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BEFORE THE PUBLIC SERVICE COMMISSION
STATE OF MISSOURI

In the matter of Petition of Alma Telephone Company for Arbitration of Unresolved Issues Pertaining to a Section 251(b)(5) Agreement With T-Mobile USA, Inc.	))))	Case No. IO-2005-0468, et al. Consolidated

REBUTTAL TESTIMONY

OF

W. CRAIG CONWELL

ON BEHALF OF T-MOBILE USA, INC.

JULY 28, 2005

Public Version

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INTRODUCTION

Q1. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND EMPLOYER.

A1. My name is W. Craig Conwell. My business address is 405 Hammett Road, Greer, South Carolina. I am an independent consultant, specializing in telecommunications cost analysis.

Q2. ON WHOSE BEHALF ARE YOU PROVIDING REBUTTAL TESTIMONY?

A2. I am testifying for T-Mobile USA ("T-Mobile").

Q3. DID YOU PROVIDE DIRECT TESTIMONY IN THIS CASE?

A3. Yes, I filed direct testimony on July 21, 2005 as the cost witness for T-Mobile.

Q4. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A4. My rebuttal testimony is in response to the direct testimony of Robert Schoonmaker, witness for Alma Telephone Company, Chariton Valley Telephone Company, Mid-Missouri Telephone Company and Northeast Missouri Rural Telephone Company ("the Incumbent Local Exchange Carriers" or "ILECs"). My testimony addresses the portion of Mr. Schoonmaker's testimony dealing with transport and termination costs and the proposed rate of $0.035 per minute for inclusion in Appendix 1 of the Traffic

Termination Agreement.[1] Mr. Pruitt is providing rebuttal testimony for T-Mobile addressing the remainder of Mr. Schoonmaker's testimony.

Q5. PLEASE SUMMARIZE YOUR REBUTTAL TESTIMONY?

A5. Alma Telephone, Chariton Valley, Mid-Missouri and Northeast Missouri Rural have proposed a single rate of $0.035 per minute for transporting and terminating intraMTA telecommunications traffic originated by T-Mobile customers. The FCC rules for reciprocal compensation require the rate not to exceed forward-looking economic costs. The ILECs have submitted an estimated cost of $***** per minute, on average for the four companies. [2]

T-Mobile disputes both the ILECs' single proposed rate and their averaged estimated cost. In fact, both substantially exceed each of the ILEC forward-looking economic costs. In my direct testimony, I estimated the average cost of the ILECs' forward-looking economic costs be $0.0074 per minute or about ****** the cost computed by the ILECs. In my rebuttal testimony, I lower slightly the cost to $0.0068 per minute, in response to Mr. Schoonmaker's testimony on capital costs. A rate of $0.0068 is the maximum the ILECs are permitted by the FCC rules to charge.

Mr. Schoonmaker's testimony sponsors the ILEC cost studies, which are based on the HAI 5.0a model. The majority of his testimony dealing with the ILEC costs discusses his rationale for using the HAI model, reservations he has about the model and changes made

[1] See pages 5 – 30, "Direct Testimony of Robert Schoonmaker," Case No. IO-2005-0468, et al. (consolidated), July 21, 2005.
[2] 47 CFR § 51.705 (a).

to the model default input values. Following are the main points I make in responding to his testimony:

Mr. Schoonmaker raises serious concerns about the HAI model and its results. In his own testimony, Mr. Schoonmaker questions whether the HAI model is capable of accurately measuring forward-looking economic costs of the four companies.[3] He specifically notes that he was unable to sufficiently assess the proposed default inputs, and particularly their appropriateness in reflecting the forward-looking costs of the ILECs.[4] Indeed, the concerns raised by Mr. Schoonmaker highlight a number of the errors I found in the ILEC cost studies and which I describe in my direct testimony. These were errors that I corrected, resulting in the $0.0068 per minute transport and termination cost.

Mr. Schoonmaker did not produce evidence supporting key cost drivers affecting ILEC costs. There are a number of important assumptions and cost data that determine ILEC transport and termination costs. 47 CFR § 51.505 (e) (2) requires the ILEC to present evidence permitting costs to be adequately reviewed. For many cost drivers, Mr. Schoonmaker either discussed them in very general terms or simply not at all. Examples of cost drivers that have not been substantiated are current interoffice fiber cable costs, route mileages, transport system capacities and forward-looking average utilization levels, current switching system costs, and the usage-sensitive portion of end office switching, among others.

[3] Pages 7-9, Schoonmaker Direct Testimony.
[4] *Id.*

The ILEC cost studies inappropriately include costs for new switching capabilities not attributable to transport and termination. Mr. Schoonmaker's rationale for increasing, rather than reducing, HAI model switching investments per line is that the ILECs have recently invested in new capabilities, such as interchangeable NXX codes, four-digit CIC code capability, and intraLATA presubscription, among others. These costs are not attributable to switching traffic originated by T-Mobile customers. These costs are not part of ILEC transport and termination costs. Nonetheless, if the Commission permits the ILECs to include the costs of these capabilities in switching investments per line, the usage-sensitive portion of end office switching should be further reduced.[5]

Changes in HAI model default input were made that either are not representative of the situation of the ILECs in this case or are inadequate for computing proper forward-looking economic costs. For example, the HAI model value for the *cost of debt* was set at 8.8%. However, two of the ILECs have no debt at all, and one has less than five percent debt as a percent of debt and equity capital. The one ILEC with significant long term debt, Northeast Missouri Rural, is paying only 4.29% – 4.31% interest on new debt acquired last year. Furthermore, the *cost of equity* in the ILEC studies was set by the FCC for the interstate jurisdiction in 1990, and the cost of equity is lower today. The costs utilized by the ILECs inflate their actual cost or debt or cost of equity.

[5] See "Direct Testimony of W. Craig Conwell," Case No. IO-2005-0468, et al., consolidated, July 21, 2005, pages 23 – 25. I computed proper forward-looking switching investments for the ILECs in the range of $236 - $364 per line, of which 5.9 – 7.6% is the usage-sensitive portion. If the ILECs are permitted contrary to the FCC rules to include in the switching investments per line the costs of switching capabilities having nothing to do with transport and termination and are not usage-sensitive, the usage sensitive percentages must be reduced from 5.9 – 7.6% to lower levels in order to exclude these costs from transport and termination.

Q6 DID MR. SCHOONMAKER'S TESTIMONY INDICATE CONFIDENCE IN THE TRANSPORT AND TERMINATION COSTS PRODUCED BY THE HAI MODEL?

A6. No. On page seven of his testimony, Mr. Schoonmaker seems to say he chose the HAI model because it produces "adequate" results and using the model is less costly than having to produce from scratch a company-specific cost study for each of the ILECs. He relies on the fact that the HAI model, as he puts it, "has been widely available throughout the industry and has been carefully studied by industry participants, the FCC and many state Commissions." However, he describes what I consider to be serious concerns with whether the HAI model results are accurate or representative of the ILECs in this case. It appears that Mr. Schoonmaker is not completely confident in the HAI model results.

Q7. DO YOU CONSIDER THE ILECs' HAI MODEL RESULTS TO BE "ADEQUATE"?

A7. I do not. I described in my direct testimony significant errors in the ILEC cost studies produced using the HAI model. These include the ILECs' use of outdated cost data and assumptions, an unrealistic increase in the end office switching investment, the over-assignment of switching costs to transport and termination, common transport costs that substantially exceed benchmarks for other companies and do not reflect the networks of these ILECs, and others.[6] The HAI model results, which are affected by these errors, are not adequate. They do not meet the FCC requirements for setting reciprocal compensation rates per 47 CFR § 51.705(a), and they overstate the ILECs' forward-looking economic costs for transport and termination.

[6] See pages 16-33, Conwell Direct Testimony.

Q8. ON PAGE 9 OF HIS TESTIMONY, MR. SCHOONMAKER SUPPORTS USING THE HAI MODEL BECAUSE IT IS THE BEST AVAILABLE TOOL AT REASONABLE COST TO THE ILECS. DO YOU AGREE WITH HIS RATIONALE FOR USING THE MODEL?

A8. After developing cost models and producing cost studies for a good part of thirty years, I appreciate the difficulty and cost of the effort. The FCC rules, though, are clear that cost-based transport and termination rates are to be established on the basis of forward-looking economic costs determined by a study pursuant to 47 CFR §§ 51.505 and 51.511. The ILEC studies based on the HAI model do not meet these requirements. The results are wrong. Even if it cost nothing to produce studies with the HAI model, the results are inappropriate.

The effort to produce company-specific cost studies according to the FCC rules for the ILECs in this case is not onerous. The ILEC networks are not nearly as complex as those of the Regional Bell Operating Companies and large independent telephone companies in terms of the number and types of switches, interoffice transport systems and other factors. According to the information produced in response to T-Mobile's data requests, Alma Telephone has a single switch connecting to the Southwestern Bell tandem switch, and Chariton Valley Telephone and Mid-Missouri have a modest number of switches and one or two interoffice rings. It is not unreasonable for the companies to produce studies that determine the current costs of construction of efficiently sized plant reflecting current technology, operating expenses for these facilities, their capacities, forward-looking average utilization, and resulting costs per minute of use. Such studies have the benefit

of being transparent and readily analyzed, which is not the case with the HAI model. I do not agree with the ILEC rationale for using the HAI model.

Q9. WHAT IS YOUR OPINION OF MR. SCHOONMAKER'S DESCRIPTION OF "HAI INPUT CHANGES" FROM PAGES 13 - 28 OF HIS TESTIMONY?

A9. Mr. Schoonmaker provides no substantive evidence to support key changes to the HAI model inputs. In addition, he failed to explain why he did not change other important input; in other words, why he simply adopted the model default values. His description is general, and he spends time describing some changes that have little or no bearing on transport and termination costs.[7]

Q10. MR. SCHOONMAKER TESTIFIES FROM PAGES 13 - 18 ABOUT CABLE MIX AND STRUCTURE SHARING. HAVE THE ILEC FORWARD-LOOKING CABLE COSTS BEEN ADEQUATELY DESCRIBED?

A10. Mr. Schoonmaker only explains the rationale for assuming the ILECs would use, on a forward-looking basis buried cable, for their outside plant, with no structure sharing. I have the same assumptions in Exhibits WCC-11 and WCC-12 of my direct testimony, where I correct the ILEC cable costs. He did not describe the key cost drivers that cause the ILEC study values for cable investments per trunk to be so high ($**** - $***** per trunk). The unanswered questions include:

- What is the forward-looking, efficient cable size (fibers per cable) that Alma Telephone, Mid-Missouri Telephone and the others would place for interoffice transport?

[7] For example, billing and billing inquiry costs, which are not part of transport and termination, are described in detail. See pages 24 – 25, Schoonmaker Direct Testimony.

- What is their current cost of cable construction per foot of cable – material prices, local contractor costs, etc.?
- What is the interoffice route mileage of Alma's connection to the Southwestern Bell point of interconnection (POI), Chariton's ring and Mid-Missouri's two rings?
- What efficiently-sized interoffice transport system would be used with these cable facilities, and what is its forward-looking average utilization (forecast DS0s in service / DS0 capacity)?

Mr. Schoonmaker did not address any of these important questions. Cable sizes, current cable costs, route mileage, transport system bandwidth and utilization are the essential drivers of cable investment per trunk. This information is needed to understand why the ILEC cable investments per trunk are so high.

Q11. DOES INFORMATION IN THE ILEC RESPONSES TO T-MOBILE DATA REQUESTS CAUSE YOU TO QUESTION WHETHER THE HAI MODEL AND ITS DEFAULT INPUT VALUES ACCURATELY REPRESENT THE ILEC NETWORKS?

A11. Yes, there are several items of information that raise questions or concerns, if I was preparing to use the HAI model to compute the ILEC interoffice cable costs. These include:

- Alma Telephone has only one switch with approximately 350 lines in service.[8,9] The switch presumably has a single transport system and cable connecting to a point of interconnection with Southwestern Bell. I would want to know the

[8] Response to data request #7, "Alma Telephone Company's Answers to T-Mobile Data Requests of June 30, 2005," 07/07/05.

location of the POI and whether the HAI model accurately estimates the distance to it. I also would want to know the transport system capacity and cable size assumed by the HAI model for what is a small number of lines and interoffice traffic.

- Chariton Valley Telephone's network diagram indicates it has **** miles of ***** buried fiber cable, with an original cost of $**** per foot.[10,11] Given this information, I would be interested in the cable sizes, route mileage and forward-looking cable cost per foot produced by the HAI model and its default input values. I would look into the transport system bandwidth and forward-looking average utilization reflected in the model. I would want to know whether the existing network represented an efficient, forward-looking architecture and how that architecture compares with the HAI model.
- Mid-Missouri Telephone's network diagram shows *** rings with an average of route mileage of **** miles (including the distance to the Southwestern Bell POI) and the use of OC12 transport. Again, I would want to know how the HAI model cost drivers compared with Mid-Missouri's network and whether the HAI model or Mid-Missouri's network reflected efficient, forward-looking designs.
- Northeast Missouri Rural's network diagram actually indicates it has an **** interoffice transport system, which has a nominal capacity of ****** DS0s for a

[9] Cell D66, Unit Costs spreadsheet, HAI model output for Alma Telephone, copy included in Exhibit WCC-2 of Conwell Direct Testimony.
[10] See Exhibit WCC-16, Conwell Direct Testimony for buried fiber cable statistics.
[11] Exhibit WCC-1 Rebuttal contains the network diagrams provided by Chariton Valley Telephone, Mid-Missouri Telephone and Northeast Missouri Rural Telephone in response to T-Mobile Data Requests.

company with 8,409 lines in service, so similar questions about forward-looking design apply.[12]

The point is simply this, there is evidence to strongly suggest the HAI model is not representative of the ILECs' current or forward-looking networks and costs; yet, few changes to the default input were made to account for this. Mr. Schoonmaker gave a fair assessment of this situation in his direct testimony when he described his concerns about the validity of the results of the HAI model. He listed these concerns as follows:

> "1) A lack of sufficient time and resources to fully explore all the proposed default inputs. While I proposed a number of changes to these inputs, there are others, such as the cost of cable and digital loop carrier equipment, which I have not had time to test against the forward-looking costs of such items for small companies in Missouri. I am concerned that the costs may not reflect the economic costs of the companies in all respects.
>
> 2) A concern that the use of broad inputs and generalized formulas for all companies, rather than specific inputs for individual companies, tend to mask unique circumstances of individual companies, which cause substantial differences in costs in the real world.
>
> 3) A concern that the model results for small companies from models like the HAI Model produce results which vary widely from comparable actual data and in a manner inconsistent with forward-looking costs raising substantial questions regarding the validity of the results for individual small telephone companies.
>
> 4) A concern that results from the model are likely to be less accurate for smaller geographic areas, such as individual exchanges or small companies with a few exchanges, than they are for large companies, such as SWBT or Verizon who have hundreds of exchanges. …"[13]

The ILECs have the obligation to provide adequate and reliable cost studies, and I cannot speak to why they were unable to provide Mr. Schoonmaker with adequate time, accurate background and data or sufficient support to create proper cost studies. To the extent that

[12] ***** DS0s (nominal) = 24 DS0s / DS1 X 28 DS1s / DS3 X 192 DS3s / OC-192. The 2004 Annual Report of Northeast Missouri Rural indicates it has 8,409 access lines in service at year end.

Mr. Schoonmaker has explained the rationale for changes he made to model values, I have been able to assess and, where appropriate, correct those values, as described in my direct testimony and as further set out in the following.

Q12. DOES AVERAGING THE INDIVIDUAL COMPANY RESULTS MITIGATE THE ERRORS IN THE INTEROFFICE CABLE COSTING?

A12. No. The ILEC cost studies produced interoffice or common transport cable costs of $0.**** -$0.**** per minute, with an average of $0.**** per minute. Each of the individual costs is substantially overstated. After correcting for errors, I computed a cost of $0.0046 per minute.[14] Averaging individual company costs that are each overstated does not eliminate the errors.

Q13. ON PAGES 18 – 21 OF HIS DIRECT TESTIMONY, MR. SCHOONMAKER DESCRIBES REASONS FOR INCREASING THE HAI MODEL DEFAULT VALUE FOR THE *CONSTANT EO SWITCHING TERM* FROM $416.11 TO $*** PER LINE. DO YOU AGREE?**

A13. No, there are several statements in Mr. Schoonmaker's testimony that are incorrect or misleading. First, he states the following on page 18:

> "Our analysis indicates that the default input value is not representative of the cost of end office switching equipment for small companies and small switches. The default switching input value that is used by the HAI modelers is based on an analysis of switch costs for larger companies (Bell Operating Companies and GTE) that were publicly available."

The default switching input values in the HAI model for small ILECs are different from those for Bell Operating Companies and large independent companies. The HAI model

[13] Pages 7-9, Schoonmaker Direct Testimony.
[14] See Exhibit WCC-6 Rebuttal for corrected common transport cable costs per minute.

investment per line for small companies is 71% greater than the investment for large companies, as described in the following excerpt from the HAI model input documentation:[15]

> **"4.1.9. End Office Switching Investment Constant Term**
>
> **Definition:** The value of the constant ("B") appearing in the function that calculates the per line switching investment as a function of switch line size for an amalgam of host-remote and stand alone switches, expressed separately for BOCs and large independents (ICOs), on the one hand, and for small ICOs, on the other hand. The function is cost per line = A *ln* X + B, where X is the number of lines.
>
> **Default Values:**

End Office Switching Investment Constant Term	
BOC & Large ICO	**Small ICO**
$242.73	$416.11

> **Support:** The switching cost surveys were developed using typical per-line prices paid by BOCs, GTE and other independents as reported in the Northern Business Information (NBI) publication, "U.S., Central Office Equipment Market: 1995 Database," compared to switch size and data from the ARMIS 43-07 report."

The HAI model already attempts to recognize the higher switching investments per line of small companies. Further increase without accurate supporting data is inappropriate.

Secondly, Mr. Schoonmaker argues the HAI model using default values understates switching investment based on a comparison of the HAI model investment versus actual switching investments for small Missouri companies. He states on page 19,

> "With the default inputs, the COE switching investments produced by the HAI Model were about 45% less than the actual COE switching investments for the small Missouri companies. I believe that is a strong indicator that the default input is generating inappropriate results for these companies."

[15] 71% = ($416.11 - $242.73) / $242.73.

He did not provide the analysis supporting his conclusion, so I attempted to replicate his comparison as shown in Exhibit WCC-2 Rebuttal. I obtained from the 2004 Annual Reports filed with the Missouri Commission the ILEC total switching investment (row 8) and lines in service (row 10), and I calculated the embedded investment per line (row 11).[16] The HAI model switching investments per line in the ILEC studies were adjusted to estimate investments using HAI model default input (rows 13 – 20).[17] Overall, the HAI model switching investments with default input are 43% below the 2004 embedded switching investment (cell F23). This is close to the 45% difference described by Mr. Schoonmaker.

However, this comparison masks some essential facts. In 1996, the switching investment per line for the ILECs ranged from $438 to $442 per line. This is shown on row 15 of Exhibit WCC-3 Rebuttal.[18] Keep in mind that the 1996 switching investments were sufficient to serve the lines in service and traffic volumes at the time. In other words, each company had working switches in place adequate to handle the traffic placed on them, and the companies had actually spent approximately $440 per line to construct these switches in 1996 and prior years.

In the following eight years, the companies experienced only one to three percent annual line growth. By 2004, the total lines in service increased just five to nine percent for three of the companies, and 23% for Mid-Missouri.[19] Given these increases in lines, it is

[16] Chariton Valley does not show in its Annual Report any digital electronic switching (account 2212).
[17] The adjustment was made by multiplying the ratio of the default *EO switching constant* to the higher, changed value for the constant used by the ILECs times the HAI model switching investment per line. This approximated the HAI investments based on default input, without re-running the model.
[18] The HAI 5.0a model contains ARMIS data for 1996.
[19] Lines in service for 1996 are from the Unit Cost spreadsheet of the HAI model, and lines for 2004 are from the ILEC Annual Reports.

reasonable to expect total switching investments to increase by similar percentages. However, this was not the case.

Since 1996, Alma Telephone increased its total switching investment by 59%, while demand grew just five percent. Northeast Missouri Rural more than doubled its investment as demand grew nine percent. On the other hand, Mid-Missouri, which experienced the greatest increase in demand, actually reduced switching investment. This suggests Alma and Northeast Missouri Rural were investing in switching capabilities in addition to keeping pace with modest growth in demand. Assuming Mr. Schoonmaker is comparing HAI model switch investments with 2004 or recent book investments, the HAI model values will appear low because of substantial investments in switching capabilities *over and above* those necessary to satisfy demand for lines or minutes of use of traffic.

Q14. DID MR. SCHOONMAKER INDICATE THE POSSIBLE RATIONALE FOR THESE LARGE SWITCHING INVESTMENTS?

A14. On page 20 of his testimony, in describing Missouri ILEC switches, he stated:

> "These switches include such recently required capabilities as interchangeable NXX codes, four-digit CIC code capability, intraLATA presubscription, and in most cases, SS7 signaling and the features required by the Communications Assistance for Law Enforcement Act ("CALEA")."

He attributed the increase in switching costs largely to software, in giving the following explanation of switching cost trends:

> "While it is generally believed that the cost of switching equipment has been falling over time, the falling costs of hardware have been at least partially offset by increasing costs of switching software."

It is essential to recognize that the investment in these capabilities are not attributable to transport and termination. Moreover, if the investments are for software, these are not usage-sensitive and should not be attributed to transport and termination, but rather lines.[20]

Q15. IS THERE A MORE APPROPRIATE COMPARISON OF THE HAI MODEL SWITCHING INVESTMENTS WITH EMBEDDED INVESTMENTS?

A15. Keep in mind, the only purpose in comparing the HAI model switching investments with actual, book investment is to judge the reasonableness of the estimates of current switching investments. Do they look high or low?

According to a Sprint cost witness in a recent arbitration of transport and termination rates in Tennessee, the Turner Price Index (TPI) for digital switching has dropped 31% over the past decade.[21] I would expect to see a similar or greater decline in the ILEC switching investments, depending on when the switches in service in 1996 were originally placed. On row 25 of WCC-3 Rebuttal, I compare the HAI model switching investments based on default input to the ILEC embedded investments in 1996, or almost a decade ago. The HAI model investments are on average 15% below the embedded investments. This is about half the decline indicated by the TPI. This suggests the HAI model investments, based on default input, are high compared to current switching investments. This makes sense. The HAI model default switching investment per line is from the mid-1990s.[22]

[20] See Conwell Direct Testimony, Exhibit WCC-7.
[21] See page 23, Conwell Direct Testimony.
[22] See previous HAI 5.0a documentation of the *EO switching investment constant*. The default input values were based on a Northern Business Information study and data from 1995.

Q16. BASED ON THIS COMPARISON, IS IT REASONABLE TO INCREASE THE HAI MODEL DEFAULT SWITCHING INVESTMENT PER LINE?

A16. No, the HAI model value for the *EO switching investment constant* of $416.11 per line should have been significantly reduced, rather than increased by ***%.[23] In my direct testimony, I corrected the ILEC forward-looking switching investments, and the results ranged from $236 - $364 per line.

Q17. WHAT IS THE EFFECT OF INCREASING THE SWITCHING INVESTMENT PER LINE?

A17. The obvious effect is that it raises end office switching costs and the cost basis for transport and termination rates. The less obvious effect is that it transfers to the CMRS Providers the recovery of costs of switching capabilities having nothing to do with transport and termination, such as those I described earlier. The FCC rules do not permit such costs to be included in reciprocal compensation rates.

Q18. IF THE ILECS DO INCREASE THE FORWARD-LOOKING SWITCHING INVESTMENT PER LINE TO INCLUDE THESE NEW CAPABILITIES, ARE THERE OTHER NECESSARY CHANGES TO THE HAI MODEL INPUT?

A18. Yes, the *EO non-port fraction* or the proportion of switch plant that is usage-sensitive must be further reduced. The ILECs used the HAI model default value of 70%, which in my direct testimony I corrected to approximately seven percent.[24] If the ILECs include the costs of these new capabilities that are not caused by transporting and terminating minutes of telecommunications traffic from wireless customers, then the seven percent

[23] **% = ($*****ILEC input - $416.11 default value) / $416.11

[24] See Conwell Direct Testimony, pages 24 – 25.

fraction must be further reduced to correctly compute termination costs. Otherwise, *termination* is not being properly defined and costs developed per §51.701 (d) of the FCC rules.[25]

Q19. DO YOU AGREE WITH THE DEBT RATIO, COST OF DEBT AND COST OF EQUITY USED BY THE ILECS?

A19. I did not change the debt ratio and costs of debt and equity when I initially corrected the ILEC cost studies as described in my direct testimony, because other errors were much more important. I do not agree, though, with Mr. Schoonmaker's rationale for using an 11.25% cost of capital for the four ILECs. The 11.25% cost of capital is based on a 44.2% debt ratio, cost of debt of 8.80% and cost of equity of 13.19%.[26] He simply used the 11.25% cost of money set in 1990 by the FCC for the interstate jurisdiction.[27] No attempt apparently was made to estimate the costs of debt and equity for the four ILECs.

The costs of debt and equity have declined since 1990. In a 2003 paper by David J. Gabel and Guang-Lih Huang on advanced telecommunications services deployment, they state the following:

> We believe that the higher rate of innovation under rate-of-return regulation is due to the high federal authorized rate of return, 11.25%. This rate of return was established by the FCC in December 1990 when the cost of money was comparatively higher. The FCC concluded at that time that a composite 11.25% rate of return was reasonable based on a finding of 44.2% debt/55.8% equity ratio, an 8.8% cost of debt, and a cost of equity of 12.5 – 13.5%.

[25] See Conwell Direct Testimony, page 8.

[26] Note, two of the ILECs, Alma Telephone and Mid-Missouri Telephone, have no long-term debt. Chariton Valley's debt ratio is just four percent ($2,128,982 long term debt / ($2,128,982 + $56,476,264 stockholder equity). Northeast Missouri Rural's debt ratio is 47% ($18,284,668 long term debt / ($18,284,668 + $20,393,182 stockholder equity). (Debt and equity amounts are from 2004 Annual Reports filed with the Missouri Commission.)

[27] See "In the Matter of Prescribing the Authorized Unitary Rate of Return for Interstate Services of Local Exchange Carriers," Notice Initiating a Prescription Proceeding and Notice of Propose Rulemaking, CC Docket No. 98-166, Released October 5, 1998, section II.H.39.

> In 2001, the cost of debt and equity was approximately two percentage points lower than in 1990, but the FCC's authorized rate of return did not decline at all over the same period."[28] (footnotes omitted)

It also is noteworthy that Northeast Missouri Rural is the only ILEC recently acquiring additional debt funding, and in 2004, the debt it issued had interest rates of 4.29 to 4.31%, well below the 8.80% used in the ILEC cost studies.

I obtained the Executive Summary of a cost of capital study for telecommunications utilities performed at the University of California at Berkeley.[29] The study determined the weighted average cost of capital for typical rural local exchange carriers in the US. The results of the study indicated the following:

- Debt ratio = 45%.
- Cost of debt = 5%.
- Cost of equity = 12.5%.
- Weighted average cost of capital = 9.11%.

The cost of debt compares well with actual, recent interest rates on Northeast Missouri Rural long term debt. The cost of equity falls within the FCC's range of reasonableness in 1990 (12.5 – 13.5%), yet reflects the decline in capital costs described by Gabel and Huang.

A cost of capital of 9.11% is appropriate for the ILEC cost studies, so I have modified the corrected transport and termination costs to reflect 9.11%, rather than 11.25%. Exhibit WCC-4 Rebuttal shows the calculation of corrected capital cost factors and necessary

[28] David J. Gabel and Guang-Lih Huang, "Promoting Innovation: Impact of Local Competition and Regulation on Deployment of Advanced Telecommunications Services for Businesses," © 2003 The Massachusetts Institute of Techonology, page 23.

[29] See http://www.sims.berkeley.edu/~bigyale/COC-Study-Execsummary.pdf. A copy of the Executive Summary is included in Exhibit WCC-7 Rebuttal.

adjustments to the annual direct expense factors used in the end office switching and common transport cost calculations.[30] Exhibits WCC-5 Rebuttal and WCC-6 Rebuttal are the corrected end office switching and common transport costs, modified for a 9.11% cost of capital. The overall result is to lower the transport and termination cost from $0.0074 produced in my direct testimony to $0.0068 per minute.

Q20. DID MR. SCHOONMAKER PROVIDE EVIDENCE TO SHOW THE ILECS WILL NOT REALIZE FUTURE PRODUCTIVITY IMPROVEMENTS IN NETWORK OPERATIONS EXPENSES?

A20. No, he did not. He simply overrode the HAI default value and set forward-looking network operations expenses to be the same as embedded expenses.

Q21. THE ILECS INCREASED THE SWITCHING EXPENSE FACTOR. DOES THE NEW FACTOR ADEQUATELY REPRESENT FORWARD-LOOKING COSTS?

A21. The ILEC cost studies substituted 4.75% for the default value of 2.69% for the *alternative CO switching factor*, almost doubling the HAI model estimate. This factor is described in the HAI model documentation as follows:

> ### 5.5.7. Alternative Central Office Switching Expense Factor
>
> **Definition:** The expense to investment ratio for digital switching equipment, used as an alternative to the ARMIS expense ratio, reflecting forward looking rather than embedded costs. Thus, this factor multiplies the calculated investment in digital switching in order to determine the monthly expense associated with digital switching. This factor is not intended to capture the cost of software upgrades to the switch, as all switching software is part of the capital value inputs to HM 5.0a.

[30] Corrected ISUP signaling costs were computed using Southwestern Bell unbundled signaling rates as benchmarks. Therefore, the cost of capital did not affect the correction to signaling costs. See Exhibit WCC-15, Conwell Direct Testimony.

Default Value:

Alternative Central Office Switching Expense Factor
2.69%

Support: New England Incremental Cost Study.[31]

I question the validity of the change made by the ILECs to the digital switching expense factor. Mr. Schoonmaker indicated the expense factor increase is based on "recent ratios of expenses to investment for these expense/investment categories for the small Missouri telephone companies."[32] As in every other change to the HAI model default values, no supporting data or analysis is provided to substantiate the claim. Consequently, we do not know whether the "recent ratios" are current or several years old. We do not know whether adjustments were made to the ratios to remove the non-recurring costs for central office line connections, which typically are recovered by ILEC service connection charges. If these costs were not removed, then the expense factor is too high and results in a double-recovery of non-recurring costs. Again, it is the obligation of the ILECs per 47 CFR § 51.505(e)(2) to provide "a written factual record that is sufficient for purposes of review," and they have failed to do so.

Q22. WHAT CHANGES WERE MADE TO THE HAI MODEL FOR TRAFFIC TO TANDEM SWITCHES, AND ARE THEY REASONABLE?

A22. Mr. Schoonmaker's testimony (pages 26 – 27) and the description of the changes in Schedule RCS-2 (items 11 and 12) are vague and unclear on this point. It appears changes were made within the HAI model in an attempt to reflect the routing of traffic to

[31] New England Telephone Company, *"1993 New Hampshire Incremental Cost Study"*, p. 394
[32] Schoonmaker Direct Testimony, page 26.

and from wireless carriers through the Southwestern Bell (or CenturyTel) tandem switch. The details of the changes and their impact on transport and termination costs are not described. Nevertheless, it is clear that the resulting common transport costs are overstated. The average common transport cost computed in the HAI model was $0.0439 per minute, and the corrected cost shown in WCC-6 Rebuttal is $0.0050. Whatever changes were made are inadequate to properly compute the ILEC forward-looking economic costs.[33]

Q23. THE ILEC COST STUDIES COMPUTE COMMON TRANSPORT CABLE AND TRANSMISSION EQUIPMENT COSTS, AND THEN DIVIDE THESE COSTS BY ACTUAL MINUTES OF USE, RATHER THAN FORWARD-LOOKING AVERAGE UTILIZATION. IS THIS APPROPRIATE?

A23. No, it has the potential of overstating forward-looking economic costs. Let me give an example. Suppose a telephone company placed a year ago a 300 pair cable to a new residential subdivision at a cost of $50,000. Today, one year later, 50 pairs of cable are in-service. If the cost per pair is computed based on actual usage, the cost is $1,000 each. This results in a very high rate to the first homeowners.

The FCC recognized this situation in establishing its rules for computing costs, so it defined the *forward-looking economic cost per unit* in 47 CFR § 51.511 (a) as follows:

> The forward-looking economic cost per unit of an element equals the forward-looking economic cost of the element, as defined in Sec. 51.505, divided by a reasonable projection of the sum of the total number of units of the element that the incumbent LEC is likely to provide to requesting telecommunications carriers and the total number of units of the element that the incumbent LEC is

[33] See Conwell Direct Testimony, pages 27 – 33, for the analysis of common transport costs computed in the ILEC cost studies.

likely to use in offering its own services, during a reasonable measuring period." (emphasis added)

Common transport costs should be computed based on a reasonable projection of traffic during a reasonable measuring period, not current utilization. This is sometimes referred to as forward-looking average utilization. In the earlier example, the cost per cable pair is properly computed by dividing $50,000 by the average utilization of cable pairs over a future period. If average utilization is 65% of the cable pairs or 195 pairs, the cost per pair is $256 instead of $1,000. I showed in my direct testimony that the current trunk utilization reflected in the ILEC cost studies is low, resulting in high common transport costs.[34]

Q24. DID THE ILECS PROVIDE ANY NEW INFORMATION THAT CAUSES YOU TO CHANGE THE CORRECTED TRANSPORT AND TERMINATION COST PRODUCED IN YOUR DIRECT TESTIMONY?

A24. The only new information provided was Mr. Schoonmaker's confirmation that the 11.25% cost of capital is the rate of return for the interstate jurisdiction set by the FCC in 1990. I have modified the corrected costs using a 9.11% cost of capital, lowering transport and termination costs from $0.0074 to $0.0068 per minute. On page 33 of my direct testimony I provided a table comparing the ILEC cost study results with corrected costs. Following is the same table with the corrected costs based on the 9.11% cost of capital:

[34] See Conwell Direct Testimony, Exhibit WCC-9, row 40. The ILEC actual minutes of use per trunk are 16% - 21% of maximum trunk utilization or about half to two-thirds the 30% level reflected in the HAI model as forward-looking average utilization.

Average ILEC Transport and Termination Costs Per Minute

	Before Corrections	After Corrections
End office switching	****	$ 0.0006
ISUP signaling	*****	$ 0.0012
Common transport	*****	$ 0.0050
Total	*****	$ 0.0068

Q25. WHAT IS YOUR RESPONSE TO MR. SCHOONMAKER'S CONCLUDING STATEMENTS ON PAGES 29 – 31?

A25. My brief response to his conclusion is as follows:

- There is no basis for the assertion on page 29 that using direct transport costs would raise the ILEC transport and termination costs. Based on the network diagrams provided by Alma, Mid-Missouri and Northeast Missouri Rural, all interoffice trunks are over the same cable and transmission equipment, resulting in effectively the same interoffice transport costs per DS0.
- While the results of the ILEC cost studies may not have affected the proposed rate of $0.035 per minute, had forward-looking economic costs been properly computed the ILECs would be compelled to lower the proposed rate. The FCC rules require the rate to not exceed costs.

Q26. CAN YOU PLEASE SUMMARIZE YOUR TESTIMONY?

A26. Mr. Schoonmaker concedes that his cost study is unreliable because, among other things, the ILECs did not give him adequate time, data, or support to complete a study that reflects the ILECs' forward-looking economic costs of terminating traffic. I have identified the most significant errors in the ILECs' cost study and corrected them to provide a more accurate and appropriate analysis.

Q27. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A27. Yes.

Exhibit WCC-1 Rebuttal – ILEC Network Diagrams

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Chariton Valley Telephone

Mid-Missouri Telephone

******

******

******

Northeast Missouri Rural Telephone

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Exhibit WCC-2 Rebuttal – HAI Model Switching Investment vs. Embedded Investment

	A	B	C	D	E	F
1	**HAI Model vs. 2004 Embedded Switching Investments**					
2						
3						
4		Alma Telephone Company	Chariton Valley Telephone Co.	Mid-Missouri Telephone Co.	Northeast Missouri Rural Tel. Co.	Average w/o Chariton
5	Year: 2004					
6	Total switching investment	$ 247,014	NA	$ 1,437,488	$ 7,008,009	
7	Lines in service	370	8,237	4,415	8,409	
8	Investment / line	$ 668	NA	$ 326	$ 833	$ 659
9						
10	HAI model switching investment after change to default input	$ 483	$ 469	$ 484	$ 463	$ 470
11						
12	*EO switching investment constant term*					
13	Default value					$ 416.11
14	Value after change					$ 520.14
15	Ratio of default-to-changed value					0.80
16						
17	Estimated HAI model switching investment with default input	$ 387	$ 375	$ 387	$ 370	$ 376
18						
19						
20	Percent difference in HAI model investment and 2004 embedded investment	-42%	NA	19%	-56%	-43%
21						
22						
23	Note: Chariton Valley's 2004 Annual Report shows no investment in analog or digital electronic switching - accounts 2211 and 2212.					
24						
25						
26						

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Exhibit WCC–3 Rebuttal – Analysis of Changes in ILEC Switching Investments

	A	B	C	D	E	F
1	**Switching Investment Analysis**					
2						
3						
4		Alma Telephone Company	Chariton Valley Telephone Co.	Mid-Missouri Telephone Co.	Northeast Missouri Rural Tel. Co.	Average
5	Year: 2004					
6	Total switching investment	$ 247,014	NA	$ 1,437,488	$ 7,008,009	
7	Lines in service	370	8,237	4,415	8,409	
8	Investment / line	$ 668	NA	$ 326	$ 833	$ 406
9						
10	Year: 1996					
13	Total switching investment	$ 155,757	$ 3,373,874	$ 1,572,834	$ 3,422,532	
14	Lines in service	352	7,671	3,592	7,735	
15	Investment / line	$ 442	$ 440	$ 438	$ 442	$ 441
16						
17	Annual line growth	1%	1%	3%	1%	
18						
19	Total line growth	5%	7%	23%	9%	
20	Total switching investment increase	59%	NA	-9%	105%	
21						
22						
23	Estimated HAI model switching investment with default input	$ 387	$ 375	$ 387	$ 370	$ 376
24						
25	Percent difference in HAI model investment and 1996 embedded investment	-13%	-15%	-12%	-16%	-15%
26						
27						
28	Note: Chariton Valley's 2004 Annual Report shows no investment in analog or digital electronic switching - accounts 2211 and 2212.					
29						
30						

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Exhibit WCC-4 Rebuttal – Corrected Capital Cost Factors

	A	B	C	D	E	F
1	**Capital Cost Factors**					
2						
3						
4		Wirecenter	Land	Digital Switching	Buried Fiber Cable	Circuit Equipment
5	Capital cost factors - ILEC cost studies	15.1%	16.8%	16.2%	15.5%	19.5%
6						
7	Corrected capital cost factors					
8	Depreciation					
9	Service life	47.8		16.7	23.9	10.1
10	Net salvage	1.9%		3.0%	-8.6%	-1.7%
11	Depreciation rate	2.1%	0.0%	5.8%	4.6%	10.1%
12						
13	Cost of money					
14	Debt ratio	45%	45%	45%	45%	45%
15	Cost of debt	5.0%	5.0%	5.0%	5.0%	5.0%
16	Cost of equity	12.5%	12.5%	12.5%	12.5%	12.5%
17	Weighted average cost of capital	9.1%	9.1%	9.1%	9.1%	9.1%
18						
19	A/P(Service life, WACC)	0.0927		0.1190	0.1042	0.1560
20	A/F(Service life, WACC)	(0.0000)		(0.0008)	0.0011	0.0011
21	Depreciation rate & cost of money factor	9.3%		11.8%	10.5%	15.7%
22						
23	Cost of money factor	7.2%	9.1%	6.0%	6.0%	5.6%
24						
25	Income taxes					
26	Effective income tax rate	39.3%	39.3%	39.3%	39.3%	39.3%
27	Income tax gross-up factor (tax rate / (1 - tax rate))	64.6%	64.6%	64.6%	64.6%	64.6%
28						
29	Equity portion of WACC	75%	75%	75%	75%	75%
30	Cost of equity factor	5.4%	6.9%	4.5%	4.5%	4.2%
31						
32	Income tax factor	3.5%	4.4%	2.9%	2.9%	2.7%
33						
34	Corrected capital cost factors	12.8%	13.6%	14.7%	13.4%	18.4%
35						
36	Adjustment to annual direct expense factors	-2.3%	-3.3%	-1.4%	-2.0%	-1.1%

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Exhibit WCC-5 Rebuttal – Corrected EO Switching Costs with Cost of Capital of 9.11%

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Exhibit WCC-6 Rebuttal – Corrected Common Transport Costs with Cost of Capital of 9.11%

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Exhibit WCC-7 Rebuttal – Cost of Capital Paper

COC-Study-Execsummary.pdf

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