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May 17, 2001

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

Re: ACC Docket No. T-00000A-00-0194

Dear Docket Control:

Enclosed please find the original and ten (10) copies of the ***Direct Testimony of Thomas H. Weiss re: Qwest's LoopMod2 Cost Model [Non-Proprietary Version]*** on behalf of AT&T Communications of the Mountain States, WorldCom, Inc. and XO Arizona, Inc., in the above-referenced matter. Proprietary and Non-Proprietary versions of this testimony are being served in accordance with the attached certificate of service. If you have any questions, please contact me at the phone number, or e-mail address, above.

Very truly yours,

Davis Wright Tremaine LLP

Larry J. Weathers
Paralegal

Arizona Corporation Commission
DOCKETED

MAY 18 2001

DOCKETED BY

Enclosures

cc: Mary Steele
Rick Wolters
Caroline Butler, ACC

CERTIFICATE OF SERVICE

ACC Docket No. T-00000A-00-0194

I hereby certify that on the 17th day of May 2001, the original and ten (10) copies of the ***Direct Testimony of Thomas Weiss re Qwest's LoopMod2 Cost Model*** **[Non-Proprietary Version]** on behalf of AT&T Communications of the Mountain States, Inc., WorldCom, Inc., and XO Arizona, Inc., in the above-referenced docket, were sent via FedEx next business morning delivery to:

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

And, I further certify that on the 17th day of May 2001, the original and three (3) copies of the ***Direct Testimony of Thomas Weiss re: Qwest's LoopMod2 Cost Model*** **[Proprietary Version]** and three (3) copies of the **[Non-Proprietary Version]** were sent via FedEx next business morning delivery to:

Jane Rodda Administrative Law Judge Hearing Division Arizona Corporation Commission 1200 West Washington Street Phoenix, AZ 85007

And one true and correct copy of both the **Proprietary** and **Non-Proprietary** versions of the foregoing were sent via FedEx next business morning delivery to:

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Dated this May 17, 2001 by _____

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BEFORE THE
ARIZONA CORPORATION COMMISSION

IN THE MATTER OF THE GENERIC INVESTIGATION INTO U S WEST COMMUNICATIONS, INC.'S COMPLIANCE WITH CERTAIN WHOLESALE PRICING REQUIREMENTS FOR UNBUNDLED NETWORK ELEMENTS AND RESALE DISCOUNTS	)))))))	**DOCKET NO. T00000A-00-0194**

DIRECT TESTIMONY OF

THOMAS H. WEISS

ON BEHALF OF
AT&T COMMUNICATIONS OF THE MOUNTAIN STATES, INC.
WORLDCOM CORPORATION
&
XO ARIZONA, INC.

RE: QWEST'S LOOPMOD2 COST MODEL

NON-PROPRIETARY VERSION

May 18, 2001

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I. INTRODUCTION & WITNESS QUALIFICATIONS

Q. MR. WEISS, PLEASE STATE YOUR NAME AND BUSINESS ADDRESS FOR THE RECORD.

A. My name is Thomas H. Weiss. My business address is 205 E. Spring Street, Fuquay-Varina, NC, 27526.

Q. ARE YOU THE SAME THOMAS H. WEISS WHO EARLIER FILED TESTIMONY IN THIS DOCKET ON BEHALF OF AT&T COMMUNICATIONS OF THE MOUNTAIN STATES, INC., WORLDCOM CORPORATION, AND XO ARIZONA, INC.?

A. Yes, I am.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY AT THIS TIME?

A. My purpose is to report the results of my review of Qwest's LoopMod2, the model with which Qwest computes its costs of unbundled loop elements.

II. QWEST'S LOOPMOD2 MODEL

A. In General

Q. PLEASE BRIEFLY DESCRIBE AND EXPLAIN YOUR UNDERSTANDING OF THE FACILITIES THAT QWEST'S LOOP MODEL2 IS DESIGNED TO ADDRESS.

A. As I understand the model, Qwest, LoopMod2 ("LM2" or "the Model") is designed to value the investment in wireline telecommunications plant that

extends a network access channel[1] (a/k/a "loop") from the telephone company central office to a customer's premises.

In general, access channels are provided from a central office to areas of customer demand over cables, known as "feeder" cables (containing several network access channels) that terminate in a point located physically near the center of access demand concentration.[2] From that concentration point,[3] other cables, known as "distribution" cables, extend the customer access channels, usually over metallic pairs of wires, to points, known as "customer terminals" (a/k/a pedestals, distribution panels, etc.), that are near (but usually not actually on) the specific customer premises. From the customer terminals, the access channels are routed over "drop wire" to a Network Interface Device ("NID") – the device to which the customer connects terminal equipment.[4]

In general, a minimum of four (4) feeder cables leave a central office with one feeder designed to serve customers in each of four quadrants (e.g., North, South, East, West) of the area served by the central office. Distribution cables are provided and routed, as necessary, within areas of concentrated demand (known as "Distribution Areas," or "DAs") so as to reach all customers that are located in the DA and who demand access to the network.

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[1] Pairs of metal wires or the digital electronic equivalent of a pair of metal wires (e.g., DS0 signal).

[2] Feeder cables typically contain several metallic pairs of wire or, alternatively, optical glass fibers over which network access can be provided to several customer locations via multiplexing arrangements.

[3] Known generally as the Subscriber Area Interface ("SAI"), or Feeder Distribution Interface ("FDI").

[4] For example, telephone sets, splitters, and modems.

Q. PLEASE BRIEFLY DESCRIBE YOUR UNDERSTANDING OF QWEST'S LOOPMOD2 PROGRAM.

A. According to Qwest, LM2 is a computer program model that is designed to develop the incremental investment costs required for Qwest to provide subscriber loops. Actually, LM2 is an MS Excel file consisting of several worksheets that link to other files necessary to run the Model. The linked files are also MS Excel worksheets containing input data or other programs (sub-programs of LM2) that extract and process data from the input files to describe the physical make-up (i.e., metallic or fiber cable sizes, length, multiplex equipment, etc.) of the various types of loops (e.g., 2-wire, 4-wire, etc.).

LM2 can be viewed as three subsidiary modules: an engineering module, a construction module and an investment cost module. The engineering module can be broken down further into feeder and distribution routines. Using cable and equipment component pricing information from the input files, LM2 converts the physical plant required to serve end-user customers to UNE loop investment data that serve as inputs to Qwest's Wholesale Cost Program ("WCP") -- the model that computes Qwest's monthly recurring UNE loop cost estimates.[5] For purposes of this docket, Qwest includes both LM2 and WCP as modules of its

[5] WCP applies the cost factors (from the Capital Cost Factors Model and the Expense Factors Model - TELRIC) to investment amounts from other models, such as LM2, to estimate Qwest's monthly recurring costs to provide various network elements (e.g., 2-wire loops, 4-wire loops, etc.). I have discussed my concerns with Qwest's cost factors in my testimony filed on May 16, 2001.

Integrated Cost Model ("ICM")[6] that is provided on the CD-ROM presented with Ms. Million's testimony.

According to Qwest, LM2 calculates loop investment amounts using standard loop feeder and distribution engineering design practices applied to end-user loop demand as that demand is actually distributed throughout the wire center serving areas. Qwest contends that the plant and equipment pricing information (i.e., prices of materials, and construction labor, etc.) used in LM2 is *primarily* Arizona-specific and represents the unit costs that Qwest pays for loop plant material, and prices that Outside Plant ("OSP") contractors can charge Qwest to provide, construct, and install loop facilities in this state.[7]

Q. WHAT IS YOUR UNDERSTANDING OF THE MANNER IN WHICH THE MODEL DESIGNS FEEDER PLANT?

A. I understand that the LM2 engineering module designs feeder plant for each quadrant in the wire center serving area beginning at the point in each quadrant that is farthest away from the wire center. From that farthest point, the Model moves toward the wire center, adding demand along the route as it passes various distribution areas. The result of this routine is a compilation of total demand at various specific distances from the wire center along the feeder route. Based on this demand information, the engineering module predicts the distances from the

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[6] Qwest's ICM consolidates inputs to and output from the individual UNE models (LM2, the Switching Cost Model (SCM), the Transport Model V4 (TM4)) and cost factor models (e.g., Capital Cost Model and Expense Factors Model) to develop, from WCP, estimates of monthly recurring costs of producing various UNEs.

[7] Testimony of Dick Buckley on behalf of Qwest, page 2, lines 15-18.

wire center where feeder cable capacity would "taper" down[8] along the feeder route. Using the taper point demand information, the engineering module decides the technology to be employed on the route (i.e., metallic pairs or digital loop carrier on fiber cable) and the method that would be utilized to place the cable (buried, aerial, underground, etc.). To determine the minimum capacity of the facilities needed, a user-defined feeder fill factor[9] is applied to the demands aggregated at each taper point. The engineering module then selects standard cable sizes (e.g., 600 pair copper cable, 48 pair fiber, etc.) to be constructed in each segment of the cable along the feeder route. At this point in the feeder plant engineering simulation, the feeder cable is defined, by segment, in terms of its length and required capacity.

Q. HOW DOES THE MODEL CALCULATE INVESTMENT IN THE DISTRIBUTION PORTION OF THE LOOP?

A. To calculate investment in the distribution portion of the loop, the Model looks at each distribution area ("DA") in the area served by the wire center and defines the DA in terms of the number of working lines in it, the longest loop in it, and the number and size of customer entrance terminals in it. With this information, the engineering module LM2 decides the design for the distribution plant to serve the customers in the DA.

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[8] Known to OSP engineers as the "taper points" on a feeder cable.

[9] The Model is default value is 80 percent per LoopMod2 User's Manual, page 1.7.

Rather than designing the distribution plant uniquely for each DA, the engineering module selects a representative design for each DA from a group of five standard distribution plant designs developed by Qwest to represent the universe of distribution designs applicable throughout the former U S WEST fourteen-state region. The standard designs, designated as Distribution Groups ("DGs") 1 through 5, reflect five categories of DA loop density ranging from high rise buildings (high density) to farm or ranch-type properties (lowest density). Each of the five standard designs is defined further by a standard amount of distribution cable footage and equipment.

Based on the length of the longest loop in the DA, and the area (square miles) encompassed by it, the engineering module matches each DA in the serving area with one of the standard distribution designs. Then, based on computed lot size in the DA as compared to computed lot size from the selected standard design, the engineering module adjusts the total cable footage from the standard design to scale the amount of cable reflected in the standard design to more closely match the dimensions of each DA in the serving area.

The outputs from the feeder and distribution sub-routines are forwarded to the main worksheet where, using unit material and construction cost data from other files, the average investment for various loop types in the state is finally computed.

B. Flaws in Model Inputs

Q. MR. WEISS, UPON WHAT INPUT VARIABLES DOES QWEST BASE ITS LM2?

A. Qwest has chosen to ground LM2 in several variables that should strongly influence the cost that ILECs incur to engineer and construct loop plant. A broad listing of those key variables that Qwest reflects in its LM2 analyses appears below:[10]

1. Distribution Cable Fills;
2. Feeder Cable Fills;
3. Average Drop Lengths;
4. Construction (Placement) Methods;
5. Allocation of Construction Methods;
6. Structure Sharing; and
7. Unit Prices (of cable and equipment).

Underlying each of these key variables are various assumptions and subsidiary inputs. For example, LM2 offers the analyst the opportunity to chose between two assumed techniques for reflecting distribution fill in the Model (Item No. 1, above); several options are available for the analyst to allocate plant construction methods used in different distribution groupings (Items No. 4 and 5, above); etc. I will cover these options, as necessary, as I address each of the key variables.

1. Distribution Fill:

Q. WHAT IS YOUR UNDERSTANDING OF THE TERM "DISTRIBUTION FILL" AS THAT CONCEPT IS INCORPORATED INTO THE MODEL?

A. In its default form, the Model does not strictly reflect the traditional interpretation of the term "fill"– i.e., units working divided by units available – for distribution

[10] Source: PROPRIETARY Exhibit RJB-3 to the Direct Testimony of Dick Buckley on behalf of Qwest.

plant.[11] Qwest contends that fill factors should not apply to distribution plant because distribution plant is designed based on an "Engineering Standard" number of lines per site to which loop capacity could be extended in the DA rather than on the basis of working lines plus an allowance for spare and defective capacity.[12] This Engineering Standard essentially assumes that distribution plant will be designed to meet not just existing demand plus an allowance for spare and defective pairs, but rather for the ultimate demand that may exist in a particular DA.

Under this approach, for DGs 1, 2, and 5, LM2 models < PROP >lines per site. For DGs 3 and 4, the model assumes < PROP >lines per site. LM2 then adjusts these benchmarks upward, increasing the number of distribution lines in the standard design to recognize an allowance for spare and defective capacity less an allowance for dedicated spare capacity[13] -- a net increase of < Prop > percent. Thus, for example, if a Qwest standard design would assume that 400 lines are required to serve all of the sites in a DA by applying the < PROP > benchmark design assumption, the model would then increase that 400 line total by applying the < PROP > percent factor, yielding a design requirement of at least < PROP > pairs. The Model then divides the total investment cost for the standard design over that < PROP > pairs, yielding the investment per pair that is used to

[11] I have provided a more comprehensive discussion regarding fill factors in my testimony filed on May 16, 2001.

[12] Direct Testimony of James C. Overton on behalf of Qwest, page 5.

[13] These allowance factors are NOT user-adjustable when LoopMod2 is run from ICM. However, the allowance factors CAN be adjusted when the Model is run on a stand-alone basis.

determine the total investment cost for DAs that match to that particular standard design.

The Model provides an analyst the option to over-ride the < PROP > "Engineering Standard" and to specify distribution fills according to the traditional definition – working capacity as a percentage of total available capacity. Running LM2 by over-riding the Engineering Standard approach to distribution design and setting the distribution fills to <PROP> for DGs 1, 2, and 5, and < PROP > for DGs 3 and 4, yields monthly recurring costs for UNE loops that are virtually the same as those produced using Qwest's default inputs exclusively.

Q. JUST WHAT IS THE PRACTICAL INTERPRETATION OF QWEST'S PROPOSED "ENGINEERING STANDARD" DISTRIBUTION FILL?

A. If DGs 1, 2, and 5 are designed to a <PROP> per site benchmark, yielding an effective distribution fill under that benchmark of <PROP> percent, the implication is that an average of only <PROP> pair per site < PROP > is assigned and working in DGs 1,2, and 5. Similarly, in DGs 3 and 4, an average of only <PROP > per site is assigned < PROP > The remaining pairs are not utilized.

Q. THIS COMMISSION HAS DETERMINED IN THE PAST THAT THE APPROPRIATE FILL FACTOR FOR AN EFFICIENT NETWORK TO BE MODELED UNDER TELRIC IS ACHIEVABLE AVERAGE FILL. IS QWEST'S PROPOSED ENGINEERING STANDARD DISTRIBUTION FILL AN ACHIEVABLE AVERAGE FILL?

A. No. It is inappropriate in a TELRIC methodology to assume that only one distribution pair per site will be assigned and working. While it is true today that at least one access line at every site will be put to work in any distribution area, it is also true that many, but not all, sites will utilize two or more access lines. For example, many residences use one line for routine daily voice communications and a second line for voice and/or Internet access via modem. Certainly, office buildings and commercial sites consume more than one pair. In fact, most ILEC outside plant engineering groups with which I am familiar recognize that an assumption of one working access line per site in the distribution network is an anachronism.

I understand that in the past cost docket, Qwest presented evidence that its actual usage as of May of 1995 was 1.1 lines per living unit. Certainly, this actual usage has increased considerably since May of 1995, given the increased use of the Internet and Qwest's heavy advertising of second lines in Arizona and other states within its region. As Mr. Hydock's testimony indicates, Qwest's line counts in Arizona have increased tremendously since the last cost proceeding, in part due to added demand for second lines.

Q. WHAT IS A MORE REALISTIC FILL FACTOR FOR DISTRIBUTION PLANT IN TODAY'S MARKET?

A. I recommend that prices for UNE loops be based conservatively[14] on a minimum distribution fill of 0.6250 for DGs 1, 2, and 5. For DGs 3 and 4, I recommend a

[14] Conservative, that is, in the favor of Qwest.

minimum fill factor of 0.6667. At 0.6250, every site in DGs 1, 2, and 5 would have access to 2 lines; all sites would be considered to consume at least one distribution pair, and every fourth site would be considered to consume two access lines. At 0.6667, every site in DGs 3 and 4 would have access to 3 lines; most sites would be considered to consume at least 2 lines and some as many as 3 lines. In my opinion, this reflects an achievable average fill as required by this Commission's order in the prior cost docket.

2. Feeder Fill:

Q. WHAT IS YOUR UNDERSTANDING OF FEEDER FILL AS THAT TERM APPLIES TO LM2?

A. According to Qwest, feeder fill is the factor by which feeder cable capacity is increased above the size needed to serve a given quantity of demand in order to provide spare pairs for breakage, line administration and some amount of growth.[15] Qwest's LM2 applies a feeder fill factor only to copper feeder cable.

Q. WHAT DEFAULT FEEDER FILL FACTOR IS USED IN QWEST'S LM2?

A. Qwest's default runs on LM2 reflect a copper feeder fill factor of 0.80 extracted directly from Section 3.3 on page 56 of the Inputs Portfolio documentation supplied with HAI Model Release 5.0a.[16] According to Ms. Million, Qwest uses the 0.80 copper feeder fill factor from the Commission's Decision No. 60635 in which the Commission found that the "achievable average" fill factor of 0.80 used

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[15] Exhibit RJB-3, page 3; a direct quotation from Section 3.3 on page 56 of the HAI Model , Release 5.0a Inputs Portfolio.

[16] Qwest response to AT&T Request No. 03-117(f).

in the HAI Model was to be used in cost studies.[17] Qwest does not explain why it chose to use the Commission's prior finding for feeder fill while ignoring the Commission's finding regarding distribution fill. Feeder Fill is directly accessible and able to be adjusted easily by the analyst in either the version of LM2 that is bundled with ICM or in the stand-alone version of LoopMod2.

Q. DO YOU HAVE ANY COMMENTS ON QWEST'S USE OF THE 0.80 COPPER FEEDER FILL FACTOR?

A. Yes. The 0.80 achievable average copper fill factor falls within the range of copper feeder fill factors I have recommended for use in UNE loop cost studies. Accordingly, I do not object to Qwest's choice of the 0.80 copper feeder fill factor in this case.

3. Average Drop Lengths:

Q. WHAT IS YOUR UNDERSTANDING OF THE AVERAGE DROP LENGTHS AS THAT TERM IS USED IN QWEST'S LM2?

A. The drop wire is the facility that extends from the distribution terminal nearest to the customer's location to the customer's premises. In LM2, drop lengths are broken out between aerial and buried and by distribution density group only in DGs 3, 4, and 5.[18]

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[17] ACC Docket No. U-3021-96-448 et al., Decision No. 60635, p. 17.

[18] Access lines in DGs 1 and 2 enter the customers' premises through entrance facilities (bulk wire terminals typically used in offices and other commercial locations).

Q. WHAT DROP LENGTHS DOES QWEST USE IN ITS DEFAULT RUNS OF THE LOOP MODEL?

A. Default values for drop lengths, in linear feet, are specific by DG as shown below:[19]

1.	Aerial Drop, Density Group 3	<PROP>
2.	Aerial Drop, Density Group 4	<PROP>
3.	Aerial Drop, Density Group 5	<PROP>
4.	Buried Drop, Density Group 3	<PROP>
5.	Buried Drop, Density Group 4	<PROP>
6.	Buried Drop, Density Group 5	<PROP>

According to Qwest, drop lengths are a < PROP >, and these default values used in Qwest's runs of LM2 apply to all states in which Qwest operates; they produce average statewide drop lengths of approximately <PROP> to <PROP> feet which Qwest claims is substantially less than average statewide drop lengths determined from surveys of existing drops in the states of New Mexico, Minnesota, and Wyoming.[20]

Q. HAS QWEST OFFERED ANY EVIDENCE THAT THE DROP LENGTHS USED IN ITS DEFAULT RUNS OF LM2 HERE IN ARIZONA BEAR ANY RELATIONSHIP TO THE ACTUAL DROP LENGTHS IN THIS STATE?

A. No. In fact, in response to AT&T Information Request No. 02-073, Qwest refused to provide any information regarding actual drop lengths in Arizona,

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[19] PROPRIETARY Exhibit RJB-3 filed on behalf of Qwest with the testimony of Dick Buckley.

[20] Id.

objecting that the request is burdensome, not currently available, and would require a special study to assemble.

Q. ARE QWEST'S ESTIMATES OF DROP LENGTHS REASONABLE IN YOUR VIEW?

A. No. Qwest's drop length proposals are grounded in the physical measurements of site locations embodied in Qwest's portfolio of five standard distribution designs. As I noted earlier, the use of those five standard designs, and the broad assumptions behind them, for modeling UNE loop costs in Arizona does not capture the actual physical characteristics of distribution plant in the state. Accordingly, in Arizona, any conclusions or results derived from the standard designs are flawed at the outset; that, of course, includes Qwest's assumed drop lengths.

Periodic studies of the average physical characteristics of loop plant, conducted by the former Bell Operating Companies, have shown that the average length of service drops nationwide has been approximately 73 feet[21] -- well below any Arizona statewide average drop length that could be derived from Qwest's LM2 default assumptions (the shortest default drop length proposed by Qwest is 70 feet in DG1). Thus, in my opinion, the default drop lengths used in LM2 are clearly overstated.

Q. WHAT DROP LENGTHS DO YOU RECOMMEND THE COMMISSION ADOPT FOR USE IN MODELING THE COST OF UNE LOOPS?

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[21] Telcordia Technologies, Telcordia Notes on the Network, Issue 4, October 2000, page 12.8.

A. Given the broad difference between the nationwide average described and Qwest's proposed LM2 default drop lengths, I recommend that the Commission shorten Qwest's default proposals by about 30 percent in DG3 and 50 percent in DGs 4 and 5. Specifically, I recommend that the Commission adopt average drop lengths of 50 ft. for DG3, 100 ft. for DG4, and 150 ft. for DG5.

4. Placement Costs:

Q. WHAT IS YOUR UNDERSTANDING OF THE DEFAULT CABLE PLACEMENT COSTS USED BY QWEST IN ITS LM2 UNE LOOP COST STUDIES?

A. Qwest contends that its default placement costs < PROP >

.[22] The unit costs range from a low of < PROP > to plow a foot of cable into the ground to a high of < PROP > per ft. to directionally bore the cable.[23] The accuracy of the unit costs for placing buried cable is critical to the determination of valid UNE loop costs through LM2.

Q. GIVEN THE IMPORTANCE OF THESE UNIT COST INPUTS TO LM2, DID AT&T SEEK TO INVESTIGATE QWEST'S CLAIMS WITH RESPECT TO UNIT COST OF MATERIAL AND CONSTRUCTION?

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[22] PROPRIETARY page 4 to Exhibit RJB-3 submitted with the testimony of Dick Buckley on behalf of Qwest.

[23] Directional boring involves the deployment of expensive high-precision lateral drilling machinery to place buried cable in sections where substantial disruption of to the operation or use of critical infrastructure would result if other construction methods were used.

A. Yes. AT&T's discovery request, Set No. 3, Item No. 117 addressed a broad range of LM2 matters, and it included requests for the documents that support Qwest's material and construction cost estimates.[24] In the same information request, AT&T sought data and documents that would show Qwest's actual recent Arizona booked unit costs of material and labor associated with loop construction in the state.[25]

Q. DID QWEST RESPOND TO THE AT&T REQUESTS?

A. Qwest steadfastly objected to most of the requests, then provided answers that: (1) were not responsive; (2) provided no substantive answer (along with an explanation as to why nothing substantive was provided), or (3) simply (and without explanation) provided nothing at all. In short, Qwest's responses to AT&T's requests for information to support Qwest's material and construction cost estimates produced nothing of value by which AT&T, this Commission, its Staff or other intervenors could assess and critically evaluate Qwest's claimed material and construction cost estimates. If Qwest does provide the information sought in response to AT&T Request 03-117, then I would like the opportunity to supplement this testimony based on those responses.

Q. NOTWITHSTANDING QWEST'S INTRANSIGENCE IN RESPONDING TO AT&T'S REQUEST 03-117, DO YOU HAVE ANY COMMENTS AT

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[24] ATT Request 03-117, Items (h), (i), and (o).

[25] ATT Request 03-117, Items (p), (q), (r), (s), (t), (u), (v), (w), (x), (y), (z), (aa), (bb), (cc), and (dd).

THIS TIME CONCERNING QWEST'S DEFAULT UNIT COSTS FOR PLACING BURIED CABLE?

A. Yes. Qwest has stated that its default unit costs for placing buried cable are derived directly from contracts into which it has entered with cable construction contracting firms. In connection with my responsibilities as Division Engineer with GTE and, more recently, in connection with my executive responsibilities with an independent telephone company in Vermont, I have been involved directly in cable construction contracting activities. These companies, and other ILECs with which I am less directly familiar, do enter into agreements like those Qwest is apparently referencing with contractors to place cable on routine OSP projects. These contracts, however, are typically limited to projects involving a relatively low amount of total expenditures over relatively short time frames.

The companies' purpose for entering into such contracts was to avoid the usual red tape involved with securing approvals from higher levels in the organization so as to allow construction to begin on routine projects without undue delay. The contracts serve both parties well but in entering into them, management recognizes that some premium cost is attached to the contractor's agreement to be available on short notice to meet a specific completion date. In contrast, when large construction projects are at issue, the construction contracting procedures are quite different and usually involve circulating requests for proposals, securing bids for work and selecting a construction contractor based on the bid responses. In these cases, management expects and receives significant savings in unit costs of construction activities relative to the unit costs involved with routine contracts.

I would be most surprised if Qwest did not approach its OSP construction program in this way, yielding one set of unit costs for small projects and a quite different set for larger projects.

If Qwest's unit construction costs for buried cable are based on small project approach, as it appears that they are, those costs are clearly overstated relative to what Qwest would expend if it had reflected the large project approach in its buried cable construction default unit inputs. In a TELRIC analysis, because the assumption of the analysis is that the entire plant will be reconstructed, the appropriate approach is to model costs based upon what an efficient company would incur on a large scale project, not on individual contract prices.

Q. ARE YOU ABLE AT THIS TIME TO DEMONSTRATE TO THE COMMISSION THAT QWEST'S ACTUAL UNIT COSTS OF BURIED CABLE CONSTRUCTION DIFFER FROM THE UNITS COSTS REFLECTED IN QWEST DEFAULT RUNS OF LM2?

A. No. One purpose of AT&T Request 03-117 was to secure actual recent cost detail from Qwest's Arizona CPR records in order to determine if, and if so, by how much, Qwest's actual unit costs for placing buried cable differed from the default values used in LM2. Since Qwest has not provided the requested information, I cannot conduct the investigation necessary to make the required determination.

Q. CAN YOU OFFER THE COMMISSION AN ALTERNATIVE SOURCE FOR UNIT COST RELATED TO BURIED CABLE CONSTRUCTION ACTIVITIES?

A. Yes. I recommend that the Commission adopt the unit construction costs and other construction-related costs for buried cable shown at Section 6 of the Input Portfolio document supplied with HM5.2a.

5. Placement Percentages:

Q. MR. WEISS, WHAT ARE PLACEMENT PERCENTAGES AND HOW ARE THEY USED IN LM2?

A. Placement percentages are estimates of the probabilities that any one of the buried cable placement methods, discussed above, is used to construct buried cable plant in each distribution density group and on urban and rural feeder cables.[26] In LM2, placement percentages are used to weight together the various activities involving placement of buried plant.[27] The construction cost is added to buried cable material cost based on this weighting.[28] The weighting is unique to each distribution density group and to urban and rural feeder cable construction.[29]

Q. WHAT CONSTRUCTION ACTIVITIES ARE "WEIGHTED" BY QWEST IN ITS LM2?

A. Qwest's proposed default inputs to LM2 include a broad mix of OSP construction activities that basically cover the full range of construction methods currently

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[26] PROPRIETARY page 5 of Exhibit RJB-3 included with the testimony of Dick Buckley on behalf of Qwest.

[27] Id.

[28] Id.

[29] Id.

available in the industry: directional boring, cut and restore, lay cable, plow, restore sod/gravel, fiber trench, hydro mulch.[30]

One of the most expensive methods of placing OSP cited by Qwest is "directional boring," which involves the deployment of high-cost precision lateral drilling machinery. Generally directional boring is used for OSP construction projects that involve placing cable (conduit, etc.) in sections where substantial disruptions to the operation and/or use of critical infrastructure would occur if other, less expensive construction methods were employed. Directional boring can also be deployed in cases where the use of other construction methods could damage, beyond cost-effective repair, existing facilities located near the construction site.

Because of its high cost and somewhat unpredictable nature, typically, directional boring is a last resort for telephone OSP construction. Directional boring is NOT the "method of all methods" as Qwest would have us believe. In fact, there have been instances where boring heads have lost their way and damaged or destroyed the plant and equipment of others located near the boring site.

Qwest's LM2 default inputs show directional boring as being used in substantial degrees to construct loop plant (primarily distribution) in all areas of the state (rural, suburban, and urban). There is little doubt in my mind that the default assumptions concerning deployment of the directional boring construction method[31] contributes heavily to the high level of the cost results produced by the

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[30] Page 4, PROPRIETARY Exhibit RJB-3 included with the testimony of Dick Buckley on behalf of Qwest.

[31] In very-high density areas where high-rise office buildings are prevalent, 20%; in mid-high density areas where apartment complexes and shopping centers are prevalent, 30%; in urban residential areas, 45%;

Model. I have not personally been responsible for outside plant construction in Arizona. In my own experience, however, Qwest's assumption that, for example, 45 percent of all construction activity in single family housing developments would require the deployment of expensive directional boring, is unfounded. Typically, construction in areas like these is accomplished principally by less expensive trenching techniques. Even Qwest's assumption that < PROP > of construction in rural areas would be accomplished by directional boring is ludicrous. Often, cable in rural areas can be placed by plowing or trenching for a fraction of the cost of directional boring.

Q. WHAT IS THE SOURCE OF QWEST'S ESTIMATES FOR THE PERCENTAGE DISTRIBUTIONS OF BURIED CABLE CONSTRUCTION METHODS?

A. Qwest attributes its estimates to "interviews with outside plant engineers who were responsible for cable rehab work."[32] Qwest also cites its "experience in placing plant for the Broadband trial in Omaha, NE" and "a citywide CATV rebuild in one of the states within the Qwest region" as support for its estimates.[33] This "support" is little more than speculation.

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in suburban residential areas, 20%; and in rural areas, 5%.

[32] Page 5, PROPRIETARY Exhibit RJB-3 included with the testimony of Dick Buckley on behalf of Qwest. Testimony of Dick Buckley, pages 20, 21.

[33] Id.

Q. DID AT&T ATTEMPT TO MORE DEEPLY INVESTIGATE QWEST'S CLAIMS REGARDING BURIED CABLE CONSTRUCTION ACTIVITIES IN ARIZONA?

A. Yes. AT&T's Information Request 02-067 sought "the most recent documentation available of Qwest's actual loop placement activities in Arizona [including] documents indicating the extent to which Qwest uses trenching, directional boring, plowing, and other placement activities assumed in LoopMod to place loop facilities in the state of Arizona." Typically, Qwest objected to the request claiming that the information is not relevant or likely to lead to discovery of relevant information because Qwest's current activity is not pertinent to modeling a total replacement network.

Q. HAS QWEST CITED VALID REASONS FOR NOT RESPONDING TO AT&T'S REQUEST 02-067?

A. No. First, clearly, any current mix of Qwest's buried plant construction methods is pertinent to any question concerning Qwest forward-looking mix of buried plant construction methods. At worst, in both instances (forward-looking or current), plant construction methods are at issue and a substantive response should be provided for that reason alone. At best, the information secured from a substantive response could shed some light for the Commission on the reasonableness and veracity of Qwest's default estimates.

Q. DO YOU HAVE ANY INFORMATION AVAILABLE TO YOU REGARDING QWEST'S ACTUAL PRACTICES IN PLACING CABLE BY BORING?

A. I have reviewed testimony provided by Qwest on this issue during prior cost proceedings. This testimony does not support Qwest's assumptions in LM2 regarding the extent to which cable would be placed using boring activities. For example, a Qwest field engineering operations manager in Washington testified that Qwest chooses to bury or plow cable as a first choice and that boring is used in Washington one percent of the time or less. I have attached this testimony as Exhibit TKM (LM2) – 1. Qwest's construction director for the state of Arizona testified in the prior cost proceeding that Qwest would not bore for any longer distance than was necessary and that, although she could not provide an accurate percentage of the amount of boring conducted in Arizona, Qwest probably used that technique approximately 20 to 30 percent of the time. Consolidated Cost Docket Tr., p. 1588. These estimates are far below the assumptions used by Qwest in its Model.

Q. IS QWEST CORRECT IN ITS CLAIM THAT A TELRIC MODEL SHOULD ASSUME THAT PLANT WILL BE RECONSTRUCTED WITH ALL OTHER EXISTING INFRASTRUCTURE IN PLACE?

A. Qwest is simply wrong in arguing that the scorched node approach to pricing requires the TELRIC of OSP-intensive UNEs to be developed assuming a costly complete network rebuild through existing infrastructure. That approach, in effect, guarantees that very real insurmountable barriers are erected against other

carriers' use of OSP-intensive UNEs to engage Qwest in competition for local exchange services. I believe Qwest's approach is clearly in violation of letter and the spirit of the Communications Act of 1996 and it should, therefore, be rejected by the Commission not merely as reason for Qwest not responding to AT&T's request for information but, more importantly, as an underlying basis for Qwest's cost analyses.

Certainly, Qwest's scorched node approach with respect to the allocation of construction methods is at odds with the FCC's general view as to the applicability of the scorched node assumption to computing the OSP portion of UNE costs. In describing its position on the applicability of the scorched node theory to the issue of structure sharing, the FCC observed:

> We note that, as past of the logical argument that the entire telephone network is to be rebuilt, it is also necessary to assume that the telephone industry will have at least the same opportunity to share the cost of building plant that existed when the plant was first built.[34]

The situation described by the FCC in its discussion of structure sharing is no different than that which underpins Qwest's position on the issue of allocating construction methods; the FCC rejected Qwest's concept that scorched node assumption requires the TELRIC costs of OSP to be computed as though all existing infrastructure, except wireline telecommunications plant, was in place and that the telephone plant must be constructed around the existing infrastructure.

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[34] *In the Matter of Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Tenth Report and Order (rel. October 21, 1999), fn. 504.

Q. HAS THIS COMMISSION REVIEWED AND REJECTED QWEST'S ASSUMPTIONS ABOUT PLACEMENT ACTIVITIES IN THE PAST?

A. The Commission did reject Qwest's assumptions regarding placement activities in the prior cost docket, in part because the Commission recognized that Qwest's assumptions regarding the necessity for using that costly boring techniques had no rationale basis. Other Commissions have also reviewed and rejected Qwest's assumptions. For example, the Washington Commission conducted a thorough review of Qwest's placement assumptions in its Docket No. UT-960369. That Commission adopted an assumption that only 5 percent of buried cable installations in developed areas would be placed by boring. The Commission specifically found that the Omaha broadband trial upon which Qwest based the boring assumption in both that proceeding and in this proceeding was "a poor barometer of the type of installation techniques used in Washington state." [35]

Q. ARE THERE ALTERNATIVE, MORE REALISTIC, ESTIMATES OF THE PLACEMENT PERCENTAGES THAT THE COMMISSION SHOULD RELY ON FOR PURPOSES OF DEVELOPING THE COSTS OF OSP-INTENSIVE UNES?

A. Yes. The Commission should refer to Section 6.2 of the Input Portfolio document supplied with HM5.2a for more realistic estimates of buried cable placement method percentages. The inputs to HM5.2a emphasize plowing and trenching as the principal buried cable construction methods and realistically assigns the

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[35] *In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale*, Docket No. UT-960369, Eighth Supplemental Order, para. 55.

largest incidence of costly cut and restore activity costs to the more dense DGs 1 and 2.

6. Structure Sharing Percentages:

Q. WHAT IS THE MEANING OF THE TERM "STRUCTURE SHARING" AS IT APPLIES TO QWEST'S LM2?

A. In LM2, the structure sharing variables represent an estimate of that portion of OSP structure costs that could be avoided by Qwest if it was willing to share structure capacity with other entities (e.g., utilities and CATV companies) that also must occupy OSP structures (poles, trenches, etc.) in the normal course of conducting their business.

Q. WHAT IS YOUR UNDERSTANDING OF QWEST'S LM2 DEFAULT POSITION WITH RESPECT TO STRUCTURE SHARING?

A. Qwest's LM2 default values for structure sharing range from Qwest bearing <PROP> percent of aerial structures (poles) to a high of Qwest bearing <PROP> percent of the cost of underground conduit. Qwest assumes that it will bear <PROP> percent of the cost to bury cable any distribution density group. As with many of the other inputs into its cost models, Qwest's position is based principally on opinions of its subject matter experts.

Q. HOW DOES QWEST'S POSITION SQUARE WITH EARLIER FINDINGS BY THE ARIZONA CORPORATION COMMISSION ON THE ISSUE OF STRUCTURE SHARING?

A. In its Order No. 60635 (page 20) in connection with Docket No. U-3021-96-448, et al., this Commission adopted a 50 percent sharing of costs between U S WEST (now Qwest) and other utilities. Accordingly, Qwest's LM2 default assumptions for structure sharing are well out of line with the Commission's position.

Q. SHOULD THE COMMISSION'S FINDING FROM ORDER NO. 60635 AS IT RELATES TO STRUCTURE SHARING CONTINUE TO APPLY TO QWEST?

A. Yes. Qwest has offered no evidence in this case that would support a change in the Commission's position on the issue.

Q. ARE YOU AWARE OF EVIDENCE THAT SUPPORTS THE COMMISSION'S PRIOR DETERMINATION?

A. Yes, the same Qwest engineer who testified regarding the use of boring also provided testimony to the effect that municipalities favor structure sharing by utilities to minimize disruption to the public. See Ex. THW (LM2) – 1 at 87-88. Mr. Denney's testimony provides further evidence and examples of opportunities for structure sharing by Qwest.

TOM- can't you add anything to this based on your own experience and opinions? Can you at least say that the Commission's percentages are realistic (or-better yet – conservative)

7. Component (Material) Costs:

Q. HAS QWEST EXPLAINED THE SOURCE FOR THE MATERIAL COSTS USED IN LM2?

A. Qwest explains that cable material costs used in LM2 are "provided by the Qwest network organization" and that "they [the prices] are based on the latest prices Qwest is paying for these components."[36]

Q. DID QWEST PROVIDE ANY OTHER SUPPORT FOR ITS UNIT MATERIAL COST ESTIMATES?

A. No. However, AT&T sought such additional detail in its Information Request 03-117 which asks Qwest to describe and explain the development of the cost figures used in Mr. Buckley's Exhibit RJB-3 (PROPRIETARY document titled LOOP MODULE, VERSION 2.0, Default Values) and to provide a copy of all documentation which supports the use of the figures in LM2. Qwest's response to AT&T Request 03-117 consisted of some proprietary schedules that list various items of OSP material and construction activities along with an amount associated with each. No documentation was provided to support the unit prices of material.

In addition to the request for additional support for the default prices, AT&T requested actual detailed printout pages from Qwest's Continuing Property Records ("CPR") that would show the price that Qwest actually paid for the material, associated labor, and other required investments during the construction of a recent OSP project that involved the specific items of material. In making these requests for CPR records, AT&T reasoned that actual recent prices paid by Qwest for the material and associated labor, for example, would constitute a reasonable check on Qwest's default cost claims. Qwest's responses to the

[36] Page 8 of the PROPRIETARY Exhibit RJB-3 included with the testimony of Dick Buckley of behalf of Qwest.

requests invariably included CPR summary pages, but not the detail that would permit development of the comparison that was AT&T's objective. In short, even in light of AT&T's detailed requests for information on actual prices, Qwest has not provided the information that would enable AT&T to satisfy itself and the Commission that Qwest's material and associated labor and other related costs accurate reflect the default unit costs used in LM2.

Q. ARE YOU IN ANY POSITION AT THIS TIME TO PROVIDE THE COMMISSION WITH REASONABLE ESTIMATES OF THESE UNIT MATERIAL AND ASSOCIATED LABOR AND OTHER COSTS?

A. No. However, if the Commission requires Qwest to respond fully to AT&T's requests for CPR detail regarding Qwest's unit costs, I would like the opportunity to review Qwest's responses and report my findings to the Commission in supplemental testimony.

8. "Grooming"

Q. ARE THERE ANY OTHER LM2 ISSUES THAT YOU WOULD LIKE TO ADDRESS AT THIS TIME?

A. Yes. One final input assumption issue deserves comment and response with respect to LM2. I noticed that the Model includes a provision for the analyst to assign "grooming" costs to UNE loops.[37] In the case of UNE loops and TM2, a provision to reflect grooming costs is available to the analyst to account for costs

[37] Grooming is a function that allows efficient use of both incoming and outgoing facilities by process of cross-connection of tributaries.

that Qwest would incur to extract individual voice grade pairs off of integrated pair gain systems before sending those pairs to the switch.

Q. DOES QWEST INCLUDE AN ELEMENT FOR GROOMING IN THE COSTS COMPUTED BY LM2 FOR UNE LOOPS?

A. Yes.

Q. IS QWEST JUSTIFIED IN ASSIGNING GROOMING COSTS TO UNE LOOPS?

A. No. Qwest will not incur grooming costs with respect to UNE loops because CLECs will be purchasing loops in fully integrated DLC systems which are fed directly into the switch without the need for de-multiplexing at the central office. Thus, it will not be necessary for Qwest to engage in grooming activities on behalf of CLECs. In those cases where a UNE loop is provided over physical pairs, since no multiplexing is involved, it follows that no grooming costs will be involved. Finally, in cases where a CLEC purchases UNE-P[38] access from Qwest, no grooming costs should apply even if the UNE-P is provided over Digital Loop Carrier because the UNE-P arrangement interfaces with the switch in the same way as Qwest's own customers interface. For Qwest to assess a grooming charge to UNE-P lines would constitute anticompetitive discriminatory pricing.

[38] An Unbundled Network Element Platform – loop and switching UNEs combined an offered as an integrated package.

In any event, grooming activity is a form of network maintenance for which costs are included in appropriate maintenance expense accounts, the full of costs of which are included in the cost factors that are a subject of my earlier testimony in this docket. Thus, for Qwest to separately include the same charges in its LM2/ICM analyses, the result would be impermissible double-recovery of grooming costs.

C. Testing The Loopmod2 Logic

Q. PLEASE DESCRIBE THE GENERAL PROCESS BY WHICH YOU CRITICALLY EVALUATED LM2.

A. Given Mr. Buckley's description of the model and my understanding of it, LM2 can be viewed as a loop engineering and construction model. That is, LM2 first develops an engineering design and then it proceeds to compute the costs of constructing that design. This is an important distinction because the engineering design portion of the model is affected directly by one certain specific set of engineering input variables (e.g., fill factors, loop lengths, technology assumptions, etc.); the construction portion is affected by the loop design developed in the engineering portion of the model and by a different set of other variables (e.g., cable plant construction methods,[39] material prices, etc.). Recognizing the distinction, an analyst can evaluate each portion of the Model separately. For example, by holding the values of the construction inputs constant, it is possible to test the Model's engineering algorithms to see if they

[39] For example, directional boring, plowing, hand trenching, etc.

respond in a logical fashion to measured changes to the engineering assumptions. This is a technique widely used by engineers to test complex systems. Using this technique, I first tested LM2 at a high level to determine if, as I understand the Model, it produces logical results as compared to results that I would expect to see based on what I know from experience.

Since I know that loop plant costs are sensitive to the type of technology used to provide loops, my first test involved comparing changes in the costs produced by the Model against changes in Qwest's proposed feeder technology default input of 12 Kft.[40] By experience, I know that loops provided using DLC and fiber cable are usually less costly on a per unit basis than loops provided exclusively with metallic cable because of the scale economies exhibited by DLC/fiber cable technology relative to metallic cable technology. Also, based on experience, I know that the length at which the technology cross-over (i.e., the engineer would switch from traditional metallic feeder design to digital/fiber feeder) would occur falls in the range of from 8,500 ft. to 9,500 ft. in distance from the central office. Thus, as my first test of LM2, I changed Qwest's default technology cross-over distance from 12 Kft. to 9 Kft. with the expectation that the loop costs produced by LM2 would decrease. Indeed, the Model did show costs for these loops to fall as I expected.

[40] The "feeder technology default" input refers to that distance from the central office where LM2 would change from designing loops using metallic cable exclusively to using DLC/fiber cable technology.

Next, I tested LM2 to determine if it produced loop cost minimums with the technology cross-over point set at 9 Kft.[41] Again, the Model produced the expected result – loop costs are minimized when the feeder technology cross-over point in the Model is set almost precisely at 9Kft.

Q. WHAT MORE DID YOU LEARN FROM THESE TWO INITIAL TESTS OF LM2?

A. The most interesting result of the two initial tests was that the costs derived from LM2 are highly and unexpectedly insensitive to changes in the specification of the technology cross-over distance. In fact, specifying the technology cross-over distance at 9 Kft. (25 percent lower than the default distance) produced only a 0.30 percent (three-tenths of one percent) reduction in loop cost.[42] From my experience, I expected to observe total cost reductions on the order of from three to four times that percentage. Given the results of these two tests I began to suspect that engineering algorithms used in LM2 were defective.

Q. GIVEN YOUR SUSPICIONS, DID YOU CONDUCT OTHER FUNDAMENTAL TESTS OF LM2?

A. Yes. In addition to the initial tests, and given the results obtained from them, I tested the Model's sensitivity to various other engineering input variable changes. For example, leaving all other Qwest default input values inputs constant and

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[41] This test involved several runs of LM2 at cross-over distances of from 8Kft. to 12Kft. with all other Qwest default variables remaining unchanged.

[42] For a 2-wire UNE loop with the cross-over specified at the default distance of 12Kft., the cost computed by LM2 is $28.96 monthly; with cross-over specified at 9Kft., the cost of a 2-wire loop as computed by LM2 was $28.87 – a difference of only $0.09 per month.

changing the default level of feeder fill to 85 percent from its default value of 80 percent – an increase of 6.25 percent -- reduced 2-wire loop costs from $28.96, computed from Qwest's default values,[43] to $28.84 computed at the 85 percent feeder fill – a decrease of only 0.40 percent (four tenths of one percent). Given that feeder cables are predominantly metallic in that test, the expectation is that total costs would be more highly influenced by a change in feeder fill.

Reasoning that the results of the feeder sensitivity tests may be influenced by the selection of the cross-over distance, I tested LM2 with all inputs, except the cross-over distance and the feeder fill, set at the default values. In this test, feeder fill was set at 85 percent and the cross-over distance was varied between 8 Kft and 12 Kft.; it showed that costs continued to be minimized at the 9 Kft. cross-over distance but the magnitude of cost difference between 80 percent feeder fill and 85 percent feeder fill did not change appreciably – only $0.04 per month (0.13 percent, thirteen one-hundredths of one percent). Similar results were obtained by reducing the default feeder fill from 80 percent to 75 percent. Thus, it appeared that in the LM2 model, a 6.25 percent change in the fill factor for feeder cable yields virtually no change in loop costs, when a finite change would be expected.

Q. DID YOU CONDUCT ANY OTHER TESTS ON THE ENGINEERING PORTION OF THE MODEL?

A. Yes. My initial tests focused on the feeder component of loop as it is developed in the engineering portion of the Model. I tested the distribution portion as well.

[43] See Testimony of Teresa K. Million on behalf of Qwest, Exhibit TKM-02, included on the CD-ROM provided with Ms. Million's testimony.

The default version of Qwest's proposed LM2 loop costs reflects distribution cable provided to customer locations according to a so-called engineering standard of 2 pairs per location in distribution groups 1, 2, and 5, and 3 pairs per location in distribution groups 3 and 4. The results produced from the Model using this engineering standard closely approximate the results obtained when distribution fill factors are set at 0.50 for distribution groups 1, 2, and 5, and 33 percent for distribution groups 3 and 4. Therefore, in assessing the outputs from the Model at different distribution factors, I compare the loop cost results obtained from LM2 using the adjusted distribution fill factors with the results obtained by using Qwest engineering standard defaults.

The magnitude of changes in loop cost due to changes in distribution plant fill should increase as the technology cross-over moves closer to the central office This is so because as the technology cross-over point moves closer to the central office, a smaller portion of the total loop length will be composed of feeder cable and a correspondingly a larger portion of the total loop length will be composed of distribution cable. Of course, as the length of distribution cable increases, the cost impact of changes in distribution fill should be magnified. I tested LM 2 to see if it accurately modeled that result by increasing distribution fill factors by 20 percent in all distribution groups and then I varied the technology cross-over point from the 12 Kft. default distance down to 8 Kft. in 1 Kft.increments. Given these parameters, the results reported out of LM2 showed a virtual constant $0.27 per month decrease in loop costs over the full 4 Kft. range of changes to the technology cross-over distance. Thus, LM2 models a less than one percent

decrease in loop costs in response to a 20 percent increase in the distribution fill factor and, equally important, the Model did not exhibit the expected decrease in cost as the technology cross-over moved closer to the central office.

As before, these results defy logic because, as a general proposition, distribution investment typically constitutes approximately one-half to one-third of total loop investment cost and changing the fill factor by as much as 20 percent on 33 percent to 50 percent of total investment should produce an up to 10 percent change in total monthly recurring cost of loops. Again, as with the engineering input variables for the feeder portion of the loop, LM2 fails to produce logical results.

Q. GIVEN YOUR FINDINGS AS YOU DESCRIBED THEM ABOVE, WHAT DO YOU CONCLUDE ABOUT THE VERACITY OF THE ENGINEERING PORTION OF LM2?

A. My findings lead me to conclude that the engineering portion of the LM2 Model fails to yield logical estimates of Qwest's costs to produce UNE loops. In fact, given that the Model responds so insensitively and illogically to changes in loop engineering input values, the Model seems to have been constructed to appear quite flexible (e.g., the large number of engineering input variables) but, actually to produce loop cost estimates that fall within some pre-determined range.

Q. ARE YOU ABLE TO ISOLATE ANY PART OF THE ENGINEERING PORTIONS OF THE MODEL THAT APPEARS TO BE MOST SUSPICIOUS IN THAT REGARD?

A. Yes. As my findings show, the problem of illogical insensitivity appears in both the feeder and distribution portions of the Model. However, I can say that the most surprising illogical results obtained from my analysis of the engineering portion of the model that pertain to the distribution portion of the loop (i.e., the fact that less than one percent change was observed in loop cost with a 20 percent change in the distribution fill factors). This finding leads me to suspect that the logic of the distribution algorithms as being a principal cause of logical inconsistencies in the Model's overall outputs.

Q. BASED ON WHAT YOU KNOW OF THE MODEL AT THIS JUNCTURE, WHERE DO YOU BELIEVE THE PROBLEM LIES IN THE DISTRIBUTION ALGORITHMS?

A. As I explained when describing my understanding of LM2, the distribution algorithms involve a process by which the engineering design of the distribution plant in each DA is determined by comparing specific characteristics of the DA to the characteristics of five standard distribution area designs. The distribution algorithm then selects one of the five designs as the basis for computing loop costs in the DA.

No two DAs in a central office serving area are likely to be sufficiently similar so as to justify the use of some standard engineering design to accurately estimate loop costs for both. Thus, in order to ensure a reasonable degree of accuracy in modeling distribution plant costs for any DA, it is important that the unique characteristics of the DA be accounted-for in the modeling process. This is not possible with LM2 since all DAs evaluated in the LM2 Model fall into one of

only five standard distribution design categories and distribution plant costs for the DA are developed based largely on that selection. If the standard designs are all configured so as to minimize the effect of certain engineering variables (e.g., distribution fills) it is not hard to see how it is possible to produce consistently flawed estimates of distribution costs. Based on the results of my testing, it is the specifications for one or more of the five standard engineering designs that I suspect to be the genesis of significant inaccuracies in LM2.

Q. WERE YOU ABLE TO LOOK INTO LM2 SUFFICIENTLY TO IDENTIFY ONE OR MORE OF THE DISTRIBUTION ENGINEERING STANDARDS AS A SOURCE OF LOGICAL INCONSISTENCIES IN LM2?

A. No. LM2 is an extremely complex program, involving a wide range of input variables and mathematical logic. The Model appears to have been constructed in such a way as to make it quite difficult for anyone not already intimately familiar with it to critically analyze it at the level of detail necessary to identify specific sources of logical inconsistencies. In the model, the standard engineering designs are shown merely as numbers on a worksheet page with no explanation or description of how those numbers were developed. So, at this juncture, it is not possible to focus critically on the standard engineering designs to determine if they are the problem and, if so, to identify the cause(s).

In any event, however, an accurate model of distribution plant costs can only be developed by considering the unique characteristics of the individual areas in which the distribution plant would be placed and that can only be done using a

bottom-up approach in the model to literally route distribution plant to individual customer locations. Qwest's standard design approach to distribution plant modeling can hardly be construed, even remotely, as being bottom-up.

Q. IS THERE ANY ASPECT TO THE FEEDER SIDE OF THE MODEL'S ENGINEERING PORTION THAT YOU BELIEVE TO BE A SOURCE OF CONCERN?

A. Yes. It has long been recognized throughout the wireline telecommunications industry that loops that range in length from 8,500 ft. to 9,500 ft. from the central office are provided most cost effectively over digital loop carrier, when the carrier is designed and operated properly. Even LM2, in its flawed condition, recognizes the significance of that distance. However, LM2 does not fully recognizing the cost effectiveness of loops derived from digital loop carrier and that is a source of significant concern with regard to the feeder side of the Model. At this juncture, I cannot identify the source of this flaw in LM2.

Q. TURNING NOW TO THE CONSTRUCTION PORTION OF THE MODEL, HAVE YOU FOUND ANYTHING IN THE CONSTRUCTION ALGORITHMS THAT GIVE YOU CONCERN?

A. Yes. While the construction algorithms are far less complex than the engineering algorithms, they are still a source of great concern. Recall that the construction algorithm takes plant information output from the engineering portion of the Model and combines it with unit material and construction costs to produce total loop investment costs. This process is rather straight forward relative to the

complexity of the engineering algorithms but it is the inputs to the construction algorithms that raises concerns.

The most significant inputs to the construction portion of LM2 are plant material costs, plant construction costs (discussed earlier) and the distribution of construction methods. LM2 recognizes a wide range of material price inputs the values of which, according to Qwest, are derived from vendor material prices in the case of cables and loop electronics, and from actual construction contracts in the case of construction costs.

Q. DID AT&T ATTEMPT TO GET BEHIND QWEST'S CABLE MATERIAL COSTS AND THE COSTS OF CONSTRUCTION?

A. Earlier, in connection with my discussion of the unit costs of construction for buried cable, I described AT&T's attempt to go behind Qwest's default estimates. That testimony described AT&T's Request 03-117 and those same comments apply here as well.

Q. ARE THERE ANY OTHER ASPECTS OF LM2 THAT ARE TROUBLING?

A. Yes. Two major problems come to mind. The first revolves the fundamental approach taken by Qwest to define the loop network for TM2. The second is the assumed mix of OSP construction methods reflected in Qwest's LM2.

With LM2, Qwest appears to be attempting to determine its cost to replace its existing embedded loop network using forward-looking technology rather than to define a new network for TELRIC pricing of UNEs based on the so-called

scorched node approach to cost studies as advanced by the FCC. Using a scorched node approach to loop costing under TELRIC, only central offices and other wire centers are assumed to remain at their existing locations; the remainder of the loop network should be modeled so as to permit development of the least cost to serve customers from existing central offices and other wire centers.

LM2 assumes that existing wire centers remain at their present locations but it also assumes that distribution areas in a forward-looking least cost loop network would be defined as being exactly as they are today in terms of size, location and terminal locations. There is simply no reason to assume that the existing distribution areas in today's forward-looking loop network would be the same as they are in today's embedded loop network. In fact, loop technological advances alone constitute ample reason to expect that they would not be the same. The embedded loop network is the product of years in development during times when loop plant technology was virtually stagnated, and it was during such times that the embedded distribution areas were defined. Today, however, digital multiplexing and fiber transmission technologies have radically altered the forward-looking capabilities of the loop network. Those capabilities of the loop network have expanded to such an extent that, on a forward-looking, least-cost basis, some existing embedded distribution areas would be candidates for consolidation into a single larger DA; other existing embedded distribution area would be downsized or made larger. When that forward-looking approach to defining DAs is incorporated into any loop model and forward-looking

technology is used to compute loop costs, loop cost would decline to more appropriate levels.

Q. IF QWEST'S LOOPMOD2 IS UNSUITABLE FOR USE AS A MEANS TO DEVELOP COST OF UNE LOOPS, WHAT METHOD DO YOU RECOMMEND THE COMMISSION SHOULD USE TO DEVELOP UNE LOOP COSTS?

A. In my view, there is only one reliable UNE loop costing model available in the industry today and that is the HM5.2a that AT&T, Worldcom, and XO Communications are sponsoring in this case. HM5.2a has been the subject of considerable debate in regulatory proceedings at both the Federal and state levels over the years since its initial introduction. As the result of this process, HM5.2a has been modified regularly and to its significant advantage such that it now develops loop costs on a consistently forward-looking basis using the same engineering design procedures and techniques that are employed on loop design in the "real" world. Unlike LM2, the HM5.2a model does not develop distribution costs based on flawed "surrogate" standard distribution area designs; rather, it builds distribution plant to individual customer locations from the bottom up, as I recommend distribution plant should be modeled. HM5.2a (or some variation of it) is becoming an industry standard in itself. Even Mr. Buckley recognizes the broad recognition now enjoyed by HM5.2a when, at page 9 of his testimony, he compares loop investment results produced by HM5.2a with the results produced by LM2. I submit that the resemblance to which Mr. Buckley

refers is purely coincidental, being based on two different approaches to the loop cost model problem – one flawed approach, LM2 and a valid one, HM5.2a.

Q. DOES THAT CONCLUDE YOUR TESTIMONY AT THIS TIME?

A. Yes, it does.

Arizona Corporation Commission
DKT. No. T-00000A-00-0194
Direct Testimony of Weiss
Exhibit TKM(LM2)-1

Deposition of: GENIE CERVARICH, 4-18-97

PAGE 1 TO PAGE 111

Pricing Proceeding for Interconnection

Patsy D. Jacoy, CSR, RPR 622-6875

CONDENSED TRANSCRIPT AND CONCORDANCE
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BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION
COMMISSION

In the matter of the Pricing) DOCKET NO. UT-960369
Proceeding for Interconnection,)
Unbundled Elements, Transport)
and Termination, and Resale)
)
In the Matter of the Pricing) DOCKET NO. UT-960370
Proceeding for Interconnection,)
Unbundled Elements, Transport)
and Termination, and Resale)
for US WEST COMMUNICATION, INC.)
)
In the Matter of the Pricing) DOCKET NO. UT-960371
Proceeding for Interconnection,)
Unbundled Elements, Transport)
and Termination, and Resale)
for GTE NORTHWEST INCORPORATED)

DEPOSITION UPON ORAL EXAMINATION
OF
GENIE CERVARICH

9:00 a.m.
April 18, 1997
2600 Century Square
1501 Fourth Avenue
Seattle, Washington

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Ron Gayman, AT&T

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SEATTLE, WASHINGTON; APRIL 18, 1997
9:10 A.M.
-oOo-

GENIE CERVARICH, sworn as a witness by the Notary Public, testified as follows:
EXAMINATION
BY MR. WAGGONER:
Q. Good morning, Ms. Cervarich.
A. Good morning.
Q. My name is Dan Waggoner, and I'm a lawyer for AT&T, and this deposition is being taken pursuant to a notice to US West. And if you could just state your name and business address for the record to start, that would be great.
A. My name is Genie Cervarich, and my business address is 17 – no, that's my home address – 1313 East Columbia, Room Number 205, Seattle, Washington, 98122.
Q. And are you employed by US West Communications?
A. Yes, I am.
Q. And what is your title?
A. Manager, field engineering operations.
Q. Have you ever had your deposition taken before?
A. No, I haven't.

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MR. WAGGONER: Yes, that's a totally different subject.
Q. You just used the word drops. Could you define drops for me.
A. We have aerial and buried drops, and drops are little pieces of wire that usually go from the end of our cable facilities to a home or a building, a structure.
Q. So it's the last 50 or 100 feet, or whatever distance it is?
A. Or a little more.
Q. And you indicated some drops are defined as submarine?
A. Well, we have some, from a permitting perspective, where people live in the middle of lakes, and we've had to put them under water to get to them. They're really the rarity, the odd item.
Q. Good. In terms of these fiber submarine routes you were describing, what is the fiber inside when it goes under the lake?
A. Pardon?
Q. I'm imaging some fiber going inside of something when it goes under the lake.
A. Right.
Q. And what is the something it goes inside?
A. It's in an armor sheath cable. It's usually not

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in a pipe.
Q. So you have an armor sheath on the outside which is made out of, what, metal of some sort?
A. Some sort.
Q. And then multiple conduits inside of that?
A. Not conduits; the cable is actually inside of it.
Q. So there's no conduits; it's just the cable inside the armor sheath?
A. Right.
Q. And do you know whether there's dark fiber in those -
A. I have no idea.
Q. Do you share any of those submarine sheath cables with any other utility or carrier?
A. I have no idea.
Q. Let's leave the water behind and move to underground. How do you define underground? And if possible, could you distinguish that from buried.
A. Underground cable is cable that is placed in conduit under the ground. Usually it's multiple conduits, three or more, and usually they're encased in concrete, and exit and enter the conduit via a utility vault.
Q. When you say they're encased in concrete, could you describe that a little more. Is the concrete like a really big tunnel kind of thing or is it a little kind of

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piece of concrete or how does that work?
A. It's like you have six ducts that are stacked side-by-side, and you have an area around those ducts where you've poured concrete to a certain spec over and under and around to protect the conduit inside, so it's not a huge area, but it's more a protection.
Q. And how big an area would you be describing that's the concrete part of this? Four-by-six, two-by-four? Do you have any feel for that?
A. It would depend on the number of ducts and it would depend on where you were placing it, what was there.
Q. Today we're at the corner of Fourth and Pike in downtown Seattle. Are there underground facilities near where we are right now?
A. Yes, that would be correct.
Q. And are those multiple conduits?
A. Yes, they are.
Q. Inside some concrete?
A. Uh-huh.
Q. And are those running down Fourth Avenue, probably? Do you have any idea?
A. Yeah, we do have ducts on Fourth.
Q. You said you do have ducts on Fourth?
A. Uh-huh, conduit.
Q. And how large would those concrete structures be,

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if you have any idea?
A. I don't have any idea.
Q. Do you have any idea how much conduit would be running through those or anything like that?
A. (Witness shaking head.)
Q. Do you have any arrangements to share underground structure with other utilities?
MS. ANDERL: Dan, could you clarify whether we are currently doing it or whether we have any formal agreements in place?
Q. Let's take it one at a time. Do you have any agreements in place which would allow you to share or other utilities to share with you your underground structures?
A. We have a process in place where they -
Q. Describe the process, then.
A. There's a group in Denver, and it goes through the market units into that group, and they research and make a decision as to whether we will or won't share those structures.
Q. So are there occasions that you're aware of in your geographic area where those underground structures are shared?
A. Yes.
Q. And can you give me some examples of those.
A. I don't know if there are formal agreements

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around this, but in Seattle Center, when I was doing Goodwill down there, we found some Seattle Center cables going through our ducts.
Q. Now, how about in downtown Seattle today, are you aware of situations where other utilities or other phone companies have shared your underground structures?
A. I'm thinking. I believe there are, but I don't have that information at my fingertips. And I believe it's innerduct structure, not entire structure. Does that make sense?
Q. Not yet, but we'll try to make it make sense.
What is innerduct structure?
A. When you have ducts, then you can pull ducts inside that are smaller, and usually you pull them inside of four-inch pipe to create more paths for usually fiber optic cables.
Q. Let me try and describe what I think you just said and you can tell me if I've got it right.
A. Okay.
Q. There's a concrete structure, and inside of that are smaller structures *of some sort*?
A. Uh-huh, four-inch pipes, usually.
Q. Four-inch pipes. And what you've described in terms of sharing is that another carrier gets to put its four-inch pipe through your concrete structure; is that

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correct?
A. No, it's usually with – what I believe I said is usually within our four-inch structure there – we have placed innerduct within that four-inch structure, and within that innerduct I believe there are some other carriers in that structure.
Q. And do you know which –
A. In downtown.
Q. And do you know which carriers those are?
A. No, I don't.
Q. You mentioned that there was some market organization in Denver which either authorized or rejected these sharing opportunities; is that correct?
A. There's a– what happens is the customer works with their market unit person, *their marketeer*, to go back to capacity provisioning and come up with a decision around whether there is an opportunity to share those facilities.
Q. And who would the customer be in that situation?
Another carrier?
A. Could be.
Q. Who else could it be?
A. I do not know.
Q. Could it be Boeing?
A. I don't know.
Q. Who are these people that make the decision in

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Denver whether or not it's okay to share underground structures?
A. I believe, I'm not 100 percent sure, that it's within the capacity of provisioning organization.
Q. And does that ultimately report to Mr. Bystrzycki?
A. Yes, it does.
Q. And do you know who is in charge of this capacity provisioning group?
A. That reports up to Harvey Plummer.
Q. Harvey who?
A. Plummer.
Q. And does Mr. Plummer in turn report to Mr. Bystrzycki?
A. That's my understanding. It fluctuates a lot, and so – just so you're aware.
Q. Have you ever been involved in a situation in which a customer or carrier requested the opportunity to share underground structure but it was rejected by US West?
A. No. Let me qualify that. In the last two and a half years, no.
Q. How about *before* that?
A. Before then, no specific examples come to mind.
Q. Just to get a feel for where underground is used as opposed to buried, is underground generally used in the

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more dense urban areas?
A. Yes, that's correct.
Q. And would that, in the Puget Sound area, be Seattle, Tacoma and Bellevue?
A. Yes.
Q. Can you think of any other instances where underground is used in this area?
A. Yeah. We built a tree structure out from our central offices, and we were building that tree structure out usually because the size of the structure, what we have going into each office, grows as you get close to the office, depending on the size of the office. The closer you get the greater the chance that you're going to end up with conduit in the ground feeding out. And so it's not necessarily just based on density. For instance, in Hoodsport we have *conduit, a short piece of conduit*, but conduit going out for a five vault.
Q. What's conduit made out of, just to clear that up?
A. It depends. It could be wood, it could be – it depends on the status, the age. It could be vitrified clay, wood or PVC.
Q. Essentially some kind of pipe?
A. That's correct. It's a path that's underground.
Q. Is what that's underground?

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A. Path.
Q. And so in situations near central offices where you have a lot of feeder cable coming into and out of the central office, you sometimes use these underground structures; is that correct?
A. That's correct.
Q. And are you aware of any situations where US West has shared that conduit near central offices with other carriers or customers?
A. Well, with the Telecommunications Act, I know we're placing conduits near central offices for other people to use, co-location opportunities. And also, like in Seattle, when we were AT&T, one large company, we have toll cables and stuff going into east and into main, where everything from that era or time frame all runs together into the CO.
Q. So in the co-location settings that you're starting to have under the Telecommunications Act, will there be actual sharing of underground structure by US West and other carriers?
A. That's my understanding, yes, at least that vault.
Q. Do you have any sense in terms of a percentage basis of what percent of your underground structure is shared in the Puget Sound area?

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A. No sense at all.
Q. Thank you. Let's turn to buried. And if you don't mind, could you just define for me what you mean by trenching.
A. Trenching is where you use a backhoe or a rock saw or some other means to create a path that remains open so you can then lay the cable inside of it.
Q. Can you define what you mean by plowing.
A. It's a specific piece of equipment that you end up putting a reel of cable on and then just heading down the street, where the plow creates the trench and actually goes ahead and does the backfill and stuff and just plow it in.
Q. So it's a simultaneous process where the same piece of equipment opens a hole, lays the cable and then puts the dirt back on top?
A. You probably have to go back and do restoration, but in the plowing operation, the placement of cable happens at the same time that the trench is being opened.
Q. And could you just define for me what you mean by boring.
A. Boring is where you have a facility that's going underground. You start at one end, and usually you have some kind of directional finder so you can see where it's heading, and it's got a prearranged place at the other end where it's coming out.

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Q. So I'm imagining something that looks like a big drill that drills under the ground. Is that a correct imagining?
A. Yes, that – well, there's a couple different ways, but that's as good a picture as anything.
Q. And how big a hole generally is made by this piece of equipment?
A. The type of boring that we usually do is for fairly large structures, and so usually we need quite a bit of room for setup and teardown.
Q. Is that two feet or six feet or half a foot or –
A. More.
Q. How much more?
MS. ANDERL: Dan, let me clarify. Are you talking about the diameter of the hole that's being bored or –
Q. That's fair. Let's look at both. How big a diameter hole is being bored?
A. In most of the cases I'm aware of, they're usually substantial holes, six to nine ducts, so pretty good-sized pipes.
Q. Is that two feet or six feet, or do you have any general idea?
A. 24-inch.
Q. Total across the whole diameter?

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A. Diameter, yeah; something large.
Q. Let's go the other direction. Let's go the length of the bore. I think you were indicating that it was fairly long bores that you were doing; is that correct?
A. Uh-huh.
Q. And can you give me a –
A. We've done some – we went under the Chehalis River, which was pretty large and long, and getting underneath there, we've – you want footage?
Q. Only if you know it.
A. No. They're not insignificant. Sometimes we do bore under roadways.
Q. So boring could be as short as six feet or as long as 150 feet?
A. I would not think we would bore if it was six feet. I would think that if you were boring it was at least 30 feet, probably more.
Q. And do you have any idea what the maximum –
A. No.
Q. – boring distance is?
A. It would depend on the terrain, the soil.
Q. Just in terms of again getting a better understanding of how this happens physically, when you bore a hole, do you simultaneously put something in there to keep the hole from falling down and collapsing?

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A. Yes, you do.
Q. And what do you put in?
A. They're – in the ones I've watched, which I've only watched one, they were bringing a plastic sheath in to keep the hole open while they were doing the bore.
Q. And after they put the plastic sheath in, do they put anything else in to reinforce the hole?
A. Yeah, they ended up putting a more form-fitted pipe in through that will keep it, and then the duct is inside the pipe.
Q. What's the pipe made out of, typically?
A. Don't know.
Q. Something hard and strong, I take it?
A. That would be my guess.
Q. And then once you've got that pipe in place, what do you put inside the pipe?
A. Usually duct structure.
Q. And what's the duct structure made of?
A. Usually plastic.
Q. And inside that what goes?
A. Cable.
Q. And would that be either copper or fiber?
A. That's correct.
Q. And does US West currently use boring both for copper and fiber?

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A. The structures we're putting in usually, on the ones I'm aware of, are for relocation events, where we have currently copper and fiber in the ground or a mix of both, so yes.
Q. What do you mean by a relocation event?
A. The one I watched was where they were doing the S-curves in 405, and their pilings were coming down on top of our duct structure, and so we had to relocate our duct structure and go up to the top of a huge hill on the other side, and the only way we could get there was by boring.
Q. Can you think of any other relocation events you're aware of where boring has been used?
A. Yeah, when they were dredging in two waterways that I know of where we had duct structures, we've had to go through and bore to get further underneath the waterway so they could continue on with their dredging projects.
Q. So is boring a fairly unusual thing to do versus burying or plowing?
A. Yes. We bury or plow as a first choice.
Q. And do you have any idea of the percentage of time in which US West employs boring versus burying or plowing?
A. I can't talk to US West for Washington alone. Due to the terrain that we have, boring is not a first choice method, and based on a conversation I've had with our

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contract inspector, I would say it would be one percent of the time or less in Washington State.
Q. One percent?
A. Or less in Washington.
Q. And who's this contract person?
A. His name is Fran Gough.
Q. And what does he do?
A. He is our contract work liaison for Washington State, and what he does is he puts contracts out to bid for our placing crews.
Q. Well, let's finish the discussion on boring, at least for now. Do you ever share bored structure with other carriers or customers that you're aware of?
A. I can give you a specific.
Q. Sure.
A. Okay. We're currently exploring the opportunities to bore over on the peninsula, where we have a cable structure that needs some help, and Washington – no, Cascade Gas is looking to share some of the – of that trench with us. And I don't know if you consider that shared, because with gas what we would do is probably do two bores side-by-side.
Q. Would it be cheaper to do two bores side-by-side rather than you just doing your one bore by yourself?
A. It depends on the environmental and the

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technical. And also it's gas. It's not one of the more typical utilities that we would share with.
Q. What are the more typical utilities that you would share with?
A. Power or T.V.
Q. And are you aware of any sharing of boring arrangements with either power or T.V.?
A. No, I'm not.
Q. If you're going to put in two bores rather than one bore, what is the advantage of sharing with Cascade Gas in that situation?
A. First off, from an impact to the public, we're only impacting the public once, and we like to minimize what we're making happen there. The second issue is from a setup cost, and bringing the equipment in, because it's a fairly large bore, bringing the equipment in to do this bore is fairly expensive. You get to share that, plus core sampling, all those other sorts of things, you get to share the cost.
Q. So there are a lot of one-time setup type costs that you can share with them?
A. Yeah, right.
Q. Let's turn to plowing. I think fortunately I sort of understand that one a little bit from a technical perspective, so I won't ask you to explain that more. Do

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correct in understanding that this is a measurement of dollars of copper cable rather than feet of copper cable?
A. That's correct.
Q. And where it indicates land development agreement, is that a situation in which US West does not have to pay for the trenching, but the developer pays for the trenching?
A. There's a land development agreement contract that we enter into with the developer where the developer provides the trench, and based on the utilization of the facilities within the trench, we provide a refund of a certain percentage over a five-year period of time.
Q. Can you explain to me what you mean by a refund in that situation.
A. We base the – the developer pays us money up front to provide facilities within the subdivision, and we take that money and rebate it over a five-year period of time based on the utilization within that subdivision.
Q. Let's focus on one other point first, which is, in the LDA for Washington State, does the developer itself have to pay for the physical trench that's created in the ground?
A. The developer has to provide the physical trench that's in the ground. I'm unclear about –
THE WITNESS: Should I say if I'm unclear,

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It's what I think it is, or –
MS. ANDERL: If you don't know –
Q. Let me ask you a question.
MS. ANDERL: – I'd rather you didn't speculate.
Q. Do you know how the developer causes this trench to be created?
A. Usually with a backhoe.
Q. And somehow or the other they have to take care of that being done, correct?
A. Correct.
Q. And US West is not financially or otherwise responsible for the creation of the hole in the ground?
A. That's correct.
Q. And does US West ever pay the developer anything for creating the hole in the ground or the trench?
A. That's where I'm unclear. I believe we do provide them some dollars back based on the number of utilities that are in the trench, but I'm not sure how that rebates. I'm not clear about this. You really need to talk to the person who does our LDA agreements.
Q. And who is that?
A. Jim Christian.
Q. Jim Christian?
A. Uh-huh.

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Q. And where is Mr. Christian located?
A. In Denver.
Q. And is he responsible for the LDA's for the entire region?
A. He is for Washington.
MS. ANDERL: Dan, could I just get a point of clarification here? Ms. Cervarich, a minute ago you said something about providing money back to the developer based on the number of utilities that were in the trench. Is that what you meant to say?
A. Again, I'm unclear about the calculations and what the LDA agreement completely entails, and –
Q. Okay, that's fine. You did indicate that there is this rebate paid back over five years to the developer, and you seem to be more clear about that.
A. Uh-huh.
Q. Let's take that in pieces, and maybe I can use an example. Let's assume we have a brand new subdivision with no houses in it yet, and US West has to come in and install facilities in the trench that the developer opens. Is that a correct hypothesis?
A. That's correct.
Q. Once US West installs those facilities, does it charge the developer for US West's costs of installing those facilities?

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A. It charges the developers before we do the install.
Q. And what are you charging the developer for? The equipment, the labor, the wire, what?
A. I do not know how they came up with the calculation. I know we calculate it based on the center line footage of the road to determine the amount that we charge.
Q. And it would be on a per-foot basis then?
A. Per center line footage, yeah.
Q. And so making this really simple, let's assume there's one road into a subdivision. You would measure how many feet along that road there are down the center?
A. Uh-huh.
Q. Is that correct?
A. That's correct.
Q. And then you would charge the developer some amount of money for your putting in the facilities into the subdivision; is that correct?
A. That's correct.
Q. And do you know what that is on a per-foot basis?
A. No, I don't.
Q. Do you have even a range that you have any idea of?
A. Huh-uh.

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Q. And that would be Mr. Christian's responsibility, again?
A. Correct. We calculate the center line footage, but he actually effects the contract.
MS. ANDERL: Dan, to just interject, you may be aware of this and are just seeking to gather what the witness's knowledge is, but a lot of this information I think is in our tariff in Section 4, which covers LDA's. And she just may not have personal knowledge of it, but it's certainly easily out there.
MR. WAGGONER: Thank you.
Q. This rebate over five years that you've talked about, do you know, is that the complete cost of the facilities US West has installed that gets rebated to the developer or is it an incomplete portion?
A. It's my understanding that it's the complete cost.
Q. And as far as you know, is that done based on the percentage of the development that actually gets filled up?
A. Correct.
Q. While we're talking about charges to developers or people building new structures, does US West, as far as you know, have any charge for line extensions to get from one area where you have facilities to another area where somebody wants to do a development?

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A. Yes.
Q. And do you know what that is about?
A. The line extension charge?
Q. Yes.
A. I think it's around 80 cents a foot.
Q. So let me give you a hypothetical. Let's assume I'm a developer up on the Sammamish plateau and I want to build a subdivision that's two miles from the nearest phone facility. Okay?
A. I believe it's – there's a definitive – and again I'm not 100 percent clear on this – inside the base rate or outside the base rate. It's in the tariff. But I believe the line extension charge is only outside of the base rate area. I'd have to go back and look it up, though.
Q. Are you telling me that if I'm outside the base rate area I'll be charged the line extension charge, but if I'm within the base rate area I won't be?
A. I'm not clear on that.
Q. It's just a tariff issue that you don't know about?
A. Right.
Q. Okay, thank you.
A. Again, we have the tariff handy, so we review it when questions come up.
Q. That's fine. Let's go back to Exhibit 1. The

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next column is total buried copper footage 1996. Am I correct in assuming that that's just the amount of feet that you laid in developer trenches in 1996 in that state?
A. I don't know that it's trenching; it's total buried.
Q. That's what I'm trying to find out. The top of the table or the box refers to developer trenches in 1996, and I'm trying to understand whether this column, if you know, is the total amount, regardless of whether it's in developer trenches.
A. That's my understanding of the information.
Q. And the next column would be a subset of that, which would be the amount not in developer trenches, correct?
A. It's an estimated amount based on the percentages from the dollars.
Q. And then the same thing in the next column would be the percentage of it that is in developer trenches, correct?
A. Correct.
Q. Do you know whether the footage not in developer trenches is provided entirely in trenches that are either dug or exclusively paid for by US West?
A. No, I don't know.
Q. Do you know whether there are situations outside

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LDA's where US West obtains trenching from some other party?
A. Give me an example.
Q. Okay. Well, we've been discussing the land development agreement, which is generally for new subdivisions, correct?
A. Correct.
Q. And what I'm trying to do is move outside of that situation and find out whether outside of that particular situation there are other arrangements US West has where somebody else actually digs the trench that US West goes into.
A. And do we pay for a piece of that trench or is the trench free?
Q. Let's find out both of those. Are there those situations that exist outside of LDA's?
A. Yes.
Q. And now let's ask, are those situations where US West gets the trench for free, at least some of the time?
A. Yes.
Q. And what kind of situations –
A. Infrequently.
Q. What kinds of situations would those be?
A. I can think of one that comes to mind, is where a developer comes in – in Washington State the developer and the builders are different, and usually you can go in and

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you can get all the permits for a huge LDA project, and rather than call that whole project an LDA, they'll subset it out to developers, okay? And to help expedite it, we might say, instead of saying the entire 3,000 lots is a subdivision and having the developer pay up front, they'll provide us trenching down the main road, and then we'll call each phase a separate LDA. So that trench down the main piece of that subdivision, they would provides us the trench and we would put the pipe and facilities in it, but that's in lieu of doing – does that make sense?

Q. Yes. You indicated there may be some situations where in trenching outside of LDA's that US West only pays for part of the trenching. What would those situations be?

A. I can think of one specific. City of Bellevue goes on a bi-weekly basis, twice a month, and has a meeting and tells where other people are burying, and pretty much puts it out to the universe that if US West is burying there, anybody else wants to go in, they jump in the trench with, and then you split the cost.

Q. Do you have any idea what percentage of the time in this area of trenching outside of LDA's US West shares the cost of trenching versus –

A. No, I do not have a percentage. It is not the norm.

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Q. What's that?

A. It is not the norm.

Q. We've talked a fair amount about sharing with utilities that are in the gas or the power business. Let's focus for a second on sharing with cable television. How much of the time does US West share a structure with cable television?

A. Virtually all of our LDA's.

Q. And how about outside of LDA's?

A. Again, those isolated instances, like City of Bellevue, big projects, usually, I think, that are happening.

Q. Do you know what percentage of the time cable television does not share with some other utility in terms of either poles or buried?

A. I have no idea.

Q. Let's go down to the next box or table on Exhibit 1. That's titled USWC Estimate of Aerial Cable Placed on Joint Use Poles in 1996. What are joint use poles?

A. Poles that they have multiple utilities on them.

Q. And this is only for Washington State. What does the percentage of pole usage via US West-owned poles refer to?

A. The percentage of poles that we own in US West of the poles that we're using.

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Q. That are joint use poles?

A. Correct.

Q. So that percentage is the percentage of joint use poles that are owned by US West; is that correct, or is that the percent of total poles in the state?

A. One moment, please. Could you restate the question?

MS. ANDERL: Dan, off the record.

(Discussion held off the record.)

Q. If I could just summarize an off-the-record discussion, and if you could confirm it, is it correct that this table that we've just been discussing indicates the percentage of poles owned by US West in the first column, the percentage of poles owned by somebody else in the second column, and then it takes those two percentages and multiplies those times the total aerial copper/fiber footage provided in 1996 to yield estimates of the total footage on US West-owned poles versus non-US West-owned poles?

A. That's my understanding.

Q. Are all of US West's poles joint use poles as opposed to sole use poles?

A. We have some 100 percent use poles.

Q. And would those be excluded from the universe of poles we're looking at here?

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A. The 100 percent poles will be included in the number of US West-owned poles, so if – for the –

Q. Let me ask: Is it your testimony that the percentage reflected in the first column is for poles where nobody else is on those poles?

A. No, it's for a combination of 100 percent, 50 percent owner and 33 percent ownership poles, any percentage where we own a piece of that pole.

Q. But my point is not about ownership. My point is about whether there's anybody else on the pole. Does anything about that percentage tell me whether there's somebody else on that pole or is it solely about percentage ownership?

A. Solely percentage ownership.

Q. I note in the third column it indicates total aerial copper/fiber footage in 1996. Do you see that reference?

A. Yes, I do.

Q. Do you have any understanding of what the relative percentages of copper versus fiber were that were installed in 1996?

A. No, I do not.

Q. But is it correct that US West is still installing both copper and fiber on poles in 1996?

A. Correct.

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you put in replacement poles, you would continue to share with the power company and the cable television company?
A. That's correct.
Q. Let's change the scenario and assume we're in a developed area. You've got buried facilities as opposed to aerial facilities and you wanted to either replace or add to those facilities in a buried situation. How would you go about doing that?
A. The same thing. You would evaluate the type of cable you currently had, the customer base or demographics around that area, and then size the new cable to feed those in a distribution situation, and then you would put new cable in the ground. And if you were buried, 99 percent of the time we will remain buried as we go in.
Q. And does this happen very often, that you would go in and completely redo a buried outside plant situation in a developed area?
A. More and more. As the usage has gone up in the residential neighborhoods, based on what people are requiring, we're having to go into more and more neighborhoods to rebuild them.
Q. And if you are doing that, what do you do with the existing plant that's already there, assuming it's sound?
A. If the existing plant is sound, usually have a

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couple strategies, but you usually come in – with a buried cable you don't – how do I say this? You determine how you can best utilize the existing and supplement it with the new cable. So you may not – if the cable is multiple or dedicated plant, if it's dedicated plant and it's sized appropriately for a cul-de-sac, for instance, but the cul-de-sac feeds down an extended street, you may go halfway down the street and then take the – bypass the first half of the street and provide new feed for the second half of the cul-de-sac. Does that make sense?
Q. Yes.
A. Okay.
Q. So just in terms of the actual burying aspect of this, would you actually dig up the old trench in this kind of scenario?
A. No.
Q. So would you put in a new trench?
A. Yes. Usually in these scenarios the cable under ground is usually aged, and so even finding the old trench would be a trick.
(Discussion held off the record.)
Q. If you are going to go in and create a new trench to either replace or add to outside plant in a developed area, would you at that time offer other utilities the opportunity to use that trench?

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A. It depends on the nature of the replacement.
Q. Can you explain that more?
A. My team is continually dialoguing with our utility and city/county peers, and if you were just going in after one street to get at one isolated clump of – where service capabilities were not existing, usually you would not. That's –
Q. Just not worth it?
A. Yeah, it's just not worth the hassle. If you were going in and doing a whole over-build of a structure, an entire neighborhood, you might talk to the other utilities and see if they want to go in as well.
Q. And do they sometimes go in as well?
A. Yes, they do.
Q. Do you have any idea what percentage of the time they do?
A. Don't have a percentage.
Q. I think we talked about this a little bit before, but when you are dealing with municipalities and counties, do you have any that you know of that require sharing?
A. City of Bellevue does.
Q. Anybody else?
A. Not on a formal basis. They – most cities and counties, if you're going down a road, do not look favorably upon having the road torn up for various projects throughout

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the year, so if they know there's multiple people looking for multiple trace placements down a street, they'll try to connect you together so at least from a public perspective you're not disturbing the people who live around that street multiple times in a given annual year.
Q. I think we talked about both aerial and buried. Let's talk about underground for a second. Well, I guess, first of all, if we're talking about underground facilities, we're always talking about a developed area, or almost always; is that correct?
A. Almost always.
Q. And if you wanted to add capacity or replace outside plant in underground structure, how would you do that?
A. Well, if the duct structure was totally out of gas, they actually had to dig the street, there's two ways. First off, once you have the underground structure in place you can add capacity just by using the existing ducts that are in the underground structure. Okay? Now, once you've utilized all those ducts, you have a couple different options. You can mine out smaller-sized cables.
Q. What do you mean by mine out?
A. Say it's an old wood creosote duct and you think it won't collapse when you pull out the old cable. You could try, if you had an old 300 or 400 in, to pull out the