BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Review of:	**)**	
Unbundled Loop and Switching	**)**	
Rates; the Deaveraged Zone	**)**	**DOCKET NO. UT-023003**
Rate Structure; and Unbundled	**)**	
Network Elements, Transport,	**)**	
And Termination	**)**	

SUPPLEMENTAL REPLY TESTIMONY OF DR. ROBERT A. MERCER

on behalf of

AT&T COMMUNICATIONS OF THE PACIFIC NORTHWEST, INC.

June 29, 2004

A. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Robert A. Mercer. I am the Principal of BroadView Telecommunications, LLC ("BVT"), a consulting firm specializing in analyses of the telecommunications infrastructure. The address of the firm is 5201 Holmes Place, Boulder, Colorado, 80303.

Q. ARE YOU THE SAME DR. ROBERT A. MERCER THAT FILED SUPPLEMTENTARY DIRECT AND REPLY TESTIMONY ON BEHALF OF AT&T IN THIS PROCEEDING?

A. Yes, I am. My resume was included as Exhibit RAM-1 to the Supplementary Direct Testimony.

Q. WHAT IS THE PURPOSE OF THIS SUPPLEMENTAL REPLY TESTIMONY?

A. I will briefly respond to several assertions made in the supplemental reply testimonies of Verizon witnesses Dr. Timothy Tardiff, Christian Dippon, and Francis J. Murphy filed on June 18, 2004 that purport to pertain to changes introduced by HM 5.3 Revised. Specifically, I will address the following four assertions made by one or more of these witnesses:

- HM 5.3 includes loops longer than 18,000 feet;
- HM 5.3 centroids, and thus distribution backbone and branch cables, are in nonsensical places;
- HM 5.3 has too few splice points because the splices are too close together; and
- HM 5.3 does not use rectilinear routing for feeder cable.

The last two of these claims, contained in the testimony of Mr. Dippon, are not specific to the revised version of the model filed by AT&T filed on June 4, 2004, nor are they made more significant by the revision, but they are essentially new arguments to which a response is needed.

B. COPPER CABLE LENGTHS ALLEGEDLY IN EXCESS OF 18,000 FEET

Q. VERIZON WITNESSES TARDIFF (AT P. 5) AND MURPHY (AT P. 3) BOTH CLAIM HM 5.3 REVISED PRODUCES MORE COPPER LOOPS WHOSE LENGTH EXCEEDS THE 18,00O FEET LIMIT SET IN THE MODEL THAN DOES HM 5.3. IS THIS AN APPROPRIATE CHARACTERIZATION OF THE MAXIMUM LOOP LENGTHS PRODUCED BY THE MODEL?

A. No. It is highly misleading. HM 5.3 carries out the following steps for laying out feeder, distribution backbone, and distribution branch cables for each cluster:

- Determines whether the total distance from the wire center to the edge of the lot furthest from the SAI serving the cluster – in other words, the total loop length including feeder and distribution cable – exceeds 18,000 feet;

- If this distance is in excess of 18,000 feet, uses fiber feeder to serve the cluster, and/or splits the cluster into sub-clusters in one or both dimensions, extending the fiber feeder cables to the middle of the sub-clusters (the feeder extensions are referred to as connecting cables), in order to ensure the maximum remaining length of copper cable is less than 18,000 feet;

- Makes an initial determination of the length and number of backbone and branch cables required to serve customers as if they are uniformly distributed in the cluster;

- Compares the resulting distribution cable route miles to the so-called "strand distance" provided by TNS, which is the cable distance required to connect all customer locations to each other and to the SAI, and develops a normalization factor which is the ratio of the strand distance to the distribution route miles; and

- Multiplies each component of the cluster cable (backbone, branch, and connecting cables) by this normalization factor to ensure the resulting distribution route distance matches the strand distance calculated by TNS.

The Verizon witnesses claim the post-normalization backbone and branch cable distances calculated in the last step should be used to determine the maximum loop length, rather than considering the pre-normalization distances – in other words, they focus on the very last step of this process, whose purpose is not to determine maximum loop lengths, but to get the route miles of cable right. By doing so, they find cases in which, they claim, the post-normalization maximum loop length exceeds 18,000 feet. However, the whole point of normalization is to match the number of route miles required to connect customers to each other, not to increase or decrease the maximum loop length. It is misleading in the extreme to confuse these two purposes.

Suppose, for instance, HM 5.3 initially calculated too few branch cables in a particular cluster because its algorithm for determining the spacing between branch cables does not adequately represent the actual spacing in that cluster. In this case, the strand distance will indicate the model has produced too few route miles, because it extends cable down too few streets. But having more streets in the real world does not mean the maximum loop length increases; it only means the route distance is greater. Normalizing cable lengths to the correct strand distance corrects the route distance, but it does not imply the maximum loop length has increased.

Q. BUT DOESN'T THE FIGURE ON P. 9 OF MR. DIPPON'S TESTIMONY SHOW THAT SOME CUSTOMER LOCATIONS ARE BEYOND THE 18,000 FOOT LIMIT?

A. No. The intention of this picture is a mystery. The circle in the figure is drawn around the SAI with a radius of only 1.9 miles – just over 10,000 feet. Demonstrating some locations are more than 10,000 feet from the SAI in no way demonstrates they are more than 18,000 feet from the SAI, even when route distance, rather than airline distance, is taken into account.

Q. HAVE YOU ANALYZED THE EFFECT ON THE RESULTS PRODUCED BY HM 5.3 REVISED IF THE MODEL <u>WERE</u> TO USE POST-NORMALIZATION BACKBONE AND BRANCH LENGTHS TO DETERMINE WHETHER CLUSTERS MUST BE SPLIT TO MEET THE 18,000 FOOT MAXIMUM LOOP LENGTH, NOTWITHSTANDING YOUR POINT THAT THIS IS NOT APPROPRIATE TO DO?

A. While it would be a complex change to HM 5.3 to make the cluster-splitting decision using post-normalization backbone and branch lengths, I have repeated the surrogate analysis I reported in my Reply Testimony in which I assumed distribution cables extend to within a few drop lengths of the corners of the cluster rectangle in each cluster. For HM 5.3 Revised, the average loop cost increases by $0.19, an increase of 2.2% compared to the loop cost of $8.50 produced by HM 5.3 Revised. Therefore, even if Verizon were to prevail in its misrepresentation of how maximum loop length should be determined, it would have a minimal effect on the results.

C. ALLEGEDLY NONSENSICAL CENTROID LOCATIONS

Q. MR. DIPPON MAKES TWO ADDITIONAL POINTS IN CONNECTION WITH THE FIGURE ON P.9. THE FIRST IS THAT CLUSTER C004 OF THE ANCRWAXX WIRE CENTER IS ALMOST ENTIRELY IN THE WATER. WHAT IS THE EFFECT IF THE CENTROID "IS MOVED ONTO THE LAND" (TO USE MR. DIPPON'S DESCRIPTION)?

A. Because the centroid of a cluster is defined to be the mid-point of the line connecting the two most distant points of a cluster, clusters with one long edge – for instance, the long side of a trapezoid – sometimes have their centroids located along that edge, or at least well displaced from the center of the rectangle that represents that cluster. This causes part of the distribution backbone and branch cables for such a cluster to lie outside the cluster. The question is, what if the centroid were moved to the center of the bounding rectangle that represents the cluster instead of being along the edge?

I have done a run of the model in which each cluster in the model is moved to the center of the bounding rectangle for that cluster. In the case of the ANCRWAXX wire center, that moves the centroid ashore, as Mr. Dippon describes. Doing this decreases the overall loop result by $0.03.

Q. BUT EVEN IF THE CENTROID IS MOVED IN THIS FASHION, MR DIPPON POINTS OUT SOME AMOUNT OF THE BACKBONE AND BRANCH CABLES WOULD STILL BE IN THE WATER. DOES THAT IMPACT THE ACCURACY OF THE RESULTS?

A. No. Mr. Dippon fails to connect two of his statements about this cluster. The first is that there appears to be "extra" cable in the water. The second is his claim that there is not enough cable to serve the customer locations above the circle, because the backbone and branch don't extend far enough. However, the cable that appears to be "in the water" can be used to serve the customers in the northern end of the cluster. As I have pointed out on a number of occasions, a cost model only needs to get the amount of cable, and hence the cable investment, right, it does not need to provide an engineering drawing of the plant location.

Q. BUT IF THE MODEL APPEARS TO PUT CABLE IN ONE PLACE WHEN CUSTOMER LOCATION MAPS SUGGEST IT IS ACTUALLY NEEDED IN ANOTHER, HOW DO YOU KNOW THE MODEL OVERALL PRODUCES THE RIGHT AMOUNT OF CABLE?

A. That is the role of the strand normalization process. Normalizing the total amount of distribution cable produced by the model to match the amount of cable TNS has determined is required to connect all the customer locations to each other and to the SAI ensures the model is producing the right amount of cable.

D. ALLEGED FAILURE TO PROVIDE ENOUGH SPLICE POINTS

Q. MR. DIPPON CLAIMS THAT, BASED ON THE CABLE INVESTMENT INPUTS, THE MODEL DOES NOT HAVE SUFFICIENT SPLICING POINTS. PLEASE COMMENT ON THIS CRITICISM.

A. While the issue of splicing points was mentioned in passing in Mr. Murphy's Reply Testimony, Mr. Dippon is essentially raising a new issue here in the sense of actually making some specific claims about the magnitude of the problem. In doing so, he has provided no workpapers to substantiate the alleged mismatch in the number of intersection versus the number of splice points assumed by the model in the Richmond Beach wire center. Nor does he make any effort to demonstrate whether this problem is limited to a specific wire center or exists in multiple wire centers. Furthermore, he fails to point out that, if anything, the longer backbone cables in HM 5.3 Revised versus the original HM 5.3 implies the branch cables are further apart, thus, if anything, alleviating the problem he alleges exists.

As for the substance of the argument, Mr. Dippon is ignoring the fact that the distances between splices used by the model to calculate cable investments are averages. Thus, while there are branch splices in the distribution cable at each point where a branch cable intersects the main cable, which may indeed occur more frequently than the distances he cites, the model is averaging over long runs of feeder cable where splices occur much less frequently. Furthermore, the branch cables assumed by HM 5.3 can be significantly longer than the inter-splice distances assumed by the model, and yet require no further splices beyond those already provided for in the customer terminal and splice investment in the Model.

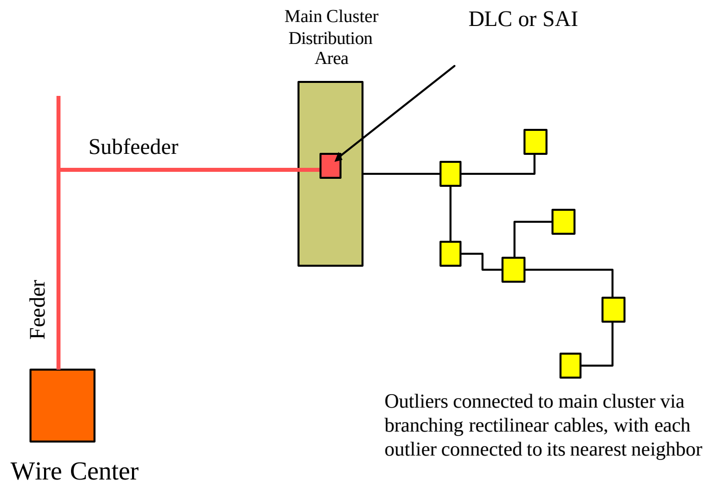
When all is said and done, the outside plant advisors to the model believe the assumed inter-splice distances are actually conservatively high compared to the average distances that will occur in the network being modeled. Mr. Dippon provides no quantitative analysis to the contrary.

E. ALLEGED NON-RECTILINEAR ROUTING OF FEEDER CABLE

Q. MR. DIPPON CLAIMS (P. 5) THAT NEITHER HM 5.3 NOR HM 5.3 REVISED USE RECTILINEAR ROUTING OF FEEDER CABLE. IS THIS TRUE?

A. For the record, let me note here that, literally, rectilinear routing means routing in a straight line, not at right angles. But as used in the context of proceedings involving the HAI Model, it has come to mean routing on a right angle, as opposed to "beeline" or "as the crow flies" routing. Thus cable connecting two points is assumed to be first routed in a direction parallel to one axis of a Cartesian coordinate system, and then in a direction parallel to the other axis. On the average, routing in this fashion adds approximately 27% to the straight line route distance.

With that clarification, Mr. Dippon is simply wrong. Feeder cables between each cluster and the wire center that serves it occurs first along a main cable that runs north, south, east, or west from the wire center (depending on where the cluster is located) to a branch point, where sub-feeder cable extends at a right angle from the main feeder to reach the cluster. This is depicted in the following picture, which also shows that outlier clusters are connected to main clusters using right-angle routing.



Q. DOES THIS CONCLUDE YOUR SUPPLEMENTAL REPLY TESTIMONY?

A. Yes, it does.