IN THE MATTER OF INVESTIGATION
INTO U S WEST COMMUNICATIONS, INC.'S COMPLIANCE WITH CERTAIN
WHOLESALE PRICING REQUIREMENTS FOR UNBUNDLED NETWORK
ELEMENTS AND RESALE DISCOUNTS

DOCKET NO. T-00000A-00-0194
NOTICE OF FILING REBUTTAL TESTIMONY OF RICHARD CHANDLER AND DANIEL KELLEY

AT&T Communications of the Mountain States, Inc. and WorldCom, Inc. hereby provide
Notice of Filing Rebuttal Testimony of Richard Chandler and Daniel Kelley.

DATED this 27th day of September, 2001.

AT&T COMMUNICATIONS OF THE MOUNTAIN STATES, INC. AND WORLCOM, INC.

By:

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CERTIFICATE OF SERVICE

I hereby certify that the original and 10 copies of the Notice of Filing Rebuttal Testimony of Richard Chandler and Daniel Kelley, regarding Docket No. T-00000A-00-0194, were hand delivered this 27th day of September, 2001, to:

Arizona Corporation Commission
Docket Control – Utilities Division
1200 West Washington Street
Phoenix, AZ 85007

and that a copy of the foregoing was hand-delivered this 27th day of September, 2001 to the following:

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Arizona Corporation Commission
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and that a copy of the foregoing was sent via United States Mail, postage prepaid, on the 27th day of September, 2001 to the following:

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BEFORE THE ARIZONA CORPORATION COMMISSION

IN THE MATTER OF
INVESTIGATION INTO QWEST
CORPORATION'S COMPLIANCE WITH CERTAIN WHOLESALE
PRICING REQUIREMENTS FOR UNBUNDLED NETWORK ELEMENTS AND RESALE DISCOUNTS

DOCKET NO. T-00000A-00-0194

REBUTTAL TESTIMONY OF RICHARD CHANDLER
ON BEHALF OF
AT&T COMMUNICATIONS OF THE MOUNTAIN STATES, INC.,
AND WORLDCOM, INC.

SEPTEMBER 27, 2001
Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.

A. My name is Richard Chandler and I am Senior Vice President of HAI Consulting, Inc., 1355 South Boulder Road, Louisville, Colorado 80027.

Q. HAVE YOU SUBMITTED TESTIMONY IN THIS PROCEEDING?


Q. PLEASE DESCRIBE YOUR BACKGROUND AND EXPERIENCE.

A. My direct testimony contains this information.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. This testimony, which is filed on behalf of AT&T Communications of the Mountain States, Inc. and WorldCom, Inc., responds to rebuttal testimony filed by Garrett Fleming, dealing with criticisms of the HAI Model’s switching modulation and rebuttal testimony of Joseph Craig, Theresa Million, and Barbara Brohl concerning unbundled packet switching. I have also included in this testimony further comments on Qwest’s Switching Cost Model. I adopt by this reference those portions of the Direct Testimony of Douglas Denney that have been deferred to this phase of the proceeding.

My colleague, A. Daniel Kelley, addresses in his testimony economic issues raised by Mr. Fleming in his rebuttal that pertain to the HAI Model’s switching calculations.
HAI MODEL SWITCHING

Q. MR. FLEMING CHARACTERIZES THE HAI MODEL'S SWITCHING CALCULATIONS AS A "GRAY BOX" AND COMPLAINS THAT THEY ARE COMPLEX AND DIFFICULT TO FOLLOW. IS HE CORRECT?

A. No, and this is a particularly ironic statement, given that the investment calculations in Qwest's Switching Cost Model (SCM) are not even viewable.

When the HAI Model was under development, my clients, AT&T and MCI (now WorldCom) decided that the Model should remain as a set of Excel workbooks to allow commissioners and their staffs to view and analyze its calculations without having to learn a high-level programming language. Excel formulas are relatively easy to analyze, and Excel has a set of auditing tools that enables the user, even one with little computer experience or skill, to trace through calculations.

Although whoever actually wrote Mr. Fleming's testimony (which is, in most sections, word-for-word identical to testimony filed by other Qwest witnesses in other jurisdictions)1 undoubtedly intended the term "gray box" to be clever, it is instead merely hypocritical, given the essential opacity of SCM.

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Q. MR. FLEMING FURTHER CLAIMS THAT THE HAI MODEL DOES NOT PRODUCE SUFFICIENT TANDEM TRUNKS. DO YOU AGREE WITH THIS ANALYSIS?

A. No. Mr. Fleming’s analysis is patently incorrect. His Exhibit 11 shows his calculations, which are based on a gross, and flawed, assumption of the total number of trunks in Qwest’s Arizona network and the misapplication of certain user-adjustable input factors in the HAI Model filed in this proceeding.

Q. HAVE YOU CORRECTED MR. FLEMING’S CALCULATIONS?

A. Yes. In Exhibit RC-1, attached to this testimony, I have prepared a pair of tables, one reproducing Mr. Fleming’s analysis with comments indicating his errors, and a second showing a correct form of his analysis.

Q. WHAT IS THE EFFECT OF MR. FLEMING’S MISCALCULATIONS?

A. Mr. Fleming concludes from his calculations that the HAI Model should equip more than 97,000 tandem trunks for Qwest’s Arizona network. The number produced by the Model is 31,125. Had Mr. Fleming correctly calculated this value, he would have arrived at a required total tandem trunk count of 28,350. The Model is thus estimating about 3,000 more tandem trunks than Mr. Fleming’s corrected analysis would require.

Q. WHAT ARE THE MISTAKES IN MR. FLEMING’S ANALYSIS?
Mr. Fleming begins by assuming a total count of all end-office trunks in Arizona based on an overall line-to-trunk ratio of eight to one. This assumption itself is incorrect and leads to double-counting of direct trunks. For the purposes of my study, however, I ignored this error and based my results on his original total trunk count assumption. The tandem trunks he addresses include those carrying local traffic, intraLATA toll traffic, and interLATA, or access, traffic.

His first fundamental mistake is misinterpreting the Model’s inputs for toll tandem fractions, which the Model uses to compute the number of tandem and direct trunks required to carry intraLATA toll and access traffic. He applied, for example, the intraLATA tandem fraction (whose default is 0.20, indicating that 20% of intraLATA toll traffic is to be carried over tandem trunks) to the end office trunk total instead of to the intraLATA toll trunk total which is considerably small than the end office total. He makes the same mistake in calculating the number of tandem trunks required to carry tandem-routed access traffic. These mistakes combined lead to a very large overstatement of the required number of tandem trunks.

His second mistake is including tandem-to-IXC (interexchange carrier) trunks in his tandem trunk totals. The tandem-to-IXC connections are special access facilities, and the costs for these connections, including tandem trunk ports, are recovered in Qwest’s special access tariff. The Model in fact computes investment for these trunks and their associated tandem trunk ports but properly
includes their costs under special access, or dedicated transport. They thus should
not be included in the general category of tandem trunks, as that leads to double
recovery of tandem trunk port costs.

Exhibit RC-1 contains a detailed description of his errors and the correct
calculations, according to Mr. Fleming’s initial assumption of total end office
trunks.

Q. WHAT IS THE “ANALOG LINE CIRCUIT OFFSET FOR DLC LINES”
INPUT IN THE HAI MODEL MENTIONED IN MR. FLEMING’S
TESTIMONY?

A. This is an adjustment the Model makes to end office switching investment in
order to capture the switch investment reduction that results from the deployment
of integrated digital loop carrier systems.

Q. MR. FLEMING NOTES THAT THIS INPUT IS INCORRECTLY
DESCRIBED IN THE HAI INPUTS PORTFOLIO AND FURTHER THAT
IT SHOULD BE SET TO ZERO. IS HE RIGHT?

A. Mr. Fleming is correct that the description of this input in the HAI Model Inputs
Portfolio (HIP) stating that it was calculated in the FCC Inputs Order is incorrect.
However, his further contention that the input value should be set to zero instead
of its default of $30 per line is not correct.

Q. WHY SHOULD THE INPUT REMAIN AT ITS DEFAULT OF $30?
In the FCC’s study of existing ILEC end office switch investment, 18.3% of the lines in the study were served by DLC systems. Because DLC systems are a forward-looking network technology, forward-looking cost studies usually assume much higher DLC penetrations than 18.3%. This makes it necessary to adjust the FCC’s switching investments to account for the cost savings inherent in integrated DLC systems. In Arizona, for example, the HAI Model calculates a 70.8% DLC penetration. If this adjustment were not made, switching investment and hence cost would be overstated on a forward-looking basis.

**QWEST SCM**

**Q.** HAVE YOU BEEN ABLE TO ANALYZE THE SCM?

**A.** Only to a limited degree. The SCM is poorly documented, and there is no detailed description of how the model works, let alone a discussion and listing of the formulas used by the model to compute investment. Furthermore, several critical input files are password-protected.

**Q.** HAVE YOU OBTAINED THE PASSWORD FROM QWEST?

**A.** Yes. Qwest partly responded to a data request by providing the password.

**Q.** IS THE PASSWORD HELPFUL IN DETERMINING HOW THE SCM WORKS?
A. No. The SCM files protected by the password are primarily input files containing specific switch investment and related inputs. There are, for example, separate input database files for 5ESS and DMS-100 switches. The databases contain tables that include what appear to be list prices of switch piece parts, tables indicating discounts, and still other tables whose purpose is unclear. Although each investment record contains an “equipment description” field, this field is often unused or it contains a cryptic description. For example, in the “PRICES” table of the ISW101a1.mdb database containing Lucent 5ESS information, there is a record for an item entitled “CM2DL16” with a description of “COMM MOD 2 DATA LINK LIS” and an investment. There is no description of the function or capacity of this item or how it might be included in a given switch configuration. Many equipment descriptions just say “NONE.”

The ISW201a1.mdb file, which contains Nortel investment data for DSM-100/200 switches, is even less useful. Most of its entries in the “PRICE” table have no equipment description whatsoever. Instead, one just finds records such as “A0286474” with a price and no explanation. There is not even any mnemonic significance, as there is with some of the 5ESS inputs (and, at that, even those are useless without cogent functional and capacity descriptions).

Q. WHY CAN’T THE USER JUST TRACE THROUGH THE CALCULATIONS AS YOU DESCRIBED FOR THE HAI SWITCHING MODULE?
Because, to the best of my knowledge, the SCM's calculations are not viewable, as I noted earlier. The "core" of the SCM calculations are in an executable file called "scmcore4.exe." This file cannot be usefully viewed, as it contains object code.

Q. **DO YOU HAVE ANY REASON TO MODIFY YOUR ORIGINAL ASSESSMENT THAT THE SCM IS ESSENTIALLY AN INSCRUTABLE MODEL?**

A. No. All that has changed is that I have been able to look at a few password-protected Microsoft Access databases. These databases shed no light on the overall working of the SCM. Although they are marginally useful in assessing isolated facts about Qwest's switching investment inputs, they do nothing to explain how switches are configured by the SCM and how investments for these configuration are calculated.

Q. **EVEN THOUGH ONE CANNOT ANALYZE THE SCM'S CALCULATIONS, CAN YOU MAKE ANY GENERAL STATEMENTS REGARDING THE LEVEL OF INVESTMENT PRODUCED BY SCM?**

A. No. Without seeing how switches are configured by SCM, there is no way of assessing the appropriateness of its results. Also, there is no way of knowing whether the manufacturer discount inputs represent the actual current discounts Qwest obtains from its switch vendors.

Q. **ARE THE DEFAULT DISCOUNT INPUTS USEFUL AT ALL?**
Yes, to a limited extent. The SCM database file “Osw301a1.mdb,” for example, shows in its “INPUT PARAMETERS” table that the “system discount for purchase of new switch” is identical to the “system discount for growth addition.” It also shows a single (and considerably higher) “line card discount.” I can only infer from these inputs that SCM assumes that investment in growth equipment costs no more than that for equivalent new system equipment. Dr. Kelley discusses the economics of Qwest’s switch growth investment assumptions in his testimony.

UNBUNDLED PACKET SWITCHING

Q. IN ADDRESSING YOUR TESTIMONY REGARDING UNBUNDLED PACKET SWITCHING, MR. CRAIG IMPLIES THAT YOU ARE UNAWARE OF THE EXISTENCE OF OTHER FORMS OF DSL THAN ADSL. IS THIS CORRECT?

A. Of course not. I noted in my direct testimony that the term “DSL” has come to represent ADSL in the popular press as well as in service provider advertising, such as that of Qwest in print ads as well as on the Internet, and I also allude to other forms of DSL in my testimony. I have worked with clients using and contemplating other forms of xDSL, including SDSL, HDSL, and g.SHDSL, and I have taught xDSL technologies and packet switching in graduate telecommunications programs for several years.
Q. AREN'T YOU NITPICKING WHEN YOU CRITICIZE QWEST WITNESSES FOR THEIR TERMINOLOGY WHEN THEY DISCUSS PACKET SWITCHING AND DSL SERVICE?

A. Not at all. None of the Qwest witnesses in this proceeding, either in their direct or rebuttal testimony, have been able to describe in cogent technical terms the rate elements proposed by Qwest for unbundled packet switching, and they thereby obfuscate the offering. Correct terminology is obviously vital to potential competitor's understanding of what it is they will be able to obtain from Qwest and what services they in turn will be able to offer using Qwest's proposed rate elements.

The terminology pertaining to technical aspects of ADSL and ATM is standardized by such bodies as the ATM Forum and the ADSL Forum, both of which are industry groups participating in the standard-making process. Using standard terminology removes any doubt about what is being offered and how it will work.

Q. PLEASE GIVE SOME EXAMPLES OF INCORRECT CONFUSING TERMINOLOGY USED BY QWEST'S WITNESSES.

A. One notable example is Mr. Craig's use of the terms "constant bit rate," "variable bit rate," and "unspecified bit rate" in his rebuttal testimony. He was attempting to respond to statements in my direct testimony discussing various ATM service categories that involve these terms and that would be useful to CLECs. Mr. Craig
apparently assumes these describe a user’s options with respect to the line rate available with ADSL service. These are, instead, technical terms precisely defined by the ATM Forum and are critical to the understanding of Qwest’s proposed rate elements. They apply to ATM service and not ADSL, as I clearly used these terms in my direct testimony.

Mr. Craig’s discussion of virtual channels, virtual paths, and virtual circuits is similarly incorrect. The ATM Forum and ADSL Forum clearly describe and define virtual paths and virtual channels, definitions my direct testimony comports with. I should also note that Qwest also describes these terms accurately in separate technical publications that have not been introduced in this proceeding by Qwest.²

Q. DOES QWEST USE TECHNICALLY ACCURATE LANGUAGE IN ITS FILED DESCRIPTIONS OF ITS PROPOSED UPS RATE ELEMENTS?

A. No. I discussed this in my direct testimony at some length. What is interesting is that terminology used in Qwest’s filed rate element descriptions does not even correspond to that used in Qwest’s own technical publications pertaining to UPS. As an example, I noted in my direct testimony that the term “Committed Bit Rate” is imprecise and does not instruct a potential purchase of the UPS rate elements about what is being offered. Qwest’s Technical Publication 77408,
which discusses Unbundled Packet Switching, does not use this term and instead uses the proper ATM term of "Unspecified Bit Rate." It goes on to describe other details, including service quality parameters, of this ATM service class, again using precise terms that allow the reader to understand unambiguously the nature of the service.

Q. GIVEN THAT THERE IS A TECHNICALLY COMPETENT DESCRIPTION OF UPS PRODUCED BY QWEST, DOES IT ADDRESS YOUR CONCERN THAT QWEST HAS NOT PROVIDED RATE ELEMENTS THAT ARE USEFUL TO A CLEC?

A. No. The Qwest technical publication describes in technically precise language a service that is not especially interesting to a potential competitor, for all the reasons I cited in my direct testimony. The document just confirms that the proposed rate elements describe nothing more than the components of services available today to residential end users. They do not include the service classes or quality of service guarantees that would allow a CLEC to offer, for example, packet voice service over DSL, which would enable the offering of competitive voice service. These rate elements would support only the lowest level of DSL and ATM service, useful primarily for email access and casual internet usage. They are not suitable, as I have previously noted, for the provision of more advanced services that CLECs could offer business and those residential users requiring them.

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Q. **EVEN THOUGH QWEST ONLY PROPOSES THE MOST BASIC LEVEL OF SERVICES IN ITS UPS RATE ELEMENTS, CAN QWEST ITSELF OFFER THE HIGHER-LEVEL SERVICES YOU DISCUSS?**

A. Of course it can. It is free to offer whatever ATM service classes it desires to its customers, all the while denying these to its competitors.

Q. **MS. BROHL COMPLAINS IN HER REBUTTAL TESTIMONY THAT YOU DO NOT ACKNOWLEDGE THE FCC’S REQUIREMENTS FOR THE OFFERING OF UNBUNDLED PACKET SWITCHING BY ILECS. IS HER CRITICISM VALID?**

A. It is not valid. I am a technical, not a policy, witness. I believe, however, that this Commission is not limited by the FCC’s requirements in this matter and in fact can go beyond what the FCC has said to foster competition in Arizona. I have described for the Commission the inadequacy of the technical aspects of Qwest’s proposed UPS rate elements and the failure of Qwest’s witnesses to give a cogent explanation of what is being offered.

Q. **IN YOUR DIRECT TESTIMONY, YOU EXPLAINED WHY QWEST’S UPS COST STUDY WAS NOT FORWARD-LOOKING. HAS QWEST CORRECTED THIS IN THEIR CURRENT UPS COST STUDY?**

A. No. The new cost study again assumes what appears to be a Lucent “overlay” system that works with a copper-based digital loop carrier (DLC) system. As I
explained in my earlier testimony, DLC on copper feeder facilities is not forward-looking. This new study does not correct the earlier deficiency.

Q. BUT MS. MILLION POINTS OUT IN HER REBUTTAL TESTIMONY THAT THE HAI MODEL ITSELF USES COPPER FEEDER FACILITIES. IS SHE CORRECT?

A. She is correct in stating that the HAI Model uses copper feeder. It does not, however, equip digital loop carrier systems using copper feeder. It instead always uses fiber feeder with DLC serving main clusters.

Q. MR. CRAIG STATES THAT QWEST USES AN "OVERLAY" TO PROVIDE ADSL ON EXISTING DLC SYSTEMS. IS THIS APPROPRIATE?

A. Qwest has chosen to provide ADSL to some of their customers now served on copper-based DLC systems with the “overlay” approach. That may be an entirely appropriate way to extend newer services to subscribers now served by an obsolete loop carrier system. It is not an appropriate basis for a forward-looking cost study, however. There is certainly nothing wrong with Qwest’s attempting to circumvent the limitations of antiquated plant, but it is entirely wrong to use such an architecture to develop forward-looking costs. The correct forward-looking technology is fiber-based DLC, and Qwest should have used this in their cost study.
Ms. Brohl states that Qwest's DSL service is "always on." Do you agree?

A. Qwest's current ADSL retail services are "always on." I do not and did not, in my direct testimony, dispute that. My concern was, and is, that Qwest's witnesses have failed to describe their proposed rate elements using technically competent language so that potential competitors can understand precisely what would be available to them using these rate elements.

SUMMARY

Q. Please summarize your testimony

A. Mr. Fleming's criticisms of the HAI Model's switching calculations are unfounded. He has, for example, incorrectly assumed that the Model produces too few tandem trunks and hence investment by using a demonstrably flawed analysis. He also inappropriately and ironically complains that he cannot decipher the Model's switching investment calculations when in fact they are entirely viewable and auditable while the SCM's corresponding calculations cannot even be seen.

Regarding the SCM, even the availability of the passwords that are required to view some of its constituent database files does not allow one to analyze the model's calculations, and it is not possible to determine the validity of its results.

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3 Qwest in the past offered (but no longer offers) a service known as Qwest DSL Select™ that allows users only limited connection intervals. Mr. Craig attempted to describe that service in his rebuttal, but the service had already been "grandfathered" at the time his rebuttal was submitted. See Qwest Tech Pub 77392, Issue H, May, 2001, p 2-8.

HAI Consulting, Inc.
Finally, Qwest has failed entirely to produce technically valid testimony explaining its proposed UPS rate elements, even though Qwest has elsewhere published documentation that describes in technically accurate terms the nature of its proposed service. The proposed level of service is no greater than that of Qwest's current residential retail ADSL service and is insufficient to allow potential competitors the ability to offer sophisticated ATM-based services to their end users.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?
A. Yes.
### Fleming analysis

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<td>8</td>
<td>Typical configurations in Qwest</td>
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<td>D</td>
<td>Interoffice Local Actual Minutes</td>
<td>33,274,339,645</td>
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<td>Local % of end ofc trunks</td>
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<td>D / F</td>
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<td>Toll end ofc trunks</td>
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<td>C - H</td>
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<tr>
<td>N</td>
<td>Tandem to IXC trunks</td>
<td>23,279</td>
<td>Assumed same as M</td>
<td>Tandem to IXC trunks are special access facilities; trunks and trunk port costs recovered in access tariff. This total should not be included here, as it leads to double recovery of cost.</td>
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<td>O</td>
<td>Total tandem trunks</td>
<td>97,273</td>
<td>J + M + N</td>
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#### Corrected analysis using basic Fleming assumptions

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<td>5,972</td>
<td>L * M</td>
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**Total tandem trunks - Fleming assumptions:**

- Total tandem trunks = 28,350
- Total tandem toll trunks from HM = 25,473
- Total local tandem trunks from HM = 5,652
- Total tandem trunks from HM = 31,125

### ARMIS usage data from HM

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BEFORE THE ARIZONA CORPORATION COMMISSION

IN THE MATTER OF
INVESTIGATION INTO QWEST CORPORATION’S COMPLIANCE WITH CERTAIN WHOLESALE PRICING REQUIREMENTS FOR UNBUNDLED NETWORK ELEMENTS AND RESALE DISCOUNTS

DOCKET NO. T-00000A-00-0194

REBUTTAL TESTIMONY OF DANIEL KELLEY ON BEHALF OF AT&T COMMUNICATIONS OF THE MOUNTAIN STATES, INC., AND WORLDCOM, INC.

SEPTEMBER 27, 2001
Q. PLEASE STATE YOUR NAME.
A. My name is Daniel Kelley.

Q. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR TITLE?
A. I am employed by HAI Consulting. My title is Senior Vice President.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.
A. My professional experience began in 1972 at the Antitrust Division of the U.S. Department of Justice where I analyzed mergers, acquisitions and business practices in a number of industries, including telecommunications. While at the Department of Justice, I was a member of the economics staff of U.S. v. AT&T.

In 1979, I moved to the Federal Communications Commission ("FCC") where I held positions as Senior Economist in the Common Carrier Bureau and the Office of Plans and Policy, and also served as Special Assistant to the Chairman. After leaving the FCC, I was a Project Manager and Senior Economist at ICF, Incorporated, a public policy consulting firm. From September 1984 through July of 1990, I was employed by MCI Communications Corporation as its Director of Regulatory Policy. At MCI, I was responsible for developing and implementing MCI's public policy positions. In August of 1990, I joined Hatfield Associates, Inc. (the predecessor of HAI) as Senior Vice President. In my current position, I conduct economic and policy studies on a wide variety of telecommunications issues, including dominant firm regulation, local exchange competition, and the
cost of local service. I have advised foreign government officials on telecommunications policy matters and have taught seminars in regulatory economics in a number of foreign countries.

Q. PLEASE DESCRIBE YOUR EDUCATION.

A. I received a Bachelor of Arts degree in Economics from the University of Colorado in 1969, a Master of Arts degree in Economics from the University of Oregon in 1971 and a Ph.D. in Economics from the University of Oregon in 1976.

Q. HAVE YOU PUBLISHED RESEARCH IN ECONOMICS?

A. Yes, I have published articles in antitrust and telecommunications economics. A copy of my resume is attached as Exhibit DK-R1.

Q. HAVE YOU TESTIFIED PREVIOUSLY?

A. Yes, I have testified on telecommunications issues before the California, Colorado, Connecticut, Florida, Georgia, Hawaii, Maryland, Massachusetts, Michigan, New Jersey, New York, Oregon, Pennsylvania, Utah and Washington Commissions, as well as the Federal Communications Commission and the State-Federal Joint Board investigating universal service reform.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been asked by AT&T Communications of the Mountain States, Inc. and WorldCom, Inc. to respond to portions of the June 27, 2001 Rebuttal Testimony
of Garrett Y. Fleming on behalf of Qwest Corporation ("QWEST"). Specifically, I have been asked to address economic issues raised by Mr. Fleming’s discussion of the HAI estimates of the economic cost of local switching. My colleague Richard Chandler is addressing technical issues raised by Mr. Fleming’s testimony.

Q. WHAT ARE MR. FLEMING’S PRINCIPAL CONCERNS WITH THE HAI SWITCHING ESTIMATES?

A. Mr. Fleming maintains that the HAI switching cost estimates are understated because the HAI 5.2a bases its approach on the algorithm developed by the FCC. Mr. Fleming raises two specific objections to the FCC switching methodology. The first is that the FCC does not include the “...ongoing upgrade investments necessary to keep a switch technologically current once it is installed” in its TELRIC investment. The second is that the FCC does not include the “...costs of those lines that need to be added to a switch as customer demand increases over the life of the switch.” [Fleming Rebuttal, p. 84]

Q. ARE MR. FLEMING’S CONCERNS LEGITIMATE?

A. No. The proper application of TELRIC principles excludes from forward looking switching costs both ongoing upgrade costs and the costs of adding new lines. Calculating forward-looking switching costs in this way does not prevent Qwest from making any necessary or prudent investment in capacity to meet future needs.
Q. WHAT DID THE FCC CONCLUDE REGARDING UPGRADE COSTS?

A. The FCC considered and rejected arguments from ILECs including Qwest that upgrade costs should be included in its USF Inputs Order, CC Docket No. 96-45, Released November 2, 1999 ("Inputs Order"). Specifically, the FCC found that:

The model platform we adopted is intended to use the most cost-effective, forward-looking technology available at a particular period in time. The installation costs of switches estimated above reflect the most cost-effective forward-looking technology for meeting industry performance requirements. Switches, augmented by upgrades, may provide carriers the ability to provide supported services, but do so at greater costs. Therefore, such augmented switches do not constitute cost-effective forward-looking technology. In addition, as industry performance requirements change over time, so will the costs of purchasing and installing new switches. The historical cost data employed in this analysis reflect such changes over time, as do the time-trended cost estimates. [¶ 317, footnotes omitted]

Q. WHY ARE ONGOING UPGRADE COSTS PROPERLY EXCLUDED FROM FORWARD-LOOKING SWITCHING COSTS?

A. The FCC's TELRIC methodology, which is based on the economic concept of Total Service Long Run Incremental Cost, does not incorporate technical advances that are not yet available to or widely used by local telephone companies. Thus, the cost of switch upgrades that have not yet been released are properly excluded from the charges that current customers must pay. Moreover, as the FCC notes in the paragraph quoted above, an upgraded older generation switch may be less cost effective than a new switch that includes the features and functions that the upgrade provides.
Q. DOES MR. FLEMING ENDORSE INCLUDING UNDEPLOYED TECHNOLOGY ELSEWHERE IN HIS TESTIMONY?

A. No. He specifically rejects this approach. He points out that “prices based on the cost of a hypothetical network or system designs that have never actually been deployed would ultimately impact the investment decisions of all parties in the market.” [Fleming Rebuttal, p. 11] The HAI switching estimates are based on technology, equipment, and architectures that are being deployed by telephone companies today. Including the effect of hypothetical upgrades would not be appropriate.

Q. MR. FLEMING ALSO SEEMS TO ARGUE THAT THE FCC APPROACH IS DEFECTIVE BECAUSE THE COST OF SWITCH UPGRADES MADE SINCE THE FCC’S DATA WERE GATHERED ARE NOT INCLUDED. [P. 84] DO YOU AGREE?

A. No. The FCC used the best available data. These data are based on historical depreciation information filed by the local telephone companies. The data were used to build a regression equation that captures cost trends for a new switch, including adjustments for inflation and productivity changes. The adjustments are designed to account for changes in switching costs that have occurred since the data were gathered. As the Commission noted in its Inputs Order, “US West agrees that the costs of the equipment such as switches and multiplexers, used to provide telecommunications services are declining, and that the per-unit cost of providing more services on average is declining.” [Inputs Order, ¶ 313] If Qwest
has better data that can be verified by third parties, it should have been made
available to this Commission and interested parties by now. Certainly Qwest has
the incentive to bring forth data that support its positions. I would also note that
the FCC attempted to gather additional information through data requests to the
large telephone companies, but did not receive usable information. [See Inputs
Order, ¶ 301]

Q. ARE THERE OTHER REASONS TO EXCLUDE UPGRADE COSTS?

A. Yes. Upgrades are made for a variety of reasons and have a variety of effects.
For example, an upgrade might result in more efficient switch operation resulting
in lower operating expenses. An upgrade might also enable the switch to perform
functions that are the basis for new services for which Qwest could derive
revenue from third parties. Adding upgrade costs to the cost of the switching
UNE without taking into account the effect of the upgrade on other costs or
revenues would not be appropriate because the change would be partial and could
lead to inconsistencies. Even Mr. Fleming recognizes that “a comprehensive and
consistent approach to analyzing inputs and assumptions is critical to arriving at
reasonable conclusions regarding inputs and assumptions.” [Fleming Rebuttal, p.
10] Moreover, I would note that upgrades can have the effect of extending the
life of a switch well beyond the 10-year economic life used in the Model. Some
1AESS switches were in service for decades because they were upgradable. If the
cost of potential upgrades were to be included, then the lives of switches would
have to be lengthened considerably. Finally, there is no guarantee that Qwest will
continue to make upgrades. Mr. Fleming admits that at one time U S West was
four generics behind in its upgrades. [Fleming Rebuttal, p. 88] Qwest could
decide to stop investing in its network once again.

Q. ARE UPGRADES A LEGITIMATE COST OF DOING BUSINESS?
A. Certainly. But that does not mean the anticipated cost should be included in a
TELRIC model. Proxy models are useful precisely because they allow the
Commission to focus on the costs of efficiently providing the particular facilities
needed to serve current demand. The existing local telephone company networks
were built over a period of years to provide a variety of regulated and unregulated
services. Modeling a network optimized to provide the precise services that
Qwest is required to unbundle under the 1996 Act and determining the TELRIC
of those services is a different exercise than modeling the Qwest legacy network,
which has been designed to advance Qwest's long term strategic business
interests.

Q. SHOULD THE COST OF PROVIDING GROWTH LINES BE INCLUDED
IN THE SWITCHING COST ESTIMATES?
A. No. TELRIC is designed to estimate the cost of providing the current level of
demand. Including the cost of capacity needed to serve future demand would
unfairly and uneconomically burden today's customers. In other words, to do so
would result in an intergenerational cross-subsidy. Today's customers would be
paying for capacity designed to serve tomorrow's customers.
Q. WHY WOULD A TELEPHONE COMPANY WANT TO ENGAGE IN SUCH A CROSS-SUBSIDY?

A. There is less competition today than there may be at a later date. By forcing current customers to bear the costs for expansion designed to serve future customers, the local telephone company can both earn higher current margins and raise its current rivals' costs.

Q. WOULD A COMPETITIVE FIRM ENGAGE IN THIS TYPE OF BEHAVIOR?

A. No. A competitive firm would be unable to do so. Suppose an automobile manufacturer anticipates growing demand and builds a manufacturing plant with capacity to build 150 percent of today's demand. If this firm were to attempt to recover the cost of carrying the excess capacity from its current customers it would fail. Consumers would turn to other manufacturers who would be quite willing to base their prices on the cost of serving current demand. This does not mean the auto manufacturer is irrational for building excess capacity. In the long term it is better off for having done so. The total cost over time of serving both current and future demand will be reduced because it enjoys economies of scale with the larger plant.

Q. ARE THERE LEGITIMATE CONCERNS ABOUT THE COST OF GROWTH LINES VERSUS THE COST OF LINES INITIALLY INSTALLED WITH THE SWITCH?
Possibly yes. If switch vendors are engaging in a razor and razor blades strategy—charging a relatively low price for initial lines and a relatively high price for growth lines, then it would be appropriate to somehow average the cost of initial and growth lines. However, Mr. Fleming does not provide data to show that this is in fact the case. As Mr. Chandler’s rebuttal testimony shows, Qwest’s model inputs show the same cost for initial and growth lines. The SCM inputs show a higher discount for ‘non-getting-started’ investment and a constant discount for line circuits.

Q. MR. FLEMING ALSO COMPLAINS ABOUT FILL LEVELS IN THE HAI MODEL? DO YOU HAVE A COMMENT?

A. Yes. Mr. Fleming complains that the 94 percent switching fill factor used in the model is too high because it does not reflect lines needed for growth. [Fleming Rebuttal, p. 92] This appears to be the analytical equivalent to the growth line problem discussed above. The proper fill level in a TELRIC model is one that allows efficient current operation. Capacity beyond that level should not be included in TELRIC rates. The FCC adopted the 94 percent number in the Inputs Order. [¶ 330] In arriving at that number, the FCC specifically rejected U S West arguments in favor of a lower fill factor. The FCC found that “U S West’s average fill factor of 78 percent is based on data that include switches with unreasonably low fill factors.” [¶ 332]. In particular the FCC notes that seven U S West switches had a combined fill factor of .027 percent. [fn. 1072]
Q. HOW DO YOU EXPLAIN THE LOWER FILL LEVELS IN THE QWEST NETWORK?

A. There are three possible explanations. First, the extra capacity may be installed for future use. Second, the capacity may be the result of inefficiency. Third, switches may have just come on line and have not reached planned usage levels or switches may be in the decommissioning process. If the capacity is for future use, then it is entirely appropriate for Qwest to build it into its network. What is not appropriate is to charge today's customers for tomorrow's usage.

Q. IS THERE PRECEDENT FOR CHARGING FOR CAPACITY BASED ON HOW IT IS USED OVER TIME?

A. Yes. That is exactly the role that depreciation plays. The cost of a capital investment is spread over the economic life of the asset. Even though Qwest may buy a switch today, it does not charge the full cost of the switch to today's customers. It has bought capacity to serve tomorrow's customers as well. Similarly, even though Qwest may have purchased the switch with enough line capacity to serve demand some years in the future, it should not charge current customers for any of the cost of that excess capacity. The proper economic treatment of the investment is to include capital costs for capacity needed to serve today's demand in today's rates and defer the depreciation and return on excess capacity to the time when that capacity is used. This means that the economic treatment of the asset may differ from the accounting treatment.
Q. MR. FLEMING ARGUES THAT AN ACCOUNTING ANOMALY MAY HAVE AFFECTED THE FCC'S RESULTS. DO YOU HAVE A COMMENT?

A. Mr. Fleming maintains that since 1992 the cost of applications software has been booked to a capital account while other large telephone companies expense it. [Fleming Rebuttal, p. 93]. The implication is evidently that the HAI costs are understated because the FCC does not pick up this expense in its switching cost data and HAI does not include it in its switching operating expense data. Application software that was purchased with a new switch would have already been included in the FCC depreciation data and is included. Moreover, the FCC used data from multiple telephone companies. In any event, the FCC expense ratio, which is used to produce the HAI Arizona results, is quite conservative. I would also note that the fact that different telephone companies use different accounting assumptions and change them over time is just one more reason why external models provide a better basis for cost estimation than company embedded accounting data.

Q. DOES MR. FLEMING RAISE OTHER SWITCHING COST ISSUES?

A. Yes. Mr. Fleming maintains that “the HAI 5.2a does not include many vertical feature related costs. These are the application software costs, SS7 costs and some feature hardware related costs.” He also maintains that “since the early 1990's, when those depreciation reports were filed with the FCC, input/output ports, recorded announcements and conference circuits have had to be added due
to new features and increased demand for existing features. So clearly the FCC
Switch Algorithm does not include these investments.” [Fleming Rebuttal, p. 98]

Q. HOW DO YOU RESPOND?

A. All capitalized investment, including applications software and feature hardware,
are included in the FCC’s price inputs. The hardware items he discusses were in
the FCC’s prices and the trending regression the FCC used would have captured
their growth, if any.

Q. MR. FLEMING STATES THAT THE LARGE GAP BETWEEN
FORWARD LOOKING INVESTMENT AND EMBEDDED INVESTMENT
PROVES THAT THE HAI MODEL UNDERSTATES COST. [p. 83] DO
YOU HAVE A COMMENT?

A. Yes. There are a number of reasonable explanations for the gap between forward-
looking and embedded investment. First, embedded fill factors are inefficiently
low. Mr. Fleming notes that the digital line fill factor is only 43 percent [Fleming
Rebuttal, p. 91]. As demand grows, Qwest will realize the benefits of this low
fill. Second, Qwest may be operating too many switches – the FCC’s TELRIC
assumption preserves existing switch locations but not the number of switches.
Third, switching capacity may have been retired but not yet removed from the
books. Fourth, Qwest may have invested in substantial capacity in anticipation of
serving Centrex customers that either were not acquired or were lost to PBXs.
Finally, the cost of switches has fallen. Mr. Fleming disputes the extent to which
switch prices have fallen. [Fleming Rebuttal, p. 83] However, switches are basically special purpose digital computers. The cost of computer processing capacity has obviously fallen substantially in the past decade. The USTA UNE Fact Report (submitted by USTA to the FCC May 26, 1999 on behalf of Ameritech, Bell Atlantic, BellSouth, GTE, SBC and US WEST) stated that “on a per-line basis, prices declined over 60 percent from 1986 to 1996 and were projected to fall another 12 percent by 2000.”

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.
Exhibit DK-R1

Daniel Kelley

PROFESSIONAL EXPERIENCE

Senior Vice President, HAI Consulting, Inc., Boulder Colorado, current position.

Conducting economic and applied policy analysis of domestic and international telecommunications issues. Recent assignments include investigation of broadband competition and interconnection, antitrust analysis of local telephone company mergers, and costing and interconnection studies in various countries. Other assignments have included analysis of competitive conditions in wireless markets, the economics of cable television regulation, analysis of the prospects for local telephone competition, and measuring the economic cost of local service.

Director of Regulatory Policy, MCI Communications Corporation, 1984-1990.

Responsible for developing and implementing MCI's public policy positions on issues such as dominant carrier regulation, Open Network Architecture, accounting separations and Bell Operating Company line of business restrictions. Also managed an interdisciplinary group of economists, engineers and lawyers engaged in analyzing AT&T and local telephone company tariffs.


Telecommunications and antitrust projects included: forecasting long distance telephone rates; analysis of the competitive effects of AT&T's long distance rate structures; a study of optimal firm size for cellular radio markets; analysis of the FCC's Financial Interest and Syndication Rules, and competitive analysis of mergers and acquisitions in a variety of industries.


Served as Special Assistant to the Chairman during 1980-1981. Advised the Chairman on proposed regulatory changes in the broadcasting, cable television and telephone industries; analyzed legislation and drafted congressional testimony. Coordinated Bureau and Office efforts on major common carrier matters such as the Second Computer Inquiry and the Competitive Carrier Rulemaking. Also held Senior Economist positions in the Office of Plans and Policy and the Common Carrier Bureau.


Analyzed proposals for restructuring the Bell System as a member of the economic staff of U.S. v. AT&T; investigated the competitive effects of mergers and business practices in a wide variety of industries.
EDUCATION

1976  Ph.D. in Economics       University of Oregon
1971  M.A. in Economics        University of Oregon
1969  B.A. in Economics        University of Colorado

PAPERS AND COMPLETED RESEARCH


"Alternatives to Rate of Return Regulation: Deregulation or Reform?" in Alternatives to Rate Base Regulation in the Telecommunications Industry, NARUC (1988).


TESTIMONY BEFORE REGULATORY AGENCIES


Massachusetts Department of Public Utilities, DPU 90-133, October 17, 1990: AT&T Deregulation.


Maryland Public Service Commission, Case No. 8584, Phase II, July 21, 1995: Local Competition.

Connecticut Department of Public Utility Control, Docket No. 95-06-17, September 8, 1995: Local Competition.

TESTIMONY (CONT'D)


Utah Public Service Commission, Docket No. 97-049-08, October 2, 1997: Access Charges.


Connecticut Department of Public Utility Control, Docket No. 95-06-17RE02, August 3, 1999: Wholesale Discount.


California Public Utilities commission, Application No. 9-12-012, April 14, 2000: WCOM-Sprint Merger.