

Exhibit T-__ (RTW-T-1)
Docket No. UT-030614
Witness: Robert T. Williamson

**BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION
COMMISSION**

In the Matter of the Petition of

DOCKET NO. UT-030614

QWEST CORPORATION

**For Competitive Classification of Basic
Business Exchange
Telecommunications Services.**

DIRECT TESTIMONY OF

Robert T. Williamson

**STAFF OF
WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION**

August 13, 2003

1 **Q. Please state your name and business address.**

2 A. My name is Robert T. Williamson, and my business address is 1300 South
3 Evergreen Park Drive Southwest, P.O. Box 47250, Olympia, Washington, 98504.
4 My business e-mail address is bwilliam@wutc.wa.gov.

5

6 **Q. By whom are you employed and in what capacity?**

7 A. I am employed by the Commission as a Utility Engineer in the
8 Telecommunications section.

9

10 **Q. Please state your qualifications to provide testimony in this proceeding.**

11 A. I received my formal engineering education at the Bell Core Technical Training
12 Center in Lisle, Illinois, the Lucent Hickory Ridge Facility in Lisle, Illinois, the
13 Lucent facility in Dublin, Ohio, and Bell Labs Naperville, Illinois, location all
14 while employed by US West and its predecessor Pacific Northwest Bell. I
15 received continued engineering and management education from US West
16 through 1995 and subsequently by Teleport Communication Group (TCG)
17 through 1996. I retired from US West after 30 years having held various
18 technical management and engineering positions in project management,
19 maintenance, network design, and Tier 2 and 3 technical support. I was the

1 technical liaison between US West and its major customers including Boeing,
2 Microsoft, Weyerhaeuser, the University of Washington, and the State of
3 Washington for engineering and maintenance issues regarding digital switching,
4 ISDN, and SONET.

5 From 1995 to 1997, I worked for TCG (a leading competitive local
6 exchange company), as the Switch Application Engineering Manager in Seattle. I
7 represented TCG on technical issues during the first interconnection agreements
8 in Washington State between TCG and GTE, now Verizon, as well as US West,
9 now Qwest. In addition, I represented TCG in a number of regulatory
10 committees and workshops including the Washington State LNP committee
11 (Docket UT-941464).

12 I was employed by the Commission in early 1997 as a Staff
13 telecommunications engineer working on a number of issues, including physical
14 CLEC collocation and the analysis of the effect on the Public Switch Telephone
15 Network (PSTN) by Internet Service Providers dial-up modem service.

16 I was subsequently hired by AT&T to work on a Department of Defense
17 contract to upgrade all communications equipment for all military installations
18 in Hawaii.

1 I left AT&T to join NeuStar, Inc., where I worked as the Director of
2 Deployment for a European C7/IN network and later as Director of New
3 Business Technical Development. In the latter capacity, I lead a team of
4 developers and engineers in the development of a service to provide local
5 number portability for Voice Over Internet Protocol (VOIP) providers. While at
6 NeuStar, Inc., I upgraded my technical knowledge in New Generation Networks
7 by attending meetings for the Internet Engineering Task Force (IETF), the
8 International Engineering Consortium (IEC), and as an active member of the
9 World C7 Planning Meeting held at Cape Town South Africa in 2000.

10 I returned to the WUTC in the spring of 2002 as a senior member of
11 technical Staff.

12
13 **Q. Have you presented testimony before this Commission in other cases?**

14 Yes, I testified in docket UT-011439 in April 2003, concerning a petition for a line
15 extension waiver in Eastern Washington

16
17 **Q. What is the purpose of your testimony?**

18 A. The purpose of my testimony is to provide technical analysis concerning some
19 aspects of the petition for competitive classification filed by Qwest Corporation.

1 In particular, I address why Qwest's exclusion of unbundled loops that are
2 typically associated with the provisioning of digital services is conservative and
3 may leave some of Qwest's competitors' market share (in the service market as
4 defined in Thomas Wilson's testimony) uncounted. I also address how Voice
5 Over Internet Protocol (VOIP) technology increasingly represents a potential
6 substitute for basic business exchange service purchased from incumbent local
7 exchange companies like Qwest. Finally, I address some of the difficulties with
8 using the Intrado 911 database to gauge CLEC business lines in this state.

9
10 **Q. Please describe the difference between analog loops and loops capable of**
11 **provisioning "digital services," as you understand the term as used in the**
12 **Qwest Petition.¹ Please take into account the following testimony of Mr. Mark**
13 **Reynolds on behalf of Qwest:**

14 **Qwest has not included its digital switched business services because**
15 **the primary focus of Qwest's Petition is competition based on the use of**
16 **specific Qwest wholesale services, such as unbundled loops. (Footnote**
17 **1: Unbundled loops typically associated with provisioning digital**
18 **services, such as DS1 capable, ISDN BRI, and xDSL capable are not**
19 **included in the unbundled loop quantities filed in Qwest's Petition.)**
20

21 **Exhibit MSR-1T, Page 4.**

1 A. The early telephone network was entirely analog in nature. “Analog” comes
2 from the word “analogous” which means “similar to.” In the
3 telecommunication transmission world, an analog electrical signal will be an
4 analogous electrical representation of the natural acoustical compression waves
5 that transmit voice through the air. A digital signal is the representation of an
6 analog transmission in binary code. The analog signal is most commonly
7 sampled 8000 times a second (Pulse Code Modulation or PCM); each sample is
8 then coded into a binary (digital) number consisting of zeros and ones. The
9 digitized voice signal can then be switched, transmitted, or stored digitally.

10 The majority of the local loops in existing telephone networks are
11 composed of twisted pair copper cables connecting customer telephone
12 equipment to the telephone company central offices. Each cable pair is accessible
13 at several distribution points. Sometimes a connection will remain at a
14 distribution point despite that fact that service has been disconnected, creating
15 “bridge tap.” For long loops of over 18,000 feet, the telephone companies
16 equipped cable pairs with load coils. Load coils are induction devices that
17 “tune” the loop to the voice frequency band (500 to 2500 Hz) improving voice
18 quality but negatively affecting frequencies above the voice band. Digital circuits

¹ See, Qwest Petition at page 8, “Table B...” Includes basic business exchange services listed in Attachment A;

1 operate above the voice band and are negatively affected by both load coils and
2 bridge tap. Unbundled loops associated with the provisioning of digital service
3 such as DS1 capable, ISDN BRI, and xDSL capable must be conditioned by the
4 removal of bridge tap and load coils.

5 Thus, analog loops (loops capable of transmitting analog voice) may have
6 bridge tap and are likely to be equipped with load coils. Digital capable-loops
7 are loops that have been conditioned by the removal of load coils and bridge tap
8 and may be used for provisioning digital services such as xDSL, T1, and ISDN
9 BRI.

10
11 **Q. Can digital services supplied by CLECs over digital-capable loops be used as**
12 **substitutes for basic business exchange service?**

13 A. Yes, digital services such as T1, ISDN BRI, and xDSL can be used as substitutes
14 for business basic exchange service. T1 is commonly used to transport 24 CLEC
15 business exchange lines to a customer premises across an unbundled digital loop
16 by utilizing CLEC equipment at each end of the T1. ISDN BRI can provide two
17 voice business lines across an unbundled digital loop connected via a "U"

excludes **digital services**, hotel screening trunks, payphone access lines and 911 services." (Emphasis added.)

1 interface. XDSL, as well as a direct T1 connection to the internet, can be used as a
2 bridge to VOIP providers for business exchange line equivalents.

3 Because of these substitution opportunities, Qwest likely is missing or
4 understating its competitors' market share in basic business exchange services by
5 excluding unbundled loops typically associated with digital services.

6
7 **Q. Can a Qwest basic business exchange, PBX or centrex customer purchase VOIP**
8 **service as a functionally equivalent substitute for a Qwest analog basic**
9 **business, PBX or centrex service listed in the petition?**

10 A. Yes. Most Qwest business customers can purchase service that is functionally
11 equivalent to Qwest basic local exchange service through a number of VOIP
12 providers. This technology, which was viewed as a novelty in the recent past,
13 has now converged with more mainstream telephone service. Early quality of
14 service problems have been lessened or eliminated and a large number of
15 companies (MCI, AT&T, Level 3, Vonage, Net2Phone, Telverse, GoBeam,
16 Packet8, Cisco, Sonus, Broadsoft, and others) are offering VOIP service and
17 equipment. VOIP's efficiencies come through its use of packet-switching
18 technology, which breaks up communications into small packets that then share
19 the same IP network with data traffic.

1 Only two things are required to make VOIP calls from a home or business:
2 a broadband connection and an Analog Telephone Adapter (ATA), which allows
3 the user to plug in his or her existing analog phone. An ATA costs about \$100,
4 but is often given away by VOIP providers. Software can be purchased that
5 allows any PC with speakers and a microphone to be used as digital telephone
6 connecting directly to the DSL or Cable modem. IP and SIP phones are available
7 from a number of companies (Cisco, Pingtel, etc.) that can be plugged directly
8 into a corporate LAN and then used for VOIP business lines.

9 Businesses with corporate LANs or WANs can use their data network for
10 voice traffic between PBX and Centrex locations bypassing the local Public
11 Switch Telephone Network (PSTN). Work-at-home employees can access the
12 corporate LAN from any location and make phone calls as if they were at the
13 headquarters location while checking corporate email. Employees that travel can
14 have access to their telephone as if they were in the office because their telephone
15 number and features follows them wherever they go.

16 A number of companies like Vonage connect to their customers via the
17 customer's existing cable modem or xDSL. Telephone numbers and access to the
18 PSTN are provided by partner CLECs. A call originated from a user is carried
19 over Vonage's IP network and then terminated at the distant end via CLEC

1 Primary Rate Interface Trunks (PRI), the CLEC completes the call to the ILEC via
2 inter-connect trunks. A call terminating to a Vonage telephone number is
3 connected to the serving CLEC and then delivered to Vonage's network via the
4 same PRI trunks. The call is then connected to the terminating customer over the
5 Vonage private IP network. Users can request any telephone area code available
6 through Vonage. For example, a user in Seattle can have a New York telephone
7 number, so clients from New York need not make a long distance call to him or
8 her.

9 VOIP telephony providers have not been required to register with the
10 WUTC. It is therefore difficult to determine the exact number of business lines
11 these companies are providing. However, there is determined and growing
12 competition by VOIP providers to provide business lines that in the past would
13 have been provided by Qwest.

14
15 **Q. Can the Intrado 911 database be queried to determine whether there is**
16 **competition for Qwest basic business exchange, PBX or centrex**
17 **telecommunications services in Washington wire centers?²**

² See Exhibit DLT-1T, July 1, 2003, Page 9.

1 A. The Intrado 911 database does contain enough information to obtain business
2 line counts by local exchange company. The records stored also reflect whether a
3 telephone number is a residence or a business line; however, only the identity of
4 the telephone company physically providing the dial tone is available at this
5 time. As Mr. Teitzel testified, E911 records do not reflect the identity of CLECs
6 that purchase UNE-P or resell Qwest service.

7 Care must be taken when using the 368,729 lines that Mr. Teitzel states
8 “[r]epresents the approximate number of CLEC E911 records associated with
9 business customers served via CLEC-owned facilities.”³ There are at least two
10 scenarios that make the use of Intrado’s 911 database inaccurate for counting the
11 number of CLEC business lines in Qwest’s serving area.

12 First, in the state of Washington most PBX operators are required to
13 update E911 records (Private Switch-Automatic Location Identification or PS-
14 ALI) for all telephone numbers served by a PBX.⁴ For a given PBX with 100
15 working telephone lines there may only be 10 Direct Inward Dial (DID) PBX
16 trunks. The CLEC providing the DID trunk service appears to have 10 times
17 more business lines than actually exist (the DID trunks in this case are counted as

³ Exhibit DLT 1-T (Teitzel Direct), p. 11, ll. 1-13.

⁴ WAC 118-68-050(2).

1 working business lines). PBX records will most likely overstate the number of
2 working business lines.

3 Second, many businesses have multiple lines that hunt from each
4 telephone number to the next telephone number in sequence. Multi-line hunting
5 assures that when one line is busy each subsequent call will “hunt” to the next
6 available line. When the number of business lines reaches 15 or more, the
7 telephone company usually builds the service as a “terminal hunt group.” A
8 terminal hunt group utilizes one telephone number to represent all 15 lines.
9 Only one telephone number will reside in the 911 database even though there are
10 actually 15 or more in service. Terminal hunt groups, therefore, understate the
11 number of working business lines.

12 Both of these scenarios apply to facilities-based CLEC business line
13 counts. It is difficult to tell, even at a macro level, if the comparison between the
14 Intrado E911 data and Qwest’s count of CLEC lines, definitively demonstrates
15 that the Qwest count of 104,109 CLEC lines, is conservative and substantially
16 understates the actual level of CLEC competition in this state.

17 Conclusion

18 **Q. Does this conclude your testimony?**

19 **A.** Yes, it does.