BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Petition of VERIZON NORTHWEST, INC., For Waiver of WAC 480-120-071(2)(a)	Docket No. UT-011439

DIRECT TESTIMONY OF
DAVID HUSKEY
FOR
RCC MINNESOTA, INC.

November 20, 2002

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

A. I am David Huskey. My employer is Cellular One/Rural Cellular, where I have worked since 2000. My position is Radiofrequency ("RF") Engineer. My business address is 1803 – 14th Avenue SE, Albany, Oregon 97322.

Q. WHAT ARE YOUR DUTIES AS AN RF ENGINEER?

A. I determine locations for new cell sites, determine cell site radio frequency design, and have primary responsibility for RF performance of all RCC cell sites in Oregon and Washington.

Q. HOW LONG HAVE YOU WORKED IN THE RADIO COMMUNICATIONS INDUSTRY?

A. I have worked in the radio communications industry since 1968.

Q. WHERE DID YOU WORK PREVIOUSLY?

A. I was the technical operations manager at Cellular One/Triton Cellular LLP from 1998 to 2000. There, I supervised installation and maintenance of cell sites for Triton Cellular's northwest markets. My responsibilities included project management and purchasing, which included budgeting and procurement of materials and labor. From 1991 to 1998, I was the technical operations manager at Cellular One/Point Communications Inc. in Albany, Oregon. While I was there, I supervised installation and maintenance of cell sites in Linn, Benton, and Lincoln Counties in Oregon. I was also responsible for project management and purchasing, which included budgeting and procurement of materials and labor. I was also an RF engineer and cell technician there. From 1980 through 1991, I was an area manager at Clackamas Communications, Inc. in Tangent, Oregon, where I managed a commercial two-way radio service and installation business. From 1975 through 1980, I was a service and installation technician at Northway Communications, Inc. in Wausau, Wisconsin, where I installed and repaired commercial two-way radio

systems. From 1968 through 1973, I was a service and installation technician at Lake Communications Service in Tavares, Florida. There, I installed and repaired commercial two-radio systems.

Q. DO YOU HAVE ANY INDUSTRY CERTIFICATIONS?

A. Yes. I have a FCC General Radio Telephone Operator License, and I am a Naber certified technician. I have several certificates of completion from industry-related schools and seminars. I am also a high school graduate.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I will testify about engineering issues, and to a limited extent cost issues, related to providing cellular service to the Taylor Location and Timm Ranch.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. My testimony is divided into four parts. I will (1) provide an overview of the service quality standards for cellular service, (2) describe the Taylor Location and Timm Ranch, (3) describe RCC Minnesota's ("RCC") efforts to serve the Taylor Location and Timm Ranch, and (4) explain why it would be very difficult and expensive for RCC to improve wireless service to the Taylor Location and Timm Ranch.

I. OVERVIEW OF SERVICE QUALITY STANDARDS

Q. BEFORE WE ADDRESS THE TAYLOR LOCATION AND TIMM RANCH DIRECTLY, LET'S TALK ABOUT SERVICE QUALITY. WHAT IS THE SERVICE AVAILABILITY GOAL FOR WIRELESS SERVICE LIKE THAT OFFERED BY RCC?

A. The industry goal for cellular service availability is to provide good quality reliable wireless telephone communications to our customers at ninety percent of the locations within our service area ninety percent of the time.

Q. IS THE WIRELINE STANDARD FOR SERVICE AVAILABILITY DIFFERENT FROM THE CELLULAR STANDARD?

A. Yes. For wireline calls, the industry standard is to have service available for 99.999 percent of all calls.

Q. IS THERE A WIRELESS INDUSTRY STANDARD FOR VOICE SIGNAL QUALITY?

A. Not really, because this is very subjective. The signal quality should be strong enough so that users can understand each other. This means that there should be a minimum of distortion, static, and disconnected or dropped calls. Again, in areas with strong signals, the cellular service will be somewhat comparable to wireline service, but not identical. Many people have decided that wireless service is an acceptable substitute for wireline service at home, but the vast majority still use wireline service at home, for a variety of reasons, including service quality.

Q. ARE CALL COMPLETION AND VOICE QUALITY AFFECTED BY SIGNAL STRENGTH?

A. Yes. A weaker cellular signal may result in distortion, static and dropped calls.

Q. EXPLAIN WHAT FACTORS CAN REDUCE SIGNAL STRENGTH.

A. Wireless telephone systems use transmitters at the cell sites and in the cellphones that emit electromagnetic radiation. This is the same type of energy as light only at a lower frequency. The location that a cellphone is usable is affected by the same factors that allow a light to be seen from a specific location. These factors are primarily distance and obstacles such as topography, buildings, environmental factors and vegetation.

Q. EXPLAIN HOW AND WHY TOPOGRAPHY IS A FACTOR.

A. For cellular service to work, the cellular receiving and transmitting device must either have a direct unobstructed view of the transmitting and receiving cell site, known as “line of sight” (“LOS”), or there must be a minimum of objects between the tower and the

cellular device, known as "close LOS." There is insufficient close LOS in many hilly or mountainous areas to provide an adequate signal, even though the cellular telephone may be very close to the cell site.

Q. HOW DO ENVIRONMENTAL FACTORS IMPACT CELLULAR SERVICE?

A. Rain, ice and snow can reduce the signal strength of cellular service.

Q. WHAT SIGNAL STRENGTH LEVEL IS ADEQUATE TO MEET THE WIRELESS INDUSTRY STANDARDS FOR SERVICE AVAILABILITY AND SERVICE QUALITY?

A. Under good conditions, a signal strength of –101 dBm to –105 dBm is sufficient to meet the industry standard for service availability and quality. A less negative number indicates a stronger signal and a more negative number indicates a weaker signal. For example, a –98 dBm signal is stronger than a –101 dBm signal.

Q. IS IT APPROPRIATE TO CONSIDER THESE INDUSTRY STANDARDS IN EVALUATING RCC'S ABILITY TO SERVE THE TIMM RANCH AND TAYLOR LOCATION?

A. Yes, particularly to the extent RCC's service is being considered as a substitute for wireline service, which traditionally has very high standards of reliability.

II. THE TAYLOR LOCATION AND TIMM RANCH

Q. DESCRIBE THE TAYLOR LOCATION.

A. The "Taylor Location" includes three residences for which there is a service request in this proceeding. These residences are located in a canyon within a region of hills. The canyon starts near State Highway 17 and runs for 2.5 miles to a box end. Hayes Road is a dirt and gravel road running through the canyon. It extends from State Highway 17 for 2.3 miles through the canyon. Ann Nichols owns the first residence, which is at 51 Hayes Road and is currently under construction. Ms. Nichols' residence is located close to the start of the canyon closest to State Highway 17. Kay Taylor lives in the

second residence, which located at the end of Hayes Road on the box end of the canyon. The Kay Taylor residence is approximately 14.3 miles outside of Bridgeport, Washington. Wendy Shomler occupies the third residence, which is a house owned by Ms. Taylor that is located on the canyon floor and is 260 yards from the Kay Taylor residence.

Q. ARE THERE ANY OTHER RESIDENCES NEARBY?

A. There are two other residences in the canyon: the Grenagers, and the Weisburns. The occupants of these two residences have not yet requested service but may do so at some point. Accordingly, I will refer to them as part of the Taylor Location in my testimony. Exhibit 1 is a map that shows the location of all Taylor Location residences. See Exhibit 1.

Q. DESCRIBE THE TIMM RANCH.

A. The "Timm Ranch" is a commercial ranch located in an open area used primarily as cattle grazing range. It is fourteen air miles away from the Taylor location. To my knowledge there have been five requests for voice service at the Timm Ranch. This includes requests by Ike Nelson located at 224 Timm Road, Bridgeport, Washington 98813; Brad Derting at 285 Timm Road, Bridgeport, Washington 98813; Darrell Shannon at 287 Timm Road, Bridgeport, Washington 98813; Billie Timm at 397 Timm Road, Bridgeport, Washington 98813; and Robert Timm at 387 Timm Road, Bridgeport, Washington 98813.

Q. HAVE YOU BEEN TO THE TAYLOR LOCATION AND TIMM RANCH?

A. Yes.

III. RCC HAS TESTED FIXED WIRELESS VOICE SERVICE AT THE TAYLOR LOCATION AND TIMM RANCH USING ITS EXISTING CELLULAR NETWORK

Q. HAS RCC TESTED ITS SERVICE USING FIXED WIRELESS EQUIPMENT TO PROVIDE VOICE GRADE SERVICE AT THE TAYLOR LOCATION AND TIMM RANCH?

A. Yes.

Q. EXPLAIN HOW RCC TESTED THE TIMM RANCH AND TAYLOR LOCATIONS FOR SERVICE AVAILABILITY AND QUALITY.

A. RCC's testing had two parts. First, as a trial, RCC engineers installed "phone cell" systems at the Ike Nelson residence on the Timm Ranch and at the Taylor residence at the Taylor Location. Second, I took signal level readings at all residences at the Taylor Location and Timm Ranch, except for the Nichols residence, using mobile equipment. I could not access the Nichols residence, so I took readings near it and conducted computer research based on topography to determine the expected signal strength there.

Q. PLEASE DISCUSS THE PHONE CELL TRIAL FIRST. WHAT IS A "PHONE CELL"?

A. A phone cell is a hybrid cellular system packaged with a dial tone emulator. It uses a base station that receives the cellular signal like a typical cell phone, then converts that signal into a noncellular signal like a standard telephone line. This makes it operate like a land line phone from the customer's perspective. RCC installed phone cell units at the Nelson and the Taylor residences. The phone cell equipment is compatible with most non-proprietary telephone equipment.

Q. HOW DOES THE PHONE CELL INTERCONNECT WITH THE PUBLIC SWITCHED NETWORK?

A. The phone cell transmits and receives radio signals from an existing RCC cellular site.

Q. WHERE IS THE RCC CELL SITE LOCATED THAT IS IN THE BEST POSITION TO SERVE THE TAYLOR AND NELSON RESIDENCES?

A. The Taylor residence phone cell operates best from our site near Pateros, Washington and the Nelson residence phone cell works best from our site near Keller, Washington.

Q. WHAT WAS YOUR ROLE IN THIS PROCESS?

A. I was responsible for supervising the provisioning and installation of the equipment for the tests and for evaluating how well the phone cell system worked.

Q. HOW DID YOU DO THE EVALUATION?

A. I analyzed the strength of the phone cell signal received by the strongest cell site. I evaluated how to improve the functioning of the phone cells and observed the quality of telephone service the phone cells provided. I also evaluated what other service options would be appropriate if the phone cell system did not work, how to implement those services, and the cost of those services.

Q. PLEASE DESCRIBE THE SECOND PART OF YOUR RESEARCH, IN WHICH YOU CONDUCTED SIGNAL STRENGTH STUDIES AT EACH OF THE RESIDENCES AT THE TAYLOR LOCATION AND TIMM RANCH. SPECIFICALLY, HOW DID YOU CONDUCT THOSE STUDIES?

A. I drove to each of the locations and took readings from test equipment in my truck. This test equipment measured the signal received from the strongest cell site. My goal was to determine whether those locations could receive a sufficient signal from the cell site to allow a phone cell device or cellular telephone to work.

(1) TAYLOR LOCATION

Q. LET US FIRST DISCUSS YOUR PHONE CELL RESEARCH REGARDING THE TAYLOR RESIDENCE. BRIEFLY SUMMARIZED, WHAT DID YOUR STUDIES SHOW?

A. I concluded that RCC could provide service to the Taylor residence using the phone cell that met industry standards.

Q. WHAT WAS THE SIGNAL STRENGTH FROM THE TAYLOR RESIDENCE?

A. I measured signal strengths of -97 to -99 dBm. This reading showed the strength of the phone cell signal received by the cell site.

Q. YOU STATED THAT YOU ALSO CONDUCTED SIGNAL STRENGTH MEASUREMENTS USING MOBILE EQUIPMENT. DESCRIBE THOSE MEASUREMENTS AT THE TAYLOR LOCATION.

A. I went to each residence at the Taylor Location. There, I measured the signal level received by the mobile equipment. I also conducted computer research to determine how well wireless equipment would work at those locations.

Q. WHAT DID YOUR RESEARCH SHOW?

A. At the Taylor Location, the signal strength was sufficient for a phone cell to operate at the Taylor and Nichols residences. None of the other residences received an adequate signal.

Q. WHAT EXACTLY WERE YOUR MEASUREMENTS?

A. At the Taylor residence, the signal strength was –109 dBm. This signal is sufficient, because the phone cell device uses an enhanced antenna system that boosts the signal by 8 dBm above this measurement. I was unable to get any closer than 290 yards from the Nichols residence, but I determined that the signal strength at that residence should be stronger than that available at the Taylor residence, based on computer studies I conducted. There was no measurable signal at any other residence.

(2) TIMM RANCH

Q. WHAT DID YOUR PHONE CELL STUDY SHOW REGARDING THE NELSON RESIDENCE AT THE TIMM RANCH?

A. The phone cell readings at the Nelson residences were –96 dBm to -103 dBm.

Q. WHAT DO THOSE RESULTS MEAN?

A. This means that the signal strength is probably sufficient to meet industry standards for signal quality and call completion using the phone cell device.

Q. YOU STATED THAT YOU CONDUCTED SIGNAL STRENGTH TESTS USING MOBILE EQUIPMENT. DID YOU CONDUCT THESE TESTS AT ALL RESIDENCES AT THE TIMM RANCH?

A. Yes.

Q. WHAT DID YOUR READINGS SHOW?

A. My readings showed that a phone cell system would probably work at the Ike Nelson and Bob Timm residences, but not the other residences at the Timm Ranch.

Q. WHAT PRECISELY WERE YOUR READINGS?

A. At the Ike Nelson residence, the signal strength was –105 dBm to –115 dBm. As I noted earlier, the phone cell device has an enhanced antenna system that would boost these measurements by 8 dBm. At the Bob Timm residence, the signal strength was -105 dBm. At the Derting residence, the signal strength ranged from –113 dBm to no service. At the Shannon residence, the signal strength was –107 dBm to no service. At the Billie Timm residence, the signal strength ranged from -113 dBm to no service.

Q. IS THERE ANY WAY TO IMPROVE THE FUNCTIONING OF THE PHONE CELL DEVICE AT THE TAYLOR LOCATION AND TIMM RANCH?

A. No, not with the existing cell sites.

IV. IT WOULD BE VERY DIFFICULT AND EXPENSIVE TO IMPROVE WIRELESS SERVICE TO THE TAYLOR LOCATION AND TIMM RANCH.

Q. WHILE YOU WERE CONDUCTING THIS STUDY, DID YOU CONSIDER WHAT WOULD BE NECESSARY TO PROVIDE IMPROVED SERVICE OR TO EXTEND SERVICE TO THE TAYLOR LOCATION AND TIMM RANCH?

A. Yes.

(1) THE TAYLOR LOCATION

Q. IS THE SIGNAL AT THE TAYLOR LOCATION WEAK?

A. Yes.

Q. EXPLAIN WHY THE WIRELESS SIGNAL AT THE TAYLOR LOCATION IS WEAK.

A. The Pateros cell site is 25 miles away from the Taylor Location, which is quite far. The Taylor Location is also below the rim of a canyon. This does not eliminate close LOS between the tower and the Taylor Location, but it does weaken the signal so that the only wireless service available is through a phone cell device. The attached documents contain a path profile showing the topography between the cell site and the Shomler, Nichols, and Taylor residences. See Exhibit 2.

Q. WHAT WOULD RCC HAVE TO DO TO IMPROVE SERVICE TO THE ENTIRE TAYLOR LOCATION, INCLUDING EXTENDING SERVICE TO THE SHOMLER, WEISBURN, AND GRENAGERS RESIDENCES?

A. RCC would have to construct a new cell site.

Q. HOW MUCH WOULD THAT COST?

A. Each cell site will cost anywhere between $150,000 and $500,000 and possibly more depending on development cost for roads and power. If RCC cannot obtain the ideal site, RCC may need to acquire two cell sites or repeater sites. The total cost to serve all Taylor Location residences or improve service to them could exceed $1,000,000. Each

resident would also have to obtain a standard cell phone or a phone cell. Each phone cell costs up to $1,200, plus installation costs.

Q. DOES RCC HAVE ACCESS TO POTENTIAL CELL SITES?

A. Theoretically yes, but it can be an immense burden to obtain that access. RCC must first test and evaluate sites. FAA and FCC regulations restrict potential sites, which complicates this process. RCC would then negotiate leases, which could be protracted and expensive. RCC would have to conduct studies, such as those the required by the State Environmental Policy Act ("SEPA") and the National Environmental Policy Act ("NEPA"). RCC would have to obtain building permits and conditional use permits in accordance with local zoning. Acquiring conditional use permits is often an expensive and lengthy process, sometimes taking years. As a result, the time from conception to turn up of a new cell site is from one to three years.

Q. COULD RCC USE THE CELL TOWERS IT CONSTRUCTS TO SERVE FUTURE RESIDENTS OF THE CANYON?

A. Probably, but each new location would have to be studied for the best solution. Wireless coverage is very location specific and can vary greatly in a short distance.

Q. WHAT WOULD RCC NEED TO DO TO IMPROVE SERVICE OR TO PROVIDE SERVICE TO THESE NEW RESIDENTS?

A. The phone cell unit might work, or the new cell sites installed in the area might allow lower-cost repeaters to be used. There is also a possibility that RCC would have to construct a new cell site.

Q. IF A WIRELINE CARRIER OFFERED SERVICE IN THE CANYON, HOW WOULD THEY SERVE NEW RESIDENTS?

A. If the wireline carrier already has a line running through or near the canyon, the carrier could then run a short line to connect the new resident.

(2) THE TIMM RANCH

Q. IS THE SIGNAL AT THE TIMM RANCH WEAK?

A. Yes.

Q: WHY IS THE WIRELESS SIGNAL AT THE TIMM RANCH WEAK?

A. The Timm Ranch is far from RCC's Keller Butte cell site, and the LOS is obstructed by a nearby mountain, as shown in the attached path profile showing topography between the Timm Ranch and the cell site. See Exhibit 3.

Q. WHAT WOULD RCC HAVE TO DO TO IMPROVE WIRELESS SERVICE TO THE TIMM RANCH?

A. Because the Timm Ranch is fourteen miles away from the Taylor location, RCC would have to construct yet another cell tower to serve a single location with few residents.

Q. WHAT WOULD THAT ENTAIL?

A. The best location to construct a cell tower to serve the Timm Ranch is owned by a third party. RCC would have to obtain a lease with that party. Then RCC would have to comply with other requirements such as those imposed by SEPA, NEPA, the FAA, FCC, and local zoning. RCC would have to obtain easements and build roads and powerlines. RCC would then construct the cell site tower and building and install the electronics.

Q. WHAT WOULD THAT COST?

A. The cost should be between $250,000 and $500,000 and possibly more if power line and road construction cost are unusual.

Q. IS RCC SAYING THAT IT IS UNWILLING OR UNABLE TO SERVE NEW CUSTOMERS IN THE TIMM RANCH AND TAYLOR LOCATION?

A. No. RCC is in the business of serving existing customers and gaining new customers. Some residents in the Timm Ranch and Taylor Locations have been using RCC's service to make and receive calls on a trial basis for a few weeks. They could decide that the service meets their needs, even though it is not exactly comparable to wireline service.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

Exhibit 1

Taylor Location Map

Exhibit 2

Path Profile for the Shomler, Nichols, and Taylor Residences

Exhibit 3

Path Profile for the Nelson, Shannon, Dearting, Billie Timm, and Bob Timm Residences