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April 23, 1997

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, NW, Room 222
Washington, DC 20554

RE: CC Docket No. 96-45 - Universal Service

Dear Mr. Caton:

Attached is a paper that was prepared by Dr. Robert Austin of Austin Communications Education Service, Inc., at the request of the United States Telephone Association (USTA). This paper is a critique of an ex parte presentation to certain members of the FCC's Common Carrier Bureau staff by AT&T and MCI on March 18, 1997.

In accordance with Section 1.1206(a)(1) of the Commission's rules, two copies of this notice are being submitted to the Secretary of the FCC today. Please include it in the public record of the proceeding.

Respectfully submitted,

Porter E. Childers

Porter E. Childers
Executive Director
Legal and Regulatory Affairs

Attachment

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Comments On An *Ex Parte* Presentation By AT&T And MCI

To The FCC Common Carrier Bureau March 18, 1997

Austin Communications Education Services, Inc.

Principal Investigator:

Robert F. Austin, Ph.D.

April 16, 1997

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Introduction

At the request of the United States Telephone Association, Austin Communications Education Services has reviewed several issues related to the FCC CC Docket No. 96-45, also known as the universal service docket. This review included an examination of cost proxy models submitted for evaluation by the FCC: the Benchmark Cost Proxy Model, which was prepared by a consortium of telephone operating companies, and the Hatfield Model, which was prepared by a private engineering company under the sponsorship of AT&T and MCI. The results of our examination have been reported in the *ex parte* filings listed here:

- Hatfield Model, Version 2.2, Release 2 – *ex parte* filing of document dated February 5, 1997.
- Benchmark Cost Proxy Model - *ex parte* filing of document dated February 23, 1997.
- Hatfield Model, Version 3.0/3.1 – *ex parte* filing of document dated March 17, 1997.

On March 18, 1997, representatives of AT&T and MCI made an *ex parte* presentation to members of the FCC's Common Carrier Bureau staff. The essence of this presentation was reported in a written communication from Mr. Richard N. Clarke to Mr. William F. Caton dated March 18, 1997.[1] The report contained hard copy versions of three slide/overhead presentations:

- "Modeling Forward-Looking Economic Costs - Why Hatfield is Superior to Competing Models and Methods" (six pages, 11 slides)
- "Hatfield Model, Release 3" (12 pages, 23 slides)
- "Hatfield Model, Release 3, Why it is Superior to Competing Models and Methods" (five pages, 10 slides)

The filing also included a written discussion of structure sharing (seven pages), a written discussion of corporate overhead costs (two pages) and a set of tables related to the discussion (five pages).

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[1] Correspondence from Mr. Richard N. Clarke, AT&T, to Mr. William F. Caton, Secretary, Federal

Certain matters described in these presentation materials constitute a misrepresentation of both actual and theoretical engineering practice. This misrepresentation serves to distort the true nature of forward-looking network construction costs. This paper is a critique of the engineering content of the presentation.

Communications Commission, dated March 18, 1997.

Structure Sharing – Background

As noted in the Introduction, we have prepared extensive comments for the FCC regarding structure sharing. These comments were filed with the FCC on April 9.[2] For the convenience of readers without access to that document, the relevant discussion in that report is reproduced here as background for later analysis.

Introduction

The Federal-State Joint Board on Universal Service, CC Docket 96-45 ("Joint Board") published its Recommended Decision on November 8, 1996. In that document, the Joint Board specified that the "technology assumed in the model should be the least-cost, most efficient and reasonable technology for providing the supported services that is currently available for purchase."[3] Furthermore, the Joint Board specified that: "All underlying data should be verifiable, engineering assumptions reasonable, and outputs plausible."

While these specifications arguably may be in conflict in some instances, they certainly constitute an endorsement for sharing network construction costs among several companies where feasible. Both models address the subject of structure sharing explicitly in several tables and implicitly in their structure. In brief, the concept assumes that several companies could use some or all support structures in a telephone network simultaneously. For example, in theory several companies could attach aerial cables to a pole.

The number of companies that may attach facilities to a pole depends primarily on the height of the pole, the class of the pole, and the number of pre-existing attachments. The height of the pole is a factor because federal, state, and local laws and ordinances, as well as safety concerns mandate certain minimum clearances over roadways and railroad tracks below the cable spans. These and other parameters, such as the weight of the cable, dictate the minimum height at which users may attach cables to poles.

The same and other regulations prescribe the spacing of cables on a pole. In

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[2] Austin, Robert F., Principal Investigator, "Engineering Evaluation of Cost Proxy Models for Determining Universal Service Support: Hatfield Model Version 3.0/3.1," March 17, 1997, Price Technical Services, Inc. and Austin Communications Education Services, Inc., ex parte filing to the FCC on April 9, 1997.

[3] Federal-State Joint Board on Universal Service, CC Docket 96-45, *Recommended Decision*, November 8, 1996, ("Joint Board Decision"), paragraph 277.

combination, these constraints determine the maximum theoretical number of cables that users may attach. Similarly, the class of the pole, which corresponds to the diameter of the pole (six feet above ground after pole placement), determines the total load that the pole may bear and the support guying required. Pre-existing attachments, by definition, occupy space to the exclusion of newcomers.

It seems reasonable to state those high relative rates of structure sharing would best serve the interests of the Hatfield Model's sponsors. In support of this statement, we note first that a high assumed rate of structure sharing would result in a calculated reduction of the average forward-looking costs of construction, hence a reduced cost for unbundled network elements. This would result in lower network "assembly" or "element leasing" costs (as opposed to construction costs) for the sponsors. In other words, the higher the rate of sharing that the model assumes, the lower the pro rata cost of new network construction that the model will calculate.

Second, a higher rate of proposed structure sharing infers the existence and current availability of a larger amount of structures for immediate use in network build-out by entrants to the market. If Entrant Local Exchange Companies ("ELEC") should decide to reject the pricing of unbundled network elements, they could demand access to this hypothetical structure capacity. If the Incumbent Local Exchange Companies ("ILEC") do not make capacity available, the ELECs could claim that the ILECs were intentionally and anti-competitively withholding this hypothetical capacity.

(Interestingly, in their supplementary Hatfield Model filing, the sponsors stated that: "Present structure owners could use their control of these scarce resources to restrict entry by potential competitors."[4] If the resources are indeed scarce, where is one to find the surplus capacity that the ELECs allege is available?)

Third, the structure sharing rates presented in the model imply that the ILECs have been prodigiously inefficient and profligate in their spending by failing to share structures at the rates recommended by the Hatfield Model sponsors. While this may be a comforting, albeit self-serving, assumption, it also, in most respects, is an unreasonable assumption. During the first 80 years of the life of the telephone industry, there were no CATV companies to share structures. Therefore, the telephone companies did not build structures to share with them.

During the same 80 years, there were no dielectric, fiber optic cable transmission facilities that could safely share a duct or feeder route trenches with power cables. The ILECs shared poles where it was possible, given concerns about

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[4] "AT&T and MCI Submission on the Hatfield Proxy Model," (*Ex Parte* Presentation - Proxy Cost Model Questions, CC Docket 96-45), January 7, 1997, page 20.

induction coordination, by attaching telephone cables to power poles, by organizing joint construction in appropriate areas, and by installing larger poles, under certain circumstances, and leasing capacity to the power companies.

Incorporating Structure Sharing in a Model

The Joint Board's specifications regarding universal service costs are clear and unequivocal. Only forward-looking costs may be considered. The scenario they specify dictates that, for modeling purposes, there are no existing telephone network structures or facilities. The scenario also specifies that models should assume that the locations of the existing wire centers persist. (Although with the benefit of 100 years of hindsight some observers may judge these wire center locations to be less than optimal, their selection for modeling is a neutral assumption: all models will work from the same given location to build new networks. In any event, their locations reflect the distribution of population reasonably well.)

One option for a cost model would be to consider the use of existing facilities placed by other industries. For the most part, the nation's CATV and power networks are in-place and in-service. (The Joint Board quite correctly does not suggest that a model of telephone network construction costs should assume "green fields" for every utility or be predicated on the complete reconstruction or new construction of these other utilities' networks.) If these utilities sized their structures to permit leasing of excess capacity to another company or companies, there might be capacity available for use by a new telephone company. The Hatfield Model does not appear to incorporate such ELEC costs (that is, leasing facilities from utilities other than ILECs), a shortcoming that we recommend for correction in future model releases.

In their supplementary Hatfield Model filing, the sponsors stated that: "It is more than reasonable to assume that, on a forward-looking basis, ... ILECs will be able to recover an increasing portion of their structure costs through joint ownership or rental arrangements."[5] This appears to be an unreasonable assumption, given that the electric companies and CATV companies already have their networks built.

If, on the other hand, the ILECs were to place all new structures for their new, forward-looking network, we must assume they would size them in compliance with the FCC's constraints on the model, including the "least cost" constraint that precludes construction of surplus structure capacity. A design engineer might assume that under some circumstances the true "least cost" might be a shared new construction cost and that the telephone company should build and lease excess new, forward-looking structure capacity to reduce aggregate costs. In this case, the telephone company will face a marketing problem: the networks of

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[5] "AT&T and MCI Submission," page 20.

the other utilities already exist. There are no other companies with whom to share these structures, except, perhaps, a hypothetical ELEC. (We must exclude the cases of new sub-divisions because the guidelines given to the model developers preclude considerations of future growth in demand.)

Practical Considerations

Beyond the philosophical issues associated, there are several tangible practical issues associated with structure sharing that the Hatfield Model ignores. Regarding aerial plant, currently accepted, industry-wide engineering practices dictate minimal use of aerial facilities. This design principal recognizes 1) the higher whole-life costs (including maintenance) of the facilities, 2) the exposure of the aerial facilities to more and greater environmental hazard, and 3) the zoning requirements of many local governments regarding design aesthetics. Consequently, the assumption regarding the mix of aerial, buried and underground plant is untenable. While the model does permit adjustment of this mix, the selection of the defaults shown in the model reflects antiquated thinking about outside plant design. It also obviates the usefulness of the Southern California Joint Pole Committee cited in the supplementary Hatfield Model filing.[6]

Regarding manhole-conduit system use, there are several cable placement problems ignored by the Hatfield Model. For example, there is a significant problem raised in the size of the manhole specified in the model. The model should specify a precast manhole with standard dimensions of 6 feet X 12 feet X 7 feet (excluding the mid-section), as recommended in the AT&T Outside Plant Engineering Handbook. Instead, the model specifies a much smaller Type A handhole with dimensions 4 feet X 6 feet X 7 feet.[7]

A manhole with these dimensions does not provide the capacity suggested by the model as being available for sharing or lease. Indeed, it would be difficult for a manhole with these dimensions to accommodate multiple splices and cable entries as the number of cables and their sizes increase. As confirmed by the AT&T handbook, engineers should only use this manhole for "light, secondary conduit runs or buried cable runs."[8] *This practice serves to reduce the cost of manholes in the model's calculation, and therefore understates the true cost of network construction. More significant to the present discussion, it precludes the volume of sharing assumed by the model.*

Under certain circumstances, regulatory authorities or responsible outside plant

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[6] "AT&T and MCI Submission," page 21.

[7] *Outside Plant Engineering Handbook*, August 1994, AT&T Network Systems Document Number 900-200-318, Winston-Salem, North Carolina (Republished October, 1996 by Lucent Technologies), Section 8. The sponsors of the model cite, as support for this selection, a publication called the National Construction Estimator, 44th edition, page 442.

[8] *Outside Plant Engineering Handbook*, page 8-43, Table "Precast General Use Manholes".

planning design principles dictate the sharing of duct. In these cases, users must make substantial modifications to the model, including changes in the size and price of the manholes and in the number and cost of multiple ducts. Moreover, users would need to incorporate the costs attributable to "proving" the duct and to cable pulling in the duct. Neither cost is evident in the Hatfield Model.

The Hatfield Model does not properly apply additional cost burdens before assuming the split in costs associated with the conduit/direct buried/ aerial applications. There will be an increase in construction placement costs in most cases if trenches or other facilities are shared or jointly occupied. In most cases, a shared trench must be deeper and wider to accommodate the additional utilities that are participating in the shared or common trenching. This is a function of the requirements for minimum separation in horizontal and vertical planes mandated by the governing authorities.

*To expand on this subject, the AT&T Outside Plant Engineering Handbook specifies "**Joint trenching with power facilities should be employed only for distribution cables and service wires, not for feeder or trunk cables**" [emphasis in original publication].*[9] *The same document also specifies the minimum separation distances that engineers must maintain between power and telephone plant to ensure public safety and the integrity of the facilities. The separation distance is 12 inches in most cases. More importantly, however, higher voltage power lines must be placed at a greater depth (for example, 42 inches for voltages over 50,000), which will increase the cost of trenching substantially.*[10] *In addition, some municipalities, counties and parishes require additional protection such as concrete caps, concrete encasement, or steel casings for shared facility use.*

Summary

The principle of "least-cost" dictates that ELECs and ILECs model their networks with facilities of dimensions and capacities suitable for present service rather than future service. Therefore, an ELEC or ILEC probably would perform forward-looking new construction with "least cost" poles that power companies could not share because of the short pole height. In any event, the power and CATV companies probably would not share these "least cost" poles because their systems already exist. The shorter pole size also would mean that ELECs that chose to attach to ILEC-owned poles might encounter difficulty ensuring road clearances at mid-span.

Similarly, the ELECs or ILECs would perform the forward-looking new

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[9] *Outside Plant Engineering Handbook*, page 9-6.

[10] *Outside Plant Engineering Handbook*, page 9-7.

construction using "least cost" manholes and fully occupied ducts. Under these circumstances, users obviously will invoke the ability to modify default values during actual cost studies. However, use of these default values by the sponsors of the Hatfield Model will skew the results of analysis during public discussion. The Hatfield Model's input and structure assumptions are inappropriate to the constraints imposed by reality.

Furthermore, we believe that users of the Hatfield Model should give some consideration to issues of public safety and security. The model does provide for user intervention in the presumed sharing rates. We believe that engineers should use this feature for reasons other than economic considerations. For example, Pacific Bell does not share conduit with gas companies or power companies. The risk of explosion or inadvertent exposure of, or damage to, a power cable is too great to justify the financial savings.

The Hatfield Model Version 3.0/3.1 contradicts itself when assigning percentages to the types of outside plant (that is, aerial, underground, or buried). In the Hatfield Model Version 3.0/3.1 documentation, the authors state that "in downtown urban areas it is frequently necessary to install cable in underground conduit systems, while rural areas may accommodate less expensive aerial or direct-buried plant".[11] *Yet the input table that appears in page 30 of the documentation and the model itself assigns 85% of "downtown urban" areas plant to aerial and only 25% of rural areas to aerial. This could be interpreted as a manipulation of the data designed to reduce total costs. In reality, placing relatively more underground and buried plant in urban areas is the norm due to municipal regulations requiring "out-of-sight" plant. These regulations apply to both feeder and distribution plant.*

The level of structure sharing proposed in the Hatfield Model Version 3.0/3.1 is, in many respects, more unrealistic than that proposed in Version 2.2, Release 2 of the Hatfield Model. The sharing assumptions made in Version 2.2, Release 2 of the Hatfield Model were clearly unrealistic. For example, Version 2.2, Release 2 assumed 33 percent of the aerial plant structure cost would be assigned to the ILEC or ELEC. In other words, the Hatfield Model Version 2.2, Release 2 model assumed that three companies would use a single structure. The Hatfield Model Version 3.0/3.1 assumes an even more unrealistic sharing level of 25 percent. It is absurd to assume that in all situations, all poles will be 40 feet tall and will have four utilities and/or carriers attached, for reasons elaborated elsewhere in this report.

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[11] Hatfield Model Release 3, February 7, 1997, model documentation, pages 27 and 30.

Structure Sharing – The March 18 Presentation

Many statements made in the AT&T/MCI presentation on March 18, 1997 are accurate, while other statements are quite simply wrong. Equally important, the overall impression of the presentation misrepresents reality. This section contains a critique of specific inaccurate statements.

Due to their legacy as rate-of-return regulated monopolies, LECs and other utilities have heretofore had little incentive to share their outside plant structure with other users.[12]

This is not true. The ILECs have had many incentives to share outside plant structures and have done so, as admitted later in the presentation. These incentives include not only reduced construction costs and reduced maintenance costs. The incentives also include the ability to use restricted or limited rights-of-way, widespread legal mandate for "out-of-sight" plant, and speed of construction. The presenters themselves acknowledge the widespread use of rational structure sharing.

Many localities now strongly encourage joint pole usage or trenching operations for conduit and buried facilities as a means of minimizing the unsightliness and/or right-of-way congestion occasioned by multiple poles, or disruptions associated with multiple trenching activities.[13]

This is not true regarding aerial plant. Most municipalities discourage pole usage entirely. In most situations, new pole usage is tolerated only for power lines. Even in these cases, municipalities often dictate minimally-sized poles and encourage all users that can use underground facilities (e.g., telephone and CATV) to do so even in the

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[12] Correspondence from Mr. Richard N. Clarke, AT&T, to Mr. William F. Caton, Secretary, Federal Communications Commission, dated March 18, 1997, "Structure Shares Assigned to Incumbent Local Telephone Companies," page 1.

[13] Clarke, "Structure Shares," page 1.

presence of power poles to prevent the unsightliness and congestion of spaghetti tangles of wires on poles.

Because of these economic and legal incentives, not only has structure sharing recently become more common, but its incidence is likely to accelerate in the future - especially given the Federal Telecommunications Act's requirements for nondiscriminatory access to structure at economic prices.[14]

This statement is misleading. Structure sharing has been common for many years, where it was part of an appropriate solution to technical or financial problems. It became more common when CATV companies arrived and negotiated access. Any future growth will be a function of economic circumstances and will reflect sound financial decision-making.

Because of safety concerns, excess ILEC capacity within a conduit that carries telephone cables can generally be shared only with other low-voltage users, such as cable companies, other telecommunications companies, or with municipalities or private network operators.[15]

This is true, but is ignored later in the AT&T/MCI presentation when the presenters believe this fact is detrimental to their argument.

The Hatfield Model does not assume that conduit is shared because as a forward-looking model of efficient supply, it assumes that a LEC will not overbuild its conduit so as to carry excess capacity available for sharing.[16]

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[14] Clarke, "Structure Shares," page 1.

[15] Clarke, "Structure Shares," page 1.

[16] Clarke, "Structure Shares," page 1.

This appears to preclude the percentage of sharing Hatfield Model 3.1 specifies for underground structures.

Sharing of trenches used for buried cable is already the norm, especially in new housing subdivisions. In the typical case, power companies, cable companies and LECs simply place their facilities in a common trench, and share equally in the costs of trenching, backfilling and surface repair. Gas, water and sewer companies may also occupy the trench in some localities.[17]

There are several problems related to this assumption about trench sharing. For example, as noted by AT&T in its *Outside Plant Engineering Handbook*:

> "Disturbance from magnetic power induction can occur wherever telephone and power lines run parallel for long distances. Plant subject to power induction of more than 300 volts (rms) to ground is considered to be exposed. Although lower voltages may exist as a result of unbalanced power line operation, induced voltages exceeding 300 volts (rms) to ground are most likely to be caused by power line faults."[18]

The rational outside plant engineer who adheres to AT&T's guidelines cannot simply assume long sections of trench sharing.

There also is a problem with the statement concerning cost sharing, which is not true. The *AT&T Outside Plant Engineering Handbook* specifies the following separations of telephone facilities from other structures:[19]

- Power – 3-inches concrete, 4-inches masonry, 12-inches well tamped earth
- Pipes (gas, oil, water) – 6 inches when crossing, 12 inches when parallel
- Power conduit terminated on pole – 90 degrees, preferably 180 degrees
- Railroads – crossing – 50 inches below top of rail
- Street railways – 3 feet below top of rail

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[17] Clarke, "Structure Shares," page 1.

[18] *Outside Plant Engineering Handbook*, page 6-3.

[19] *Outside Plant Engineering Handbook*, pages 8-26 to 8-27.

None of these separations are reflected in the Hatfield Model 3.1.

Aerial facilities offer the most extensive opportunities for sharing... Indeed, the typical pole carries the facilities of at least three potential users - power companies, telephone companies and cable companies.[20]

This is true, but irrelevant. As the presenters noted, most municipalities do not permit aerial cable. Therefore, forward-looking network designers will make very little use of this method of construction. The Hatfield Model 3.1's assumptions about aerial cable placement are illogical and contradictory.

Methods of setting purchase prices and of calculating pole attachment rates generally are prescribed by federal and state regulatory authorities.[21]

Once again, this is irrelevant. No forward-looking network design will include the proportion of aerial plant that the Hatfield Model 3.1's inventors assumed.

Moreover, most local authorities restrict sharply the number of poles that can be placed on any particular right-of-way, thus rendering pole space a scarce resource.[22]

This is further evidence of the irrelevance of aerial plant design in a truly forward-looking model.

The aerial distribution share factors displayed below capture a forward-looking view of the importance of these arrangements.[23]

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[20] Clarke, "Structure Shares," page 1.

[21] Clarke, "Structure Shares," page 2.

[22] Clarke, "Structure Shares," page 2.

[23] Clarke, "Structure Shares," page 2.

This is not true. Forward-looking design will not include the high percentages of aerial plant that the Hatfield Model 3.1's inventors want to assume to ensure an unrealistically low network construction cost.

Since best forward looking practice indicates that structure will be shared among LECs, IXCs, CAPs, cable companies, and other utilities, default structure sharing parameters are assumed to be less than one. Incumbent telephone companies, then, should be expected to bear only a portion of the forward-looking costs of placing structure, with the remainder to be assumed by other users of this structure.[24]

This statement poses two problems. First, as noted on page 12 above, the presenters stated that they did not expect to see conduit sharing for logical reasons. However, the Hatfield Model 3.1 includes such sharing. Second, the other networks already exist. Although it may be comforting to assume a green field for new telephone construction, the other potential sharers cannot be expected to dismantle their existing networks for the convenience of ELEC pricing.

In addition, LEC shares of buried feeder structure are larger than buried distribution structure shares because a LEC's ability to share buried feeder structure with power companies is less over the relatively longer routes that differentiate feeder runs from distribution runs. This is because power companies generally do not share trenches with telephone facilities over distances exceeding 2500 feet.[25]

The presenters implicitly acknowledge the problems of induction coordination, but do not incorporate the problem in a meaningful way in the way in the Hatfield Model 3.1.

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[24] Clarke, "Structure Shares," page 2.

[25] Clarke, "Structure Shares," pages 2-3.

As noted in the overview to this section, aerial facilities (poles) are already a frequently shared form of structure, a fact that can readily be established through direct observation.[26]

This is true, but irrelevant. Aerial cable placement is for the most part an obsolete method of placement, particularly in urban areas. Forward-looking analysis would not include the high percentages of aerial cable used in the Hatfield Model 3.1.

Because a power company commonly needs to use a larger amount of the space on the pole to ensure safe separation between its conductors that carry currents of different voltages (e.g., 440 volt conductors versus 220 volt conductors) and between its wires and the wires of low voltage users, the power company is typically responsible for a larger portion of pole cost than a telephone company.[27]

The power companies will simply charge the ILEC for its contact on the pole, just as it will charge an ELEC for its contact. If either the ILEC or ELEC should choose to use aerial plant, the developers might incorporate this in the Hatfield Model 3.1 much more simply than by making unsustainable assumptions about structure sharing. However, as noted previously, aerial cable placement is for the most part an obsolete method of placement, particularly in urban areas. Forward-looking analysis would not include the high percentages of aerial cable used in the Hatfield Model 3.1.

The proportion of ILEC aerial structure costs recoverable through pole attachment fees is now likely to increase still further as new service providers enter the telecommunications market.[28]

This is not true. First, on a forward-looking basis, ILECs will not place aerial support structures in the proportions assumed by the Hatfield Model 3.1's inventors. Second,

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[26] Clarke, "Structure Shares," page 3.

[27] Clarke, "Structure Shares," page 4.

on an embedded-cost basis, the existing, in-service poles generally would be too small to support multiple additional contacts. Third, the cost contribution made by CATV companies for shared facilities is strictly limited by federal statute (47 U.S.C., paragraph 224). For aerial structures, the current rate of contribution is 7.4% of the pole's annual cost. Thus, even if a CATV firm is sharing a particularly structure with three other companies, the proportion to be paid by the other firms would be higher than 25% each.

HM 3.1 assumes that ILECs install the most commonly placed pole used for joint use, a 40-foot, Class 4 pole.[29]

The veracity of this statement is doubtful. As noted in a previous filing, the Hatfield Model 2.2.2 specified a smaller pole at higher cost, while the Hatfield Model 3.1 specified a 40-foot, class 4 pole. However, the Hatfield Model 3.1 specifies a lower material cost and a lower placement cost for this larger pole than did the previous model. Either Version 3.1 does not actually specify a 40-foot, class 4 pole as claimed in the documentation, or the price is specified incorrectly in the Hatfield Model 3.1's data tables.

Because the Telecommunications Act requires ILECs to provide nondiscriminatory access to structure as a means of promoting local competition, on a forward-looking basis, it is extremely reasonable to expect that ILECs will need, on average, bear as little as 25 percent of the total cost of aerial structure.[30]

Although this is a true statement, it is misleading, for the reasons described in detail above. There is no question that a forward-looking ILEC would share facilities. The logical flaw in the presentation is the assumption that the forward-looking ILEC would

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[28] Clarke, "Structure Shares," page 4.

[29] Clarke, "Structure Shares," page 4.

use the high percentage of aerial plant assumed by the Hatfield Model 3.1's inventors.

Contacts with telephone outside plant engineers, architects and property developers in several states confirm that in new subdivisions, builders typically not only prefer buried plant that is capable of accommodating multiple uses, but they usually dig the trenches at their own expense, and place power, telephone, and CATV cables in the trenches, if the utilities are willing to supply the materials. Thus, many buried structures are available to the LEC at no charge.[31]

If this assertion were true, and the presenters offer no evidence, then the cost of buried structures would be zero. We should therefore assume that all ELECs would prefer buried placement and the model's cost calculations are irrelevant. It would be unnecessary for the ELEC to lease unbundled network elements from an ILEC. This is an absurd, albeit logical, implication of the presenters claim.

Indeed, the true costs of sharing structures are substantial. Even if a trench was provided without charge, there are significant costs associated with coordination of activities, scheduling cable placement and organizing material deliveries. These costs generally outweigh the theoretical cost savings that might result from sharing "free" trenches. The value of engineering and management time must be incorporated in any calculation of true, forward-looking costs.

Because power companies do not need to use a disproportionately large fraction of a trench - in contrast to their disproportionate use of pole space, and because certain buried telephone cables are plowed into the soil rather than placed in trenches, the HM 3.1 assumed LEC share of buried structure generally is greater than of aerial

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[30] Clarke, "Structure Shares," page 5.

[31] Clarke, "Structure Shares," page 5.

structure.[32]

This is not true. Power lines occupy a proportionally larger amount of the trench than low voltage occupants occupy. Note the requirements for separation with concrete or tamped earth cited previously.

Facilities are easily placed next to each other in a trench as shown below.[33]

This is not true. Note the requirements for separation with concrete or tamped earth cited previously.

Underground plant is generally used in more dense areas, where the high cost of pavement restoration makes it attractive to place conduit in the ground to permit subsequent cable reinforcement or replacement, without the need for further excavation. Underground conduit usually is the most expensive investment per foot of structure -- with most of these costs attributable to trenching. For this reason alone, it is the most attractive for sharing.[34]

This is true. However, the comparatively high cost probably is the reason the Hatfield Model 3.1's inventors use such a low proportion of underground plant. Although it certainly would predominate in a truly forward-looking network design (for reasons of congestion, but also for the security of fiber optic cables), the inventors assumed an inappropriately small amount of underground plant.

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[32] Clarke, "Structure Shares," pages 5-6.

[33] Clarke, "Structure Shares," page 6.

[34] Clarke, "Structure Shares," page 7.

Modems – The March 18 Presentation

The eleven slide, six page presentation entitled "Modeling Forward-Looking Economic Costs - Why Hatfield is Superior to Competing Models and Methods" repeats many of the inaccurate statements discussed earlier.[35] It also makes two significant statements regarding long loops that are inaccurate and misleading.

The first misleading statement is: "long loaded loops are extremely uncommon in HM 3.1."[36] However, a substantial number of long loops are implicit in the Hatfield Model 3.1 and are extremely common.

The second misleading statement is: "long loops, engineered with coarse gauge wire and load coils can support V.34 modem data throughput."[37] There are several problems with this statement. First, although the sponsors of the Hatfield Model 3.1 allege that the model allows a user to specify coarse gauge wire, there actually is no mechanism for incorporating the cost in the model.[38] There is not, then, a way of designing a coarse gauge loop.

The second problem is the reference to V.34 modems. Citing a recent article on V.34 modems, the Hatfield Model 3.0/3.1 designers stated:

> *The presence of loading coils on long loops will not inhibit the operation of a properly-implemented V.34 modem. Such modems operate at a maximum speed of 33.6 kbps, although they will "fall back" to somewhat lower rates, e.g., 28.8 kbps or less, under adverse channel characteristics. One may expect that these modems will operate at a rate*

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[35] Correspondence from Mr. Richard N. Clarke, AT&T, to Mr. William F. Caton, Secretary, Federal Communications Commission, dated March 18, 1997, "Modeling Forward-Looking Economic Costs- Why Hatfield is Superior to Competing Models and Methods" (slide presentation).

[36] Clarke, "Modeling " (slide presentation), page 2, slide 4.

[37] Clarke, "Modeling " (slide presentation), page 2, slide 4.

[38] Austin, pages 23-24.

of at least 24 kbps on virtually any loop, including long loaded loops.[39]

As we noted in a previous *ex parte* filing to the FCC Common Carrier Bureau, there are numerous problems with this defense of loaded loops for data transmission. Consider the concatenation of qualifiers used by the sponsors of the Hatfield Model 3.1 in their system documentation: If the modems are "properly-implemented," we "may expect" the modems to operate, albeit at "somewhat lower rates."

> *Without debating the accuracy of this assessment, it is reasonable to observe that no ELEC firm would be willing to accept and pay full price for such a defective circuit when the time comes to purchase network elements. This would be a far more meaningful evaluation of the viability of a long loaded loop.*[40]

Third, V.34 modems do not represent the state of the art for data communications and certainly do not represent an adequate, self-sufficient design criterion for a forward-looking network designer. For example, the week after the publication of the IEEE article cited by the Hatfield Model 3.1's sponsors, the firm U.S. Robotics announced the commercial availability of 56 kbps modems. This renders most of the discussion moot.

Although some of the problems of incorrect loop length calculation were corrected in the latest release of the Hatfield Model 3.1, many problems remain.

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[39] Hatfield Model 3.1 Model Description, page 32, footnote 26, citing Forney, G. David, Jr., Les Brown, M. Vedat Eyuboglu, John L. Moran III, "The V.34 High-Speed Modem Standard," *IEEE Communications Magazine*, December, 1996, p. 28.

[40] Austin, page 23.

Summary

The technical issues raised in the AT&T/MCI presentations reviewed here do not represent accurately the true state of development of the Hatfield Model 3.1. The presentations contain numerous examples of misleading statements and statements that simply are wrong.