COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

Investigation by the Department of Telecommunications and Energy on its own Motion into the Appropriate Pricing, based upon Total Element Long-Run Incremental Costs, for Unbundled Network Elements and Combinations of Unbundled Network Elements, and the Appropriate Avoided Cost Discount for Verizon New England, Inc. d/b/a Verizon Massachusetts' Resale Services in the Commonwealth of Massachusetts	D.T.E. 01-20

SURREBUTTAL TESTIMONY OF JOHN C. DONOVAN

ON BEHALF OF AT&T

NON-PROPRIETARY VERSION

December 17, 2001

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EXHIBITS

JCD-1	Duplicate copy of Curriculum Vitae filed with Direct Testimony
JCD-4	Mr. Gansert Was Unable to Cite One Page of Verizon's 12,000 Pages of Outside Plant Guidelines Violated by the HAI Model
JCD-5	Tabulation of Verizon *Distribution Area Documentation Records*
JCD-6	Cable Foreman Magazine Article: When Quickness Counts: Verizon Sees 8100-Pair SAI as a Major Labor Saver
JCD-7	Selected Verizon *Distribution Area Documentation Records*
JCD-8	Verizon-MA Cost Study: Subsection 5.7 DLC Electronics – Remote End
JCD-9	Alcatel Product Information Sheets on Ease of Installing Remote Terminals
JCD-10	Documented Personal Purchase of DLC Remote Terminal Channel Card
JCD-11	Verizon Outside Plant Practices: Economic Fill At Relief

I. INTRODUCTION AND SUMMARY.

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is John C. Donovan and my business address is 11 Osborne Road, Garden City, New York 11530. I am the President of Telecom Visions, Inc., currently providing telecommunications consulting services to AT&T and WorldCom concerning outside plant infrastructure design and construction, as well as costing aspects of the local loop. I also provide services to a number of other companies. I am a professional outside plant engineer by trade.

Q. ARE YOU THE SAME JOHN C. DONOVAN WHO PRESENTED DIRECT AND REBUTTAL TESTIMONY IN THIS CASE?

A. Yes. My qualifications were listed in my *Direct Testimony* in this case, and my Curriculum Vitae was included as Exhibit JCD-1 to that testimony. A duplicate copy of Exhibit JCD-1 is attached to this prefiled surrebuttal testimony

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?

A. The purpose of my testimony is to respond to the Verizon rebuttal testimony of Joseph Gansert and Timothy J. Tardiff filed on July 18, 2001 in this proceeding.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. Following this introductory section, my testimony is organized in the following fashion:

Section II.	**The HAI Model Clusters Customers in a Reasonable Manner.**
Section III.	**The HAI Model Builds Plenty of Spare Pairs.**
Section IV.	**The HAI Model Properly Models Facilities.**
Section V.	**Mr. Gansert and Dr. Tardiff Make False Claims About Input Values in the HAI Model.**

Section VI. Dr. Tardiff and Mr. Gansert Proffer Inaccurate and Misleading Comments About Pole Costs.

Section VII. Dr. Tardiff and Mr. Gansert Proffer Inaccurate and Misleading Comments about Digital Loop Carrier Costs.

Section VIII. Conclusions.

Q. PLEASE SUMMARIZE YOUR SURREBUTTAL TESTIMONY.

A. Mr. Gansert's ad hominem attack of me and my Direct Testimony fails the tests of logic and fails the tests of fact. Where opportunities presented themselves for Mr. Gansert to back up his baseless allegations that the HAI model is based on incorrect engineering practice, he failed to submit one shred of evidence. This failure to provide evidence is particularly striking in the face of the fact that Verizon was compelled to produce over 12,000 pages of outside plant practices in response to discovery requests by AT&T (see Exhibit JCD-4). Yet Mr. Gansert could find no evidence in those volumes of practices to support his points.

In fact, Mr. Gansert is not a qualified outside plant engineer; his experience has been at a network staff level. This Department should ignore all of Mr. Gansert's ramblings, and recognize that AT&T's position in this proceeding is grounded on generally accepted outside plant engineering practices, as confirmed by an outside plant engineer who wrote NYNEX's outside plant methods and procedures, and was eventually in charge of all of its outside plant methods writers (*i.e.*, me).

Since Mr. Gansert cannot cite a single page of Verizon's own distribution engineering practices (which it claims are consistent with industry practice – see Verizon's Response to WCOM-VZ 4-4), then the Department should properly

conclude that I am an expert on industry outside plant practices, and that the HAI model conforms to those industry practices – which, in fact it does.

II. THE HAI MODEL CLUSTERS CUSTOMERS IN A REASONABLE MANNER.

Q. MR. GANSERT CLAIMS THAT THE METHOD OF CLUSTERING CUSTOMER LOCATIONS IN THE HAI MODEL VIOLATES ENGINEERING STANDARDS. IS THAT A VALID CRITICISM?

A. No. Mr. Gansert was unable to cite a single page from its more than 12,000 pages of outside plant practices to support his specious allegations. On the other hand, neither Verizon's cost study nor the HAI Model purports to create engineering work prints drawn to scale. This proceeding is about determining forward looking costs of a network to serve current demand. The difference between the two modeling approaches is that the HAI model reflects correct outside plant engineering practices, while the Verizon model makes no attempt to do so at all. The Verizon cost study samples a few embedded base loops, then kludges together an average loop that represents no actual loop, embedded or otherwise, and then calls all loops the same for pricing purposes. In marked contrast to Verizon's backward looking and superficial approach, the HAI Model follows generally accepted engineering principles in modeling every working line in the network, while allowing for an abundance of extra spare loops for administrative spares and even quite a bit of future growth. Mr. Gansert makes the absurd claim that:

> The creation of a distribution area to serve real customers is not an exercise in "clustering." Rather, one must identify where actual customers (and potential customers) are located, and then define a physical area to be served by a specific feeder interface.

> A distribution area must be treated as a uniform entity [with uniform transmission loss characteristics] for purposes of providing service. The Hatfield Model does not do this.[1]

That certainly looks like clustering to me. As an outside plant engineer with many years of real-world experience, I know that that the process of defining a distribution area as described by Mr. Gansert is in fact a process of identifying a cluster of customers that can efficiently be served in a single distribution area. That is exactly what the clustering process reflected in the HAI model does, and that clustering process is completely consistent with and indeed mirrors proper outside plant engineering practices.

In addition, the HAI Model certainly does define each cluster to have uniform transmission characteristics, and certainly does treat it as a uniform entity. Mr. Gansert's claim to the contrary is unsupported and is simply wrong. Both Mr. Gansert and Mr. Tardiff attempt to mislead this Department into thinking that the HAI Model is wrong because it clusters actual customer locations into distribution areas with uniform transmission characteristics, and that it does not conform to generally accepted outside plant engineering practices. Engineers cluster customers into Distribution Areas, and so does the HAI Model. Verizon presents no evidence to the contrary – no copies of generally accepted outside plant engineering practices, although they claim to have thousands of pages of such – and then attempts to divert attention by claiming that an engineer's clustering is OK, but the HAI Model's clustering is not. This argument fails all tests of reasonableness. In fact, Mr. Gansert claims that he

[1] Rebuttal Testimony of Joseph Gansert, July 18, 2001 ("Gansert Rebuttal"), pg. 5.

doesn't even know whether the HAI Model clusters realistic distributions areas or not.[2]

III. THE HAI MODEL BUILDS PLENTY OF SPARE PAIRS.

Q. DO YOU AGREE WITH CLAIMS MADE BY DR. TARDIFF AND MR. GANSERT THAT THE HAI MODEL DOES NOT ACCOUNT FOR GROWTH?

A. No. Dr. Tardiff claims that:

> The Hatfield Model produces … a network that will never experience any growth, customer churn, or fluctuations in demand.[3]

This statement is false. As I stated in my Direct Testimony:

> In the spirit of conservatism, AT&T and WorldCom have used cable sizing factors that achieve distribution cable initial utilization percentages of only 48.3 percent, which provides **more** than enough spare facilities to last for the **entire** service life of the plant.[4]

Given such a clear statement in my Direct Testimony, I can only conclude that Dr. Tardiff is attempting to mislead this Department into thinking that such a low achieved fill rate provides no spare pairs for any growth, customer churn, or fluctuations in demand. In fact, Dr. Tardiff does not believe that even enough spares for the entire service life of the cable plant, which the HAI model ends up producing, would be sufficient. The HAI Model produces plenty of spare pairs.

Mr. Gansert claims that the HAI Model is wrong because an engineer sizes cable plant not on what is there, but on what might be there in the future. Says Mr. Gansert:

> **[C]urrent demand has no bearing on distribution design.**

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[2] Gansert Testimony, pg. 5, "Whether this abstract process models the current distribution of demand, or realistic distribution areas, is difficult, if not impossible, to verify."

[3] Rebuttal Testimony of Timothy J. Tardiff, July 18, 2001 ("Tardiff Rebuttal"), pg. 6.

[4] Direct Testimony of John C. Donovan, May 1, 2001 ("Donovan Direct"), pg. 20.

> New distribution cable in residential areas must often be constructed long before the residential or business units are built. Because there are no existing customers, the OSP engineer must size the cable to accommodate all potential units in the area.[5]

Current demand has no bearing on distribution design? That makes no sense. Mr. Gansert provides no evidence of what I believe are non-existent *"guidelines"* that provide a basis for his claim that engineers must always make up a guess as to how many unknown potential living units might exist. Perhaps this is why Mr. Gansert's unsubstantiated claims about Verizon's extremely low embedded fill factors occur, based on the premise that its engineers are scattering never-to-be-used spare pairs all over the turf.

Frankly, I would fire an engineer who repeatedly built cable plant throughout vacant land. I teach engineers to require new builders to put up a bond, and then to build distribution plant incrementally to care for the possibility that a builder might go bankrupt after building the first 30 or 50 homes in a 100 home development. In any case, the example presented in Mr. Gansert's rebuttal testimony is so atypical as being unworthy of merit in this proceeding. His argument is illogical because if I follow it to its natural modeling conclusion, then I would make cables in existing housing developments larger to care for as yet un-built housing developments somewhere else in the Commonwealth. Mr. Gansert believes that:

> It is uneconomic and impractical to incrementally enlarge distribution cable as development occurs.[6]

But this just does not make sense.

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[5] Gansert Rebuttal, pgs. 6-7.

[6] Gansert Rebuttal, pg. 7.

Q. DO YOU AGREE WITH MR. GANSERT THAT THE HAI MODEL DOES NOT CARE FOR CUSTOMER CHURN AND FLUCTUATION IN DEMAND?

A. No. Mr. Gansert states that:

> Verizon MA experiences an access line disconnect/connection rate of 20-25%.[7]

This is potentially a very misleading statement. First of all, Mr. Gansert leaves the Department in the dark as to what this measurement represents. This measurement, if true (although no evidence was presented by Mr. Gansert to substantiate this number), indicates that of all telephone lines in service, between 20% and 25% of them experience one case of being disconnected and reconnected during the course of one year. What is important is how long the telephone line was idle before being reconnected. This interval can be as short as part of a day, since people normally go to *Closing* on the sale of a house, and move into their home wanting telephone service the same day. Therefore, a telephone line simply undergoes a transformation of paying customer which primarily involves only the billing record. It would be imprudent to build an extra POTS line to a home to deliver dial tone, knowing that the prior occupant has already scheduled a disconnection the day of the house *Closing*. It has nothing to do with physical facilities. In any case, the pure definition of the measurement is that the line was both disconnected and reconnected within the same year. Once again, these idle assigned pairs are well cared for in the HAI Model's Cable Sizing Factors, and normally represent a very small percentage of total facilities. As Mr. Baranowski explains in his Rebuttal Testimony, an idle line or vacancy rate of 5% is

[7] *Ibid*, pg. 7.

reasonable. Mr. Gansert's claim of a 1990 Census survey vacancy rate of 9% is completely unsupported by submitted evidence.[8] I believe a 5% vacancy rate is much more realistic, and in any case such a rate would still be more than cared for within the HAI Model's achieved distribution fill of 48.3%, considering the fact that distribution costs involve approximately 80% of what is involved in the local loop.

Q. IS THERE ANY MERIT TO MR. GANSERT'S CLAIM THAT THE HAI MODEL DOES NOT PRODUCE SUFFICIENT DISTRIBUTION CABLE LENGTH BECAUSE THE FILL FACTORS ARE TOO LOW?

A. No. Mr. Gansert makes the specious argument that:

> [B]y distributing current demand across the distribution area, rather than potential demand, means that the Hatfield Model is likely to understate the cable requirements of an efficient distribution plant. Put simply, there will not be enough cable to reach all of the potential, or currently vacant, customer locations because the Hatfield Model does not account for their existence.[9]

Once again, the fill factor argument that the cables are not large enough has nothing to do with how long they are. The HAI Model covers the entire cluster with sufficient cable structure to reach all customers, and the cables are sized large enough to have plenty of spare pairs.

Q. IS MR. GANSERT CORRECT IN CLAIMING THAT THE HAI "TARGET" FILL IS UNACHIEVABLE?

A. No, nothing could be farther from the truth. A cable sizing factor is a tool, not a target. Although "target fill" is not a technical *term of the art*, if that term were to be interpreted as an achieved fill then the HAI Model produces an achieved fill of 48.3%, not 75%. In addition, Mr. Gansert's claim that my testimony is

[8] In response to Data Request DTE-VZ 1-6, Verizon responded that the preliminary 2000 data was already down to 6.8%.

[9] Gansert Rebuttal, pg. 8.

inconsistent reveals either an arithmetic mistake on his part, or more likely, and upon very careful reading, an intent to mislead the Department. He claims that the HAI Model's use of 75% results in a "1.33 pairs per existing working line," which Mr. Gansert claims is in direct conflict with my testimony of 1.5 to 2 pairs per living unit. Assuming an average working lines to living unit ratio of 1.2, as is the case in Massachusetts, there is no discrepancy since 1.2 lines per living unit divided by 75% equals 1.6 lines per living unit, exactly as I claim, and exactly as Mr. Baranowski describes in his Rebuttal Testimony. To equate the HAI Cable Sizing Factor to a pairs per living unit basis shows that the HAI Model is using a 1.6 pairs per living unit ratio before upsizing due to cable size modularity. The end result is a 48.3% distribution cable achieved fill, or an actual achieved distribution cable sizing of 2.48 pairs per living unit actually built or costed by the HAI Model.[10]

Q. IS THERE A BLATANT INCONSISTENCY IN MR. GANSERT'S TESTIMONY REGARDING THE TAPERING OF BACKBONE CABLES?

A. Yes. Mr. Gansert states that:

> [T]he Model then arbitrarily reduces the resulting backbone cable[11] investment by 35% to account for "tapering."[12]

In his Q & A, Mr. Gansert lectures about the tapering and branching of cables.

> As they [backbone cables] pass logical groupings of customers (e.g., a local street), the cables are branched and tapered.[13]

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[10] 1.2 working lines per living unit ÷ 0.483 achieved distribution cable fill = 2.48 pairs per living unit.

[11] A Distribution Area normally includes a backbone cable that runs down a main street, with side branches off each side of the backbone cable.

[12] Gansert Rebuttal, pg. 10.

[13] Gansert Rebuttal, pg. 11.

For example, following Mr. Gansert's explanation, a backbone cable would pass local street side legs and be tapered from 200 pairs to 100 pairs to 50 pairs to 25 pairs. The HAI Model takes an extremely conservative approach, assuming that rather than multiple taper points, the cable would only be tapered in half once (rather than three times)[14], and conservatively reduces cost by only 35% (i.e., rather than 50%).

Mr. Gansert recognizes that backbone cables are tapered, and the HAI Model recognizes that backbone cables are tapered. The HAI model approach is in fact more expensive than the way backbone cables would be tapered in most settings. There is no valid rebuttal here.

Q. IS MR. GANSERT'S ASSERTION THAT THE HAI MODEL DOES NOT ACCOUNT FOR STRANDED INVESTMENT CORRECT?

A. Absolutely not. Whereas Mr. Gansert claims there should be approximately 10% stranded investment, the HAI level of stranded investment is actually 75% minus 48.3%, or 26.7%. There is no valid argument here either.

Q. WHAT COMMENTS DO YOU HAVE REGARDING MR. GANSERT'S DISCUSSION OF STATISTICAL PRINCIPLES UNDERLYING PROPER DISTRIBUTION CABLE DESIGN?

A. Mr. Gansert spends several pages berating my purported lack of understanding of the "statistical principles underlying proper distribution cable design."[15] To the

[14] In fact, standard industry practice calls for engineering judgment in limiting the number of taper points so that four different cable sizes are not spliced together along a 4-block backbone, as Mr. Gansert believes should occur. In fact, in response to Data Request WCOM 4-1, Verizon responds, "Cables are tapered at points where the engineer determines. Considerations include the cost of labor to splice the cable vs. the cost of material to place a larger cable, ease of construction, intersections, field side to road side construction, road crossings, etc." This is exactly why the HAI model runs extra-oversized backbone cable, which it tapers only once, rather than using ever decreasing cable sizes along the distribution backbone.

[15] Gansert Rebuttal, pg. 11.

best of my knowledge neither Mr. Gansert nor I claim to be statisticians; hence this criticism from someone who has never drawn an outside plant engineering job is a bit ironic. Mr. Gansert goes on with the following bold statement:

> Dissatisfied with his initial assumption of 50% distribution utilization, Mr. Donovan claims that this figure will increase to 100% as the "plant ages."[16]

Besides speculation as to my feelings regarding satisfaction, Mr. Gansert's subsequent diatribe is meaningless, unnecessarily complicated, and confusing.

Cable is placed, initial service is provided, and the amount of service and hence cable utilization goes up over time. It is as simple as that. For the purposes of cost modeling, we do not need to know how old the neighborhood is, as Mr. Gansert hypothesizes. If we did, and as only Verizon has the wherewithal to know, utilization could be driven much higher than the 48.3% outcome of the HAI Model.

Q. WHAT DO YOU CONCLUDE ABOUT MR. GANSERT'S REBUTTAL REGARDING CABLE UTILIZATION OR FILL FACTORS?

A. I believe Mr. Gansert makes much ado about nothing. The HAI Model is very conservative, and produces far more cable pairs than is needed to provide current service. If anything, much higher Cable Sizing Factors – and thus much lower loop rates – could readily be justified. As for Mr. Gansert's position, he clearly wants to push for higher costs. He thinks that even 50% utilization is too high:

> Well-designed distribution plant should never approach 100% utilization (i.e., where there is no excess capacity for growth), or even 50% utilization (i.e., where local demand concentrations can be accommodated only at considerable expense or hardship).[17]

[16] *Ibid*., pg. 12.

[17] *Ibid*., pg. 14.

Mr. Gansert is way off the mark. By his statements he advocates never achieving more that 50% utilization over the entire service life of the outside plant facility. Since the ratepayers in the Commonwealth of Massachusetts would pay for any such doubling of facilities, I think Massachusetts consumers might think of demanding a "buy one, get one free" policy out of Verizon for local loop facilities. In fact, any customer that continues to maintain one residence line from Verizon should be allowed to order a second line from a CLEC, at no UNE loop cost to the CLEC, since the consumer has already paid for 2 lines per household in the basic rate structure that would result if Mr. Gansert were believed.

IV. THE HAI MODEL PROPERLY MODELS FACILITIES.

Q. DO YOU AGREE WITH MR. GANSERT THAT THE HAI MODEL DOES NOT FOLLOW FUNDAMENTAL DESIGN PRACTICES IN SIZING DISTRIBUTION AREAS?

A. No. Mr. Gansert proclaims that:

> [T]he Hatfield Model ignores proven OSP engineering concepts.
>
> The Hatfield Model's feeder methodology is based on the premise that Carrier Serving Areas ("CSAs") and distribution areas should be as large as permitted by transmission and equipment size limits. This is contrary to the engineering logic that drives economically efficient serving area selection …[T]he feeder/distribution interface point should be located as far into the local serving area as possible. … [T]he objective is to achieve the minimum size distribution area that will produce a reasonable fill of the feeder facilities.[18]

These are all speculative musings that have no basis in fact, in logic, or in Mr. Gansert's self-proclaimed engineering rules.

It is no wonder that Mr. Gansert is unable to provide a citation to any industry established practice that agrees with his assertions – he is simply wrong.

[18] *Ibid*., pages 15-16.

After three decades of hands-on experience, I can report that larger distribution areas are possible because larger SAI hardware is being produced by vendors, and that the efficient placement of SAIs has changed only slightly as the result of introducing fiber feeder. Economies of scale still dictate that bigger is better – bigger is more efficient when it comes to aggregating demand. That is true whether it is in assembling airline passengers onto high capacity routes using a hub-and-spoke route design, or in aggregating long distance demand into tandem switches, or in aggregating local telephone service into a fiber fed DLC system.

Q. WHERE SHOULD SAI'S BE PLACED WITHIN A SERVING AREA FOR COPPER FED FEEDER ROUTES?

A. The standard outside plant engineering rule of thumb that I learned 30 years ago in an "all copper" feeder world, of which Mr. Gansert is obviously unaware, was that the engineer should seek to place the SAI 1/4 to 1/3 of the way into the Distribution Area. This balanced the additional cost of the heavy, thick copper feeder cable against the cost of distribution cable structures.

Q. WHERE SHOULD SAI'S BE PLACED WITHIN A SERVING AREA FOR FIBER FED DLC FEEDER ROUTES?

A. With the advent of fiber fed DLC systems, there is a new trade-off. Since the small fiber-count feeder cable is less expensive than a thick copper feeder cable, then it makes sense in fiber fed Distribution Areas to place the SAI in the centroid of the Distribution Area, rather than at a point closer to the central office, as was the case with copper feeder cable. This is true because placement of the SAI in the centroid of the Distribution Area minimizes the length and size of the copper distribution backbone cable.

For the sake of simplicity, the HAI Model places all SAIs at the centroid of all Distribution Area clusters, even though this results in costs for copper feeder loops that are somewhat higher than they should be. In sum, this is yet another example of how the HAI model results in conservatively high costs, and how the true TELRIC cost should be lower than the HAI estimates.

Q. WHY DO SMALLEST POSSIBLE DISTRIBUTION AREAS MAKE NO SENSE?

A. Mr. Gansert is completely wrong in his logic that "the objective is to achieve the minimum size distribution area," and that is why he cannot find a cite to an established engineering practice that supports him. To see why, let's take the argument to the extreme. The minimum size distribution area would be Fiber To The Home or Fiber To The Curb, *i.e.* a distribution area consisting of feeder cable running directly from the central office to a single customer location or a single drop terminal. We all know that that is still not an economic alternative. Even a simple look at Verizon's own cost model in this proceeding shows that the DLC cost per line is lowest in the largest sized DLC system Remote Terminals. The issue is not the cost of the fiber cable. That is only a dollar or so per foot for smaller sizes. The huge cost is in the electronics associated with the DLC equipment. Therefore, those network nodes should be as large as possible, along with their accompanying SAIs.

Q. DID VERIZON'S ENGINEERING SURVEY DATA REFLECT SMALLER SAI'S OR A TREND BY VERIZON ENGINEERS TO AGGREGATE EXISTING SERVING AREAS INTO LARGER SERVING AREAS?

A. Although Verizon was originally asked to provide all workpapers involved in its alleged engineering survey of VZ-MA feeder routes, Verizon ultimately selected

only some of those workpapers involving several routes chosen by Verizon for discovery production. I have reviewed the limited documentation that Verizon finally did produce. They reveal a definite trend, by Verizon's own engineers, to consolidate small serving areas into larger serving areas, which I would expect to see, but which is in direct contradiction to Mr. Gansert's claims in testimony. Verizon produced several hundred *Distribution Area Documentation Records*. This type of record is created by a Verizon planning engineer to document the characteristics of existing Distribution Areas, and to indicate the most efficient plan for making any changes to the configuration of that Distribution Area the next time a construction job is required.

Q. DO YOU HAVE ANY SPECIFIC EXAMPLES OF VERIZON'S DOCUMENTATION REVEALING PLANS TO CONSOLIDATE SMALLER SERVING AREAS INTO LARGER SERVING AREAS?

A. Yes. In order to retain confidentiality of records, I will not identify a particular central office, address, or other distinguishing characteristic. However, I have tabulated excerpts from Verizon *Distribution Area Documentation Records* in Proprietary Exhibit JCD-5. Several redacted examples are as follows:

Verizon Outside Plant Engineers Calls for Consolidating All These Distribution Areas[19]	
DA No.	**Notation**
x40110	**SAI X: Ultimate feed for DA x40110 - Also feeds DA's x40310, x40510, x40910, x40920, x50110, x50510, x60110, x60510.**
x40310	**SAI X: Ultimate feed for DA x40110 - Also feeds DA's x40310, x40510, x40910, x40920, x50110, x50510, x60110, x60510.**
x40510	**SAI X: Ultimate feed for DA x40110 - Also feeds DA's x40310, x40510, x40910, x40920, x50110, x50510, x60110, x60510.**
x40910	**SAI X: Ultimate feed for DA x40110 - Also feeds DA's x40310, x40510, x40910, x40920, x50110, x50510, x60110, x60510.**
x40920	**SAI X: Ultimate feed for DA x40110 - Also feeds DA's x40310, x40510, x40910, x40920, x50110, x50510, x60110, x60510.**
x50110	**SAI X: Ultimate feed for DA x40110 - Also feeds DA's x40310, x40510, x40910, x40920, x50110, x50510, x60110, x60510.**
x50510	**SAI X: Ultimate feed for DA x40110 - Also feeds DA's x40310, x40510, x40910, x40920, x50110, x50510, x60110, x60510.**
x60110	**SAI X: Ultimate feed for DA x40110 - Also feeds DA's x40310, x40510, x40910, x40920, x50110, x50510, x60110, x60510.**
x60510	**SAI X: Ultimate feed for DA x40110 - Also feeds DA's x40310, x40510, x40910, x40920, x50110, x50510, x60110, x60510.**

Verizon Outside Plant Engineers Calls for Consolidating All These Distribution Areas[20]	
DA No.	**Notation**
x41310	**SAI Y: Ultimate feed for DA x41310 - Also feeds DA's x41510, x41520, x60310.**
x41510	**SAI Y: Ultimate feed for DA x41310 - Also feeds DA's x41510, x41520, x60310.**
x41520	**SAI Y: Ultimate feed for DA x41310 - Also feeds DA's x41510, x41520, x60310.**
x60310	**SAI Y: Ultimate feed for DA x41310 - Also feeds DA's x41510, x41520, x60310.**

Verizon Outside Plant Engineers Calls for Consolidating All These Distribution Areas[21]	
DA No.	**Notation**
x40910	**SAI Z: Ultimate feed for DA x40910 - Also feeds DA's x41210, x41110.**
x41210	**SAI Z: Ultimate feed for DA x40910 - Also feeds DA's x41210, x41110.**
x41110	**SAI Z: Ultimate feed for DA x40910 - Also feeds DA's x41210, x41110.**

There are many examples of such planned consolidation to create larger serving areas in a forward-looking migration path from existing, inefficient small clusters to more efficient larger clusters.

[19] See Page 6 of Exhibit JCD-5.

[20] *Ibid.*

[21] *Ibid.*

Q. DO YOU HAVE ANY EVIDENCE THAT, DESPITE MR. GANSERT'S CLAIMS, VERIZON BELIEVES BIGGER SAI'S ARE BETTER THAN SMALLER SAI'S?

A. Yes. Despite Mr. Gansert's claim to the contrary, Verizon actually believes that bigger SAIs are more efficient than smaller SAIs – which makes logical sense. I have included a magazine article as Exhibit JCD-6 that quotes New England Telephone (at Page 14) as stating that they are very excited about using a new extra-large 8400-line SAI.

> "Doing it this way eliminates the guesswork in service provisioning," says Johnson. He sees the 8100-pair SAI as "a major labor-savor for us."

This is a quote from a Verizon "engineering specialist" who was project manager for an actual outside plant engineering job described in this article in the trade journal *Cable Foreman*.

Q. WHAT CONCLUSIONS DO YOU MAKE ABOUT MR. GANSERT'S CLAIM THAT SMALLER DISTRIBUTION AREAS ARE BETTER THAN LARGER ONES?

A. Mr. Gansert's position that the objective is to achieve the minimum size distribution area is ludicrous, cannot be supported by industry opinion, and is not even believed by practicing engineers at Verizon. His testimony is both factually and logically unsound.

Q. DR. TARDIFF AND MR. GANSERT CLAIM THAT THE HAI MODEL UNDERESTIMATES SAI INVESTMENT. DO YOU AGREE?

A. No. Dr. Tardiff's testimony claims that the HAI Model improperly sizes SAIs. He is wrong on two grounds: (1) he makes errors in simple arithmetic, and (2) he leaps to incorrect conclusions regarding the way a good outside plant engineer would size an SAI. Dr. Tardiff correctly states that SAI sizes are based on 3.5 times the number of households, plus 2 times the number of miscellaneous lines.

Standard industry practice tells an engineer to build enough terminations on the Distribution side of the SAI to allow for 2 pairs per living unit, and enough terminations on the Feeder side of the SAI to allow for 1.5 pairs per living unit; hence the multiplier of 3.5. In addition, the engineer is taught to add enough terminations on the Distribution side of the SAI and enough terminations on the Feeder side of the SAI to terminate non-residential lines in service; hence the multiplier of 2 times the number of miscellaneous lines.[22] I have examined every cluster in the HM5.2a Model produced in this proceeding, and in every case the SAI is properly sized based on the above formula.

Q. DOES DR. TARDIFF MISCALULATE THE NUMBER OF REQUIRED LINES TO BE TERMINATED IN A PROPERLY ENGINEERED SAI?

A. Yes. Dr. Tardiff's page 46 example (3.5 x 304 + 2 x 602 = 2,226) has an arithmetic error. The correct answer is 2,268 not 2,226. Also, on page 47, applying an 80 percent feeder sizing factor to the 947 lines required would result in 1,184 lines (947 ÷ 0.80 = 1,184), not 1,330 lines as Dr. Tardiff mistakenly states in his testimony. The first calculation, regardless of the correction, still properly creates a 2400-line SAI to terminate 947 working lines terminated on Feeder binding posts and Distribution binding posts in the SAI cabinet.

The rest of Dr. Tardiff's analysis is flawed because he is not an outside plant engineer and does not understand why the generally accepted outside plant engineering practice works as it does. The HAI Model correctly calculates

[22] Exhibit JCD-7 contains three examples of *Distribution Area Document Records* allegedly utilized in Verizon's loop study. A part of that record is used to plan the number of feeder pairs to be terminated at the SAI. As can be observed, the engineer multiplies the number of ultimate residential living units ("Ult Units") by 1.5 and adds the number of miscellaneous non-residential pairs ("Misc Pr") to arrive at the total feeder pairs ("Total Pr") to be terminated on the SAI.

Distribution cable fill based on the number of working lines compared to the backbone cable sizes that appear at the SAI splice point. However, just because oversized cables appear at the splice point does not mean that dead pairs created by jumping to the next larger cable size (frequently called "breakage" because the break point between cable sizes are so large) are all terminated. In fact, it makes no sense to terminate dead pairs that only go down the backbone but do not go down the side distribution legs. They are just there because the next size backbone cable sheath was needed. When engineers use the 2.0 SAI Distribution Terminations per household rule, they are using a 50% termination sizing factor per household, or in this case an achieved residential line termination fill of 56.7% (345 residence lines per 608 Distribution Terminations), and to that add the miscellaneous line terminations. Since feeder cables may be reinforced on 2-5 year intervals, a lower fill factor is used for Feeder Terminations. When engineers use the 1.5 SAI Feeder Terminations per household rule, they are using a 66.7% termination factor per household, plus Feeder Terminations sufficient for the miscellaneous lines.

The bottom line is as follows: In the example given by Dr. Tardiff, the 947 working lines (947 feeder pairs connected to 947 distribution pairs) are in an SAI designed to terminate 1,210 distribution pairs and 1,058 feeder pairs, upsized to the next larger SAI of 2,400 lines. The HAI Model follows generally accepted outside plant engineering practice, which is the same as Verizon's outside plant SAI engineering practice – and the calculations in the model are correct.

Q. HOW DO YOU RESPOND TO MR. GANSERT'S CRITICISMS REGARDING SAI COSTS?

A. At page 16 of his rebuttal testimony, Mr. Gansert states, "The current Hatfield Model (sic.) implies an average distribution area of about 1,100 lines, and an **average SAI** capable of terminating about **4,000** (feeder plus distribution)" (emphasis added). In the next immediate Q&A, Mr. Gansert states, "The **average SAI** produced by the Hatfield Model (sic) in Massachusetts is capable of terminating about **3,500** lines" (emphasis added). Besides the error of comparing averages to averages, and the fact that Mr. Gansert cannot decide whether the average SAI size produced by the model is **4,000** line terminations or **3,500** line terminations, the argument fails even the simplest test of common sense.

Regardless of the average to average *non sequitur*, terminating 1,100 lines consisting of 1,100 feeder terminations cross connected to 1,100 distribution terminations is still well within the capacity of an SAI containing **4,000** terminations or even **3,500** terminations. Mr. Gansert's testimony is confusing and unenlightening, and certainly does not point to any error in the HAI 5.2a-MA model.

Q. WHAT DO YOU CONCLUDE ABOUT DR. TARDIFF'S AND MR. GANSERT'S CLAIMS THAT SAI COSTS ARE IN ERROR?

A. Both Dr. Tardiff's and Mr. Gansert's testimony claiming that SAI costs are in error are wrong due to miscalculations and lack of understanding about generally accepted industry and Verizon outside plant engineering practice. Dr. Tardiff's claim that SAIs used for 3.2 million of approximately 5 million lines are inappropriately sized and costed is completely wrong. I have checked each

cluster and the sizing is correct in 100% of the cases. The Department should reject Verizon's testimony on this point.

V. MR. GANSERT AND DR. TARDIFF MAKE FALSE CLAIMS ABOUT INPUT VALUES IN THE HAI MODEL.

Q. DOES MR. GANSERT MAKE FALSE CLAIMS REGARDING HAI MODEL INPUT VALUES IN HIS REBUTTAL TESTIMONY?

A. Yes. Mr. Gansert has presented similar testimony in other states, which we have rebutted, so he knows better than to repeat the same misstatements here. Outside plant input values in the HAI 5.2a-MA model were determined by a team of expert outside plant engineers, each with decades of hands on practical experience, and then validated by testing against obtainable price quotes. [23] Yet Mr. Gansert makes believe that the HAI input values were determined otherwise. He states,

> This "cost" [of buried drop placement] was allegedly selected from a sample of surveys received from 13 contractors. The default input value, however, was chosen, without explanation, from the third and fourth lowest quotes. One would have at least expected a simple average of prices or a Massachusetts-specific estimate. [24]

AT&T is on record for more than 4 years, in every jurisdiction where the Hatfield/HAI Model was filed, that this survey of responses by contractors was a validation exercise conducted to validate the reasonableness of opinions by members of the engineering team, not to generate an input value per se. Mr. Gansert's assertion to the contrary is incorrect, as he should well know.

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[23] This is the engineering team that Mr. Gansert refers to on page 20 of his rebuttal testimony as "the same mysterious experts that support all of the Model's default values." Despite our new aura of "mysterious", in fact Mr. Gansert knows well the names and backgrounds of the experts, knows that three of them are Verizon retirees, and is out of place in his rhetoric.

[24] *Ibid*., pgs. 17-18.

Second, despite Mr. Gansert's assertion that "One would have at least expected a simple average of prices," is nonsensical and completely contrary to accepted procurement practice. AT&T would have been justified in simply choosing the very lowest price from a qualified vendor or contractor (if it were to have used such a validation method to re-set costs, which it did not) – but it took a more conservatively higher approach and did not use the lowest obtained quote. Apparently, if Mr. Gansert were shopping for a new car among equally qualified dealers for the same model of car, he would ignore the lowest price offer and go back and pick a dealer in the middle range of prices. I cannot believe that Mr. Gansert would pay much more than he had to for a car, and under TELRIC rates may not be set under the assumption that inefficient purchasing practices would be followed. But Mr. Gansert and Verizon nonetheless would have this Department believe that costs should be determined that way, by ignoring the least cost, most efficient methods available.

Q. DOES DR. TARDIFF MAKE FALSE CLAIMS ABOUT HOW THE HAI MODEL INPUT VALUES WERE DETERMINED?

A. Dr. Tardiff makes the statement that: "Many inputs are based on the opinion of either one 'expert,' or the opinions of a group of 'experts,' none of whom have any direct experience in Massachusetts." (Tardiff Rebuttal at 14) This is false at several levels.

First, despite Dr. Tardiff's denigrating use of quotes around the word expert, individual members of the team Dr. Tardiff refers to are certified experts, each has been qualified in dozens of states, not a single one has ever been

successfully challenged regarding being an expert, and together the team has about 200 years of hands-on experience.

Second, regarding the statement that none have experience in Massachusetts, Dr. Tardiff must have copied his statement from testimony in other non-Massachusetts states. Dr. Tardiff should know from reading my CV, and certainly Mr. Gansert knows from personal experience, that my last job at NYNEX was the procurement and distribution of over $1 million per work day in equipment and materials. That work included consolidating the entire corporate logistics purchasing and distribution function for electronic equipment into the Southborough, Massachusetts warehouse complex. I know what it is like to purchase telecommunications equipment in Massachusetts from personal hands-on experience, and I assure the Department that I am qualified to give opinions on costs in Massachusetts.

Q. DOES DR. TARDIFF ACCURATELY QUOTE A STATEMENT THAT YOU MADE IN ALABAMA TESTIMONY IN 1998 REGARDING HOW WELL GOOD ILEC ENGINEERS ESTIMATE COSTS?

A. The words are there and quoted accurately, but the context, of course, is missing.

First, at page 31 of his rebuttal testimony, Dr. Tardiff accuses the engineering team that supported the HAI Model as being people "principally engaged in supporting a litigation effort rather than running a network." I find this to be a curious statement from someone who has never been an engineer and makes much or all of his living from being a paid expert witness, supported by a Verizon manager (Mr. Gansert) who is also toiling at litigation.

Second, Dr. Tardiff attempts the illusion that I was complementing the efficiency of ILEC engineers in the statement he excerpts from my Alabama

testimony in 1998. I can testify that the proper context was that I was explaining that the expert members of our team learned how to do proper outside plant cost estimating, from the bottoms-up. The grounding of the HAI 5.2a-MA model in sound engineering stands in marked contrast to Verizon's cost model. Engineers did not put together the costs presented in this case by Verizon. Corporate managers put together the costs Verizon has proposed, and they are unreasonable to any qualified engineer. For example, no engineer would purchase a factory preassembled Digital Loop Carrier cabinet for $28,302, and then pay a contractor $19,975 to install it.[25] It is simply a matter of the amount of labor required to lower a cabinet onto mounting bolts, install batteries, attach power lines, and turn on the equipment for its built in self-testing routines. Paying almost $20,000 to perform a simple installation for a $28,000 cabinet is way out of line. Verizon's cost study equates to a labor investment of over 330 hours (at $60/hr.), or paying over $500 per hour for what I believe can be done in approximately 45 hours. Good engineers know how to estimate costs and have tools to help them do so. It is unfortunate that Verizon did not use those resources in its cost filing.

[25] Source: Verizon-MA work papers, Subsection 5.7 DLC Electronics -- Remote End (Exhibit JCD-8).

VI. DR. TARDIFF AND MR. GANSERT PROFFER INACCURATE AND MISLEADING COMMENTS ABOUT POLE COSTS.

Q. IS DR. TARDIFF CORRECT IN HIS CRITICISM ABOUT MIXING THE LABOR COMPONENT FROM ONE QUOTE WITH THE MATERIAL COMPONENT OF ANOTHER QUOTE TO DERIVE THE COST OF AN INSTALLED TELEPHONE POLE?

A. No. Dr. Tardiff has no experience in telephone company procurement and contracting operations. In the real world – as distinguished from Dr. Tardiff's fantasy world – telephone poles and telephone pole installation services are not obtained from the same source. Telephone poles are purchased by Verizon in bulk from a manufacturer of poles, and are installed by local contractors or by local employees. Verizon does not ask a local construction contractor to go to Home Depot and purchase a telephone pole before installing it. They are told to pick up a telephone pole at a local telephone company garage and then install it at a field location as dictated by an engineering work order. I know this is true because I used to be the person purchasing telephone poles for the New York and New England telephone companies. Dr. Tardiff knows better – he has made this argument before, and he has heard my answer before. Yet he continues his tired mantra with no credible supporting evidence on his part. Dr. Tardiff then takes his baseless and incorrect telephone pole example and tries to extrapolate that to as yet unnamed other inputs. His specious attack should be ignored as vague, technically incorrect, and in any case groundless.

Q. IS DR. TARDIFF CORRECT IN HIS CRITICISM REGARDING INSTALLED TELEPHONE POLE COSTS?

A. No. At page 34 of his rebuttal testimony, Dr. Tardiff states, "For telephone poles, at current prices Verizon would have to expend 8 times as much as the investment

level assumed in the Hatfield Model." Since the HAI Model uses an input value of $417 per pole, that would mean a cost of $3,336 per pole – which would be completely unreasonable, even for Verizon. Dr. Tardiff does share the statistic that Verizon's embedded base for pole investment is $435 per pole (but then uses a cost-to-book ratio of 2.39 in an attempt to claim the real embedded non-TELRIC cost is $1,040). In fact the $417 input to the HAI 5.2a-MA model is correct, and is completely consistent with Dr. Tardiff's suggestion that Verizon has been able to purchase and install poles for $435.

Dr. Tardiff also claims that Mr. Gansert blames the HAI Model for significantly underestimating pole investment because "a substantial amount of aerial cable is assumed not to require any poles." Both Dr. Tardiff and Mr. Gansert know better, since this issue has come up before in their complaints about an old version of the HAI Model that has since been changed. The HAI Model now distinguishes between aerial cables on poles in the two highest density zones, and Block & Building Cable in the two highest density zones. (I am referring to the two highest density zones as defined in the HAI model on the basis of line density, not to the UNE rate zones that have been used or are proposed in Massachusetts.) One does not put telephone poles in the elevator shafts of buildings, which is why in cities one has cable that is not buried or underground, but is also not attached to poles.

Q. IS MR. GANSERT'S CRITICISM REGARDING DISTANCES BETWEEN TELEPHONE POLES SIGNIFICANT OR CORRECT?

A. No. Mr. Gansert complains that appropriate distances between telephones were obtained by the FCC by "former" RBOCs and independent telecommunications

carriers throughout the US (statistics with which the HAI model proponents agree), and then quibbles about whether telephone poles are 150 feet apart or are 120 feet apart. Although Verizon is privy to its precise records for more than 670,000 telephone poles, Mr. Gansert is unable or unwilling to produce any evidence to substantiate his claims of distance between telephone poles, instead offering his personal opinion as a non-outside plant engineer. One need only drive through various parts of the Commonwealth of Massachusetts and count the number of poles per mile (using an automobile odometer to measure miles) to validate reality. The following table indicates the poles per mile one would observe.

Interval	Poles per Mile
120 ft. - Gansert Urban & Metropolitan	44
135 ft. - Gansert Suburban & Rural	39
150 ft. - HAI Metro/Suburban	35
175 ft. - HAI Suburban	30
200 ft. - HAI Rural	26
250 ft. - Very Rural	21

I invite Commissioners and members of Staff to count poles per mile, and especially since they are rare in downtown Boston, to observe them in Suburban and Rural environments in Massachusetts. Based on my many observations, while working for NYNEX in the Commonwealth, I can assure you that Mr. Gansert's testimony is pure surmising and has no basis in fact.

VII. DR. TARDIFF AND MR. GANSERT PROFFER INACCURATE AND MISLEADING COMMENTS ABOUT DIGITAL LOOP CARRIER COSTS.

Q. IS MR. GANSERT CORRECT IN HIS CRITICISMS REGARDING DLC SITE COSTS?

A. No. Neither Mr. Gansert nor Dr. Tardiff have ever arranged for DLC sites or has either one supervised anyone who has performed such a task. In contrast, I have been personally involved in DLC site arrangements in Rural, Suburban, and Urban areas, including over 200 DLC sites in Manhattan and over 200 DLC sites in northeastern New York State.

Mr. Gansert states, on page 18 of his rebuttal testimony, that:

> The term "patio pads" hardly describes the 15 x 19 foot reinforced structure with telephone and electrical conduits depicted in Mr. Donovan's testimony, which are designed to support hundreds of thousands of dollars of electronic equipment for twenty years or more.

This statement is indicative of Verizon's cost modeling faults over a broad spectrum of inputs. Verizon believes supporting costs such as "plain vanilla" concrete slabs, with a few holes in them to allow cables up through the middle, are a function of the cost of electronic equipment. This belief is silly. Poured concrete with a few reinforcing rods is concrete none-the-less. The concrete does not get smarter or more expensive because it supports expensive electronic cabinets. DLC equipment does not require special, expensive, high-tech concrete sitting underneath it. As an engineer trained in mechanical engineering and concrete design, along with experience in negotiating contractor bids for concrete construction, I recognize that specifications deal with weight loads, and there is nothing unusual about the weight loads of DLC equipment cabinets. This is a non-issue.

Q. Q. WHAT COMMENTS DO YOU HAVE REGARDING MR. GANSERT'S CLAIM THAT THE REMOTE TERMINAL ELECTRONIC EQUIPMENT INPUTS RECOMMENDED BY YOU ARE UNREASONABLE?

A. Mr. Gansert claims that my recommended costs for DLC Remote Terminal electronic equipment are understated considerably. Such is not the case. Mr. Gansert claims (at pages 20-21),

> Verizon has arguably the largest and certainly most advantageous contract for DLC equipment in the industry, the details of which have been supplied in discovery responses during this proceeding. Verizon's costs derived from this contract are extensively documented in the workpapers provided with Verizon's direct testimony. Comparing these fact-based figures to the speculative Hatfield Model inputs reveals a consistent understatement of costs by the Model. For example, the Model's typical cost of a 672 line RT system is more than 25% less than Verizon's costs, and the Model's cost of RT service channel units is 20% less.

Mr. Gansert's statement is not only misleading, it is outright wrong. The difference in cost lies not with material purchasing power, but is completely explained by Verizon's absurdly high EF&I labor costs it claims are necessary to place a factory pre-assembled cabinet onto a concrete pad that has mounting bolts properly positioned via use of a template embedded in the surface of the flat concrete pad. Not only is there little discrepancy in material costs, despite Mr. Gansert's claims to the contrary, HAI material inputs for NGDLC Remote Terminal equipment are actually higher than Verizon's.

I agree with Mr. Gansert that Verizon has very large bulk purchase contracts for DLC equipment from its major supplier Alcatel. SBC Communications is another large purchaser, but I have no doubt that both major companies have very steep equipment price discounts that should be reflected in rates. I do not disagree with Mr. Gansert's claim regarding Verizon's electronic

equipment material costs. However, let us look at the true facts which reveal that the difference is in the fact that Verizon is using ludicrous estimates of labor required to stick electronic printed circuit boards, known as plug-ins, into slots in an open frame, and to bolt in place factory pre-assembled cabinets.

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I have been unable to exactly duplicate Mr. Gansert's alleged 25% cost difference (my details show Verizon's material & labor to be 44.3% higher than HAI), since Mr. Gansert submitted no evidence to support his calculation. However, it is clear that Verizon's EF&I labor costs are beyond anything even remotely reasonable, and fly in the face of the manufacturer's claims about easy installation. Please see Exhibit JCD-9 for the equipment manufacturer's claims regarding ease of field installation. As may be noted above, Verizon material costs are actually more than 10% lower than those assumed in the HAI 5.2a-MA model.

[26] **[PROPRIETARY]**

Q. WHAT COMMENTS DO YOU HAVE REGARDING MR. GANSERT'S CLAIM THAT THE DLC RT SERVICE CHANNEL UNIT COST INPUTS RECOMMENDED BY YOU ARE UNREASONABLE?

A. Mr. Gansert claims (at page 21) that the HAI Model's cost of RT service channel units is 20% less than what Verizon experiences. That is simply not the case. Mr. Gansert does not identify the derivation of his claimed 20% -- therefore I must use intelligent speculation that he is comparing Verizon's input value of $96 per line with the HAI input value of $77.50 (a 23.4% difference). Just like the cost of NGDLC Remote Terminal costs, the real data shows that Verizon's channel unit material cost is actually much less than the HAI material cost input. The difference, once again is an absurd 2 hours, rather than one minute, to install a simple channel card.

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The installed cost of POTS RT Channel Units in the HAI5.2a Model filed in this case is $310 per 4-line RT card. Verizon's claimed cost is **[BEGIN PROPRIETARY]** **********

[27] **[PROPRIETARY]**

********** ********** **[END PROPRIETARY]**, plus another $7.75/card of cost I have been unable to identify, to reach a total cost of $384 ($96 per line). It should be noted that the equivalent fill factor effect on the HAI input, based on 90% fill would add $34.44 to the $310 for a total {sic} of $344.44, which would mean that Verizon's alleged cost is 11.5% higher. The HAI Model input for channel unit cards assumes the placing of the cards in bulk during the installation of the RT, including enough extra cards to reduce utilization to 90%. Hence, the cost of installing each card is negligible. Verizon, on the other hand, loads up its costs by assuming about 2 hours to stick a self-testing card into a slot on a frame – an operation that actually takes, at most, 60 seconds. Just as with DLC Remote Terminal costs, Verizon's material cost for a channel card are significantly less than the cost input to the HAI 5.2-MA model filed in this case. In the case of channel cards, the Verizon material cost is much, much less.

Q. DO YOU HAVE MORE RECENT INFORMATION REGARDING THE COST OF POTS CARDS THAN WHAT WAS USED IN THE HAI MODEL?

A. Yes. Besides Verizon's actual material cost of **[BEGIN PROPRIETARY]** ****** **[END PROPRIETARY]** per card, on October 19, 2001, I purchased a current version of the Alcatel Litespan-2000 RPOTS-2 remote terminal POTS service channel unit card, that provides services for 4 POTS lines, at a cost of $133.25 including shipping, as opposed to the $310 input to the HAI model (See Exhibit JCD-10). This is further evidence that telecommunications is a declining cost industry, and that prices that constitute appropriately forward-looking inputs

to a TELRIC model one year can quickly become outdated and lead to inappropriately high cost estimates. Verizon's claimed cost of an installed channel unit card is grossly overstated, the cost of such equipment has been dropping drastically, and even the input value in the HAI5.2a Model filed in this proceeding is much higher than the fair market value of this channel unit card. In addition, there should be virtually no EF&I labor costs associated with this card.

Q. MR. GANSERT DISAGREES WITH YOUR USE OF 90% FILL FOR DLC REMOTE TERMINAL CHANNEL UNIT PLUG-INS. DO YOU AGREE WITH HIS TESTIMONY?

A. No. Mr. Gansert's testimony states at Page 21 of his rebuttal testimony. He asserts that:

> 1) RT channel units are the equivalent of feeder cable pairs
>
> 2) [feeder pairs] are engineered on a "maximum fill at relief" basis (i.e., additions are planned so that relief capacity is installed at approximately the time the maximum fill level is reached).
>
> 3) Because RT channel units can be augmented more easily than copper cables (provided of course that common equipment shelf space is available), these units are placed on a 6-12 month relief interval, as compared to 3-5 years for copper feeder and RT common equipment shelves.
>
> 4) [T] industry standard for maximum fill of DLC-supplied feeder facilities is 90%, and RT channel unit additions are installed before the RT utilization exceeds 90%, which includes channel units in an assigned, but non-working state. Thus, the maximum RT channel utilization is actually less than 90%.

He is wrong on all counts.

First, RT channel units are not the equivalent of feeder pairs because they are a portable asset that can be moved around to coincide with demand – something that a copper feeder cable pair cannot do.

Second, Mr. Gansert violates generally accepted outside plant planning practice when he slips in the word "maximum" into the standard phrase "fill at

relief" for outside plant copper cables. The correct term is "economic fill at relief." (Please see Verizon's outside plant engineering practices, Section 3.01, Page 2, included as Exhibit JCD-11.) Verizon's outside plant engineering practices teach its engineers that there is an economic fill at relief, that it will vary by route demographics and growth rates, and that new cables and pair gain systems should be added in an economical fashion rather than by use of a fixed percentage, as they are needed, and not before. (Please see Verizon's practice at Page 3 of Exhibit JCD-11.)

Third, Mr. Gansert is not quite accurate in his statement that Verizon uses a copper feeder cable relief interval of 3-5 years. Actually, Verizon's practice involves a relief interval of 2-5 years. (Please see Verizon's practice at Page 1 of Exhibit JCD-11.) In addition, Mr. Gansert takes another bit of literary license when he claims that Verizon's practice is a relief interval of 6-12 months for RT channel unit cards (a 0% to 100% difference). Actually, Verizon's practice is to install a DLC RT with sufficient channel unit cards to meet in-service requirements plus 6 months of growth, not 6-12 months of growth. Also, Mr. Gansert neglects to mention that although DLC common equipment shelves should be engineered for a relief interval of 2-5 years, the fill factor for such shelves in the Verizon cost study is set at only 55.2%, which is enough to last about 11½ years (at 4% growth) to reach 85% fill, or over 15 years to reach 100% fill.

Fourth, there is no industry standard for the "maximum" fill of DLC-supplied feeder facilities at 90%, and I believe he will be unable to cite any

credible source to that effect. Whereas it may take 9 months to 18 months to engineer and construct the placement of lengths of heavy copper feeder cable, the time required to provide RT channel unit relief is as long as it takes a technician to drive to a DLC Remote Terminal site, open the cabinet, plug in the channel unit card, and wait less than 60 seconds for the card to be recognized and self-tested in the system (certainly far less than one day). There is no magic "maximum" 90% fill that would justify lower than 90% channel utilization. The HAI5.2a-MA input value of 90% is far more generous than necessary in this regard, since 6 months of growth in Massachusetts is less than 2%. In addition, although Mr. Gansert mentions the 90% DLC RT channel unit fill factor, he neglects to mention that Verizon's cost study was filed with a channel unit fill factor of only 80%.

VIII. CONCLUSIONS.

Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE REBUTTAL TESTIMONY OF DR. TARDIFF AND MR. GANSERT?

A. I believe that Dr. Tardiff and Mr. Gansert are attempting to intentionally mislead the Department. They offer themselves up as better outside plant engineers, but in fact have never engineered an outside plant job. They offer criticisms fraught with mathematical errors and distortions of fact. They offer no citations or evidence to back up their claims that the knowledgeable expert outside plant engineers involved with the HAI Model were clueless about outside plant engineering practices, purchasing methods, competitive construction bidding procedures, and realistic prices in the real world of competitive procurement. In a nutshell, the rebuttal testimony of Dr. Tardiff and Mr. Gansert should be

dismissed from further intellectual consideration as to issues pertaining to outside plant. Their testimony is unfair, baseless, and quite simply wrong.