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BEFORE THE ARIZONA CORPORATION COMMISSION 4: 09

MARC SPITZER
Chairman
JAMES M. IRVIN
Commissioner
WILLIAM MUNDELL
Commissioner
JEFF HATCH-MILLER
Commissioner
MIKE GLEASON
Commissioner

AZ CORP COMMISSION
Arizona Corporation Commission DOCUMENT CONTROL

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MAY 12 2003

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IN THE MATTER OF INVESTIGATION
INTO QWEST CORPORATION'S
COMPLIANCE WITH CERTAIN
WHOLESALE PRICING REQUIREMENTS
FOR UNBUNDLED NETWORK ELEMENTS
AND RESALE DISCOUNTS

DOCKET No. T-00000A-00-0194

**QWEST CORPORATION'S NOTICE OF
FILING REBUTTAL TESTIMONY**

Qwest Corporation ("Qwest") hereby provides notice of filing the Rebuttal Testimony of
Teresa K. Million and Philip Linse in the above referenced matter.

DATED this 12th day of May 2003.

FENNEMORE CRAIG

By 
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Josie Maldonado

BEFORE THE ARIZONA CORPORATION COMMISSION

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CHAIRMAN
JAMES M. IRVIN
COMMISSIONER
WILLIAM A. MUNDELL
COMMISSIONER
JEFF HATCH-MILLER
COMMISSIONER
MIKE GLEASON
COMMISSIONER

**IN THE MATTER OF INVESTIGATION INTO]
QWEST CORPORATION'S COMPLIANCE]
WITH CERTAIN WHOLESALE PRICING]
REQUIREMENTS FOR UNBUNDLED]
NETWORK ELEMENTS AND RESALE]
DISCOUNTS.]**

**DOCKET NO. T-00000A-00-0194
PHASE II AND PHASE II-A**

REBUTTAL TESTIMONY OF

TERESA K. MILLION

ON BEHALF OF

QWEST CORPORATION

MAY 12, 2003

TESTIMONY INDEX

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II. PURPOSE OF TESTIMONY 1

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1

I. IDENTIFICATION OF WITNESS

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Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND POSITION WITH QWEST CORPORATION.

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A. My name is Teresa K. (Terri) Million. My business address is 1801 California Street, Room 2050, Denver, Colorado 80202. I am employed by Qwest Services Corporation as a Director, Service Costs, in the Policy and Law Department. In this position, I am responsible for preparing testimony and testifying about Qwest's cost studies in a variety of regulatory proceedings.

9
10

Q. ARE YOU THE SAME TERESA K. MILLION WHO PREVIOUSLY FILED TESTIMONY IN THIS PROCEEDING?

11

A. Yes. I filed direct testimony in Phase II-A of this proceeding on April 28, 2003.

12

II. PURPOSE OF TESTIMONY

13

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

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A. The purpose of my testimony is to rebut the testimony of Mr. Michael Lee Hazel on behalf of Mountain Telecommunications, Inc., and Messrs. Douglas Denney, Joseph Gillan and Richard Chandler on behalf of AT&T Communications of the Mountain States, Inc. and WorldCom, Inc.

18

III. TRANSPORT RATES

1 **Q. MR. HAZEL STATES IN HIS TESTIMONY THAT "QWEST'S**
2 **IMPLEMENTATION OF BUNDLED TRANSPORT RATES WHICH INCLUDE**
3 **ENTRANCE FACILITIES IS ENTIRELY OF QWEST'S OWN MAKING."**¹ **IS**
4 **THIS TRUE?**

5 A. No. Perhaps because Mr. Hazel did not participate in Phase II of the cost
6 docket, he is unaware that it was the CLECs, not Qwest, who proposed
7 combining the costs for transport and entrance facilities into a single rate in the
8 cost docket. Qwest provided separate costs for these elements and advocated
9 separate rates for transport and entrance facilities. Thus, it was the
10 Commission's decision to choose the CLEC-sponsored HAI model to determine
11 UNE rates that resulted in a single rate for transport and entrance facilities.
12 Qwest merely implemented the rates for these elements as ordered and
13 approved by the Commission.

14 **Q. WAS THE COMMISSION AWARE THAT THE HAI MODEL PRODUCED A**
15 **HIGHER RATE FOR TRANSPORT THAN QWEST'S ICM PRODUCED?**

16 A. Yes. In fact, the Commission's order discussed the transport rates produced by
17 the HAI model and AT&T's argument that it would be inappropriate to use the
18 HAI model for pricing transport. The Commission acknowledged that Qwest was
19 "entitled to ask that the HAI model be applied consistently and not just where it
20 creates the greatest advantage for the CLECs."² The Commission then affirmed,

¹ Hazel Direct testimony at 5.

² Decision No. 64922 at 79.

1 despite the objections of the CLECs, that it would “adopt the HAI model’s results
2 for purposes of pricing transport in this proceeding.”³ Mr. Hazel implies that the
3 Commission did not know what rates it was ordering Qwest to implement and
4 suggests that Qwest acted unilaterally to increase transport rates and include the
5 cost of entrance facilities in the rate. His conclusion clearly ignores the
6 Commission’s careful consideration of the transport issues in Phase II and the
7 fact that the Commission, the ALJs, and all parties involved in that phase of the
8 docket clearly understood the transport rates that would result from using HAI.

9 **Q. DO YOU STILL BELIEVE THAT STAFF’S OPTION 2, AS DESCRIBED IN**
10 **YOUR DIRECT TESTIMONY, IS THE OPTION THAT THE COMMISSION**
11 **SHOULD ADOPT IN THIS PROCEEDING.**

12 **A.** Yes. Qwest agrees that no CLEC should be charged for entrance facilities that it
13 does not use. That is precisely why Qwest advocated separate rates for
14 transport and entrance facilities in Phase II. It is the CLEC-sponsored HAI model
15 that produces a transport rate that combines the costs for those two elements.
16 Therefore, the appropriate solution is not to return to the rates that were in effect
17 prior to the cost docket but, as proposed in Staff’s Option 2, to utilize the
18 transport rates approved by the Commission and remove the cost of entrance
19 facilities from those rates for CLECs that do not purchase entrance facilities from
20 Qwest.

³ *Id.*

1 **Q. AT PAGE 5 OF HIS TESTIMONY, MR. HAZEL ARGUES THAT OPTION 1**
2 **WOULD BE EASIER TO ADMINISTER. IS THIS A VALID ARGUMENT?**

3 A. No. While Qwest always appreciates it when the CLECs take into consideration
4 the difficulties it faces in administering Commission orders, Mr. Hazel's concerns
5 are unfounded in this instance. Whether the Commission decides to adopt
6 Staff's Option 1 or Option 2, the result will be separate rates for transport and
7 entrance facilities. Under Option 1 the Commission would resurrect the old rate
8 for transport; under Option 2 the Commission would use the results from HAI to
9 establish a new rate for transport that does not include costs for entrance
10 facilities. Under both options, there would be a separate rate for entrance
11 facilities. From Qwest's perspective, therefore, there would be no administrative
12 difference between these options. For reasons discussed above, as well as in
13 my direct testimony, Qwest believes that the Commission should adopt Staff's
14 Option 2 to determine appropriate transport rates.

15 **Q. IN ARGUING THAT QWEST IMPROPERLY INCREASED ITS MULTIPLEXING**
16 **RATES MR. HAZEL SAYS THAT "THE COMMISSION STATED THAT**
17 **'SUFFICIENT EVIDENCE DOES NOT EXIST IN THE RECORD FOR**
18 **PURPOSES OF RENDERING A DECISION.'"⁴ IS THIS ISSUE WITHIN THE**
19 **SCOPE OF THIS PROCEEDING, AND IS MR. HAZEL CORRECT?**

20 A. No. First, the stipulation and Procedural Order that identify the issues for this
21 phase of the docket expressly limit the issues to specific aspects of transport and

⁴ Hazel Direct testimony at 6.

1 switching. Multiplexing is not one of the issues and, to my knowledge, was never
2 discussed among the parties as being part of this proceeding. It is unclear,
3 therefore, why Mr. Hazel is raising multiplexing when there is no justification for
4 doing so.

5 Second, the statement that Mr. Hazel quotes relating to multiplexing and a lack of
6 "sufficient evidence" is from Commission Staff, not from the Commission itself.
7 Evidently, Mr. Hazel did not see the Commission's note on page 80 of Decision
8 No. 64922 attributing the statement to Staff as part of a discussion of Staff's
9 proposal to set interim rates using a default calculation. The Commission
10 rejected Staff's proposal and also stated that it would not adopt Qwest's
11 proposed rates for services for which there was not an adequate record. The
12 Commission then urged the parties to resolve pricing issues as promptly as
13 possible stating that, if necessary, they would be resolved in Phase III.

14 As for multiplexing, the rate included in the compliance filing was the result of an
15 agreement between the parties to the cost docket to resolve the pricing for that
16 particular element rather than defer it to Phase III. It is therefore inappropriate,
17 as well as outside the scope of this proceeding, for Mr. Hazel to take issue with
18 the multiplexing rate.

1 **Q. MR. HAZEL BELIEVES THAT THE RATES RESULTING FROM THIS**
2 **PROCEEDING SHOULD BE APPLIED RETROACTIVELY TO JUNE 12, 2002.**
3 **DO YOU AGREE?**

4 A. No. Mr. Hazel appears to base his position on Staff's opinion that the transport
5 rates approved by the Commission produced an unexpected and unreasonable
6 rate increase not intended by the Phase II Order. However, as discussed above,
7 the rates implemented by Qwest in December 2002 were, contrary to Mr. Hazel's
8 assertion, implemented with the express approval of the Commission. Qwest did
9 not initially advocate the transport rates adopted by the Commission in Decision
10 No. 64922. In fact, Qwest agrees with Mr. Hazel that separate rates for transport
11 and entrance facilities are appropriate. Nevertheless, once the Commission
12 made it clear that it was adopting the HAI model for other rates, Qwest requested
13 that, to ensure consistency, the Commission also use HAI for transport. The
14 Commission ultimately agreed with Qwest and adopted the HAI model for
15 transport knowing that the model produces a rate that combines the costs of
16 transport and entrance facilities. Although Mr. Hazel and MTI may have been
17 surprised by the increased transport rates, the parties that elected to participate
18 in Phase II of this docket fully understood that the Commission's decision to use
19 HAI to set rates for UNEs would cause transport rates to rise. Thus, this is not a
20 case of rates that were ordered by the Commission in error or that were imposed
21 through some malfeasance on Qwest's part. To the contrary, the Commission
22 concluded in Phase II that the transport rates it ordered were lawful and

1 appropriate and consistent with the requirements of TELRIC. In these
2 circumstances, where Qwest implemented the rates as ordered by the
3 Commission, there is no basis for applying any changes to the rates retroactively.
4 In addition, even if such retroactive application were appropriate in principle, it
5 would still be necessary to review individual CLEC interconnection agreements to
6 determine whether retroactive application is allowed.

7 **IV. ANALOG PORT RATES**

8 **Q. WHY DO YOU DISAGREE WITH THE POSITION OF MESSRS. GILLAN AND**
9 **CHANDLER THAT 100% OF THE SWITCHING COSTS SHOULD BE**
10 **ALLOCATED TO THE PORT?**

11 A. While it is true that today's vendor contracts charge Qwest for some switch
12 facilities on a per-line or per-trunk basis, it is not true that this type of contract
13 structure means that usage-based costs have been eliminated. Therefore,
14 although on a superficial level one might conclude that all switching costs are
15 caused by the number of lines and trunks, a more thorough analysis reveals that
16 in the long run, large portions of switching costs are still caused by usage.

17 **Q. WHAT IS THE FLAW IN THE ARGUMENT THAT LOCAL SWITCHING COSTS**
18 **ARE NOT CAUSED BY USAGE?**

19 A. The argument ignores the fact that the manner in which a switch is designed to
20 account for particular levels of usage has a direct and material effect on
21 switching costs. Although Qwest's Network witness, Philip Linse, discusses the

1 engineering of switches in more detail, briefly, an engineer determines how much
2 switch fabric and processor capacity to install depending on the amount of
3 average peak usage expected from the ports connected to the switch. That is,
4 as usage (calls or minutes of use "MOU") increases, these portions of the switch
5 must be engineered to handle the additional traffic. More usage means more
6 trunks, conference circuits, interactive announcements and processors and, in
7 turn, greater switching costs. While ports are dedicated to a customer, the
8 trunking and the switch fabric are shared by all customers. If there are no more
9 ports, but the usage per port increases, the usage-sensitive portions of the switch
10 must be engineered to accommodate this.

11 For years, the telecommunications industry has realized that pure peak-usage
12 pricing (i.e., only charging for usage in the busy hour) is problematic, and thus
13 usage-based costs have been recovered over the entire day. In some cases,
14 time of day pricing (e.g., day, night and weekend rates) has been established to
15 accommodate the fact that usage fluctuates over the course of a day. However,
16 it has never been established that busy-hour demand correlates with the number
17 of ports (rated on a flat basis) to the same extent that it correlates with usage.
18 Common sense would indicate that an average usage charge – while not
19 perfectly reflecting the peak nature of the costs – would be more related to cost
20 causation than a flat port charge. To determine the approach that is most
21 consistent with cost-causation, the Commission should ask if busy hour usage is

1 more correlated to the total amount a customer *uses* its line or to the fact that it
2 purchased a line in the first place.

3 **Q. DO MESSRS. GILLAN AND CHANDLER ARGUE THAT THE SWITCH PORT**
4 **REPRESENTS A LEASE OF SWITCH CAPACITY?**

5 A. Yes. Their argument seems to be that because all of the switch's functionality is
6 available to a port, it doesn't matter how much the port uses those functions in
7 determining cost. This is not correct if the concept of cost causation is to be
8 applied to setting rates. While it is clear that the switch is engineered to have
9 enough traffic-sensitive equipment so that there is minimal blocking during peak
10 usage, it is clearly wrong to infer that each port has a fixed or committed amount
11 of capacity dedicated to its use.

12 In fact, the traffic-sensitive capacity – the switch fabric, trunks, conference
13 circuits, interactive announcements, and processors, etc. – is shared by many
14 ports. When these resources are being fully used by a group of ports, they are
15 not available to other ports. For example, the switch may be designed,
16 depending on how much usage is anticipated, so that for every 1000 lines, there
17 are 100 call paths. Only 100 calls can be simultaneously in session at any one
18 time. If all 100 paths are being used and the 101st port wants to make a call, it
19 will be blocked. Only when one of the 100 callers hangs up and frees a path can
20 one of the other 900 ports make a call. The relevant point is that traffic-sensitive

1 or usage-sensitive equipment is not committed to a port. Quite simply, if a switch
2 port uses one of these 100 paths more than the other ports in the switch, it has
3 caused more costs. Similarly, if the switch port uses this traffic-sensitive
4 equipment less than other ports, it has caused fewer costs. If more ports want to
5 use traffic-sensitive equipment than is available to be used, more traffic-sensitive
6 equipment must be purchased.

7 **Q. CAN YOU PROVIDE AN EXAMPLE THAT ILLUSTRATES THIS POINT?**

8 A. Yes. One of the most dramatic examples of the usage-sensitive nature of certain
9 switching equipment is the impact that dial-up Internet usage has had on the
10 network over the past several years. Switches were designed with enough trunk
11 ports based on a forecast of what the peak usage would be. The forecasts did
12 not anticipate the explosion of Internet use and, therefore, there were not enough
13 interoffice trunks. ILECs, such as Qwest, were forced to make significant
14 investments in trunk capacity to meet this demand. For example in Arizona, as
15 provided in Exhibit TKM-1R, Qwest's network group forecasted in approximately
16 1999 that increased usage would require Qwest to invest an additional \$99.6
17 million over four years to acquire increased trunk capacity over and above the
18 capacity built into Qwest's contracts with its switch vendors. The network group
19 forecasted total additional switching expenditures of \$252.6 million, including the
20 \$99.6 million for increased trunk capacity. Consistent with these forecasts,
21 Qwest has been required to make very substantial investments in trunk capacity

1 and other switching facilities over and above what was provided for in the initial
2 vendor contracts. The large increase in trunk investments reflects the substantial
3 increases in usage that have occurred, including, most significantly, the rise in
4 dial-up Internet calls.

5 **Q. DO QWEST'S SWITCHING CONTRACTS REFLECT THE FACT THAT**
6 **INCREASES IN USAGE INCREASES COSTS?**

7 A. Yes. While virtually all major switch vendors are selling their analog line switch
8 capacity on a per analog line basis, Qwest's contracts clearly reflect the fact that
9 there are traffic-sensitive costs. For example, in Qwest vendor contracts, the
10 "price per analog line" is actually different depending on the CCS⁵ per line - or
11 the CCS per line is restricted to the maximum stated in the contract. The fact
12 that the maximum CCS per line allowed in a particular contract is designed to
13 provide coverage during peak usage does not make that aspect of the contract
14 any less usage-based. Also, trunks are not included in the per-line rate, or else
15 the number of trunks per 100 lines is limited to 12. If more trunks are needed,
16 there is another price that must be paid to purchase additional trunks. (The
17 purchase in Arizona of these additional trunks is what comprises the \$99.6
18 million discussed above.) In addition, the price per line provides enough
19 conference circuits, interactive announcements and processing capacity to meet
20 a limited feature penetration. If that penetration is exceeded, the cost of adding

1 additional capacity is in addition to the per line price. This added cost is based
2 on switch usage, not on the number of lines. Finally, contract terms are limited.
3 If, in the long run, the usage per line is more than the switch vendor assumed
4 originally, the vendor will increase the price per line or demand a more traffic-
5 sensitive price structure when the contract is renegotiated. Again, the fact that
6 the current contract price per line provides adequate coverage for usage does
7 not make the underlying driver of cost per line any less usage-based.

8 **Q. ARE ALL VENDOR PRICES FOR SWITCHING CHARGED ON A PER LINE**
9 **BASIS?**

10 A. No. As noted above, there are some prices that are not charged on a per line
11 basis. For example, if more than 12 trunks are needed per 100 lines installed
12 initially or if trunks are added after the initial switch installation, these trunks are
13 charged for on a per trunk basis. In Qwest's network, the number of trunks
14 required per 100 lines is close to 20, so 8 additional trunks must be purchased
15 along with each 100 lines initially installed. These additional trunks are
16 necessary because the usage generated by the installed lines cannot be handled
17 by the trunks included in the initial line price. Since trunks are shared by all lines
18 and are engineered based on usage, Qwest must order trunks based on the
19 number of trunks needed to serve anticipated usage. It is obvious that these
20 costs are usage-based. Therefore, if usage increases in the office, Qwest will be

⁵ CCS stands for 100 call seconds.

1 forced to order more trunks regardless of the number of lines provided for in the
2 switch.

3 **Q. ARE THERE OTHER VENDOR CHARGES RELATED TO SWITCHING THAT**
4 **ARE NOT PRICED ON A PER LINE BASIS?**

5 A. Yes. TR-303 Integrated Digital Line Carrier ("IDLC") remote terminals are
6 connected to the switch with DS1 terminations. The vendor rate structure prices
7 these terminations on a per TR-303 DS1 port basis. However, the number of
8 TR-303 DS1 ports that are required is a not a function of the number of lines at
9 the IDLC remote terminal, rather it is a function of the amount of usage those
10 IDLC lines generate. This is particularly significant when considered in
11 conjunction with the forward-looking loop models, which assume that nearly half
12 of all lines are served with IDLC and not analog line technology. In fact, in the
13 HAI model nearly 72% of lines are assumed to be DLC technology. Clearly, this
14 results in a major switch investment that is driven by usage rather than the
15 number of lines.

16 **Q. ARE ANALOG LINE PRICES AFFECTED AT ALL BY USAGE?**

17 A. Yes. The cost per analog line for switching equipment may increase if the usage
18 per line reaches a certain point. While Messrs. Gillan and Chandler have argued
19 that the charge increases only above a level of CCS that would not likely be
20 achieved and is, therefore, not a binding constraint, the fact that there is a usage

1 limit certainly demonstrates that the switch is in fact engineered based on usage.
2 Further, the CCS limit to avoid a larger per line charge for one of Qwest's switch
3 vendors is only half the CCS limit imposed by the other vendor. The vendor with
4 the lower limit is at a level of CCS that is much more likely to be exceeded and,
5 in fact, is exceeded in a number of offices in Qwest's region. Thus, if the CCS
6 per line for that vendor's switch is greater than the limit imposed in the contract,
7 the cost per line increases.

8 **Q. CAN YOU ILLUSTRATE WHAT WOULD HAPPEN IF THE CCS PER LINE**
9 **EXCEEDED THE ALLOWED CCS PER LINE FOR ONE OF QWEST'S**
10 **VENDORS?**

11 A. In order to understand the real-world impact of exceeding the allowable CCS in a
12 switch contract, and based only on the current contract prices, I have provided an
13 analysis of the increase in cost if the busy hour CCS were to double. This exhibit
14 (Confidential Exhibit TKM-2R) shows that if usage doubled (i.e., increased by
15 100%) for each of the switches, the total cost would increase by 187% based on
16 current contract prices and line counts. What this exhibit shows is that, assuming
17 the line counts for each switch location stay constant but their usage doubles, the
18 total cost for this vendor's switches would increase from \$28 million to \$80.4
19 million. This is because the Average Busy Season Busy Hour (ABSBH CCS) in
20 the vendor's contract for a 4 CCS line is really 3.32 ABSBH CCS. Similarly, an 8
21 CCS line is really limited to 5.74 ABSBH CCS. So, lines that exceed 5.74
22 ABSBH CCS have a contract price of \$302 more than the price for lines with less

1 than 3.32 ABSBH CCS. Thus, if usage in a switch with 3 ABSBH CCS per line
2 doubled to 6 ABSBH CCS, the cost per line would increase by \$302. Clearly, in
3 this example, doubling usage results in increased switching costs.

4 **Q. ASSUMING THAT ALL SWITCH PRICES ARE CHARGED ON A PER LINE**
5 **BASIS WITH NO USAGE CONSTRAINT, DOES THAT MEAN THAT ALL**
6 **SWITCHING COSTS ARE CAUSED BY THE NUMBER OF LINES?**

7 A. No, and this is a key point. Assume that Vendor A is charging Qwest for all
8 switching equipment on a per line basis. When Vendor A sets this price, the
9 price per line is designed to compensate the vendor for all of the switching
10 equipment it installs, both the costs that are engineered based on lines and the
11 costs that are engineered based on usage. Thus, if the anticipated usage per
12 line increases, the amount of usage-sensitive equipment (e.g., trunks, talk paths
13 through the switch fabric, etc.) provided by the vendor will increase. If the vendor
14 wants to be compensated for its increased investment, when the current contract
15 expires, the vendor will increase the price per line because the vendor will have
16 to provide more equipment. This is different from the example provided by
17 Messrs. Gillan and Chandler involving loop plant. In their example, they argue
18 that a DS3 is more costly than a DS1 because it has greater capacity. However,
19 in the case of a DS3, the key factor is that there are more dedicated channels
20 and thus more customers that can be served with this type of facility. In other
21 words, a DS3 is more costly than a DS1 because a DS3 provides 672 channels
22 to serve customers while a DS1 provides only 28 channels to serve customers.

1 In the case of a switch, an increase in the amount of usage-sensitive equipment
2 does not correlate to an increase in the number of lines or customers that are
3 served; only the amount of usage available to customers increases. In the long
4 run, the price per line is driven by the amount of usage; thus, any long run cost
5 analysis would need to consider this fact in the development of costs.

6 Although the current contract price per line does not change below a certain high
7 level of CCS, the vendor has set this price based on the assumed average level
8 of CCS per line and feature use per line that it believes the switch will need to
9 bear. However, focusing on only the present contract and the current levels of
10 CCS incorporated in the contract provides the Commission with only a short run
11 analysis of switch costs. TELRIC requires cost studies to be long run, not short
12 run studies. If greater usage increases cost in the long run, that increase must
13 be reflected in a properly constructed study. Even if usage never increases, as
14 long as Qwest must periodically renegotiate switch contracts, and as long as
15 those contracts contain pricing that reflects maximum usage based on CCS, then
16 a long run TELRIC study would take usage into account. In future contracts,
17 while it is conceivable that a vendor would be willing to provide a lower per line
18 price if usage fell below current levels of usage, Qwest would almost certainly
19 have to pay the higher price if usage did not fall and remained unchanged. This
20 reality demonstrates that in the long run, there are costs associated with usage,
21 even when prices are offered by vendors on a per line basis.

1 **Q. DO USAGE-BASED RATES CAUSE CROSS-SUBSIDIES?**

2 A. No. This argument is based on an assumption that there are no usage-based
3 switching costs and that, therefore, a usage-based charge will require high-usage
4 customers to subsidize low-usage customers. In reality, since high-usage
5 customers cause more costs, it is a flat structure, with all costs allocated to the
6 port, which will lead to cross-subsidies. Such a flat charge results in the low-
7 usage customers subsidizing the high-usage customers. It is not surprising that
8 the CLECs have begun to argue for allocation of the switching cost to the port
9 because the CLECs are likely to target their service offerings to high-usage
10 customers and they would be on the receiving end of the subsidy. However,
11 because the Commission is concerned with the interests of all Arizona citizens, it
12 should reject a pricing structure that averages the cost for low-usage residential
13 customers in with high-usage business customers to the benefit of the business
14 customers. Rather, the Commission should adopt a pricing structure (i.e., a
15 lower port charge combined with a usage charge) that keeps the overall costs
16 lower for residential customers and assigns more costs to the high-usage
17 business customers.

18 **Q. COULD THE ALLOCATION OF SWITCHING COSTS TO THE PORT IMPACT**
19 **RETAIL RATES?**

20 A. Yes. Currently, Qwest's retail rate structure recovers a portion of the costs of the
21 usage-sensitive portion of the switch via toll rates, while the non-traffic sensitive

1 portion is recovered primarily through basic exchange rates and CALC charges.
2 If the Commission establishes a 100% flat-rated port charge to recover all
3 switching costs, it is essentially saying that no switching costs are usage-
4 sensitive. This means that usage-sensitive toll rates would be out of synch with
5 how the Commission has determined that switching costs are incurred. If the
6 Commission decides to adopt a 100% port-based local switching UNE rate, it
7 must carefully consider the implications on toll rates and other usage-based
8 rates. Thus, the implications of a flat-rated port are significant in setting both toll
9 and local retail rates.

10 **Q. IS QWEST'S PROPOSED COMBINATION OF USAGE-BASED AND PORT**
11 **CHARGES BASED ON THE SAME COSTS AS THE FLAT RATE PROPOSED**
12 **BY MR. DENNEY?**

13 **A.** Yes. Mr. Denney agrees with Qwest that changing the End Office Non-Port
14 Fraction in HAI to 0.0% results in a flat rate charge of \$4.06, as demonstrated in
15 Exhibit TKM-4 filed with my direct testimony on April 28, 2003. A comparison of
16 the calculations in Exhibit TKM-2, also filed with my direct testimony, to the
17 calculations in Exhibit TKM-4 show that Qwest's proposed rates of \$2.44 per port
18 and \$0.0009695 per MOU are based on the same annual cost and units as are
19 used to produce the flat rate of \$4.06, except for an adjustment made to the
20 MOU rate to account for billed minutes.

1 Q. DOES THIS CONCLUDE YOUR TESTIMONY?

2 A. Yes, it does.

BEFORE THE ARIZONA CORPORATION COMMISSION

MARC SPITZER
CHAIRMAN
JIM IRVIN
COMMISSIONER
WILLIAM A. MUNDELL
COMMISSIONER
MIKE GLEASON
COMMISSIONER
JEFF HATCH-MILLER
COMMISSIONER

IN THE MATTER OF INVESTIGATION)
INTO QWEST CORPORATION'S)
COMPLIANCE WITH CERTAIN)
WHOLESALE PRICING REQUIREMENTS)
FOR UNBUNDLED NETWORK)
ELEMENTS AND RESALE DISCOUNTS)
STATE OF COLORADO)
COUNTY OF DENVER)

DOCKET NO. T-00000A-00-0194
Phase II & IIA
AFFIDAVIT OF
TERESA K. MILLION

Teresa K. Million, of lawful age being first duly sworn, deposes and states:

1. My name is Teresa K. Million. I am Director – Services Costs in the Policy and Law organization of Qwest Services Corporation in Denver, Colorado. I have caused to be filed written Rebuttal testimony and exhibits in support of Qwest Corporation in Docket No. T-00000A-00-0194, Phase II and IIA.
2. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct to the best of my knowledge and belief.

Further affiant sayeth not.


Teresa K. Million

SUBSCRIBED AND SWORN to before me this 9th day of May, 2003.


Notary Public residing at
Denver, Colorado

My Commission Expires: March 4, 2005

BEFORE THE ARIZONA CORPORATION COMMISSION

MARC SPITZER
CHAIRMAN
JAMES M. IRVIN
COMMISSIONER
WILLIAM A. MUNDELL
COMMISSIONER
JEFF HATCH-MILLER
COMMISSIONER
MIKE GLEASON
COMMISSIONER

**IN THE MATTER OF INVESTIGATION INTO]
QWEST CORPORATION'S COMPLIANCE]
WITH CERTAIN WHOLESale PRICING]
REQUIREMENTS FOR UNBUNDLED]
NETWORK ELEMENTS AND RESALE]
DISCOUNTS.]**

**DOCKET NO. T-00000A-00-0194
PHASE II AND PHASE II-A**

EXHIBITS OF

TERESA K. MILLION

May 12, 2003

INDEX OF EXHIBITS

The following Exhibits are provided in CD format:

| <u>Exhibit</u> | <u>Description</u> |
|-----------------------|--------------------------------|
| TKM-1R | Forecasted Switch Expenditures |
| TKM-2R (Confidential) | SW2 CCS Usage Analysis |

AZ Forecasted Switch Expenditures

Arizona Corporation Commission
 Docket No. T-00000A-00-0194
 Qwest Corporation - TKM-1R
 Exhibits of Teresa K. Million
 May 12, 2003

| PRODUCT | YEAR 2000 | 2001 | 2002 | 2003 | GRAND TOTAL |
|---------------------|---------------|---------------|--------------|--------------|----------------|
| 008_DS1 Total | \$4,784,785 | \$8,644,225 | \$4,292,848 | \$2,089,899 | \$19,811,757 |
| 303_DNUS Total | | \$395,688 | \$2,026,136 | \$766,669 | \$3,188,492 |
| 303_DS1 Total | \$11,171,871 | \$13,154,476 | \$2,159,994 | \$1,804,306 | \$28,290,647 |
| ANALOG_LINES Total | \$13,076,004 | \$5,908,804 | \$2,069,843 | \$1,571,243 | \$22,625,895 |
| BRI Total | \$1,333,619 | \$1,144,936 | \$162,602 | \$128,447 | \$2,769,603 |
| CNVRT_MSG_PRI Total | | | \$317,516 | \$698,667 | \$1,016,183 |
| COIN Total | \$95,241 | \$5,394 | \$3,326 | | \$103,961 |
| DS1_DNUS Total | \$20,403,306 | \$20,758,822 | \$2,413,023 | | \$43,575,151 |
| DS1_MSG Total | \$17,864,926 | \$16,363,746 | \$1,418,723 | \$1,628,456 | \$37,275,851 |
| DS1_NXT_GEN Total | | \$106,919 | | | \$106,919 |
| MISC Total | \$15,938,609 | \$21,881,385 | \$9,065,041 | \$2,605,682 | \$49,490,717 |
| PRI_DNUS Total | | \$2,385,595 | \$1,472,497 | \$630,255 | \$4,488,347 |
| PRI_DS1 Total | \$4,729,435 | \$6,527,686 | \$2,181,073 | \$1,616,620 | \$15,054,814 |
| PRI_INCR Total | \$2,812,934 | \$1,559,250 | \$473,208 | | \$4,845,392 |
| SPM_DS1_MSG Total | \$8,932,569 | \$9,842,690 | | | \$18,775,259 |
| UMB_DS1 Total | \$399,906 | \$319,081 | \$157,226 | \$313,295 | \$1,189,509 |
| GRAND TOTAL | \$101,543,205 | \$108,998,698 | \$28,213,054 | \$13,853,539 | \$252,608,497 |

BEFORE THE ARIZONA CORPORATION COMMISSION

**MARC SPITZER
CHAIRMAN
JIM IRVIN
COMMISSIONER
WILLIAM A. MUNDELL
COMMISSIONER
MIKE GLEASON
COMMISSIONER
JEFF HATCH-MILLER
COMMISSIONER**

**IN THE MATTER OF INVESTIGATION INTO)
QWEST CORPORATION'S COMPLIANCE)
WITH CERTAIN WHOLESale PRICING) DOCKET NO. T-00000A-00-0194
REQUIREMENTS FOR UNBUNDLED) PHASE II AND PHASE IIA
NETWORK ELEMENTS AND RESALE)
DISCOUNTS.)
)
)**

REBUTTAL TESTIMONY OF

PHILIP LINSE

ON BEHALF OF QWEST CORPORATION

May 12, 2003

TESTIMONY INDEX

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I. IDENTIFICATION OF WITNESS

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

A. My name is Philip Linse. I am employed by Qwest Corporation ("Qwest") as a Director, Technical Regulatory in the Local Network Organization. My business address is 700 W. Mineral, Littleton, Colorado, 80120.

Q. BRIEFLY OUTLINE YOUR EDUCATIONAL AND EMPLOYMENT BACKGROUND.

A. I received a Bachelors degree in Criminology and Sociology from the University of Northern Iowa in 1994. I have been in the telephone communications industry since 1995. I began with CDI Telecommunications in the engineering department as an Outside Plant Engineer. In 1998, I accepted a position with Pacific Bell as a Loop Technology Planner with responsibility for analyzing network capacity and selecting loop technology to deploy for the Sierra/North region of California.

In 2000, I accepted a position with U S WEST as a manager, Outside Plant Tactical Planning. I soon accepted a promotion to a staff position in Technical Regulatory, Interconnection Planning for Qwest. In this

1 position, I developed network strategies for interconnection of unbundled
2 Signaling System 7 ("SS7"), unbundled switching and switching-related
3 products. In addition to my strategy responsibilities, I provided network
4 evaluation of new technologies and represented the network organization
5 in interconnection agreement negotiations as a subject matter expert. As
6 a subject matter expert in switching and signaling, I have learned about
7 the switching concepts of the network. I accomplished this through
8 on-the-job training and internal training opportunities, including
9 one-on-one training with central office technicians and switch engineers.

10
11 **II. PURPOSE OF TESTINONY**

12
13 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

14 **A.** The purpose of my testimony is to respond to switching issues raised in
15 the direct testimony of AT&T/WorldCom witnesses, Joseph Gillan and
16 Richard Chandler, and to demonstrate that switch usage affects both the
17 design and the costs of a switch.

1
2 **III. ENGINEERING OF SWITCHING CAPACITY IS USAGE BASED**
3

4 **Q. ON PAGE 20, LINE 5 THROUGH LINE 6 OF THE TESTIMONY OF**
5 **JOSEPH GILLAN AND RICHARD CHANDLER, THEY CONTEND THAT**
6 **QWEST'S SWITCHING COSTS ARE NOT USAGE-BASED. DO YOU**
7 **AGREE?**

8 **A.** No. There is clearly a relationship between some switching costs and
9 usage, as reflected by the fact that switch vendors sell switch processors
10 with different usage capacities at different prices. While the costs for
11 some parts of the switch (e.g., line ports) are caused by the number of
12 lines, costs for other parts of the switch (e.g., trunk ports and central
13 processor) are caused by usage. The size of a switch and the ultimate
14 cost of switching bears a direct relationship to the levels of usage by
15 customers who use the switch; the trunking and processing components
16 of switches are engineered based on usage requirements. In fact, at page
17 20, lines 7 and 8, Messrs. Gillan and Chandler admit that the cost of
18 switching increases as capacity (i.e. usage) increases.

19
20 **Q. HOW IS THE TERM "USAGE" DEFINED IN THE CONTEXT OF**
21 **TELEPHONE ENGINEERING?**

22 **A.** "Usage" has a specific meaning in the context of telecommunications
23 networks. It refers to the length of time a call is in place over a period of

1 time. Telephone engineers rely on usage statistics and data to plan and
2 design the network. The amount of anticipated usage determines the
3 amount of trunking and switch central processor capacity an engineer will
4 include in a network design or plan and, in turn, the amount of capital a
5 company will invest to add to the network.

6
7 **Q. HOW IS USAGE MEASURED?**

8 A. Usage is measured as Centum Call Seconds ("CCS"), or one hundred call
9 seconds. A line or trunk that is in use for one hour, or sixty minutes, is
10 being used for 3600 seconds, or 36 hundred call seconds, or 36 CCS. As
11 stated in Newton's Telecom Dictionary, "One hundred call seconds or one
12 hundred seconds of telephone conversation. One hour of telephone traffic
13 is equal to 36 CCS ($60 \times 60 = 3600 / 100 = 36$) which is equal to one Erlang."
14 Newton's Telecom Dictionary, Volume 17 February 2001 page 131.

15
16 **Q. ON PAGES 17 AND 18 OF THEIR DIRECT TESTIMONY MESSRS.**
17 **GILLAN AND CHANDLER ARGUE THAT SWITCHING CAPACITY IS**
18 **LIMITED BY THE NUMBER OF ACCESS LINES. IS THIS TRUE?**

19 A. No. While the number of access lines is a factor that must be considered
20 in switch engineering, it is not the determining engineering factor. The
21 Gillan and Chandler testimony confuses the total number of access lines
22 and trunks served by a switch with the switch processing resource
23 capacity needed to effectively operate the lines and trunks. Many other

1 factors, such as switch software features used by existing access lines,
2 are also important in switch engineering. I am not aware of any industry or
3 vendor engineering standard, principle, or practice that does not design
4 and engineer switching processors, initially or under growth
5 circumstances, based on usage, as expressed in terms of CCS. In
6 addition, the number of trunks engineered in a switch directly relates to
7 usage (CCS) requirements.
8

9 **Q. ON PAGES 12 AND 13 OF THEIR DIRECT TESTIMONY, MESSRS.**
10 **GILLAN AND CHANDLER STATE THAT THE SWITCH PROCESSING**
11 **CAPACITY IS LIMITED BY TRAFFIC AND/OR CALL ATTEMPTS. HOW**
12 **IS THIS ASSOCIATED WITH USAGE?**

13 **A.** This statement actually confirms that switch designs and costs are
14 determined in substantial part based on usage. Specifically, they
15 acknowledge that "the control structure's capacity limit is therefore
16 typically expressed in terms of busy-hour call attempt."¹ This is no
17 different than stating that the control structure's capacity is defined by
18 usage. Indeed, using the definition of usage set forth by Messrs. Gillan
19 and Chandler at page 10, lines 3 through 5, of their testimony, the "busy-
20 hour call attempt" is clearly a form of usage. As they acknowledge, this
21 form of usage is a limiting factor of a switch.
22

¹ Joint Direct Testimony of Joseph Gillan and Richard Chandler, page 13 line 2 and 3

1 Messrs. Gillan and Chandler admit further that a switch's switch fabric
2 "capacity limit is thus affected by traffic and is usually expressed in traffic
3 terms, either Erlangs or CCS."² This also clearly falls under the definition
4 of "usage" that they give on page 10 lines 6 and 7. Again, this
5 demonstrates that usage is a limiting factor of a switch. As can be clearly
6 deducted from their testimony, the capacity measurement of both switch
7 fabric and the control structure is defined by Messrs. Gillan and Chandler
8 as "usage".
9

10 **Q. ON PAGES 14 THROUGH 16, GILLAN AND CHANDLER THEN**
11 **CONTEND THAT SWITCH PROCESSING CAPACITY IS NOT A**
12 **LIMITING FACTOR OF SWITCHING CAPACITY. WITH THE**
13 **ADVANCES IN SWITCH PROCESSOR TECHNOLOGY, DOES USAGE**
14 **STILL PLAY A ROLE IN THE DESIGN OF SWITCHES?**

15 **A.** Yes. Although technology advances provide greater processor capacities,
16 switch engineering and design is still based on the fundamentals of switch
17 usage. Essentially, a switch is designed and engineered based on the
18 central processor, the line peripherals and the trunk peripherals. The
19 peripherals provide the line and trunk ports. As line and trunk demands
20 increase, more peripherals are added to the switch to increase the number
21 of lines and/or trunks served by the switch. This can happen during the

² Joint Direct Testimony of Joseph Gillan and Richard Chandler, page 13 line 9 and 10

1 initial switch engineering process or at a later time. In either case, the
2 switch central processing capacity must be increased to accommodate the
3 additional *usage* the central processor will experience. The Gillan and
4 Chandler testimony admits that “ILECs will obviously not install switches
5 with maximum capacity in all wire centers.”³

6
7 **Q. HOW IS THE END USER RELEVANT TO SWITCH USAGE?**

8 A. The individual switch usage of the end user using each line is highly
9 relevant because the aggregate usage by end users ultimately determines
10 how much central processing capacity must be purchased by Qwest and
11 deployed for the use of customers. In other words, the amount of central
12 processor capacity needed is a direct function of switch usage—it is not a
13 direct function of the number of lines. Put another way, lines are relevant
14 to the amount of switch processor capacity that is required, but usage is
15 the overriding factor.

16
17 **Q. ON PAGE 21, MESSRS. GILLAN AND CHANDLER CONTEND THAT**
18 **SWITCHING COSTS DO NOT RISE WHEN USAGE INCREASES BUT,**
19 **INSTEAD, THAT COSTS RISE WHEN THE NUMBER OF LINES**
20 **INCREASES. IS THIS ASSERTION CORRECT?**

21 A. No. If the usage per access line increases, the total usage can increase
22 with no change in line quantities. For example, an increase in usage

³ Joint Direct Testimony of Joseph Gillan and Richard Chandler, page 18 line 7 and 8

1 without any increase in the number of access lines can require a carrier to
2 add equipment, such as trunk modules and line concentration modules.
3 This occurs because much of the switch is engineered based on usage,
4 not based on line quantities. A plain example of how usage can increase
5 much faster than line growth is the phenomenal growth in dial-up Internet
6 traffic in the past few years.

7
8 **Q. HOW DOES DIAL-UP INTERNET TRAFFIC CREATE ADDITIONAL**
9 **SWITCH USAGE?**

10 A. From a network perspective, a dial-up Internet call has the same
11 appearance as a voice call. However, there is a critical difference. It is
12 commonly recognized in the telecommunications industry that the average
13 duration, or hold time, of a voice call is about three minutes, while the
14 average hold time of a dial-up Internet call is 20 to 30 minutes or more⁴.
15 Many of these calls last for multiple hours and sometimes even for days.
16 When a customer initiates and connects such a call to its Internet Service
17 Provider (ISP), the local switch must be used to make sure that the call is
18 routed to the ISP (sometimes more than one switch is involved). During
19 the entire duration of the call, some of the capacity of the switch continues
20 to be used. Thus, dial-up Internet traffic has caused substantial increases
21 in network usage. This increased usage has led to the need for Qwest to

⁴ Impacts of Internet Traffic on LEC Networks and Switching Systems , AmirAtai,Ph.D., James Gordon, Ph.D.,
Telcordia Technologies, RedBank, Newjersey, June 1996; Architectural Solutions to Internet Congestion
Based on SS7 and Intelligent Network Capabilities, A Telcordia Technologies Perspective by Dr. James

1 increase the capacity of the Arizona network, including its switching
2 central processor capacity. In light of that, Messrs. Gillan's and Chandler's
3 proposal for a flat-rated approach to usage-based switching is illogical; it
4 simply fails to account for the relationship between usage and switching
5 costs.

6
7 **Q. HOW HAS THE INCREASED USAGE RESULTING FROM DIAL-UP**
8 **INTERNET CALLS CAUSED QWEST TO INCREASE ITS NETWORK**
9 **CAPACITY?**

10 **A.** The increased usage caused by dial-up Internet traffic has required Qwest
11 to make significant additions to its network in Arizona, both in trunking and
12 central processor capacity, to switch the increased load. These additions
13 are needed because as long as a dedicated path is held up, the switch is
14 performing functions to make sure the call stays up until the customer
15 requests a disconnect by ending the call.

16
17 **Q. IF THESE TYPES OF USAGE REQUIREMENTS WERE NOT PLACED**
18 **ON THE NETWORK, WOULD THE VENDOR ENGINEERING COSTS**
19 **ON A PER LINE BASIS BE LOWER?**

20 **A.** Yes, they would. Switch usage is considered by all switch vendor
21 engineers when they engineer the central processing capacity needed, not
22 only for the number of access lines assigned to the switch, but also for the

1 switching resources available to these access lines. In fact, as noted in
2 Teresa Million's testimony, Qwest pays switch vendors a higher rate when
3 higher CCS requirements exist in any given switch.
4

5 To use Messrs. Gillan's and Chandler's reference to personal computers⁵,
6 the switch can be viewed as a large computer. The lines and trunks can
7 be analogized to peripheral equipment, such as printers, floppy and CD
8 drives, and the terminal screen. In both cases, the number of lines and
9 trunks and the number of peripherals attached are relevant to capacity,
10 but they are not determinative. The number of peripheral devices
11 connected to a computer does not dictate the need to upgrade the
12 computer; similarly, the number of lines and trunks connected to a switch
13 does not dictate the need to increase the switch's central processing
14 capacity.
15

16 In both cases, the determinative factor leading to the need to upgrade the
17 computer or the switch is the increased demand (i.e. usage) on the
18 capacity of the central processor. The need to increase central processor
19 capacity arises not from the number of lines connected to the switch, but
20 from the amount of *usage* customers are pumping through the lines.
21

Albert A. Fredericks, Charles D Pack, 1997

⁵ Joint Direct Testimony of Joseph Gillan and Richard Chandler, page 14 line 11

1 Under the proposal of Messrs. Gillan and Chandler, the CLECs would
2 have every incentive to increase usage. This would impose significant
3 additional switching costs on Qwest which, under a flat-rated switching
4 scheme, Qwest would not be able to recover.

5

6

IV. CONCLUSION

7

8 **Q. DOES THIS CONCLUDE YOUR TESTIMONY.**

9 **A. Yes it does.**

BEFORE THE ARIZONA CORPORATION COMMISSION

MARC SPITZER
CHAIRMAN
JIM IRVIN
COMMISSIONER
WILLIAM A. MUNDELL
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MIKE GLEASON
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IN THE MATTER OF INVESTIGATION)
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DOCKET NO. T-00000A-00-0194
PHASE II AND PHASE IIA
AFFIDAVIT OF
PHILIP A. LINSE

STATE OF COLORADO :
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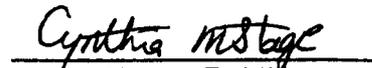
COUNTY OF ARAPAHOE

Philip A. Linse, of lawful age being first duly sworn, deposes and states:

1. My name is Philip A. Linse. I am Director, Technical Regulatory in the Local Network Organization of Qwest Corporation in Denver, CO.
2. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct to the best of my knowledge and belief.


Philip A. Linse

SUBSCRIBED AND SWORN to before me this 12 day of May, 2003.


Notary Public

My Commission Expires:

4-10-04