

BEFORE THE
WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION

IN THE MATTER OF LEVEL 3
COMMUNICATIONS, LLC'S PETITION
FOR ARBITRATION PURSUANT TO
SECTION 252(B) OF THE
COMMUNICATIONS ACT OF 1934, AS
AMENDED BY THE
TELECOMMUNICATIONS ACT OF 1996,
AND THE APPLICABLE STATE LAWS
FOR RATES, TERMS, AND CONDITIONS
OF INTERCONNECTION WITH QWEST
CORPORATION,

LEVEL 3 COMMUNICATIONS, LLC,

Petitioner.

Docket No. UT-063006

DIRECT TESTIMONY OF

KENNETH L. WILSON

ON BEHALF OF

LEVEL 3 COMMUNICATIONS, LLC

May 30, 2006

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1 **I. INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME, POSITION, EMPLOYER, AND BUSINESS**
3 **ADDRESS.**

4 A. My name is Kenneth L. Wilson. I am a Senior Consultant and Technical Witness with
5 Boulder Telecommunications Consultants, LLC. My business address is 970 11th Street,
6 Boulder, Colorado, 80302. I am filing this testimony on behalf of Level 3
7 Communications, LLC of Broomfield, CO.

8 **Q. PLEASE REVIEW YOUR EDUCATION AND RELEVANT WORK**
9 **EXPERIENCE.**

10 A. I am currently a Senior Consultant and Expert Witness with Boulder
11 Telecommunications Consultants, LLC. During the past eight years I have participated
12 as a witness and consultant in over sixty proceedings involving various aspects of the
13 Telecom Act of 1996. In these proceedings I testified on all types of Unbundled Network
14 Elements (UNEs), interconnection trunks, collocation, resale, advanced services and
15 operational support systems. I have also testified in several anti-trust cases and in other
16 regulatory and judicial matters involving telecommunications. From 1995 through spring
17 1998, I was the Business Management Director for AT&T in Denver, managing one of
18 the groups responsible for getting AT&T into the local market in the Qwest states. My
19 primary responsibility was as the lead negotiator for AT&T with Qwest in the 14 Qwest
20 states. I was also the senior technical manager in Denver, leading teams working on local
21 network and interconnection planning, OSS interface architectures, and the technical
22 aspects of product delivery.

23 For the 15 years before coming to Denver, I worked at Bell Labs in New Jersey in
24 a variety of positions. From January 1994 through May 1995 I led a team at Bell Labs
25 investigating the various network infrastructure alternatives for entering the local

1 telecommunications market. Between 1980 and 1994 I was in various technical projects
2 at Bell labs, primarily focused on network architecture, network performance and
3 systems engineering.

4 I received a BS in Electrical Engineering from Oklahoma State University in
5 1972. I received an MS in Electrical Engineering from the University of Illinois in 1974.
6 I completed all the course work for a Ph.D. in Electrical Engineering from the University
7 of Illinois in 1976. My Curriculum Vitae is attached; please see Exhibit W-1.

8 **Q. HAVE YOU FILED TESTIMONY IN WASHINGTON BEFORE?**

9 A. Yes, I have filed testimony and testified on behalf of AT&T and others in Washington in
10 several cases. I also acted as the technical witness for Electric Lightwave (ELI) in its
11 anti-trust case against Qwest. The ELI case was filed in Washington. These cases are
12 listed in **Exhibit KLW-2**.

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

14 A. I have been asked by Level 3 to review some of the technical issues in this case based on
15 my extensive knowledge of the Public Switched Telephone Network (PSTN), circuit
16 switches, Internet protocol based networks, Voice over Internet Protocol (VoIP) and the
17 Level 3 and Qwest networks in Washington.

18 **Q. WHAT ARE THE MAJOR ISSUES THAT YOU ADDRESS IN YOUR**
19 **TESTIMONY?**

20 A. My testimony is focused on how the Level 3 network interconnects with the Qwest
21 network from a technical point of view and what the implications of that interconnection
22 are in the context of this proceeding. Specifically, I address how the network treats ISP-
23 bound traffic and VOIP traffic. Additionally, I explain why combining all traffic types
24 over a single interconnection trunks as Level 3 requests is both sound and efficient from
25 an engineering point of view.

1 **II. LEVEL 3'S NETWORK IN WASHINGTON.**

2 **Q. WHAT INFRASTRUCTURE DOES LEVEL 3 HAVE IN WASHINGTON AND**
3 **WHERE DOES LEVEL 3 ESTABLISH POINTS OF INTERCONNECTIONS?**

4 A. Level 3 has invested in a substantial amount of facilities in Washington and has a large
5 number of points of interconnection. The map attached to Mr. Greene's testimony as
6 **Exhibit MDG-3** shows the Level 3 fiber routes, fiber distribution points and points of
7 interconnection in Washington. Points of interconnection are located at collocation sites
8 in Qwest offices, at Qwest offices where Level 3 has leased facilities and in Qwest
9 offices where Direct End Office Trunks (DEOTs) terminate. These trunks are shared
10 with Qwest and each company pays their fair share of the trunk cost based on originating
11 traffic, as required by Washington rules.

12 **Q. DOES LEVEL 3 HAVE POINTS OF INTERCONNECTION IN ALL LATAS IN**
13 **WASHINGTON?**

14 A. Yes. Level 3 has one or more points of interconnection in every Washington LATA. In
15 some LATAs Level 3 has a large number of points of interconnection.

16 **III. NETWORK FUNDAMENTALS OF INTERCONNECTION.**

17 **Q. HOW DO TWO NETWORKS EXCHANGE TRAFFIC?**

18 A. At its most fundamental level, in order for two different networks to exchange traffic –
19 whatever type of traffic it might be – the networks have to be interoperable and connect
20 at some point. Interoperability is simply the ability of each network to understand what
21 the other network is saying and to act upon this understanding.

22 **Q. WHAT IS A POI?**

23 A. A "point of interconnection" or POI is the location where two carriers connect their
24 networks for the purpose of exchanging traffic. In this case, it is the point to which
25 Level 3 brings its traffic to connect with Qwest's network to exchange traffic. Each party
26 pays for its network on its respective side of the POI. This allows each party to provide

1 service according to the technical requirements of their network. A POI can consist of
2 any number of leased or owned facilities including a fiber meet point, a collocation
3 arrangement or at other mutually agreed to points. Either party has the choice of
4 constructing or leasing facilities up to the POI. The POI also defines the point at which
5 each company takes its traffic from a financial point of view. The technical and financial
6 aspects of POIs are intermixed and must be addressed together.

7 **Q. WHAT IS A TRUNK?**

8 A. A trunk is a logical connection between two switches, provisioned by means of physical
9 facilities between those two switches. The physical facility is not the trunk. It may be
10 any appropriate medium - copper, optical fiber, microwave radio, coaxial cable, etc. The
11 trunk is the logical path carried on the physical facility. The term "trunk" arises from
12 within the PSTN, so, not surprisingly a trunk refers to a single voice-grade connection,
13 capable of carrying one voice call between two switches.

14 **Q. WHAT IS A TRUNK GROUP?**

15 A. A trunk group is a collection of trunks, normally (but not necessarily) provisioned over
16 the same physical facility connecting two switches, configured to operate as a cohesive
17 unit when delivering multiple voice connections between the two switches. You can
18 think of the physical facility carrying a trunk group as a completely unmarked road - just
19 a wide concrete path between two cities. Each individual lane that we paint on the
20 highway is a trunk. All the lanes going together in the same direction are a trunk group.
21 The wider the highway, the more lanes it has, and the more traffic it can carry.

22 **Q. HOW ARE CALLS ROUTED ON THE PSTN?**

23 A. Local calls are routed between switches according to the routing tables in each switch.
24 Depending on the number dialed (putting aside number portability), a switch either
25 handles a call entirely on its own (such as a call between next-door neighbors); or it sends

1 the call off to some other switch by routing it outbound on a particular trunk port. Toll
2 calls - that is, calls carried by IXCs - are routed according to the Local Exchange Routing
3 Guide (LERG). The LERG is a database that identifies switches and numbers associated
4 with those switches, based on the NPA NXX codes of the North American Numbering
5 Plan (NANP), as well as specific physical locations at which traffic bound for particular
6 switches may be delivered. Thus, for example, in the normal course within the PSTN,
7 the LERG would indicate that a call to a number within the "208" NPA should be
8 delivered to a particular carrier, at a particular location in Washington. Which carrier and
9 which location will depend on the "NXX" of the dialed number. Switches within a local
10 calling area know which numbers are associated with the local calling area and which
11 numbers are not.

12 **IV. DETERMINATION OF A LOCAL CALL**

13 **Q. WHEN IS A CALL THAT IS DIALED BY A QWEST CUSTOMER TO A**
14 **LEVEL 3 CUSTOMER A LOCAL CALL?**

15 A. When a Qwest customer dials a Level 3 customer using a local number (not a 1+ long
16 distance call) the call should be considered a local call when Level 3 has a POI within the
17 LATA. Washington has ruled that CLECs need only have a single POI in the LATA and
18 that they do not need to duplicate Qwest's network in order for their customers to receive
19 or originate local calls with Qwest customers.

20 **Q. IS THERE A BASIC DISPUTE BETWEEN QWEST AND LEVEL 3 ON HOW TO**
21 **DETERMINE WHETHER TRAFFIC IS "LOCAL"?**

22 A. Yes. As I understand it there is a fundamental disagreement between the parties with
23 respect to what traffic is properly characterized as "local" and what is not. I recognize
24 that there are legal and policy aspects to this disagreement. I will address the technical
25 aspects of this dispute. That said, the dispute is basically this: Level 3 contends that since

1 the only thing the PSTN “knows” about a call is the originating and terminating
2 telephone number, the status of traffic as “local” should not be determined based on the
3 supposed geographic area associated with the telephone numbers of the calling and called
4 parties.

5 **Q. HAS THE LOCATION OF THE CUSTOMER PREMISES BEEN THE**
6 **DETERMINING FACTOR IN THE DEFINITION OF A LOCAL CALL IN THE**
7 **PAST?**

8 A. No. As I described above in connection with routing calls, the PSTN uses the calling
9 party’s number and the called party’s number to determine if a call is a local call.

10 **Q. DO LOCAL SWITCHES KNOW THE LOCATION OF THE PARTIES WHEN A**
11 **CALL IS MADE?**

12 A. No. Circuit switches have no way of knowing the geographic location of the calling or
13 called party end user. The switch is programmed with a list of which numbers are
14 “native” to its area and treats calls to and from such numbers accordingly (i.e., it routes
15 them on trunks to other switches to which it is connected, based on the NPA-NXX
16 dialed). Calls that it recognizes as “toll” are routed to the caller’s presubscribed IXC.
17 Older circuit switches have a limited geographic range within which it can serve end
18 users and maintain its quality standards. With the introduction of newer technology
19 switches, soft-switches and now VoIP those distance limitations are fading, phone
20 numbers can be assigned to end users anywhere within the country or world, and
21 switches have no way of knowing the geographic location of the end user.

22 **Q. SO CALLS BETWEEN TWO LOCAL NUMBERS ARE TREATED AS LOCAL**
23 **CALLS?**

24 A. Yes. As noted above, each end office switch has a table of NPA-NXXs that the particular
25 switch views as “local.” For all such NPA-NXXs, the switch has to make only one
26 decision: “Is this call ‘mine’ or do I need to send it to some other switch?” If the dialed

1 number “belongs” to the originating switch, as noted above, the call stays there. But if
2 the dialed number “belongs” to some other switch, the only thing the originating switch
3 needs to know is which trunk port to send the call out on.

4 Note that, from this network perspective, the only truly “local” calls are calls that
5 begin and end in the same physical switching device. Long ago, however, local calling
6 plans grew to include customers served by many different switches. As a result, what
7 constitutes a “local” call for a customer is not really a technical matter at all. It is simply
8 a market scope decision. From a technical perspective it is essentially an arbitrary
9 decision which NPA-NXXs to include on the programmed list of “local” calls and which
10 to exclude (which means, usually, that the customer has to dial a “1” before the NPA-
11 NXX-XXXX in order to complete the call).

12 **Q. FROM A TECHNICAL NETWORK PERSPECTIVE, IS THERE ANY**
13 **LIMITATION ON THE DISTANCE THAT A “LOCAL” CALL CAN TRAVEL,**
14 **THE SIZE OF A “LOCAL” CALLING AREA, OR THE NUMBER OF**
15 **CUSTOMERS IN A “LOCAL” CALLING AREA?**

16 **A.** None at all. And, in fact, the size and scope of “local calling areas” varies greatly from
17 place to place around the country. Some states have large local calling areas; others have
18 small local calling areas. Again, from this perspective, the technical network personnel
19 have no preference one way or another. The carrier’s marketing and/or regulatory
20 personnel just have to tell the engineers which NPA-NXXs to include on the “local” list
21 for any given switch. The originating switch does not “care” (in the sense of doing
22 anything at all technically different) where it is actually sending a “local” call to a
23 number served by some other switch; and the terminating switch does “care” (in the same
24 sense) where a “local” call is coming from. These are retail marketing questions, not
25 technical questions.

1 **Q. SO THE DISTANCE QWEST TRANSPORTS TRAFFIC IS THE SAME**
2 **WHETHER THE LEVEL 3 CUSTOMER IS 500 YARDS, 2 MILES, OR 200**
3 **MILES FROM THE POI?**

4 A. Yes. Qwest transports calls that it originates to the POI, regardless of where the Level 3
5 customer is located. The location of the Level 3 customer or end user is immaterial to
6 Qwest's call transport or for Qwest's costs for that matter. Mr. Greene will discuss in his
7 testimony how Qwest's costs are the same no matter where the Level 3 end user is
8 located.

9 **Q. HOW WOULD SWITCHES IMPLEMENT THE QWEST IDEA OF USING THE**
10 **GEOGRAPHIC LOCATION AS THE DETERMINATION FOR A LOCAL**
11 **CALL?**

12 A. I have no idea. A switch has no way of storing information regarding the premises
13 location associated with a phone number assigned to that switch, and no way of receiving
14 or storing information about the premises location assigned to a phone number calling
15 someone served by that switch. A switch is really just a simple traffic cop – making a
16 relatively binary decision of where to send traffic. The SS7 protocol that sends
17 information between switches for call set-up and billing purposes does not have any
18 parameters to identify the premise locations of calling or called parties. I have asked
19 engineers that have worked in switch design for 25 years and no one has ever heard of a
20 feature that would store the geographic location associated with a phone number in the
21 switch or in any peripheral that is accessible by a switch. If Qwest were to design such a
22 feature in a peripheral device, it would no doubt be expensive to implement since each
23 call would need to reference a database, and the database itself would need to be created
24 and maintained.

25 As I pointed out above, moreover, the status of any given call as "local" or not is
26 a market and political based choice, not anything that affects or is driven by any relevant
27 network technology. So, from my network engineering perspective, it seems to me that

1 Qwest, by pressing its premises-location-based notion of what constitutes a “local” call,
2 is just trying to impose its own retail marketing choices onto Level 3. There is certainly
3 no technical basis for Qwest’s position that I can see.

4 **Q. IS QWEST’S INTERCONNECTION TRUNKING THE SAME NO MATTER**
5 **WHERE THE LEVEL 3 END USER CUSTOMER IS LOCATED?**

6 A. Yes. Qwest’s trunking is always to the POI, no matter where the Level 3 end-user
7 customer is located. It doesn’t matter if the Level 3 customer is 500 yards, 2 miles, or
8 200 miles from the POI. Level 3 carries the traffic to its end-user customer, no matter
9 where they are located. Qwest’s interconnection trunking to the POI is the same no
10 matter where the Level 3 customer that they are calling is actually located.

11 **Q. DOES IT MAKE SENSE FROM A TECHNICAL POINT OF VIEW THAT**
12 **LOCALLY DIALED CALLS ORIGINATED BY QWEST CUSTOMERS**
13 **SHOULD BE TREATED AS LOCAL CALLS?**

14 A. Yes. When a Qwest customer dials a Level 3 customer using a local number, the call is
15 processed by the Qwest network as any other locally dialed call. The call is routed to an
16 interconnection trunk, usually over a Level 3 Direct End Office Trunk (DEOT) at the
17 Qwest local switch. Qwest switches treat the call as any other local call. The calls are
18 not long distance access calls and do not require Feature Group D (FGD) handling.
19 Qwest is not being asked to transport the calls within the Level 3 network. While the
20 transport distance may be slightly longer than for local calls completely within the Qwest
21 network, this is a natural outcome of the fact that Level 3 does not have the same number
22 of switches in the state as does Qwest. Transport between offices is cheap for Qwest, and
23 Level 3 should not be required to build out its network to the same extent that Qwest has
24 built out its network.

1 **Q. WHAT IS QWEST'S POSITION WITH RESPECT TO ISP-BOUND CALLS.?**

2 A. Qwest has maintained for some time that Level 3 must have ISP modems in the local
3 calling area in order for dial-up Internet traffic to be considered local traffic. This policy
4 is contrary to Washington rules regarding local traffic. Qwest seeks to change that
5 traditional arrangement and to attempt to assess the status of a call based on the actual
6 physical location of the calling and called parties. Qwest maintains that the rating of a
7 call should be changed to reflect the geographic location of both the calling and called
8 party premises as opposed to the originating and terminating phone numbers that have
9 traditionally been used.

10 **V. COMPARISON OF LEVEL 3 NETWORK AND QWEST NETWORK**

11 **A. TREATMENT OF ISP-BOUND TRAFFIC**

12 **Q. DO THE QWEST NETWORK AND THE LEVEL 3 NETWORK PROVIDE THE**
13 **SAME FUNCTIONALITY TO ITS ISP CUSTOMERS?**

14 A. Yes. Both the Level 3 network and the Qwest network provide dial-up service to its ISP
15 customers by substantially the same network functionality.

16 **Q. HOW DOES QWEST PROVIDE ISP SERVICE IN WASHINGTON?**

17 A. Yes. Qwest's affiliate QCC provides ISP service both at the retail and wholesale level.
18 QCC accesses many remote offices via ISDN PRI trunks. It is my understanding that
19 Qwest's position is that these ISDN PRI trunks provide the "local" presence for QCC and
20 its ISP customers.

21 **Q. IS LEVEL 3 ASKING FOR THE SAME FUNCTIONAL CONNECTIVITY THAT**
22 **QWEST PROVIDES TO QCC?**

23 A. QCC provides both retail and wholesale ISP services to its customers. The wholesale
24 services that QCC provides are very similar to those offered by Level 3. QCC uses PRI
25 trunks instead of the DEOT/DTT trunks that Level 3 uses. The only difference is that the
26 PRI trunks are retail service that is slightly more expensive than the DEOT/DTT trunks.

1 In addition, there is no reciprocal compensation on the PRI trunks. QCC is apparently
2 operating as a customer of Qwest's and not a co-carrier as Level 3. Level 3 is a CLEC
3 and should not be penalized by Qwest for operating as a CLEC. Qwest seems to believe
4 that Level 3 should act as Qwest's customer and purchase its retail services in order to
5 provide local service to its ISP customers.

6 **Q. TECHNICALLY, WHAT ARE THE PRI TRUNKS AND DEOT/DTT TRUNKS**
7 **PROVIDING TO QCC AND LEVEL 3 RESPECTIVELY?**

8 A. Both PRI and DEOT/DTT trunks provide basic connectivity or capacity from one office
9 to another office. Both types of trunks are sized to meet the traffic requirements that the
10 company estimates are necessary for good service. Both PRI and DEOT/DTT trunks
11 provide switching by the end office so that ISP subscribers can call a local number and
12 get connected to the Internet through the ISP. Both PRI and DEOT/DTT trunks provide a
13 local presence in the local calling area. Technically, they are almost identical. PRI
14 trunks use a subset of SS7 signaling while DEOT/DTT interconnection trunks use the full
15 SS7 protocol since the traffic is between carrier switches. Both PRI and DEOT/DTT
16 trunks require essentially the same resources in the local switch. They both use trunk
17 cards on the local switch. DEOT/DTT interconnection trunks require trunk termination
18 facilities on the Level 3 switch as well. Qwest creation and utilization of the PRI
19 trucking product within its network makes sense when connecting to QCC customers as
20 this is a retail service and QCC is not acting as a competitive carrier. It is appropriate for
21 Level 3 to use DEOT/DTT interconnection trunks for the identical type of traffic since
22 Level 3 is a competitive, co-carrier.

23 **Q. DOES EITHER LEVEL 3 OR QCC PROVIDE "DIAL TONE" SERVICE TO ISP**
24 **CUSTOMERS?**

25 A. No. The service that both Level 3 and QCC are providing to ISP customers is not a "dial
26 tone" type service as no dial tone is necessary. Qwest has said that the Qwest End Office

1 Switch provides dial tone for the QCC ISP customers, but this is not correct. ISPs do not
2 originate calls, they only receive calls from dial-up Internet users. However, the Qwest
3 End Office Switch can be viewed as providing service to the QCC ISP customers. The
4 Level 3 switch is providing service to the Level 3 ISP customers. Since the Qwest switch
5 is providing basic service to the QCC customers, it is appropriate that the trunking to the
6 switch is different and slightly more expensive. Qwest is not providing basic service to
7 the Level 3 ISP customers. Level 3 is providing that service. Level 3 is a co-carrier,
8 while QCC is Qwest's customer.

9 **Q. WOULD IT BE REASONABLE TO REQUIRE LEVEL 3 TO COLLOCATE**
10 **SWITCHING IN EVERY LOCAL CALLING AREA?**

11 A. No, it would not. One of the principal tenets of the Telecommunications Act is that the
12 CLECs should not be required to build out their networks and mirror the networks of the
13 ILECs. Level 3 should not be required to install additional equipment so that it can meet
14 a higher standard of physical presence that Qwest does not require of itself or of QCC.

15 **B. TREATMENT OF VOIP TRAFFIC**

16 **Q. WHAT IS THE PRIMARY ISSUE WITH RESPECT TO VOICE OVER**
17 **INTERNET (VOIP) IN THIS CASE?**

18 A. There is a dispute between the parties with regard to the POI and/or physical presence for
19 VoIP calls. This dispute is similar in nature to the dispute regarding the POI and/or
20 physical presence for dial-up Internet service.

21 **Q. WHAT IS LEVEL 3'S POSITION ON THE POI FOR VOIP TRAFFIC?**

22 A. Level 3 believes that the physical presence requirement for VoIP traffic is the same as
23 that for dial-up traffic. Level 3 is paying for transport to both the Primary and Secondary
24 POIs as discussed earlier. These POIs are the point to which Level 3 has paid to bring its
25 traffic.

1 **Q. WHAT IS QWEST'S POSITION ON THE POI FOR VOIP TRAFFIC?**

2 A. My understanding from Qwest's filed testimony and from a workshop conducted with
3 Qwest in another state is that Qwest could require the POI for VoIP to be at the point
4 where the ESP hands off traffic to Level 3 or where calls are converted from IP to TDM
5 (or vice versa) – the Media Gateway. So, for example, the VoIP POI for a call that
6 originates with a VoIP provider such as Skype would be where Skype puts traffic onto
7 the Level 3 network. This could be in Virginia for the entire country. On Level 3/701,
8 Greene/1-2, this would be either at the Media Gateway (box labeled "Level 3 Seattle
9 Gateway") or at the VoIP Provider Network point (Internet cloud at lower right). Both of
10 these points are within the Internet, not on the PSTN.

11 **Q. WHAT WOULD LEVEL 3 NEED TO DO UNDER QWEST'S POSITION ON**
12 **VOIP TO MAKE VOIP CALLS LOCAL CALLS?**

13 A. Under Qwest's proposed rules, Level 3 would need to effectively place a Media Gateway
14 in every local calling area in Washington or to lease private lines to every local calling
15 area from the Level 3 Media Gateway in Seattle. Putting a Media Gateway in every local
16 calling area makes no sense from either a technical or an economic point of view.
17 Technically, the traffic from a single local calling area does not have the volume to
18 justify a Media Gateway. Typical Media Gateways are designed to handle a huge
19 amount of traffic and are engineered to aggregate traffic from multiple calling areas in a
20 single location. Economically, it would make no sense to put Media Gateways in every
21 local calling area as they are expensive devices and most of their capacity would be
22 unused. Qwest does not do this for its own VoIP service. Leasing private lines from
23 every local calling area to a central Media Gateway also makes no sense. Alternatively,
24 Level 3 could lease private lines from Skype's location in New York to every local
25 calling area in Washington. They would also need to lease private lines from every other
26 VoIP provider whose traffic they carry to all Washington local calling areas as well. This

1 option is absurd as it would require Level 3 to essentially build a large private long
2 distance network. It is not even clear which of these requirements would satisfy Qwest.

3 **Q. WHAT IF A SKYPE CUSTOMER WAS CALLING THEIR NEIGHBOR NEXT-**
4 **DOOR USING VOIP?**

5 A. Under the rules proposed by Qwest, Level 3 would still need either a Media Gateway in
6 the local calling area or private lines to New York to make a call between neighbors a
7 local call.

8 **Q. IS THE QWEST PROPOSAL REASONABLE?**

9 A. No, it is not. It would be prohibitively costly for Level 3, or any provider to put media
10 gateways in every local calling area or to lease private lines to the point at which traffic is
11 handed to Level 3 from the VoIP provider. Qwest is trying to force an expensive
12 architecture on Level 3 so its service is not competitive. The current Level 3 architecture
13 is efficient, economical and reasonable.

14 **Q. WHAT IS YOUR OVERALL RECOMMENDATION WITH RESPECT TO THE**
15 **ISSUES ADDRESSED ABOVE?**

16 A. I would advise this Commission to follow the Level 3 recommendations for these issues.
17 Level 3 is paying its fair share of network costs for delivering traffic to its customers and
18 has gone much further than any other CLEC in moving POIs into the local calling area.
19 The network structure that Qwest seeks the Commission to adopt has no justification
20 from an engineering or efficiency point of view. Qwest is attempting to leverage CLECs
21 to mirror the large Qwest network and the design that QCC has chosen, which relies on
22 the large Qwest network. CLECs such as Level 3 that have embraced the engineering
23 and efficiency advantages of IP based networks should not be curtailed by Qwest from
24 providing the greatest degree of benefits to the citizens of Washington that their networks
25 can provide. Level 3's proposal should be adopted.

1 copper wires. The smallest normal unit of capacity on an optical network is an OC-3,
2 which is the equivalent of three DS3s. Other common capacity measures for optical
3 networks are the OC-12 (12 DS3s), the OC-48 (48 DS3s), and the OC-192 (192 DS3s).

4 **Q. HOW DO TELECOMMUNICATIONS ENGINEERS DECIDE HOW MUCH**
5 **CAPACITY TO PUT INTO PLACE BETWEEN TWO SWITCHES?**

6 A. At a very high level, the more traffic that will flow between the switches, the bigger the
7 trunk group you will put into service. But it is actually more complicated than that.

8 Think about the highway example discussed above. Imagine that you are trying
9 to design a highway between a large city and a populous suburb. You would not look at
10 the number of cars driving between the city and the suburb at 3:00 on Sunday morning.
11 And, although perhaps not as obvious, you would not just look at the total number of cars
12 that travel that route over the course of a day or week or month. Instead, to properly
13 design the highway, you would look at how many cars are trying to travel that route at the
14 very same time, at rush hour on the busiest day of the week. That way, you would know
15 how much traffic your new road will need to be able to handle when it is at its busiest.
16 That will tell you how big to make your highway.

17 This same principle applies to deciding how big to make trunk groups between
18 switches. Different routes that serve different types of customers have different “rush
19 hours” (called “busy hours” in the telecommunications business). A route between
20 switches that mainly serve business customers might have a busy hour between 9:00 and
21 10:00 a.m. when people arrive at their offices for work. On the other hand, a route
22 between switches that mainly serve residential customers might have a busy hour
23 between 3:00 and 4:00 p.m. as children get home from school and they and their parents
24 start calling each other to discuss homework, social events, or the evening’s plans.

1 There is a final, but critically important, consideration in determining how large
2 trunk groups should be. This issue is known as “trunking efficiencies” which I address
3 later in my testimony.

4 **Q. WHY ARE QWEST’S CLAIMS THAT LEVEL 3 MUST ESTABLISH FGD**
5 **TRUNKING INCORRECT?**

6 A. There is no issue as to whether traffic subject to different rating schemes can be
7 exchanged over a single network as Qwest has readily conceded in the past Qwest can
8 route local traffic over the same trunks as Qwest currently routes “switched access” or
9 “interexchange” or “FGD” traffic today. The converse is equally as true.

10 **Q. SO A “TRUNK” IS A “TRUNK”, CORRECT?**

11 A. Yes. There is no fundamental difference between FGD trunks and any other trunks.
12 Historically, one of the features of FGD trunks was the proper rating of calls. However,
13 there are now better ways to rate calls, given that end users are not necessarily physically
14 located in the rate center associated with a particular switch. Accordingly, Qwest’s
15 objections to Level 3’s Section 7.2.2.9.3.1 are unfounded.

16 **Q. AND A SWITCH IS A SWITCH, CORRECT?**

17 A. Yes. Switches route traffic between local loops and trunk groups and between different
18 trunk groups.

19 **Q. SO, IS IT TECHNICALLY FEASIBLE FOR AN END OFFICE SWITCH OR A**
20 **TANDEM SWITCH TO ROUTE BOTH LOCAL AND TOLL TRAFFIC OVER**
21 **THE SAME OUTGOING TRUNK GROUP?**

22 A. Yes it is.

23 **Q. IS LEVEL 3 REQUESTING A MORE EFFICIENT ARCHITECTURE FOR**
24 **ROUTING CALLS?**

25 A. Yes, instead of using two different trunk groups for routing local calls and interexchange
26 calls, Level 3 is requesting that Qwest route both local and interexchange calls to the

1 same trunk group. This is more efficient from an engineering standpoint, especially
2 when there are only a small number of interexchange calls, which is the case with
3 Level 3.

4 **Q. PREVIOUSLY YOU REFERRED TO “TRUNKING EFFICIENCIES?”, WHAT**
5 **DO YOU MEAN BY THAT?**

6 A. It turns out that, while the number of trunks that you need in a trunk group to carry a
7 given amount of busy hour traffic definitely increases as the amount of traffic increases,
8 the number of trunks goes up at a slower rate than the traffic goes up. If the current
9 amount of traffic is carried on a single DS1 (24 DS0s), it will not require three DS1s to
10 carry three times as much traffic. Instead, it will require, perhaps, only two DS1s.
11 Moreover, this effect continues as the traffic growth get larger, so that ten times as much
12 busy hour traffic will not require anything near a 10-fold increase in the number of
13 trunks.

14 In practical terms, this means that carriers can greatly conserve on the number of
15 trunks they need to establish between two switches, by combining as much of the
16 interswitch traffic as possible onto a single, large trunk group.

17 **Q. HOW WOULD THE END OFFICE SWITCH ROUTE CALLS DIFFERENTLY**
18 **WITH THE ARCHITECTURE THAT LEVEL 3 IS PROPOSING?**

19 A. The end office switch has no more difficulty in routing an interexchange call to an
20 interconnection trunk group than it does to a FGD trunk group. It is just a matter of
21 programming the routing table with the correct trunk group assignment. Since the
22 routing table must be programmed for either architecture, the configuration that Level 3
23 is proposing is no more difficult than the traditional architecture.

24 **Q. IS THE LEVEL 3 CONFIGURATION MORE EFFICIENT?**

25 A. Yes, the Level 3 configuration does not require the provisioning of a FGD trunk group.

1 **Q. HOW WOULD THE TANDEM OFFICE ROUTE CALLS USING THE LEVEL 3**
2 **ARCHITECTURE?**

3 A. Once again, this is a simple matter of programming the routing table in the tandem to
4 interexchange calls bound for Level 3 to the Interconnection Trunk Group instead of to a
5 FGD trunk group. The routing table must be programmed in either case.

6 **Q. IS THIS ARCHITECTURE MORE EFFICIENT THAN THE ARCHITECTURE**
7 **PROPOSED BY QWEST?**

8 A. Yes, the architecture proposed by Level 3, is more efficient than the architecture
9 proposed by Qwest. In the Level 3 architecture there is no need for a separate FGD trunk
10 group.

11 **Q. WHAT ARE SOME OF THE REASONS WHY A SINGLE LARGE TRUNK**
12 **GROUP IS BETTER THAN MULTIPLE SMALLER TRUNK GROUPS?**

13 A. As alluded to above, requiring multiple trunk groups along the same path between two
14 switches is unnecessary, inefficient, costly, and can harm network performance. For
15 example, one key problem is that using multiple trunk groups will lower the blocking
16 Grade of Service (GOS), unless additional trunks are installed.

17 **Q. WHY IS THIS INEFFICIENT?**

18 A. From a network point of view, it is always preferable to combine as much traffic as
19 possible on single trunk groups. Large single trunk groups are much more efficient than
20 multiple smaller trunk groups. For example, one trunk group with four DS1s will handle
21 much more traffic than two trunk groups, each with two DS1s. To handle the same
22 amount of traffic, the two trunk groups would need to contain 3 DS1s each to have the
23 same capacity. This would require a total of six DS1s to do the same job as four DS1s on
24 one trunk group. "Breakage" of a single trunk group into multiple trunk groups always
25 requires additional trunks to carry the same traffic load with the same blocking grade of
26 service.

1 **Q. EARLIER YOU MENTIONED “BLOCKING GRADE OF SERVICE.” WHAT**
2 **DOES THAT TERM REFER TO?**

3 A. Blocking Grade of Service (“GOS”) is the measure of call blocking on a trunk group.
4 Blocking is generally measured at the busy hour and is given as a percent of the calls that
5 are blocked due to insufficient trunk capacity. A standard, acceptable blocking GOS
6 would be 2% end-to-end. This means that for every 100 calls that customers try to make
7 that would be carried on that route, group, two calls will be blocked due to insufficient
8 capacity. When 2% call blocking is desired end-to-end, an allocation is made to various
9 facilities and equipment to achieve the 2%. Typically, a trunk group between two
10 switches is allocated 1% blocking level so that 2% can be maintained end-to-end. This is
11 due to the fact that many calls involve more than one switch and thus more than one
12 trunk group. There are also small probabilities of blocking on digital loop carrier
13 equipment and associated loop transport. (Within the traditional PSTN, you would know
14 that you had encountered blocking on a trunk group when you heard a “fast busy” signal,
15 or a recording telling you that “all circuits are busy.”)

16 **Q. WHAT IS THE IMPACT ON BLOCKING GOS WHEN A LARGE AMOUNT OF**
17 **TRAFFIC MUST BE BROKEN DOWN INTO MULTIPLE TRUNK GROUPS?**

18 A. If a large trunk group (say, 48 DS0s, or 2 DS1s) is split into multiple trunk groups with
19 the same total size (two groups of 1 DS1 each), the overall carrying capacity of the
20 multiple smaller trunk groups is smaller than the carrying capacity of the original one
21 trunk group. The laws of trunk engineering dictate that the total number of trunk
22 members in multiple trunk groups must be significantly larger in order to carry the same
23 amount of traffic. The effect is like congestion on the highway. One four-lane highway
24 will carry considerably more traffic than two, 2-lane highways. For example, a single
25 trunk group with 48 members (two DS1s) can carry about 15% more traffic than two
26 trunk groups with 24 members each.

1 **Q. IS THERE ANOTHER TYPE OF INEFFICIENCY WITH RESPECT TO**
2 **SPLITTING A LARGE TRUNK GROUP INTO MULTIPLE SMALLER TRUNK**
3 **GROUPS?**

4 A. Yes. Earlier I mentioned “breakage.” This term is used to describe the problem when
5 facilities with discrete sizes must be divided into smaller facilities. As I noted earlier, the
6 DS1 (24 DS0s, or 24 simultaneous calls) is the smallest normal unit in which trunks
7 between switches are ordered and provisioned. This is because the DS1 is the most
8 common size of “port” on switching and transport equipment. This makes the practical
9 effect of the inefficiencies of breaking a large trunk group down into two or more smaller
10 trunk groups even worse.

11 For example, suppose that if a trunk group needs a total capacity of 30 DS0
12 trunks. Because trunks are ordered and provisioned in DS1 units, two DS1s must be used
13 (that is, 48 DS0s). Even though the need is only for 6 DS0s above the first DS1, two
14 complete DS1s will be established, because the switching and transport gear accepts
15 trunk groups in DS1-sized “chunks.”

16 Now, if this trunk group must be divided to handle two different call types on two
17 different trunk groups, it is quite possible that the ratio between the two call types is not
18 50/50. If the trunk requirement is larger than a multiple of 24 (even if it is only one trunk
19 member larger – say 25 DS0s) a new DS1 must be provisioned and the associated
20 equipment added to terminate the new DS1. Coupled with the need for additional
21 capacity to maintain the same blocking GOS, this leads to significant increases in the
22 overall number of DS1s needed for a given traffic volume when the trunk groups must be
23 split. Taking this factor and the blocking factor into account, one trunk group with 48
24 members cannot be replaced with two trunk groups of 24 members. To get the same
25 blocking grade of service using two trunk groups, both trunk groups would need to have

1 two DS1s. So the effect of splitting the large trunk group into two is actually to *double*
2 the total number of DS1s needed - *to carry the exact same amount of traffic!*

3 **Q. WOULD QWEST FACE THE SAME INEFFICIENCIES FROM MULTIPLE**
4 **TRUNK GROUPS THAT YOU HAVE DESCRIBED ABOVE FOR LEVEL 3?**

5 A. Yes. Just like Level 3, Qwest would need to dedicate DS1 ports on its FOTs, DCSs, and
6 switches to the additional DS1 trunk groups made necessary by inefficient, multiple trunk
7 groups.

8 **Q. WILL THERE BE ANY INCREASE IN MISROUTED CALLS IF “LOCAL,”**
9 **“TOLL,” AND OTHER “TYPES” OF ARE CARRIED ON A SINGLE, LARGE**
10 **TRUNK GROUP?**

11 A. No, not at all. Briefly, to determine how to route a call, the switches looks at the first six
12 digits of the telephone number (the “NPA-NXX”). Part of the human staff effort
13 described above in administering trunk groups is properly programming the switch to
14 know that, if the NPA-NXX of the called number on an outgoing call is “208-348,” the
15 call gets routed to “Trunk Group XX,” but if the NPA-NXX is “208-555,” the call gets
16 routed instead to “Trunk Group YY.”

17 Of course, in actual practice it’s a bit more complicated than that. For example, if
18 the called number has been ported from its original carrier to a competing carrier, the
19 switch doesn’t look at the NPA-NXX of the number that was actually dialed, it looks at
20 the “NPA-NXX”-equivalent portion of the “Location Routing Number,” or LRN. And, if
21 the NPA-NXX in question is subject to “thousands-block pooling,” it will be necessary to
22 look not only at the first six digits of the number (the NPA-NXX), but also at the seventh
23 digit - essentially, the NPA-NXX-X - as well.

24 But the point is that none of this activity involved in routing a call outbound from
25 Qwest to Level 3, or vice versa, is affected in any way by any regulatory overlay that
26 classifies a call as “local” or “toll” or “intraLATA” or “IP-enabled” or “ISP-bound” or

1 “interstate” or “intrastate.” What matters is the dialed number or, for ported numbers the
2 LRN. The rest of the regulatory stuff has literally no impact at all on call routing. The
3 network will have no trouble correctly routing any type of calls, no matter how many are
4 combined on the same trunk group. While there will always be some small numbers of
5 misrouted calls in the network, this number will not increase when these traffic types are
6 combined on the same trunk group.

7 **Q. ARE ALL OF THE DIFFERENT SWITCH TYPES THAT QWEST USES**
8 **CAPABLE OF THE ROUTING ARCHITECTURE THAT LEVEL 3 IS**
9 **PROPOSING?**

10 A. Yes, with the exception of tandem switches used for only local calls, mentioned above,
11 all of the switch types used by Qwest are capable of this routing, whether they are made
12 by Lucent, Nortel or another manufacturer. The Level 3 architecture is not requiring the
13 switch to do anything new or different. It is merely a matter of assigning the routing to a
14 different trunk group.

15 **Q. ARE THERE BILLING ISSUES ASSOCIATED WITH THE ARCHITECTURE**
16 **THAT LEVEL 3 IS PROPOSING?**

17 A. Qwest is concerned about billing issues. Level 3 addressed these issues in some detail in
18 testimony filed in this case. In that testimony it is shown how the billing for different call
19 types on a single trunk group can be handled. Level 3 is doing this successfully today
20 with SBC, Bell South and Verizon, so there is no reason that the same arrangement can't
21 be made with Qwest.

22 **Q. WHAT IS THE PROBLEM WITH ORDERING FGD TRUNK GROUPS TO**
23 **EACH POI?**

24 A. The majority of Level 3's traffic is locally dialed traffic. In other words, Level 3 picks up
25 and delivers all traffic to POIs located within the LATAs in which the traffic originates
26 from Qwest's customers or in which Level 3 brings it for termination to Qwest

1 customers. So even assuming that Qwest's billing concerns could justify requiring that
2 Level 3 go to this expense and trouble to establish FGD trunks, there is very little traffic
3 that would require this sort of billing anyway. This is true despite Qwest's
4 unsubstantiated accusations regarding WilTel traffic, but I will allow Mr. Greene to
5 address that directly. Nonetheless, by any measure, it makes no sense for Level 3 to
6 order separate FGD trunks for a small amount of access traffic.

7 **Q. DO AT&T, VERIZON OR QWEST DEPLOY SWITCHES OR BILLING**
8 **SYSTEMS THAT ARE MATERIALLY DIFFERENT THAN WHAT QWEST**
9 **USES TODAY?**

10 A. AT&T, Verizon and Qwest all use the same types of switches. The majority of their
11 switching is done by Lucent and Nortel switches, all of which have great flexibility in
12 their operation. These switches can easily route 1+ dialed traffic at interconnection
13 trunks.

14 **Q. IS LEVEL 3 USING THIS METHODOLOGY WITH OTHER ILECS?**

15 A. Yes, Level 3 is combining all traffic on interconnection trunks in the AT&T, BellSouth,
16 and Verizon territories. We are using the PLU/PIU method of billing in the 34 states
17 comprising these Bell operating regions with problems no more severe or any different
18 than the sorts of verification that occurs daily between carriers exchanging not only vast
19 amounts of traffic, but vast amounts of billing information about that traffic.

20 **Q. DO LEVEL 3'S METHODS REDUCE BILLING COSTS?**

21 A. Yes.

22 **Q. PLEASE EXPLAIN.**

23 A. Level 3's billing factors tend to reduce the costs of billing by virtue of the fact that
24 reliable sampling and application of factors, as proposed by Level 3, actually requires far
25 less effort than billing each and every call. Recording every call and then sending it to

1 various databases for rating requires resources and human intervention for errors. In
2 addition, there are always a small percentage of calls that can not be properly rated.
3 These calls require billing factors for rating anyway.

4 **Q. WHEN IMPLEMENTING A SINGLE NETWORK, SHOULD LEVEL 3 BE**
5 **REQUIRED TO DUPLICATE THE NECESSARY SS7 LINKS BETWEEN THE**
6 **NETWORKS?**

7 A. No. This issue is similar to the previous issue on combining both local and interexchange
8 switched access traffic on single trunk groups. Level 3 is proposing to use SS7 Quad
9 Links for both local and toll traffic. This is an efficient use of scarce resources for both
10 the links (which must be provisioned in a redundant manner for reliability) and ports on
11 the Signaling Transfer Points (STPs). Level 3 proposes using the same PLU and PIU
12 calculations for calculation of charges for SS7 messages.

13 **Q. WHAT IS QWEST'S POSITION ON THIS ISSUE?**

14 A. Qwest is proposing that Qwest and Level 3 put in separate, duplicative SS7 quad links
15 (one set for local traffic and one set for toll traffic) between their SS7 networks. Qwest
16 does not want Level 3 to use existing SS7 quad links for both local and toll traffic.

17 **Q. WHAT IS THE SS7 NETWORK AND WHAT ARE SS7 QUAD LINKS?**

18 A. The SS7 network is the part of the PSTN that allows switches and databases to
19 communicate with each other. Its main function is for call set up, but it is also used for
20 database look up such as required by 800 service. SS7 quad links are the data links that
21 connect two SS7 networks. Without these links, neither Qwest nor Level 3 could
22 complete calls to the other company's network.

23 **Q. WHAT EFFICIENCIES WOULD BE OBTAINED BY COMBINING LOCAL**
24 **AND TOLL SS7 MESSAGES ON ONE SET OF QUAD LINKS?**

25 A. Using the same quad links for both local and toll call set up messages will save both
26 Qwest and Level 3 transmission links and ports on their SS7 switches. Since

1 transmission links and SS7 ports are provisioned in a redundant manner for additional
2 reliability, the Qwest proposal will waste a significant number of transmission links and
3 ports on both networks, doubling the links and ports that are needed.

4 **Q. IS IT IMPOSSIBLE FOR QWEST TO IMPLEMENT THE SHARING OF LINKS**
5 **BETWEEN LOCAL AND TOLL TRAFFIC?**

6 A. No, absolutely not. Qwest does not need to distinguish between messages relating to
7 local calls and messages relating to toll traffic. There is a simpler way to handle the
8 billing issues for these messages. The same PLU and PIU factors that are used to
9 correctly bill access charges for the actual calls can be used to charge for SS7 messages.
10 The data traffic flowing between the two SS7 networks mirrors the actual call traffic
11 flowing between the two networks as the SS7 messages are setting up and managing the
12 calls. The PLU and PIU for the one can be used to accurately calculate billing for the
13 other. Qwest can simply calculate the charges based on total messages and then factor
14 the bill down using the PLU and PIU. If, hypothetically, the bill from Qwest to Level 3
15 for SS7 messages was \$20,000 for one month and the PLU is 65%, then the actual bill
16 would be \$7,000.

17 **Q. WHAT SHOULD THIS COMMISSION DO WITH RESPECT TO THIS SS7**
18 **ISSUE?**

19 A. The Commission should rule in favor of Level 3's language, which presents an efficient
20 and fair way of managing the SS7 network, saving transmission links and SS7 switch
21 ports in both the Level 3 and the Qwest networks.

22 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

23 A. Yes. It does.

EXHIBITS

Exhibit KLW-2

Resume of Kenneth L. Wilson

CERTIFICATE OF SERVICE

I hereby certify that I have this 30th day of May, 2006, served the true and correct original, along with the correct number of copies, of the foregoing document upon the WUTC, via the method(s) noted below, properly addressed as follows:

Carole Washburn	<input type="checkbox"/>	Hand Delivered
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I hereby certify that I have this 30th day of May, 2006, served a true and correct copy of the foregoing document upon parties of record, via the method(s) noted below, properly addressed as follows:

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I declare under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

DATED this 30th day of May, 2006, at Seattle, Washington.

S. Arellano

CURRICULUM VITAE

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Past Positions

1995-1998 AT&T Technical Negotiations Director, Local Service Organization
Western Region – Technical leader of negotiations and witnessing team
responsible for all aspects of AT&T's contracts in 14 states with US WEST.
Led technical planning for local infrastructure and Operations Support Systems
"OSS" interfaces.

1994-1995 AT&T Bell Labs local infrastructure development and business analysis –
technical lead for team evaluating local infrastructure alternatives and OSS.

1992-1994 Bell Labs Technical Director Network Deployment and Asset
Management – key team leader on AT&T project to optimize network
infrastructure by changing engineering rules and OSS processes.

1988-1992 Bell Labs MTS Supervisor responsible for network design and OSS
performance of the FTS2000 network. Network performance planning for new
business customer features. Competitive testing and analysis of multiple
vendor networks.

1984-1987 Bell Labs MTS and MTS Supervisor, Cellular Telephone Development.
Responsible for systems requirements and systems testing of new cellular
telephones.

1980-1984 Bell Labs MTS responsible for 4ESS feature and architecture planning.

1977-1980 Software, hardware and manufacturing engineering in two small
companies.

1972-1977 Teaching Assistant, University of Illinois Department of Electrical
Engineering.

Education

ABD for Ph.D. in Electrical Engineering, University of Illinois, 1976

MS in Electrical Engineering, University of Illinois, 1974

BS in Electrical Engineering, Oklahoma State University, 1972

A. WRITTEN TESTIMONY, AFFIDAVITS AND REPORTS

Date	State	Docket	Filed By	Description
2/11/1998	IA	AIA-96-1	AT&T	Direct Testimony - Arbitration Remand - USWC
2/12/1998	OR	UT138	AT&T	Reply Testimony UM351 Compliance Tariffs - USWC
2/12/1998	OR	UT139	AT&T	Reply Testimony UM351 Compliance Tariffs - GTE
3/9/1998	IA	AIA-96-1	AT&T	Direct Answer Testimony - Arbitration Remand - USWC
3/13/1998	NM	96-411-TC	AT&T	Direct Testimony - Arbitration AT&T/USWC
3/23/1998	IA	AIA-96-1	AT&T	Rebuttal Testimony - Arbitration Remand - USWC
4/8/1998	CO	96S-331T	AT&T	Testimony - Arbitration - Cost Issues - USWC
5/26/1998	AZ	T-0000A-97-238	AT&T	Reply Testimony - Sect. 271 Telecom Act
6/16/1998	MT	D97.5.87	AT&T	Direct & Rebuttal Testimony - Sect. 271 Telecom Act
7/27/98	NM	97-106-TC	AT&T	Direct & Rebuttal Testimony - Interconnection - Sect. 271
7/27/1998	NM	97-106-TC	AT&T	Direct & Rebuttal Testimony - Signaling - Sect. 271
8/7/1998	NE	C-1830	AT&T	Direct & Rebuttal Testimony - Signaling - Sect. 271
8/7/1998	NE	C-1830	AT&T	Direct & Rebuttal Testimony - Interconnection - Sect. 271
9/8/1998	NM	97-106-TC	AT&T	Reply Testimony - Sect. 271 Telecom Act
9/8/1998	NM	97-106-TC	AT&T	Reply Testimony (prop version) - Sect. 271 Telecom Act
11/6/1998	MT	D97.5.87	AT&T	Supplemental Rebuttal Testimony - Sect. 271 Telecom Act
11/13/1998	WA	UT-960369 et al.	AT&T	Sup. Responsive Testimony Arbitration Cost Case
12/1/1998	WA	C97-1073Z	ELI	Expert Opinion - ELI complaint against US WEST for violation of the Sherman Act
2/1/99	WA	C97-1073Z	ELI	Expert Report - ELI complaint against US WEST for violation of the Sherman Act
10/22/99	CA	CA97-2015	CalTech	Expert Report - CalTech complaint against Pacific Tel for violation of the Sherman Act
12/99	CA	CA97-2015	CalTech	Supplement to Expert Report - CalTech complaint against Pacific Tel for violation of the Sherman Act
12/17/99	WA	UT-991292	AT&T	Direct and Rebuttal - Access complaint against US WEST
1/00	CA	CA97-2015	CalTech	Declaration - CalTech complaint against Pacific Tel for violation of the Sherman Act

1/00	AZ	USW application for Section 271 relief	AT&T	Comments on 271 Checklist items 3, 7, 8, 9, 10, 12, and 13
4/00	CO	USW application for Section 271 relief	AT&T	Comments on 271 Checklist items 3, 7, 8, 9, 10, 12, and 13
5/00	WA	USW application for Section 271 relief	AT&T	Testimony on 271 Checklist Items 3, 7, 8, 9, 10, 12, and 13
6/00	CO	Section 271 PUC Workshop,	AT&T	Affidavit on checklist items 3, 7, 8, 9, 10, 12, and 13
7/00	WA	Section 271 PUC Workshop,	AT&T	Affidavit on checklist items 3, 7, 8, 9, 10, 12, and 13
7/00	VA	Circuit Court, Fairfax County, Chancery # 166950	Hogan Hartson	Initial Expert Report in Trade Secret Case involving High Speed Access and Internet.
7/00	VA	Circuit Court, Fairfax County, Chancery # 166950	Hogan Hartson	Final Expert Report in Trade Secret Case involving High Speed Access and Internet. This report was not filed but was produced in discovery
8/00	CO	Section 271 PUC Workshop, checklist	AT&T	Affidavit on checklist items 1, 14
8/00	AZ	Section 271 PUC Workshop,	AT&T	Affidavit on checklist items 1, 14
9/00	AZ	Section 271 PUC Workshop,	AT&T	Affidavit on checklist items 1, 14
9/00	CO	Section 271 PUC Workshop, checklist items 1, 14 (follow-up)	AT&T	Affidavit on checklist items 1, 14
10/00	UT, IA, etc.	Section 271 PUC Workshop,	AT&T	Affidavit on checklist items 1, 11, 14
10/00	AZ	Section 271 PUC Workshop,	AT&T	Affidavit on checklist items 2, 5, 6
10/00	OR	Section 271 PUC Workshop,	AT&T	Affidavit on checklist items 1, 11, 14
11/00	CO	Section 271 PUC Workshop,	AT&T	Affidavit on emerging services checklist items (dark fiber, DSL, subloop unbundling)
11/00	WA	Section 271 PUC Workshop,	AT&T	Affidavit on checklist items 1, 11, 14
11/00	AZ	Section 271 PUC Workshop	AT&T	Affidavit on Unbundled loops and Number Portability
12/00	CO	Section 271 PUC Workshop	AT&T	Affidavit on Packet Switching, Line Sharing, DSL, Dark Fiber and SubLoop Unbundling

12/00	WA	Antitrust Case against US WEST	Metronet	Plaintiffs Report on Telecommunications issues
01/01	CO	Section 271 PUC Workshop	AT&T	Affidavit on Unbundled Switching, Unbundled Transport, Combinations, UNE-P and general UNE issues
02/01	UT, IA, etc.	Section 271 PUC Workshop	AT&T	Affidavit on Unbundled Switching, Unbundled Transport, Combinations, UNE-P and general UNE issues
02/01	WA	Section 271 PUC Workshop	AT&T	Affidavit on Unbundled Switching, Unbundled Transport, Combinations, UNE-P and general UNE issues
03/01	OR	Section 271 PUC Workshop	AT&T	Affidavit on Unbundled Switching, Unbundled Transport, Combinations, UNE-P and general UNE issues
03/01	WA	Antitrust Case against US WEST	Metronet	Declaration in Support of Opposition to US WEST Motion for Summary Judgement
03/01	UT, IA, etc	Section 271 PUC Workshop	AT&T	Comments on Unbundled Loops, Line Splitting and Network Interface Devices
03/01	CO	Section 271 PUC Workshop	AT&T	Comments on Unbundled Loops, Line Splitting and Network Interface Devices
03/01	AZ	Section 271 PUC Workshop	AT&T	Comments on Unbundled Loops, Line Splitting and Network Interface Devices
04/01	DC	Class Action, DC Superior Court, 01CA000405	Cohen, Milstein	Affidavit for Plaintiff on technical issues in DSL case against Verizon, in response to motion to dismiss.
05/01	WA	Section 271 PUC Workshop	AT&T	Comments on Unbundled Loops, Emerging Services, Subloop Unbundling
05/01	OR	Section 271 PUC Workshop	AT&T	Comments on Unbundled Loops, Emerging Services, Subloop Unbundling
05/01	GA	Section 271 PUC Hearing	AT&T	Affidavit on Interconnection Trunking and Local Number Portability
05/01	LA	Section 271 PUC Hearing	AT&T	Affidavit on Interconnection Trunking and Local Number Portability
06/01	KY	Section 271 PUC Hearing	AT&T	Affidavit on Interconnection Trunking and Local Number Portability
07/01	AL	Section 271 PUC Hearing	AT&T	Testimony on Interconnection Trunking and Local Number Portability
08/01	CO	Civil Action 01-S-0025	City of Louisville	Defendant's Report on Technical Issues. Involving placement of Microwave Towers
10/01	AZ	Affidavit in Docket T-00000A-97-0238	AT&T	Affidavit regarding the redesignation of Interoffice Facilities (IOF) as loop facilities
12/01	AZ	Section 271 PUC Workshop	AT&T	Comments on Qwest's Stand Alone Test Environment OSS interface simulator
01/02	MN	Section 271 PUC Hearing	AT&T	Affidavit on Non-OSS Checklist items. Docket MPUC P-421/CI-01-0370

01/02	AZ	Section 271 PUC	AT&T	Comments on SATE Summary Evaluation Report Version 3. Docket T-00000A-97-0238
01/02	OR	UM 1038	AT&T and Worldcom	Testimony regarding Commission policy of posting quality reports to its website
02/02	MN	Section 271 PUC Hearing	AT&T	Surrebuttal Affidavit on Non-OSS Checklist items. Docket MPUC P-421/CI-01-0370
02/02	AZ	Section 271 PUC	AT&T	Affidavit Supporting Motion to Reopen Checklist Item 7. Docket T-00000A-97-0238
03/02	AZ	Section 271 PCU	AT&T	Second Affidavit Supporting Motion to Reopen Checklist Item 7. Docket T-00000A-97-0238
03/02	SD	Section 271	AT&T	Affidavit on Checklist Item 4 – Unbundled Loops and Checklist Item 11 LNP. Docket TC 01-165
03/02	SD	Section 271	AT&T	Affidavit on Checklist Item 3 – Rights-of-Way and Checklist item 7 911/E911. Docket TC 01-165
03/02	SD	Section 271	AT&T	Affidavit on Checklist Item 13 – Reciprocal Compensation. Docket TC 01-165
03/02	SD	Section 271	AT&T	Affidavit on Checklist Item 1 and 14 – Interconnection, Collocation and Resale. Docket TC 01-165
03/02	SD	Section 271	AT&T	Affidavit on Issues Regarding Emerging Services. Docket TC 01-165
04/02	WY	Section 271	Contact Communications	Testimony on Issues Regarding Interconnection, Collocation, Loops, Subloops and Emerging services
04/02	OR	UM 1038	AT&T and Worldcom	Rebuttal testimony regarding Commission policy of posting quality reports to its website
06/02	MN	Section 271 PUC Hearing	AT&T	Affidavit on Loops and Number Portability. Docket MPUC P-421/CI-01-0370
06/02	MN	Section 271 PUC Hearing	AT&T	Affidavit on Interconnection, collocation and resale. Docket MPUC P-421/CI-01-0370
06/02	MN	Section 271 PUC Hearing	AT&T	Affidavit on Reciprocal compensation. Docket MPUC P-421/CI-01-0370
06/02	MN	Section 271 PUC Hearing	AT&T	Affidavit on UNEs, Switching and Transport. Docket MPUC P-421/CI-01-0370
06/02	MN	Section 271 PUC Hearing	AT&T	Affidavit on Emerging Services. Docket MPUC P-421/CI-01-0370
07/02	FCC	Qwest 271 Filing	AT&T	Declaration on Checklist items in Qwest I filing for CO, ID, IA, NE and ND
08/02	FCC	Qwest 271 Filing	AT&T	Declaration on Checklist Items in Qwest II filing for MT, UT, WA, WY
08/02	MN	Section 271 PUC Hearing	AT&T	Surrebuttal Affidavit on Loops and Number Portability. Docket MPUC P-421/CI-01-0370

08/02	MN	Section 271 PUC Hearing	AT&T	Surrebuttal Affidavit on Interconnection, collocation and resale. Docket MPUC P-421/CI-01-0370
08/02	MN	Section 271 PUC Hearing	AT&T	Surrebuttal Affidavit on Reciprocal compensation. Docket MPUC P-421/CI-01-0370
08/02	MN	Section 271 PUC Hearing	AT&T	Surrebuttal Affidavit on UNEs, Switching and Transport. Docket MPUC P-421/CI-01-0370
08/02	MN	Section 271 PUC Hearing	AT&T	Surrebuttal Affidavit on Emerging Services. Docket MPUC P-421/CI-01-0370
09/02	FCC	Qwest 271 Filing	AT&T	Ex Parte Declaration on the discriminatory impact of Qwest's secret deals with CLECs WC Docket No. 02-148
10/02	FCC	Qwest 271 Filing	AT&T	Declaration on Qwest's Unfiled Agreements with CLECs WC Docket No. 02-314
10/02	FCC	Qwest 271 Filing	AT&T	Joint Declaration of John F. Finnegan, Timothy M. Connolly, and Kenneth L. Wilson. On Qwest's OSS. WC Docket No. 02-314
11/02	FCC	Qwest 271 Filing	AT&T	Declaration on access to Mechanized Loop Test (MLT) and loop qualification issues. WC Docket No. 02-314
11/02	FCC	Qwest 271 Filing	AT&T	Supplemental Declaration on Qwest's Unfiled Agreements. WC Docket No. 02-314
12/02	FCC	Qwest 271 Filing	AT&T	Supplemental MLT and loop qualification Declaration. WC Docket No. 02-314
2/03	FCC	Qwest 271 Filing	AT&T	Declaration on checklist item issues. WC Docket No. 03-11.
2/03	NY State	Student Guide	NY State	Course on "Emerging Technologies and Convergence in the Telecommunications Network
4/03	CA	Expert Report	Albert Stein, on behalf of	Class Action Suit against Pacific Bell regarding problems provisioning DSL service to DLECs in California
4/03	WY	Expert Report	Contact Communications	Arbitration between Contact Communications and Qwest regarding reciprocal compensation for ISP traffic.
10/03	CO	Direct Testimony	Micro Tech-Tel	Testimony in support of MicroTech-Tel's Triennial Review 90 Day case regarding Enterprise Switching
3/04	CO	Expert Report	Pinnacle Properties	Dispute over Right of Way for telecommunications and power
5/04	MI	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case
5/04	CA	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case
6/04	IN	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case

6/04	IL	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case
9/04	AR	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case
9/04	CT	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case
9/04	KS	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case
9/04	OH	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case
9/04	WI	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case
10/04	IN	Prefiled Rebuttal Testimony	Level 3	Network Testimony in Arbitration Case
11/04	NV	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case
12/04	MO	Prefiled Testimony	Level 3	Network Testimony in Arbitration Case
12/04	NV	Prefiled Rebuttal Testimony	Level 3	Network Testimony in Arbitration Case
2/05	FL	Expert Report	ICS	Contract dispute between ICS and Prosodie regarding quality of service and ownership of 800 numbers
3/05	WY	Prefiled Testimony	Contact Communications	Dispute with Qwest on charges for interconnection trunking
4/05	FL	Rebuttal Report	ICS	Contract dispute between ICS and Prosodie regarding quality of service and ownership of 800 numbers
4/05	FL	Supplemental Report	ICS	Contract dispute between ICS and Prosodie regarding quality of service and ownership of 800 numbers
5/05	WA	Declaration in opposition to T-netix	Judd, et al.	Class action suit regarding rate notification for collect calls from Department of Corrections facilities
5/05	WA	Supplemental Declaration in opposition to T-netix	Judd, et al.	Class action suit regarding rate notification for collect calls from Department of Corrections facilities
5/05	WA	Declaration regarding ATT Objection to Expert Designation	Judd, et al.	Class action suit regarding rate notification for collect calls from Department of Corrections facilities.
5/05	WA	Supplemental Declaration regarding ATT Objection to Expert Designation	Judd, et al.	Class action suit regarding rate notification for collect calls from Department of Corrections facilities.

8/05	MN	Expert Report on behalf of FirstCom	FirstCom vs Qwest	Complaint in US District Court, District of Minnesota, 4 th Division. Civil File 04-994 ADM/AJB
8/05	WA	Declaration Supporting Plaintiffs' response to T-Netix, Inc." Motion for Summary Judgment	Judd, et al.	Class action suit regarding rate notification for collect calls from Department of Corrections facilities.
3/06	MN	Supplemental Report on behalf of FirstCom	FirstCom vs Qwest	Complaint in US District Court, District of Minnesota, 4 th Division. Civil File 04-994 ADM/AJB
4/06	MN	Declaration on behalf of FirstCom	FirstCom vs Qwest	Complaint in US District Court, District of Minnesota, 4 th Division. Civil File 04-994 ADM/AJB
5/06	OR	Supplemental Testimony on behalf of Level 3	Level 3 vs Qwest	Arbitration of Interconnection Contract Issues

B. LIVE TESTIMONY AND DEPOSITIONS

Date	State	Case
2/97	Arizona	Arbitration Hearings between AT&T and U S WEST, representing AT&T.
6/97-12/97	Arizona	Arbitration Hearings between AT&T and U S WEST, representing AT&T. Total of approximately 15 days.
10/17/97	Iowa	Second Motion to compel U S WEST to perform under AT&T Interconnection Agreement, representing AT&T.
4/98	Colorado	96S-331T U S WEST Arbitration Cost Case, representing AT&T.
3/98	NM	96-441-TC U S WEST Arbitration Hearing, representing AT&T.
2/98	OR	UM 351 U S WEST Compliance Tariffs, representing AT&T
3/98	IA	Arbitration Remand between AT&T and U S WEST, representing AT&T.
11/98	WA	UT 960369 U S WEST Arbitration cost case, representing AT&T.
12/98	WA	Deposition – ELI Complaint under the Sherman Act against U S WEST
2/99	WA	Hearing – ELI Complaint under the Sherman Act against U S WEST
12/99	CA	Deposition – CalTech Complaint under the Sherman Act against Pacific Bell
12/99	CO	Hearing – AT&T Complaint against U S WEST for Access

		Service Quality
1/00	MN	Deposition – AT&T Complaint against U S WEST for Access Service Quality in Minnesota
2/00	WA	Hearing – AT&T Complaint against U S WEST for Access Service Quality
1/00	AZ	Section 271 Workshop, representing AT&T on checklist items 3, 7, 8, 9, 10, 12, and 13
2/00	MN	Hearing – AT&T Complaint against U S WEST for Access Service Quality
3/00	AZ	Section 271 PUC Workshop, representing AT&T on checklist items 3, 7, 8, 9, 10, 12, and 13
6/00	CO	Section 271 PUC Workshop, representing AT&T on checklist items 3, 7, 8, 9, 10, 12, and 13
6/00	WA	Section 271 PUC Workshop, representing AT&T on checklist items 3, 7, 8, 9, 10, 12, and 13
6/00	CO	Section 271 PUC Workshop, representing AT&T on checklist items 3, 7, 8, 9, 10, 12, and 13 (follow-up)
7/00	WA	Section 271 PUC Workshop, representing AT&T on checklist items 3, 7, 8, 9, 10, 12, and 13 (follow-up)
8/00	CO	Section 271 PUC Workshop, representing AT&T on checklist items 1, 14
8/00	AZ	Section 271 PUC Workshop, representing AT&T on checklist items 1, 14
9/00	AZ	Section 271 PUC Workshop, representing AT&T on checklist items 1, 14 (follow-up)
9/00	CO	Section 271 PUC Workshop, representing AT&T on checklist items 1, 14 (follow-up)
10/00	UT, IA, etc.	Section 271 PUC Workshop, representing AT&T on checklist items 1, 11, 14 (6 State consolidated proceeding)
10/00	AZ	Section 271 PUC Workshop, representing AT&T on checklist items 2, 5, 6
10/00	OR	Section 271 PUC Workshop, representing AT&T on checklist items 1, 11, 14
11/00	CO	Section 271 PUC Workshop, representing AT&T on emerging services checklist items (dark fiber, DSL, subloop unbundling)
11/00	WA	Section 271 PUC Workshop, representing AT&T on checklist items 1, 11, 14
11/00	CA	Antitrust trial CalTech vs. Pacific Bell in Federal Court.
11/00	WA	Section 271 PUC Workshop, representing AT&T on checklist items 1, 11, 14 -
12/00	CO	Section 271 PUC Workshop, representing AT&T on checklist items for Dark Fiber, DSL, Packet Switching and Subloop Unbundling
12/00	UT, IA, etc.	Section 271 PUC Workshop, representing AT&T on checklist items for Interconnection and Collocation (7 State

		consolidated proceeding)
01/01	WA	Section 271 PUC Workshop, representing AT&T on checklist items for Interconnection and Collocation
01/01	UT, IA, etc.	Section 271 PUC Workshop, representing AT&T on checklist items for Collocation, Dark Fiber, DSL, Packet Switching (7 State consolidated proceeding)
01/01	CO	Section 271 PUC Workshop, representing AT&T on checklist items for Interconnection and Collocation
01/01	AZ	Section 271 PUC Workshop, representing AT&T on checklist items for Dark Fiber, DSL, Packet Switching and Subloop Unbundling
02/01	OR	Section 271 PUC Workshop, representing AT&T on checklist items for Interconnection and Collocation
02/01	AZ	Section 271 PUC Workshop, representing AT&T on checklist items for Interconnection and Collocation
02/01	CO	Section 271 PUC Workshop, representing AT&T on checklist items for Unbundled Platform, UNE Switching, Transport and Combinations
02/01	UT, IA, etc.	Section 271 PUC Workshop, representing AT&T on checklist items for DSL, Packet Switching and Subloop elements (7 State consolidated proceeding)
03/01	AZ	Section 271 PUC Workshop, representing AT&T on checklist items for UNE Loops, Line Splitting and Number Portability
03/01	WA	Section 271 PUC Workshop, representing AT&T on checklist items for Unbundled Platform, UNE Switching, Transport and Combinations
03/01	CO	Section 271 PUC Workshop, representing AT&T on checklist items for Unbundled Platform, UNE Switching, Transport and Combinations
03/01	UT, IA, etc.	Section 271 PUC Workshop, representing AT&T on checklist items for Unbundled Platform, UNE Switching, Transport and Combinations (7 State consolidated proceeding)
04/01	AZ	Section 271 PUC Workshop, representing AT&T on checklist items for Unbundled Platform, UNE Switching, Transport and Combinations
04/01	CO	Section 271 PUC Workshop, representing AT&T on checklist items for Loops, Number Portability and Line Splitting.
04/01	WA	Section 271 PUC Workshop, representing AT&T on checklist items for Unbundled Platform, UNE Switching, Transport and Combinations
04/01	UT, IA, etc.	Section 271 PUC Workshop, representing AT&T on checklist items for Loops and Line Splitting. (7 State consolidated proceeding)

05/01	OR	Section 271 PUC Workshop, representing AT&T on checklist items for Unbundled Platform, UNE Switching, Transport and Combinations
05/01	AZ	Section 271 PUC Workshop, representing AT&T on checklist items for Loops, Number Portability and Line Splitting.
05/01	CO	Section 271 PUC Workshop, representing AT&T on checklist items for Loops, Number Portability and Line Splitting.
06/01	AL	Section 271 Hearing, representing AT&T on checklist items for Interconnection Trunks and Number Portability
07/01	WA	Section 271 PUC Workshop, representing AT&T on checklist items for Loops, DSL, Subloop and Line Splitting.
07/01	OR	Section 271 PUC Workshop, representing AT&T on checklist items for Loops, DSL, Subloop and Line Splitting.
07/01	WA	Section 271 PUC Workshop, representing AT&T on checklist items for Loops, DSL, Subloop and Line Splitting.
12/01	AZ	Section 271 PUC Workshop, representing AT&T in the evaluation of Qwest's OSS test environment.
01/02	AZ	Section 271 PUC Workshop, representing AT&T in the evaluation of Qwest's OSS test environment.
03/02	MN	Section 271 Hearing on Non-OSS Checklist items, representing AT&T in the evaluation of Qwest's compliance
04/02	AZ	Section 271 PUC Workshop, representing AT&T in the evaluation of Qwest's OSS test environment
05/02	WY	Section 271 PUC Hearing, representing Contact Communications on various interconnection issues
06/02	CO, IA, ID, NE, ND	Ex Parte presentation with AT&T to DOJ regarding Qwest compliance with 271 checklist items, OSS, and performance
06/02	CO, IA, ID, NE, ND	Ex Parte presentation with AT&T to FCC regarding Qwest compliance with 271 checklist items, OSS, and performance
07/02	MT, UT, WA, WY	Ex Parte presentation with AT&T to DOJ regarding Qwest compliance with 271 checklist items, OSS, and performance
07/02	MT, UT, WA, WY	Ex Parte presentation with AT&T to FCC regarding Qwest compliance with 271 checklist items, OSS, and performance
09/02	MN	Section 271 PUC Hearing, testifying for AT&T on issues of interconnection, resale and unbundled network elements.
02/03	NY	Course on "Emerging Technologies and Convergence in the Telecommunications Network" given to the New York Department of Public Service
5/03	CA	Deposition in Class Action Suit representing plaintiff Albert Stein in his case against Pacific Bell.
6/03	WY	Deposition in Arbitration Case, representing Contact Communications in their suit against Qwest.
7/03	WY	Testimony in Arbitration Case, representing Contact Communications in their suit against Qwest.

10/04	MI	Testimony in Arbitration Case, representing network issues for Level 3 in their contract arbitration with SBC
10/04	IL	Testimony in Arbitration Case, representing network issues for Level 3 in their contract arbitration with SBC
10/04	IN	Testimony in Arbitration Case, representing network issues for Level 3 in their contract arbitration with SBC
12/04	CT	Testimony in Arbitration Case, representing network issues for Level 3 in their contract arbitration with SBC
5/05	FL	Deposition in Dispute between ICS and Prosodie on contract issues.
6/05	WY	Testimony before Wyoming Commission on trunking issues between Contact Communications and Qwest
3/06	OR	Workshop with Qwest and Oregon Staff on Technical issues regarding dispute between Level 3 and Qwest
3/06	MN	Deposition in case between FirstCom and Qwest
5/06	MN	Deposition in case between FirstCom and Qwest