the auditors' use of the Bayesian analysis adds no creditability to the auditors' flawed audit design and process.

2. E&Y's Conclusions

Based on the work performed, E&Y concluded that "the estimates in the Report contain *biases*, and are *highly inaccurate* in other ways too. Given these errors and biases, the conclusions in the report concerning the amount of overstated investment are unsound and cannot be fairly relied upon."[43] Given this conclusion, the Commission has no basis to impose an adjustment to BellSouth's investment accounts based on the sampling results documented in the Report.

3. E&Y's Re-Calculation Using BellSouth Scoring and Categorization

BellSouth requested E&Y to prepare an estimate for missing investment based on BellSouth's categorization of line items set forth in BellSouth's Response to Issue 2, *infra*. E&Y used all of the auditors' calculations except that the multiplier was calculated using the results of the simulation prepared in the E&Y Report. The results of the calculation yielded an estimate of

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[42] E&Y Report at 5.

[43] E&Y Report at 6 (emphasis added).

$147.9 million with a standard error of $33.7 million. Applying the multiplier calculated from the simulation distribution for a 99% lower confidence bound yielded a lower bound of -$2.0 million. Accordingly, using BellSouth's scoring and categorization, any estimate of missing investment is completely immaterial.

ISSUE 2: The validity and reasonableness of the methodology used by the Bureau's auditors in determining whether to rescore or to modify a finding during a field audit that equipment was "not found"

On April 7, 1999 the Chief of the Accounting Safeguards Division ("ASD") of the Bureau issued a public notice ("ASD Notice"), simultaneous with the Commission's *Notice*, that discussed the auditors methodology used to re-score items that the audited companies believed to be in error. The ASD Notice states that in order to have an item re-scored the companies had to meet a standard of providing "adequate and convincing evidence that the facts were different than appeared at the time of the auditors' on-site inspection." The ASD Notice went on to state that "[i]n order to warrant a change in scoring [the] additional evidence had to have strong probative value equal to the physical inspection evidence." The ASD Notice then discusses the types additional evidence that most companies supplied was in the form of source documents, such as invoices, purchase orders, time sheets and work orders, or engineering drawings. This evidence "constituted probative evidence sufficient to warrant a change in original scoring" for three basic situations: (1) quantity recording errors,[44] (2) interim retirements,[45] and (3) embedded items.[46]

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44 This type of error was caused by an improper quantity be recorded in the CPR than was actually procured. For example five items being actually purchased while a keying error caused six to be recorded in the CPR.

45 This type of error occurred when an item was retired between the time the CPR data was provided to the auditors and the time of the on-site visit.

46 This type of error occurred when an item was embedded within a larger piece of