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Mark Nichols, Founder and President

PO Box 283, 2510 Mt. Diablo Scenic Blvd, Diablo, CA 94528

Phone: 925.855.8838 Fax: 925.855.8836 www.GlobalTelecomSolutions.com

AT&T CORP. SECURITIES LITIGATION
UNITED STATES DISTRICT COURT
DISTRICT OF NEW JERSEY

EXPERT REPORT OF MARK NICHOLS

FEBRUARY 5, 2004

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I. QUALIFICATIONS

I am the founder and President of Global Telecom Solutions, a telecommunications consulting company that provides expertise in capital and operational expense analysis, facility and network implementation, next generation migration and support for strategic decision-making.

During my prior employment, I have negotiated contractual obligations of greater than $500 million in telecommunications equipment, infrastructure construction and the deployment of bundled services in all major metropolitan markets worldwide. Consistently, my charter has been to design, budget and manage multi-protocol network expansions to meet customer demands of emerging "next generation" technologies.

My employment milestone achievements include:

1. As a Co-Founder of Digital Island (sold to Cable & Wireless for $1.1 Billion), I led the provisioning of infrastructure to support the first multinational E-Commerce distribution network Worldwide. Our customer list included: Cisco Systems, Sun Microsystems, Microsoft, National Semiconductor, E-Trade, Stanford University, MasterCard, UBS Warburg, Financial Times, Canon, ABN Amro, Reuters and Charles Schwab.

2. As the Vice President of Network Operations at Dialpad Communications, I led the provisioning of infrastructure to support the fastest growing web portal in the history of the Internet (faster than Yahoo! and AOL combined), which became a 15 million-person subscriber base represented from every country in the world.

3. As the Managing Director of Telecom of AboveNet Communications (sold to MetroMedia Fiber Networks for $3.0 Billion) during the height of the "Internet Boom," I acquired extensive carrier peering relationships and

physical plant facilities that contributed to the largest aggregated bandwidth network in the world.

My telecom-related areas of specialization include voice, data and Internet transmissions. I have a thorough understanding of the most viable commercial protocols and services including: TDM, Frame Relay, ATM, Native IP, Clear Channel, DSL, HFC, MGCP, SIP, WiFi, SONET, Ethernet, Metro Area Access Networks, Satellite/Microwave Bands and voice-over Internet protocol (VoIP) technologies.

Key technical skills I offer for consulting services in regards to telecommunications include:

- Voice, Data, Internet, and Facilities Collocation
- Network Design, Engineering, Topography and Provisioning
- Equipment Selection, Testing and Installation
- Auditing of Capital Expenditures
- Cost Auditing and Prospective Financial Modeling
- Contract Negotiations and Interpretations
- Operational Support for all Faculties of Telecommunications

I earned a Bachelor of Science degree from the Business Administration department of California State University, Sacramento. My specific application of study concentrated in Operations & Systems Management with a minor in Human Communications.

My publications, recent expert testimony, and compensation for the present case are listed at the end of my report.

II. OPINIONS AND DISCUSSION

I was retained by the defendants in this case to review and comment on the Expert Report submitted on or about December 5, 2004, by Rick Lawrence of ASH Executive Consulting LLC,

on behalf of the plaintiffs ("Lawrence Report"). In particular, I was asked to comment upon the reasonableness, based on my expertise and under the prevailing standards in the industry at the time, of budget and schedule projections made by AT&T Corp. ("AT&T") with regard to the planned upgrade of a nationwide cable communications system that AT&T acquired from TeleCommunications, Inc. ("TCI") in March 1999. I was also asked to comment upon the reasonableness and accuracy of statements made by AT&T concerning its establishment of goals for the TCI cable plant upgrade, and concerning its progress in achieving these goals.

Having reviewed the Lawrence Report, the Deposition of Richard Lawrence taken on January 30, 2004, the documents and deposition transcripts identified in Attachment "A" to this Report, and the standard texts and treatises listed in Attachment "A," I conclude as follows:

A. Mr. Lawrence's opinions are based upon the generalities of his practical experience and fail to take into account the specifics of the facts of this case and the principles directly applicable to the upgrade of an HFC cable system. Thus, they are not well founded.

B. Mr. Lawrence's opinions are based on and drawn from a very narrow selection of documentary evidence (and, in many cases, mischaracterizations or misunderstandings of that evidence), apparently selected and provided to him by plaintiffs' counsel as supporting preconceived notions and opinions, and his opinions thus ignore and are contrary to the broader and more accurate factual context.

C. Contrary to the opinions expressed by Mr. Lawrence, my opinion, as explained in detail below, is that AT&T at all times made reasonable and accurate projections and statements concerning its budget, plan for, and progress in achieving the

upgrade of the TCI cable plant and the provision of bundled broadband services to consumers.

In short, my opinion, based upon my experience in managing network construction and upgrade projects that were similar in complexity and that had budgets of a similar magnitude, is that AT&T's achievements in upgrading the TCI cable plant should be a source of pride and a cause for considerable satisfaction, not the basis for allegations of fraud or deception.

Each of these points is discussed below, as are my responses to Mr. Lawrence's specific opinions.

A. LAWRENCE OPINION NO. 1

Mr. Lawrence first offers the following opinion: "During the class period, AT&T's public projections of the cost of upgrading its cable plant were unreasonable when made." Lawrence Report, p. 7. This opinion, in turn, is based upon two subsidiary points: (a) an "Introduction and Construction Overview," in which Mr. Lawrence recites, without reference to the specific facts of this case and based entirely on his personal experience in related but distinct fields, the complexities of telecommunications construction projects; and (b) a study commissioned by AT&T, prior to its acquisition of TCI, which resulted in a report issued by Coaxial International, Inc. (the "Coaxial Report") validating AT&T's budget assumptions for the upgrade as of that time. Neither of these points supports Mr. Lawrence's Opinion No. 1 and, as demonstrated below, my firm and contrary opinion is that AT&T's budget projections were both reasonable and based on reasonable assumptions when made.

(1) Mr. Lawrence's Description Of The Upgrade Process Is Irrelevant In Many Material Respects

Mr. Lawrence's seven-page description of the "building or rebuilding of a cable television system and/or Fixed Wireless System" (Lawrence Report, pp. 7-13) may be relevant to his practical experiences in building cable TV or fixed wireless systems, but in many instances it has little or no relevance to AT&T's upgrade of a Hybrid Fiber/Coaxial ("HFC") broadband cable system to provide bundled services to consumers. Mr. Lawrence admitted in his deposition (Lawrence Tr., p. 69)[1] that he did nothing to determine the condition of the TCI cable plant prior to the upgrade (so as to understand what needed upgrading and what did not), did not learn as a result of his document review during this case exactly what portions of the TCI cable plant were planned to be upgraded, or to what extent (Lawrence Tr., p. 66), and did not refer to any industry standard texts or treatises on upgrading broadband HFC cable networks (Lawrence Tr., p. 17).

As a result of these deficiencies in his review of the relevant facts and circumstances, Mr. Lawrence describes, and asserts that AT&T should have included costs in its cable plant upgrade budget for, several steps that are not relevant to broadband HFC cable upgrades. For example, Mr. Lawrence refers to the cost of obtaining rights of way or easements, and states that this may require a one time payment or an annual ongoing payment. Lawrence Report, p. 8. Mr. Lawrence evidently has in mind a "new build" project, which is one in which there is no existing network in place, and as such, you have to obtain rights of way and construct an entirely new network. In an upgrade situation such as AT&T faced, a cable operator actually has an existing network that is connected to subscribers and already exists in areas protected by rights of

[1] References to Mr. Lawrence's deposition on January 30, 2004, are cited as "Lawrence Tr. at ___.".

way. It is seldom that new routes are used for cable placement and even if they are, they are usually covered by public right of ways that the cable operator is authorized to use.

Similarly, Mr. Lawrence refers to poles or underground facilities owned independent of the franchise authority that require a payment to the owner of those facilities. He also mentions that these may include a per pole fee or a per foot fee for conduit. Lawrence Report, p. 8. Again, Mr. Lawrence evidently has missed the difference between a new construction project and a network upgrade. In the case of a network upgrade, there is already a network in place that is attached to all of the poles that are required to provide service to the homes in the franchise area. It is rare that you need any additional pole attachments for a network upgrade over and above those you had before you started. You may add some additional cables in extremely limited areas of the network (~15% max), but this does not result in new attachments or any additional pole rental fees. Even if it did, this is normally an operating expense, not a capital expenditure.

Mr. Lawrence also confuses a network upgrade with a new construction process when he states that "make-ready" work is both costly and time consuming. Lawrence Report, p. 9. He refers to there often being a lack of space on the pole for the initial or secondary strand, but it is extremely rare, in my experience, to have a cable company attach more than one strand to a pole. During a network upgrade, you already have strand attached to the pole with a cable lashed to it. The strand remains in place at its current attachment location. The industry standard is to reuse the strand and in most cases the cable. Thus, upgrade work rarely requires "make-ready" work.

Mr. Lawrence has further compounded his inadequate review of the specific facts of this case by either not reading at all, or by paying no attention to if he did read, deposition testimony given by the witnesses with knowledge of the facts on which his opinions are based. See Lawrence Tr., p. 62. This deficiency is particularly apparent in Mr. Lawrence's discussion at

various points in his Report of "certification" of upgraded cable facilities. Mr. Lawrence creates his own definition for the term "certification," a definition which is at odds with the way in which AT&T uses the term, then he bases much of his criticism of AT&T on applying his own definition of "certification" to that term as used in AT&T documents. Mr. Lawrence states that "[c]ertification occurs when all facets of the construction have been completed and the Sweep Tech has certified that signal is appropriately available to specific areas to market." Lawrence Report, p. 12. In contrast to this definition, Randall Fischer, Vice President of Field Financial Operation for TCI and then for AT&T Broadband, made clear in his deposition that what Lawrence calls "certified" is what AT&T called "constructed":

> Q: During your time at TCI in connection with the upgrade, did you have an understanding of the term certification?
>
> A. Yes.
>
> Q. And what was that understanding?
>
> A. My understanding of certification was that after the plant was rebuilt or upgraded, there was a process whereby the homes that that plant passed were loaded into the billing system and other databases for tracking billing to make those customers available for the advanced services.
>
> I don't know the exact process which was followed for certification, but that's my general understanding of it.
>
> Q. *Was your understanding that certification was a testing process?*
>
> A. *No. I think by the time the plant was constructed, it was already tested.*
>
> Q. *On what did you base that understanding?*
>
> A. *My understanding was that certification was not a field process, it was a corporate systems process.*

> Q. *But my question was the statement you made about constructed having already been tested, on what did you base that? Was it something somebody told you or did you read that or –*
>
> A. *I think you would call that standard industry practice. If you're using a contractor or even if you're conducting construction in-house, you don't hand that plant over as being done until you've tested it to make sure that your work is up to specification.*

Fischer Tr., pp. 36-39 (emphasis added).

In fact, Mr. Fischer's understanding is more consistent with industry standards, in my experience. Accordingly, Mr. Lawrence's opinions based on applying his definition of "certification" to the term as used in AT&T's documents – including the opinion later in his Report that AT&T falsified statements regarding its adherence to schedule by reporting segments of the cable system as being "upgraded" when they were not "certified" (see Lawrence Report, p. 18-19) – are unfounded and contrary to the facts of this case.

(2) The Lawrence Report Mischaracterizes The Purpose And Meaning Of The Coaxial Report

The Lawrence Report relies almost exclusively on the Coaxial Report to support Lawrence's opinion that "AT&T was at all times informed that the upgrade would cost far in excess of $2.758B." Lawrence Report pp. 13-17. In fact, the Coaxial Report is one of a number of prudent measures that AT&T undertook in order to confirm that its budget projections for the TCI cable plant upgrade were reasonable.

AT&T employed the services of Coaxial to complete a capital budget review regarding network upgrades of the TCI cable television system located in Dallas. Contrary to the statement in the Lawrence Report (p. 13), Coaxial was not retained "to calculate a projected cost of the upgrade of the cable plant." As the Coaxial Report itself made clear, the goal of the engagement was expressed clearly: Coaxial was to use the Dallas data to corroborate whether the proposed

nationwide upgrade budget established by TCI was reasonable and reliable, not to calculate a new and independent budget. Coaxial Report, p. 8 (ATB028002453).

Even more inaccurate is Mr. Lawrence's characterization of the conclusions of the Coaxial Report. Mr. Lawrence asserts that "[t]he Coaxial Report clearly and creditably concluded that the system-wide upgrade would cost AT&T far more than $2.748B." Lawrence Report, p. 13. In fact, the Coaxial Report reached no such conclusion. On the contrary, the Coaxial affirmatively concluded as follows:

> We can state with a high level of confidence that the Dallas area budget assumptions and cost projections are reasonable: *If the other markets provided information with the same degree of accuracy as Dallas, then the $2.5 billion figure* [that TCI was projecting as the system-wide upgrade budget at the time] *also should be reasonable*. Coaxial Report, p. 8 (ATB028002453) (emphasis added).

Consequently, and contrary to Mr. Lawrence's assertions, Coaxial actually concluded that, using the Dallas data as a baseline from which to extrapolate, TCI's budget projections for the system-wide upgrade were, in fact, reasonable.

Coaxial, of course, also made the self-evident observation that there was "inherent risk" in extrapolating Dallas data over the entire country "because of the small sample size, and the variation in assumptions and costs among systems and markets." Coaxial Report, p. 6 (ATB028002451). Mr. Lawrence ultimately acknowledged in his deposition, however, that this obvious "risk" meant only that the cost of the system-wide upgrade could be higher – not that Coaxial "clearly and creditably concluded," as Mr. Lawrence asserts in his report (p. 13), that it would be higher – and that the total cost could also, for that matter, be lower. Lawrence Tr., p. 101-102, 105.

In the end, Mr. Lawrence acknowledged that Coaxial did not conclude that the upgrade budget was wrong, only that AT&T needed to do more to confirm that it was right. Lawrence Tr., p. 106. Moreover, Mr. Lawrence admitted that he does not know what else AT&T did to confirm that it had data as reliable as that relied upon in Dallas for the other major markets that were to be upgraded. Lawrence Tr., p. 106. It is clear from the Coaxial Report itself, however, that equally detailed and reliable data were available for all of the major markets that were scheduled for upgrade, even though Coaxial was not asked to review, and did not review, such data. See, e.g., Coaxial Report, p. 16 (ATB028002461) ("*As with all of the TCI major market metro areas*, the Dallas [budget] book and its costs were developed primarily from information provided by system/regional personnel as well as corporate cost models") (emphasis added); Coaxial Report, p. 8 (ATB028002453) (Coaxial has "not reviewed other markets' detailed assumptions and budget estimates."); ATB028002479 (Table showing budget models for 10 major markets).

Mr. Lawrence's assertion that Coaxial informed AT&T that the upgrade would cost $3.47 billion or more (Lawrence Report. pp. 13-14) also is totally indefensible. The $3.47 billion figure was generated by Coaxial as a hypothetical illustration of the "inherent risk" of extrapolating data from one market over the entire country. Coaxial Report, p. 8 (ATB020802453). In fact, the $3.47 billion figure clearly is not a budget projection at all, but is a mathematical exercise that involves simply multiplying 17.6 million (the total number of homes within the eventual cable plant "footprint" planned by AT&T) by $178.38 – the per home average cost of the upgrade in Dallas. Coaxial Report, p. 6 (ATB028002451). As the Coaxial Report makes clear, however, (and as Mr. Lawrence acknowledges [Lawrence Report, p. 15]), AT&T never intended to upgrade all 17.6 million homes in the eventual footprint, much less to

upgrade all 17.6 million homes to the same level. Coaxial Report, p. 6 (ATB028002451). Even if AT&T had intended to upgrade all 17.6 million homes, there is no basis on which to conclude that the average per home cost of the upgrade would be $173.38; in some markets (Chicago, for example [see ATB028002479]), the average per home cost would likely be substantially lower, while in others it would likely be higher.

Surprisingly, Mr. Lawrence attempts to convert AT&T's announced plans to upgrade different parts of its market to different upgrade levels into some sort of misrepresentation. See Lawrence Report, p. 15 ("Instead of a full upgrade [that AT&T led investors to believe would be performed], only 71% of the original homes (12.5M versus 17.6M) appear to be getting the full upgrade."). AT&T's plans, however, not only were made clear to Coaxial but were also announced to the market analyst community and the public: in presentations at the December 6, 1999 analyst meeting, for example, AT&T depicted the percentages of homes projected to be upgraded to 550-860 MHz, the percentage to be upgraded to less than or equal to 450 MHz, and those to be upgraded for two-way services. ATC155001478.

Mr. Lawrence similarly asserts that AT&T "improperly excluded ... from its public projection" the alleged cost of a new cable modem for each upgraded home. Lawrence Report, pp. 16-17. Again, however, it is clear not only that AT&T disclosed fully to Coaxial (and that Coaxial fully understood) that per home incremental costs for cable modems were not included in the capital budget for the upgrade, but also that AT&T clearly disclosed to the Wall Street analyst community that "Variable Capital" costs per subscriber for telephony cable modems (also known as Network Interface Units) and other equipment to be located at the subscriber's premises could range, on average and over time, from $590 to $840 per home, on top of the

overall fixed capital projection. See Analyst Meeting, December 6, 1999, p. 20 (ATC1550001480).

Additionally, Mr. Lawrence inaccurately asserts that customers who subscribed to the new bundled services to be offered by AT&T Broadband would require new fiber enhanced "subscriber drops" servicing their homes. Lawrence Report, p. 17. That is not only completely inaccurate, but underscores Lawrence's apparent lack of understanding of how a HFC network operates, the technology required to support the marketplace, and what is entailed in the upgrade of such a network. In fact, and completely contrary to Lawrence's representations (see Lawrence Tr., p. 154), the existing coaxial subscriber drop to the homes had absolutely no requirement for modified spectrum or access material upgrade to support bundled services. An HFC network spectrum upgrade only affects the portions of the network that are used for transport of the services between the network aggregation and distribution facilities. At the customer premises, only the customer's cable modem needs to be replaced with a modem that is compliant for data compression and transmissions, thus enabling the two-way communications to support those customers who select to use Internet and/or telephony services. In any event, to the extent there was a necessity to replace any subscriber drops, AT&T, as the Coaxial Report makes clear, had a separate budget for that activity. Coaxial Report, pp. 14-15.

In fact, all of AT&T's specific intentions in regards to the scope of the planned HFC upgrade and construction methods were publicly well documented in the Analysts Meeting dated December 6, 1999. AT&T explained within the Network Upgrade portion of the Hybrid Fiber Coaxial Network overview that the majority of the network (including subscriber drops) were re-usable, and that the upgrade consisted simply of replacing electronic devices and adding the *fiber portion* – which is a minority portion. Customers who ultimately subscribed for the additional

services that were available after the upgrade could simply install a new cable modem to enable the new two-way data flow (ATC155001511).

Mr. Lawrence's discussion of the Coaxial Report contains numerous other deficiencies in understanding and misinterpretations or distortions of Coaxial's findings. In the end, Mr. Lawrence has essentially attempted to substitute his own opinions for the "industry standard paradigm" to which the nation's largest cable and telephony operators should be held and by which they should be measured. He does so, moreover, without regard for many of the facts of this case and the specifics of the upgrade planned by AT&T.

In sum, the Coaxial Report, contrary to Mr. Lawrence's opinion of it, concluded with a high level of confidence that the Dallas area budget assumptions were reasonable and that they tended to corroborate the overall upgrade budget. The Coaxial Report thus constitutes a significant enhancement to the professionalism and accuracy of the TCI and AT&T personnel responsible for developing the budget. Based upon the Coaxial Report, all of the other documents and testimony I have reviewed, and my experience in budgeting for and provisioning nationwide network construction and upgrades, my opinion is that AT&T's budget projections were developed in good faith and in accordance with good industry standards and practices, and were eminently reasonable when made.

B. LAWRENCE OPINION NO. 2

Mr. Lawrence further opines that "During the class period, AT&T's statements that it was on/ahead of schedule and on/below budget in the upgrade of its cable plant were materially false and misleading when made." Lawrence Report, p. 17. This opinion also is predicated on two subsidiary points: (a) that AT&T exceeded its capital budget for the upgrade in calendar year 1999, and (b) that AT&T completed less upgrade work than scheduled in calendar year 1999.

Lawrence Report, pp. 17-19. Neither of these points can withstand close examination, and both are at odds with the documents Mr. Lawrence attempts to rely on to support them. As shown below, AT&T actually completed *more* upgrade work than scheduled in calendar year 1999, and stayed admirably within its projected capital budget while completing this extra work.

(1) AT&T Upgraded 4.6 Million Homes, Rather Than Only 4.2 Million Homes As Scheduled, During Calendar Year 1999

The documents upon which Mr. Lawrence relies for his opinions make clear that AT&T's "commitment to the investment community for 1999 [was] for 4.2 million homes," and that the number of "homes constructed" by the end of 1999 totaled 4.6 million, substantially exceeding the 4.2 million commitment. December 31, 1999 Master Buildout Schedule, ATB028002030, ATB028002032. Mr. Lawrence nonetheless contends that AT&T lied by saying the upgrade was on or ahead of schedule at the end of 1999 because, even though well over 4.2 million homes had been constructed, only 3.77 million had been "certified." Lawrence Report, pp. 18-19; Lawrence Tr., pp. 184-185.

In essence, Mr. Lawrence accuses AT&T of a lie based on his own misunderstanding of AT&T's use of the word "certified" in its internal documents. As explained previously in this Report (pp. 7-8, above), AT&T did not consider a home "constructed" until the engineering group had determined that the cable in place was capable of passing a signal within acceptable parameters. This appears to be what Mr. Lawrence has in mind when he speaks of cable plant being "certified," such that, as a practical matter, "constructed" to AT&T means the same thing as "certified" to Mr. Lawrence. To the extent that Mr. Lawrence means something more than that by the term "certified," I would emphatically disagree with Mr. Lawrence's contention that "it is industry standard not to consider homes upgraded unless they are certified." Lawrence

Report, p. 19. Given the definition of "constructed" revealed by AT&T witnesses and documents, and based on my experience in managing the construction or upgrade of nationwide communications networks, it is my opinion that AT&T properly considered "constructed" homes, as AT&T used that term, to be "upgraded," and that AT&T therefore fairly concluded that, by completing 4.6 million homes constructed, it had exceeded its scheduled upgrade of 4.2 million homes in 1999.

(2) There Was No "Massive" Budgetary Overspend On The Broadband Cable Upgrade In 1999

Based on a single document, Mr. Lawrence concludes that "[i]nternal AT&T documents clearly indicate a massive budgetary overspend on the upgrade in 1999." Lawrence Report, p. 17. To begin with, Mr. Lawrence's assertion, even if it were true (which, as discussed below, it is not), is not of much practical significance. In my experience, in a project of this magnitude – which stretched over several years and involved several billion dollars – it is neither practical nor even particularly desirable to manage budgets precisely for each calendar period within such a long-term project. Inevitably, budgets will be overrun in some calendar periods and underrun in others, depending upon a host of variables too numerous to mention. In my experience (and, in my view, the common understanding), statements made during a long-term project to the effect that 'we are on budget' are made with reference to the overall budget, not some calendar segment within it. It would appear that AT&T's practice and understanding is consistent with mine, because Mr. Lawrence has not referenced any statement by AT&T along the lines of 'we are on budget for calendar year 1999.'

In any event, even the single document referenced by Mr. Lawrence does not support his point as to any "massive" overspend. On the contrary, it is my opinion that AT&T's

performance was admirably close to its budget projections, particularly given the fact, detailed above, that approximately 8% more homes (4.6 million versus 4.2 million) were upgraded in 1999 than were scheduled to be upgraded. There certainly was no "massive" budgetary overspend on the upgrade in 1999, and AT&T's statements at the time that the upgrade was on or below budget were, in my opinion, fair, accurate and reasonable.

The document Mr. Lawrence uses to support his point – the "December 31, 1999 Monthly Reporting Package" circulated by Meagan Jarecki on January 12, 2000 (ATB007002446-2557) (the "Jarecki Package") – actually demonstrates, when properly analyzed, that AT&T was on or below budget for the upgrade at the end of 1999. Once again, Mr. Lawrence either has failed to devote the time and care necessary to evaluate the document properly, or has been led by plaintiffs' counsel to a preconceived conclusion, or both.

First, Mr. Lawrence fails entirely to grasp the impact of the timing of the consummation of AT&T acquisition of TCI on the 1999 upgrade budget. In his deposition, Mr. Lawrence could not explain why the Jarecki Package shows separate columns for TCI budget amounts and AT&T budget amounts, nor had he considered how the timing of the TCI acquisition could affect the 1999 upgrade budget. Lawrence Tr., pp. 169-171. In fact, the documents and testimony that I have reviewed show that the TCI acquisition closed more than one month sooner than planned. As a result, rather than incurring for the number of months of upgrade work that had been budgeted for at the beginning of 1999, AT&T incurred the costs – and, of course, the benefits – for additional months of upgrade work.

Second, testimony that I have reviewed show that AT&T accelerated work scheduled for 2000 into 1999 – that is, upgraded a number of miles of cable plant in 1999 that had been scheduled and budgeted for upgrade in 2000. Somers Tr., pp. 628-32; 655-56. Consequently, a

portion of the apparent 1999 "overrun" was actually budgeted work that was within the 2000, not 1999, budget. Overall, AT&T's performance against its upgrade budget in 1999 was remarkably good, especially in light of the fact, as noted above, that some 8% more homes than scheduled were upgraded. Based on my experience in managing projects of similar complexity with budgets of similar magnitude, AT&T's performance on the upgrade should rightly be a cause for celebration, not for allegations of securities fraud. There certainly was no "massive" overspend by any calculation, and, in these circumstances, it was in no way either false or misleading for AT&T to state that the upgrade was on or below budget at the end of calendar year 1999.

C. LAWRENCE OPINION NO. 3

In rendering his opinion that "[d]uring the class period, AT&T's public projections of how many cable telephony subscribes it would have by year end 2000 were unreasonable when made" (Lawrence Report, p. 19), Mr. Lawrence is both undermined and betrayed by his own unwillingness to study and understand the relevant evidence or by plaintiffs' counsel's unwillingness to provide such evidence to him.

The centerpiece of Mr. Lawrence's opinion in this regard is an April 3, 2000 presentation (see Lawrence Report, p. 20) which Mr. Lawrence claims was "issued by" Joe Bagan and Pete D'Amato. Lawrence Report, p. 26. (Mr. Bagan was Vice President and Chief Information Officer for AT&T Broadband at the time.) Based on statements in this document – which Mr. Lawrence ascribes to Bagan merely because Bagan's name is on the cover page (see Lawrence Tr., pp. 207-210) – Mr. Lawrence leaps to the conclusion that AT&T's stated goal of having 400,000 to 500,000 cable telephony subscribers was "a direct contradiction to all information available to management," and, even more remarkably, that "senior management" was aware of limitations that would "preclude" the launch of bundled services. Lawrence Report, p. 20.

Nothing could be further from the truth or be more blatantly contrary to the available evidence. Mr. Bagan's sworn testimony concerning this document was crystal clear and squarely refutes Mr. Lawrence's "assumptions" about the document. First, neither Mr. Bagan nor any other AT&T employee prepared or "issued" the document in question: it was prepared by an outside consulting firm. Bagan Tr., pp. 101-102. More importantly, Mr. Bagan made clear that he strongly disagreed with the conclusions stated in the document, that he voiced his disagreements at the time to all present at the meeting where the document was discussed (including the outside consultants who had drafted the document and who were presenting it), and that he rejected the statements in the document as erroneous. When asked about the very same statements in this document upon which Mr. Lawrence now relies, Mr. Bagan testified as follows:

> Q. At the time you received this document, did you believe that was a true statement?
>
> A. No.
>
> * * *
>
> Q. (BY MR. MANDLEKAR) Why do you say no?
>
> A. Because I believed that we would meet our commitment to Wall Street. This says we will not.
>
> Q. Did you ever – okay. So just to clarify, you're saying this document says that AT&T will not meet its business commitments to Wall Street?
>
> A. This document says, The current systems architecture, processes, and staffing in supporting cable telephony will not adequately support business results committed to Wall Street. I don't know who wrote that, and I don't agree with it.
>
> Q. Did you agree with it at the time?
>
> A. No.

Q. Did you ever tell anybody that you didn't agree with it?

A. Yes.

Q. Who did you tell?

A. The people in the meeting.

Q. And you can't remember who any of those persons are?

A. I can remember some of them.

Q. Aside from the act of submitting this document, did any of the people at the meeting ever tell you that they believed that to be true?

A. I can't recall.

* * *

Q. (BY MR. MANDLEKAR) Okay. The next bullet point says, At its current run rate, taking into account current monthly increases, AT&T Broadband will fall far short of its year 2000 installed subscriber commitments. Do you see that, sir?

A. I do.

Q. At the time you received this document, did you believe that to be a true statement?

A. No.

Q. Why not?

A. Because I believed that we would meet our 2000 installed subscriber commitments.

Bagan Tr., pp. 108, 110 - 111, 123.

Mr. Bagan also makes clear that he has no basis on which to believe that this document was made available, contrary to Mr. Lawrence's statement, to "senior management." Lawrence

Report, p. 20; Bagan Tr., p. 104-105. Mr. Lawrence testified that he read Mr. Bagan's deposition, but he didn't take it into consideration. Lawrence Tr., p. 61-63. If he did read and understand Mr. Bagan's testimony, one would have to call seriously into question Mr. Lawrence's good faith in attributing the statements he makes in his Report to Mr. Bagan.

Mr. Lawrence further relies on a presentation dated May 26, 2000 (ATB004002611-628), which Mr. Lawrence acknowledges to be an "author unknown" document. Lawrence Report, p. 21. Specifically, Mr. Lawrence references a chart that shows the projected number of "Households Passed" at the end of calendar year 2000. (ATB004002612). Without benefit of the author's (whoever he or she might be) interpretation of this document or the interpretation of any recipient of the document, Mr. Lawrence concludes that AT&T would have a "deficit" of some 400,000 "households passed" by the end of 2000. Based on the assumption that this chart actually should be interpreted to mean that, in fact, at the end of the year 2000 the upgrade would have passed 3.06 million homes rather than 3.48 million homes, Mr. Lawrence concludes that "AT&T was on a trajectory to fall short of its subscriber goals" of 400,000 to 500,000 subscribers, and therefore lied by stating it expected to meet those goals. Lawrence Report, p. 21 (emphasis added). Even assuming that the chart on which Mr. Lawrence relies means what he claims it does as to homes passed, Mr. Lawrence provides no basis for his conclusion that, if AT&T achieved 3.06 million homes passed, it could not achieve 400,000 to 500,000 new subscribers. Indeed, elsewhere in his Report, Mr. Lawrence advances his personal opinion (without reference to any industry standard) that AT&T should assume that 70 percent of homes passed would subscribe to telephony services. Lawrence Report, p. 16. Applying Mr. Lawrence's 70 percent standard here, more than 2 million of the 3.06 million homes passed would become telephony subscribers, more than quadrupling AT&T's announced goals. While

this 70 percent subscription rate is, in my opinion, excessive, it is also my opinion that AT&T could reasonably expect to achieve easily more than 400,000 new subscribers from 3.02 million homes passed. Again, Mr. Lawrence's opinions seem to use facts selectively in order to reach preconceived positions.

Most notable in this regard is Mr. Lawrence's studied indifference to the question of how many telephony subscribers AT&T actually had signed up by the end of calendar year 2000. Mr. Lawrence admitted during his deposition (Lawrence Tr., pp. 203-204) that he does not know how many cable telephony subscribers AT&T had by year-end 2000. I find it unfathomable that Mr. Lawrence can decree what is "unreasonable" to achieve when he admittedly does not know what actually *was* achieved. In fact, based on the deposition testimony that I have reviewed, it is clear that AT&T reached its telephony subscriber goals for the end of the year 2000. E.g., Somers Tr., p. 683. While I do not contend that the fact that the company achieved its goals conclusively demonstrates that the goals were reasonable when set, it obviously is a consideration that you would expect an expert to be interested in. My opinion, based on this fact and all of the other relevant facts and considerations, is that AT&T's year-end 2000 cable telephony subscriber goals were eminently reasonable when set.

D. LAWRENCE OPINION NO. 4

Mr. Lawrence also advances the opinion that "[d]uring the class period, AT&T's statements on its progress in achieving its targeted number of cable telephony subscribers by year end 2000 were false when made."

Mr. Lawrence's principal basis for this opinion is the use of a "run rate" accounting methodology, in which results for one or more calendar months are projected out for the remainder of the year on a straight-line basis. In essence, this methodology chooses a "snap

shot" period, and assumes that progress through the remainder of the year will be made at the same pace – neither faster nor slower – as that achieved during the "snap shot" period. This methodology, obviously, assumes that no process improvements will be made, that no learning curve effects will be realized, and that none of the problems encountered during the "snap shot" period will be resolved during the period that follows.

Using a static "run-rate" calculation also means assuming that current problems and impediments to progress will never be improved upon or solved. This appears to be the assumption underlying Mr. Lawrence's extensive discussion of AT&T Broadband's difficulties with CSG, one of its telephony vendors. See Lawrence Report, pp. 21-25. Contrary to this assumption, however, AT&T fully expected, based on aggressive management by Mr. Bagan and others of issues with CSG and other vendors, to accelerate solutions to the problems and remove the impediments. E.g., Bagan Tr., p. 154. Solving such problems normally contributes to significant ramp-up, not to linear "run-rate" progression. Consequently, my opinion is that Mr. Lawrence's emphasis on AT&T Broadband's difficulties with CSG is misplaced, as is his adoption of a linear "run-rate" projection.

For national provisioning events such as the TCI cable plant upgrade, it is not, in my opinion, either good practice or the industry standard to use a "snap shot" of a particular calendar window to definitively quantify eventual metrics. From my experience, I cannot identify one instance in which any persons trying to quantify a future event concerning customer acquisition and subsequent revenue calculations would consider using a "run rate" with a constant metric from the fifth month of a calendar year to accurately define year-end aggregates. While using a static "run rate" might be a useful illustration of how steep learning curve effects and ramp-up

needs to be to achieve stated goals, it should never be used as a formula to predict accurate period-end metrics.

As a professional who has been tasked with national network service acquisition and provisioning of infrastructure to support growth markets, using a "run rate" formula incorrectly for an appropriate year-end metric would not have been accepted by any CEO, CFO, Board Members or peer executive staff members with whom I have worked.

In fact, in his deposition testimony, Mr. Lawrence clearly acknowledges, despite the opinion expressed in his report, that the "run rate" is not the accounting method used by AT&T to project year-end aggregate subscribers. Lawrence Tr., p. 223-225. Instead, AT&T uses an "Outlook" calculation, which Mr. Lawrence understands vaguely at best. Lawrence Tr., p. 223. The same document upon which Mr. Lawrence relies to show that, by using the static "run rate" method, AT&T will fall short of its year-end 2000 subscriber goals also shows that the AT&T "Outlook" for the same period predicts that AT&T will acquire more than 500,000 cable telephony subscribers by year's end – more than 25% in excess of the lower end of the stated goal range. ATB004002614. Again, Mr. Lawrence is narrowly selective in the documents and data he chooses to use to support his predetermined opinions.

My own opinion, based on the documents relied upon by Mr. Lawrence and the other documents and deposition testimony I have reviewed, is that AT&T's goal of 400,000 to 500,000 telephony subscribers by year-end 2000 was a reasonable goal, that AT&T had a reasonable and professional plan to achieve that goal, and that AT&T remained justifiably confident throughout 2000 that, in the end, that goal would be achieved. These opinions are confirmed by the fact that the goal was, in fact, achieved.

E. LAWRENCE OPINION NO. 5

Mr. Lawrence asserts that "[d]uring the class period, AT&T's statements that it could use fixed wireless as a viable alternative to cable for the delivery of broadband services were false when made." Lawrence Report, p. 27. In fact, Mr. Lawrence does not identify any "statements" by AT&T concerning its intentions for deploying fixed wireless, but references instead a November 1999 Wall Street Journal article which draws an inference that AT&T's inclusion of its fixed wireless technology among the assets to be included in its wireless tracking stock offering "reflect[ed] AT&T's growing confidence it can use [fixed wireless] as an alternative to cable television lines as it attempts to provide local-telephone service nationwide." Lawrence Report, p. 27. Mr. Lawrence opines that these "statements" – or, presumably, AT&T's failure to correct the inferences drawn by the Wall Street Journal – were lies because AT&T allegedly "knew at all times that it was not feasible for it to provide bundled broadband services on a commercially practical scale over fixed wireless." Lawrence Report, p. 27.

Mr. Lawrence goes on to assert that AT&T "knew" fixed wireless was not a feasible alternative because "AT&T did not own or control sufficient spectrum to deliver the services [and it] would be unreasonable to expect a potential competitor [to] lease sufficient spectrum to a company such as AT&T." Lawrence Report, p. 28. In short, Mr. Lawrence appears to be arguing that AT&T's intentions concerning fixed wireless were some kind of charade, that AT&T knew all along that fixed wireless was not a viable alternative but pretended to pursue it seriously as an option.

Mr. Lawrence's opinion is not defensible for several reasons. First, documents that I have reviewed during my engagement on this case – documents that Mr. Lawrence either has chosen not to review or that plaintiffs' counsel has chosen not to show him – demonstrate that

AT&T considered fixed wireless to be a serious and viable alternative. For example, AT&T developed internally full-scale, extensive business plans for its anticipated fixed wireless business. See, e.g. ATC052002599-ATC052002643; ATB052008076-ATB052008108; ATB004002102-ATB004002296. It is not plausible to think that AT&T would go to the trouble and expense of generating these internal planning documents for the sole purpose of perpetrating some elaborate charade. Second, it is not, in my opinion, in any way "unreasonable" to expect that AT&T's competitors would lease wireless spectrum to AT&T. In my experience, AT&T, WorldCom, Sprint and other competitors routinely lease or wholesale to each other every sort of telecommunications capacity, and there is absolutely no reason to believe that such arrangements would not have been reached with respect to fixed wireless spectrum. Third, even if AT&T had been unable to lease additional spectrum from its competitors, AT&T, in fact, already owned fixed wireless spectrum, and was actively pursuing plans for the commercial development and deployment of that spectrum. See ATB004002111.

Despite all of these clear indicators that AT&T was serious about pursuing fixed wireless as a viable alternative, Mr. Lawrence asserts that his opinion "is supported by internal AT&T documents." Lawrence Report, p. 28. In fact, Mr. Lawrence identifies only one document that he claims supports his opinion in fixed wireless: an October 12, 1999 memorandum from Leo Hindery to C. Michael Armstrong. At the time of this memorandum, Mr. Hindery was on his way out as CEO of AT&T Broadband because of his disagreements with AT&T's Chairman about, among other things, the viability of fixed wireless. See Hindery Tr., p. 80. In the memorandum cited by Mr. Lawrence, Mr. Hindery states his opinion that fixed wireless "is not an alternative in the truest sense of the word – rather, is simply the best response to a failed preferred course of action." ATC148000265 (Emphasis added). Mr. Lawrence does not explain

– and there is no plausible reason – why Mr. Hindery's opinion that fixed wireless was a second best alternative means that the opinion of Mr. Armstrong and others at AT&T that fixed wireless was a viable alternative were all false. Moreover, the fact that AT&T Wireless decided in 2001 to withdraw from the fixed wireless effort does not, despite Mr. Lawrence's attempt to create an inference to the contrary (see Lawrence Report, p. 29), indicate that AT&T was not serious about, or was lying to AT&T shareholders and the analyst community concerning its intentions with respect to, fixed wireless in 1999.

Quite to the contrary, it is my opinion that AT&T and its principal competitors considered fixed wireless to be not just a viable alternative, but also a very promising prospect, in 1999. AT&T, BellSouth, Sprint and MCI/WorldCom had all begun independently to invest heavily in securing fixed wireless spectrum to provide data and telephony services as a viable alternative to cable broadband access. These "Tier 1" carriers spent an aggregate of billions of dollars acquiring the licensing rights to various fixed wireless spectrums enabling "competitive broadband services" to millions of households nationwide. Whatever Mr. Hindery's opinion about fixed wireless may have been (and Mr. Lawrence acknowledges that Mr. Hindery's experience and expertise was in cable and cable-related access, not fixed wireless opportunities), AT&T's pursuit of the fixed wireless alternative was very much in step with its competition. Indeed, Mr. Lawrence himself was quoted in the trade press at the time touting the advantages and highly promising future of fixed wireless. See Lawrence Tr., p. 295-296, Lawrence Deposition Exhibit 12.

In short, I find no basis for Mr. Lawrence's opinion that AT&T's "statements" concerning fixed wireless were false – assuming that AT&T, in fact, made any such statements, since Mr. Lawrence does not refer to any.

F. LAWRENCE OPINION NO. 6

Mr. Lawrence's final opinion is that "[d]uring the class period, AT&T's statements regarding its offering of high speed internet services were misleading when made." Lawrence Report, p. 29. The misleading "statements" he has in mind are apparently those in which AT&T "spoke in very positive terms" about its high speed internet access offerings, such as saying that high speed internet access was in "strong demand" in 1999. Lawrence Report, p. 29. Mr. Lawrence does not and cannot say that these statements were false when made, but opines instead that they were "misleading half-truths" because "they did not disclose the extremely serious and crippling operational problems" that AT&T was allegedly having at the time with Excite@Home ("@Home"), which provided internet access. Lawrence Report, p. 29.

The supposedly "serious and crippling" problems to which Mr. Lawrence refers are these documented by Susan Marshall in correspondence identified in Mr. Lawrence's Report including problems with @Home staffing, network traffic congestion in certain markets, and inadequate circuit capacity. Lawrence Report, pp. 29-30. Once again, however, Mr. Lawrence has either declined to read what the author of this correspondence said in her deposition about it, or, if he did read it, is unable to remember that he did. In fact, Ms. Marshall characterized AT&T's problems with @Home as follows:

> A. You know, in managing projects, or just managing a business area, I view that your job is to identify issues, and some of them are small and some of them are big and some of them get dealt with immediately and some of them take time, and it's just kind of the normal course of business, and I was expressing here that I didn't feel we were making progress on some of these issues that we had as a group identified, and we needed to – we needed to recognize that and do something about it.
>
> Q. What did you mean by issues?

> A. It could be that there were still database problems. I – that's just an illustrative point. Or that there were circuit issues that hadn't been solved yet. I mean, issues could be a variety of things in a variety of areas, and, you know, to a certain extent they're just kind of normal blips in the road that you identify and then do something about.

Marshall Tr., p. 149.

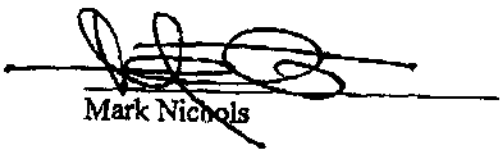
Having reviewed the Marshall deposition and exhibits, my opinion is that Ms. Marshall was taking the problems being experienced with @Home seriously and managing them aggressively and appropriately, but that they were, in fact, "normal blips in the road" in the context of a project of the magnitude of that undertaken by AT&T Broadband. In fact, based on my experience in managing projects of similar magnitude, Ms. Marshall's problems with @Home are considerably less serious than some I have faced and overcome. I am unaware of any principle that would require AT&T to make a public disclosure of these sorts of fairly routine business headaches. This is confirmed by the fact that Ms. Marshall and her colleagues at AT&T Broadband did, in fact, overcome these problems and made their year-end new data subscriber targets. Marshall Tr., p. 151. Mr. Lawrence has chosen to ignore this fact, but is nonetheless willing to opine that AT&T made false or misleading statements about achieving its goals without knowing whether or not, in the end, AT&T did achieve them. Lawrence Tr., p. 278.

The relative insignificance of the @Home issues of the broader scheme of AT&T Broadband's efforts is further confirmed by the document that Mr. Lawrence claims provides "financial context" to those issues. Lawrence Report, p. 31. Mr. Lawrence references a January 13, 2000 financial reporting package assembled by Randall Fischer, one line item of which indicates that capital expenditures for the "@Home Launch" were at 195 percent of budget. ATB007002576. What Mr. Lawrence fails to point out is that the entire budget for the @Home

Launch is less than 2 percent of the overall 1999 AT&T Broadband capital expenditure budget. This fact also tends to confirm the view that the problems with @Home were "blips in the road."

III. CONCLUSION

Based on all of the documents and testimony I have reviewed, and in drawing upon my experience in the telecommunications industry, I find nothing that indicates any kind of bad faith, falsity, or effort to mislead in AT&T's statements concerning its budget projections, goals, and progress against schedule and budget in relation to the upgrade of the TCI cable plant. On the contrary: everything I have read convinces me that AT&T conducted the upgrade of the TCI cable plant with a high degree of professionalism and integrity, and succeeded remarkably in achieving the very difficult tasks it set out to achieve. I believe that Mr. Lawrence's opinions to the contrary are not well-founded or defensible.



Mark Nichols

DATED: February 5, 2004

ATTACHMENT A

I. PUBLICATIONS AND PRIOR TESTIMONY

A. Publications

1. "*Speaking Over the Net*," An Overview of VoIP systems for OEM manufacturers and platform porting (2001).

2. "*Entrepreneurial Spirit*," Harvard Business School. A Case Study of a Technical Start-Up Enterprise (2001).

B. Prior Testimony

1. Lucent vs. Telephony International

2. Lucent vs. Network Access Solutions

3. Nortel vs. Genuity

4. TKTel vs. Ericsson

5. Cogent vs. eBroadbandnow

II. COMPENSATION

My fees for consulting are $300 per hour, though, charges for travel are reduced to only $100 per hour.

III. REFERENCES RELIED UPON

A. Documents

1. Plaintiffs' Complaint

2. Expert Report of Rick Lawrence

3. Deposition transcript and corresponding deposition exhibits of Rick Lawrence

4. ATB004002611 AT&T Broadband 2000 Telephony Rollout

5. ATB028002028 December 31, 1999 Master Buildout Schedule

6. Deposition transcript and corresponding deposition exhibits of Joe Bagan

7. Deposition transcript and corresponding deposition exhibits of Susan Marshall

8. Deposition transcript and corresponding deposition exhibits of Leo Hindery

9. Deposition transcript and corresponding deposition exhibits of Randy Fischer

10. Deposition transcript and corresponding deposition exhibits of Dan Somers 1 & 2

11. Deposition transcript and corresponding deposition exhibits of Jack Grubman

12. Deposition transcript and corresponding deposition exhibits of John Moreno

13. AWS015000243 AT&T Annual Report 1999

14. ATB007002558 Randy Fischer Memo January 13, 2000

15. ATB028002446 Coaxial Report

16. ATC155001390 analyst meeting December 6, 1999

17. ATB007002446 Meagan Jarecki Memo January, 12 2000

18. AT&T News Release Monday, December 6, 1999 "Somers Named Head Of AT&T Broadband Unit"

19. AT&T News Release Monday, December 6, 1999 "AT&T Outlines Plans For Growth"

20. ATB001002087 AT&T Broadband HFC Telephony Systems Review and Future Architecture Project April 3, 2000

21. ATB045001488 Logic for Consolidation Message 6/14/00

22. ATB001002068 Root Cause Analysis Project June 19, 2000

23. ATC059004663 Meagan Jarecki Memo September 7, 2000

24. ATC148000265 Leo Hindery Letter October 12, 1999

25. ATB002000383 Susan Marshall Memo October 26, 1999

26. ATB007002558 Randy Fischer Memo January 13, 2000

27. ATB004002409 Curt Hockemeier Memo April 3, 2000

28. ATB004000608 Joe Bagan Letter June 28, 2000

29. ATB004000605 Jack Pogge Letter June 30, 2000

30. ATB004000603 Joe Bagan Letter July 10, 2000

31. ATB004000600 Joe Bagan Letter August 15, 2000

32. ATB004000597 Jack Pogge Letter August 24, 2000

33. TWP000172 Thomas Weisel Partners March 29, 2000

34. Wall Street Journal Friday, April 28, 2000 by Leslie Cauley

35. Wall Street Journal Wednesday, November 24, 1999, Rebecca Blumenstein

36. AT&T News Release Tuesday, October 23, 2001 "AT&T Wireless Services Reports Third Quarter Total Revenue Increase of 25 Percent"

37. 10-k filing AT&T year end 1999

38. Richard Martin, Public Relations AT&T re: Los Angeles Times article January 2, 2000

39. ATC119014645 AT&T Broadband Services

40. ATB042000490 Monthly Rebuild Activity Report Monthly Ending December 31, 1999

41. Frank Ianna deposition transcript at pages 163-250

42. Mike Armstrong deposition transcript at pages 65-80, 132-280, 595-601

B. Books

Hybrid Fiber-Optic Coaxial Networks by Ernest Tunmann
How To Design, Build and Implement an Enterprise-Wide, Broadband Hybrid Fiber-Optic Coaxial (HFC) Network that will carry Voice, Data and Multi-Channel, Bi-directional Video and easily interconnect with standard carrier-provided ATM and SONET.

Broadband Hybrid Fiber/Coax Access System Technologies by Winston I. Way
Systematically and thoroughly covers end-t-end broadband hybrid fiber/coax access technologies

Modern Cable Television Technology by Walter Ciciora, James Farmer and David Large
Explains digital cable, analog cable, data on cable, telephone on cable, and headend practices. Features distribution systems, from drops through fiber optics, and covers everything from basic principles to network architectures.

Broadband Cable TV Access Networks by Shlomo Ovadia
Next-generation CATV systems: architecture, protocols, technologies, and applications. Hardware architecture and operation of digital set-top boxes and cable modems.

Video Dialtone Technology by Daniel Minoli
Digital Video over ADSL, HFC, FTTC & ATM. Your complete guide to digital video architectures, services, protocols, products, and markets.

Digital Telephony Over Cable by D.R. Evans
The PacketCable Network enables high-speed simultaneous transmission of digital computer data and telephone voice signals over cable modems and facilitates the widespread deployment of vide and voice internet applications by utilizing cables that are already in place through cable T.V.

Broadband Return Systems For Hybrid Fiber/Coax Cable TV Networks by Donald Raskin & Dean Stoneback
Building profitable, reliable HFC networks. The indispensable guide for cable operators, system designers and suppliers.

Cable Television Proof-of-Performance by Jeffrey L. Thomas
A practical guide to cable TV compliance measurement using a spectrum analyzer.

IP Telephony by Bill Douskalis
The Integration of robust VoIP services

A Practical Guide to Information Systems Process Improvement by Anita Cassidy and Keith Guggenberger
Process management, process improvement, and process reengineering must extend beyond the traditional business areas of Quality, Manufacturing, and Engineering and must enter the area of Information Systems.

The Effective Incident Response Team by Julie Lucas and Brian Moeller
Formulating reactive or preventative operational strategy.

Migrating Legacy Systems by Michael L. Brodie and Michael Stonebraker
Gateways, Interfaces & The Incremental Approach (for CIOs, Technical Managers, and MIS Professionals)

Newton's Telecom Dictionary, 17th edition by Harry Newton
The Official Dictionary of Telecommunications, Networking and the Internet

McGraw-Hill Illustrated Telecom Dictionary, 2nd edition by Jade Clayton
The only fully illustrated telecommunications dictionary anywhere.

The Telecommunications Survival Guide by Pete Moulton and Jason Moultan
Understanding and Applying Telecommunications Technologies to Save Money and Develop New Business.