BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE PETITIONS FOR ARBITRATION PURSUANT TO THE TELECOMMUNICATIONS ACT OF 1996 **TO RESOLVE ISSUES RELATING TO AN INTERCONNECTION AGREEMENT WITH ALLTEL, INC.**	)	DOCKET No. TC 07-111 Through TC 07-116

SUPPLEMENTAL DIRECT TESTIMONY OF W. CRAIG CONWELL ON BEHALF OF ALLTEL COMMUNICATIONS, LLC.

June 12, 2008

Public Version

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INTRODUCTION

Q. Please state your name, business address and employer.

A. My name is W. Craig Conwell. My business address is 405 Hammett Road, Greer, South Carolina. I am self employed as an independent consultant, specializing in telecommunications cost analysis.

Q. Have your previously filed testimony in this case?

A. Yes, I filed on March 24, 2008 direct testimony on behalf of Alltel Communications, LLC ("Alltel").[1] This testimony provided the results of my review of the forward-looking economic cost studies for transport and termination produced by the six Rural Local Exchange Carriers ("RLECs") in this case.[2] I found the studies do not comply with FCC rules for establishing cost-based reciprocal compensation rates in 47 C.F.R. 51.705(a)(1), 51.505 and 51.511. The proposed rates resulting from these studies substantially exceed the RLECs' forward-looking economic costs. My direct testimony identified 18 cost-related issues with the studies, which the South Dakota Public Utilities Commission (the "Commission") was asked to decide in establishing reciprocal compensation rates in compliance with FCC rules.[3] At

[1] "Direct Testimony of W. Craig Conwell on behalf of Alltel Communications, LLC," Before the State of South Dakota Public Utilities Commission, Docket Nos. TC 07-111, 112, 113, 114, 115 and 116, March 24, 2008.

[2] The RLECs are Alliance Communications Cooperative, Inc., Beresford Municipal Telephone Company, Kennebec Telephone Company, McCook Cooperative Telephone Company, Santel Communications Cooperative, Inc. and West River Cooperative Telephone Company.

[3] See Conwell Direct Testimony pages 8-10 for a table of RLEC cost study issues and recommendations for the resolution of each issue.

the conclusion of my testimony, I indicated that the RLEC transport and termination costs are expected to be $0.0059 per minute, or less.

Q. What is the purpose of your present testimony?

A. This testimony is to supplement my March 24, 2008 direct testimony based on information produced on May 16, 2008 by the RLECs in supplemental responses to Alltel's interrogatories and requests for production of documents dated February 8, 2008. The RLECs initial responses to Alltel's interrogatories, which were available at the time I filed direct testimony were incomplete. Alltel filed with the Commission on March 17, 2008 a Motion to Compel the RLECs to produce responses to interrogatories. The Commission granted the Motion, and the RLECs responded on May 16th.

Q. Does you supplemental testimony address the direct testimony of witnesses for the RLECs filed on March 24, 2008, when you filed direct testimony?

A. No, I intend to reply to the direct testimony of RLEC witnesses in testimony currently scheduled to be filed on June 26, 2008.

Q. Did the RLEC supplemental responses to Alltel's interrogatories provide necessary information that was previously missing from their cost study documentation or initial responses to interrogatories?

A. The supplemental responses "fill gaps" in the information needed to determine the basis of the RLEC estimates of transport and termination costs; however, to date, they still have failed to produce documentation that would satisfy the requirements of FCC Rule §51.505(e), which states:

> An incumbent LEC must prove to the state commission that the rates for each element it offers do not exceed the forward-looking economic cost per unit of providing the element, using a cost study that complies with the methodology set forth in this section and Sec. 51.511.

For example, the RLECs' cost studies assume similar configurations of equipment for switches and transport electronics (between host and "non-host switches") resulting in high investments and costs per unit of demand for small exchanges. They have not shown that alternative, lower cost configurations might be used, and thus have not proven that the "efficient network configuration" requirement of §51.505(b)(1) has been met. The cost-related issues identified on pages 8-10 of my direct testimony represent 18 areas in the studies in which the *methods* or *input values* used in the cost studies either do not comply with FCC Rules §§51.505 and 51.511, or are dubious. I will start by describing the additional switch investment information produced by the RLECs and its implications for Cost Issues 1.1 and 1.3.

Cost Issue 1.1 – What switch investments (by switch category and exchange) should be used in the RLEC cost studies? Cost Issue 1.3 – What percentage or portion of

the switch investments is usage-sensitive and recoverable in transport and termination?

Q. Please briefly explain Cost Issues 1.1 and 1.3?

A. In their cost studies, the RLECs estimated switch investments for each of their exchanges, separated among four categories – *common*, *line card*, *line interface* and *trunk card*. They included the *common* and *trunk card* investments and associated annual costs (capital costs and operating expenses) in termination. *Line card* and *line interface* investments and costs were not included, presumably because the RLECs considered these to be non-usage sensitive.[4] However, the RLECs had not produced information giving details on the equipment items, capacities, quantities and unit investments underlying the total investments for each exchange and category. Therefore, it was not possible to fully evaluate the investments for compliance with FCC Rule §51.505 - more specifically §51.505(b) and §51.505(b)(1) (the definition of TELRIC and the efficient network configuration requirement). It also was not possible to validate whether the *common* switch components are usage-sensitive; *i.e.*, busy hour call attempts or minutes of use exhaust component capacity, cause additional components to be placed and, therefore, cause investment and costs. I recommended that the Commission require details underlying the switch investments be provided and that five questions be

[4] See definition of "termination" and the FCC's position on the inclusion of only usage-sensitive switch investment and costs in termination on pages 16-18 of Conwell Direct Testimony.

addressed in deciding appropriate switch investments.[5] These questions dealt with the following:

- Appropriateness of the components of switch investment,
- Applicability of tandem switch investments to mobile-to-land traffic,
- Efficient switch configuration,
- Validity of source cost data,
- And, whether investments and costs for "non-host switches" are includable in termination.

Q. Did the RLEC supplemental responses provide the required details underlying the switch investments?

A. Exhibit Supplemental WCC-1 is an example of the spreadsheets labeled "CO Switch Detailed Estimates" provided by the RLECs for each of their exchanges giving more detail on the make-up of switch investments by category. The spreadsheet identifies hardware and software components included and the quantities of each. But, it does not provide component capacities (if applicable) and unit investments. Only the total material costs and investments (material costs plus loadings for installation, engineering, taxes and other miscellaneous construction costs) are shown. It is not possible to determine the portion of total investment represented by each component. It is analogous to being given the total price for a new personal computer and a list of components and quantities – processor, hard drive, keyboard, mouse,

[5] *id.*, pp. 29-31.

software, *etc.* – but no information on the unit cost of each component or the cost of upsizing, downsizing or eliminating a component.

Q. Did Alltel request the unit investments and information on the source of these investments?

A. Yes. Unit investments were requested in order to understand the relative importance of each hardware and software component to the total switch investment for each category. Alltel also asked for the source of unit investments. The RLECs continue to not provide specific details regarding the sources of unit investments. Alliance stated the following in its supplemental response:

> The source of the unit investment associated with the switching system estimates is based upon a composite of proposals received from switching electronics vendors for entities other than Alliance Communications. The pricing utilized is specific to projects of similar size and scope to the Alliance Communications network. As described in DR11, the engineering design was based on a commonly deployed packet switching platform. Details concerning unit descriptions, unit quantities, and category pricing can be found in the response to DR 11.[6]

Alliance and the other RLECs have failed thus far to prove that the unit investments underlying total switch investments in their cost studies are representative of the current costs the RLECs would incur to purchase and install new switches.

[6] The "[d]etails concerning unit descriptions, unit quantities, and category pricing" for DR11 are those illustrated in Exhibit Supplemental WCC-1.

Q. Does the information provided in the "CO Switch Detailed Estimates" indicate that any hardware and software components should be omitted from termination?

A. Based on supplemental responses, the RLEC cost studies appear to reflect switching systems from Metaswitch, a company that designs and manufactures softswitches. In addition to the supplemental responses, I obtained information on switches from the Metaswitch website. The information in the "CO Switch Detailed Estimates" spreadsheet and the Metaswitch website indicates that several *common* switch components should not be included in termination-related investments and costs, and that others are questionable. (Refer to Exhibit Supplemental WCC-1, Description column.)

- Call Agent (CA), CA Software, CALEA license and Centrex license. A pair of CAs is deployed in each exchange, or at each host and "non-host switch." The Metaswitch website indicates that the CA9024 Call Agent Server "supports up to 1.3 million busy hour call attempts (BHCA) – sufficient for a network of up to 250,000 subscribers.[7] Given that the largest number of subscribers in any RLEC exchange is [redacted] usage will not exhaust the CAs (or CA software). This means CA investments and costs are not usage-sensitive and recoverable in termination charges. Metaswitch also offers an "integrated softswitch option" that might satisfy RLEC requirements and provide a more

[7] See http://www.metaswitch.com/products/callagent.htm.

"efficient network configuration" per §51.505(b)(1). In addition to call processing, the CA provides custom calling, CALEA and Centrex functions. The CALEA and Centrex license fees should not be included in termination, since these costs are not attributable to terminating mobile-to-land traffic.

- 3510 Media Gateway (MG) Chassis, 2510 MG Chassis and MG software. RLEC host switches include the 3510 MG Chassis, and "non-host switches" include the 2510 MG Chassis. According to Metaswitch, the 3510 and 2510 MG Chasses can accommodate up to 28,224 and 2,304 concurrent calls, respectively.[8] Given that the largest host and "non-host switches" have [redacted] and [redacted] respectively, it is extremely unlikely that the MG chasses are exhausted by usage.[9] Therefore, their investments and costs are not usage-sensitive and recoverable in termination charges. This also applies to the associated MG software.
- Web Self-Care System, Web Self-Care License per CA and Web Self-Care User License. Metaswitch states that Web Self-Care "enables subscribers to configure and manage their advanced calling services via easy-to-use Web interfaces."[10] In other words, it permits the RLECs' end

[8] See http://www.metaswitch.com/products/mediagateway.htm.

[9] In addition, Exhibit WCC 5.3 in my direct testimony shows that eight of nine RLEC host switches have 1,477 or fewer lines in service, suggesting that the 2510 MG might suffice for all hosts, except the Alliance Brandon switch. The RLECs, therefore must show that the larger 3510 MG is necessary for all host switches for reasons other than concurrent call capacity requirements.

[10] See http://www.metaswitch.com/news/webselfcare.htm.

users to self-provision services without having to contact a customer support center. The investments in the Web Self-Care System and license fees are attributable to retail services, such as caller ID, call waiting and others, rather than the termination of mobile-to-land traffic. FCC Rule §51.505(d)(2) does not permit retail service costs to be included in the forward-looking economic costs of termination.

- Outboard Line Bay (OLB) Chassis, OLB Processor, and OLB Administration and Maintenance Processor. In their supplemental responses, the RLECs described the purpose of OLB equipment as follows:

> Due to the fact that packet switching platforms typically have no capability of providing on-board analog POTS line interfaces, it was necessary to include an Outboard Line Bay (OLB) platform to provide this functionality. In this example, the OLB resides in the central office and is functioning as an extension of the switch. The OLB shelves communicate with the packet switching platform via GR-303 links.

The RLECs correctly do not include the *line cards and line interfaces* installed in the OLB platform in termination, but do include the OLB chassis and processors. However, the OLB chassis and processor appear to be terminals for broadband loop carriers, similar to digital loop carrier systems. They are part of access or loop plant and should be excluded from termination, just as a digital loop carrier system would not be

included in termination provided in a traditional TDM switch architecture.[11]

- Spares. The RLECs cost studies include either a 3510 or 2510 MG spares kit at each exchange. Spare OLB processors are kept at each host switch. In addition, there are other spares. Since the RLECs have not produced unit investments for each component, it is not possible to determine the significance of spare costs. Nevertheless, given that many switches likely are in unmanned locations requiring a technician to be dispatched for physical repairs, a more efficient network configuration might result from centralizing spares and reducing their quantity and costs.

Depending on the proportion of total investment represented by each component, it appears that little, if any, of the investment and associated annual costs included in the switch *common* category are usage-sensitive or attributable to terminating mobile-to-land traffic.

Q. Is this consistent with your assessment in direct testimony?

A. Yes, on pages 41-44 of my direct testimony, I discussed evidence that indicated that *common* switch investments did not appear to be usage-sensitive. The information produced by the RLECs in their supplemental responses and the Megaswitch website further indicate that little, if any, *common* switch investment and costs should be attributed to termination.

[11] TDM – Time division multiplexing.

Q. Do you have other observations related to the RLEC *common* switch investments?

A. My direct testimony included Exhibit WCC-5.3 showing the *common* investment per line for host and "non-host switches."[12] For "non-host switches," the investments per line ranged from [redacted] to [redacted]. Based on the RLEC supplemental responses, one factor contributing to high investments per line for small exchanges is that media gateways and related components are assumed to be placed in all exchanges regardless of line size. Thus, the McCook Winfred exchange with [redacted] likely has the same fixed investment for these components as the Crooks exchange with [redacted]. The RLECs should demonstrate that this represents "the use of the most efficient telecommunications technology currently available and the lowest cost network configuration" for serving the small exchanges per §51.505(b)(1). In the alternative, one can only conclude that media gateway and other "non-host switch" investments and costs are fixed, *i.e.*, not usage sensitive, over this range of demand [redacted].

Q. Did the RLEC supplemental responses provide any additional information relevant to the determination of *trunk card* investments?

[12] See Conwell Direct Testimony, Exhibit WCC-5.3, column E.

A. Yes. The RLECs provided information that indicates low utilization of the types of trunk cards reflected in their cost studies. Exhibit Supplemental WCC-1 shows there are two types of trunk cards – one with three T3 ports (3 X T3) and the other with 16 T1 ports (16 X T1).[13] The T3 trunk card costs [redacted] each and is assumed for host switches. The T1 trunk card costs [redacted] and is assumed for "non-host switches."

For host switches (excluding two switches serving as intermediate tandems), utilization of the T3 trunk card ranges from only [redacted][14] This low utilization results in high trunk card investments per line in the smaller host switches, such as Santel's Woonsocket, West River's Bison and the Kennebec switch. For these three switches, trunk card investments per line range from [redacted][15] Trunk card investments per line for legacy TDM switches were approximately $18, based on publicly available cost data contained in the HAI 5.0a model, which RLECs have used elsewhere to estimate local network element costs.[16]

[13] The "CO Switch Detailed Estimates" spreadsheet refers to trunk cards as "trunk interfaces" and describes them as Circuit Interface Adaptor 3xT3 and Circuit Interface Adapter 16xT1.

[14] [redacted]

[15] [redacted]

[16] The HAI 5.0a model includes default input values for trunk terminations (installed) of $110, and the model assumes a 6:1 line-to-trunk ratio. This equates to $18.33 per line. See

For "non-host switches" utilization of the T1 trunk card ranges from [redacted] Trunk card investments per line range from [redacted] Low utilization is causing extraordinarily high trunk card investments per line and termination costs per minute.

The RLECs assume the same type of trunk card in each exchange. It is important that the RLECs demonstrate that alternative trunk cards with less capacity and lower costs are not available. While there may be other, lower cost alternatives, one might be to use 16 port T1 trunk cards at a cost of [redacted] in place of the three port T3 cards [redacted] in several of the host switches. A 16 port T1 trunk card has nominal capacity for 384 voice trunks. Assuming forward-looking efficient utilization of 66 percent, this indicates the T1 trunk card might handle 253 trunks. Using the RLEC assumption of [redacted] the T1 trunk card might serve [redacted] As Exhibit WCC-5.3 in my direct testimony shows all but [redacted] of the RLECs' host switches have fewer than [redacted] Furthermore, [redacted] switches might be served by the T1 trunk card without pushing fill above [redacted] Using the T1 trunk card would lower total switch investment and switching costs per minute.

"HAI Model, Release 5.0a, Inputs Portfolio," Sec. 4.18 and 4.54, HAI Consulting, January 27, 1998.

17 [redacted]

Q. Please summarize your findings with respect to Cost Issues 1.1 and 1.3 from reviewing the RLECs' supplemental responses to Alltel's interrogatories?

A. In deciding Cost Issues 1.1 and 1.3, the Commission should consider the following:

- Several components of switch investment and costs are not attributable to the termination of Alltel's mobile-to-land traffic – Web Self-Care, Centrex software, OLB chassis and processors, and perhaps others. These components should not be included in switch investments used to compute termination costs.
- The media gateway and call agents do not appear to be exhaustible by the traffic volumes expected for the RLEC host and "non-host switches." The amount of investment and costs for these components, therefore, do not vary with usage. Since they are not usage-sensitive, Alltel mobile-to-land traffic does not cause "additional costs of terminating such calls" per the Telecom Act.[18] These components should not be included in termination costs.
- The RLECs must demonstrate that lower cost network configurations, which would reduce switching costs, are not possible. These might include centralization of spares, alternative network architectures that would reduce media gateway or other component investments in small

[18] 47 U.S.C. §252(d)(2)(A)(ii).

exchanges, or the use of lower capacity/lower cost trunk cards, if available.

Q. In your direct testimony for Cost Issue 1.5 you testified that the RLECs' forward-looking costs for switching are $0.0014 per minute or less. Is this still the case?

A. Yes. Information provided by the RLECs in their supplemental responses further supports this conclusion. The switching costs determined by the RLECs in their cost studies - $0.0042 to $0.0245 per minute – include costs of non-usage sensitive switch components, costs of components attributable to retail services and costs of network configurations that likely are not the least cost (due to low trunk card utilization, spares in all exchanges and others).

Cost Issue 2.1 – What transport electronics base, line and tributary investments should be used in the RLEC cost studies?

Q. Please explain Cost Issue 2.1.

A. The RLEC cost studies include transport electronics investments for each exchange, separated among three categories – *base*, *line* and *tributary*. The cost study documentation and initial responses to Alltel interrogatories did not provide details underlying these investments – specifically, a listing of equipment items, item quantities and unit investments, along with information on the source of unit investments. In addition, information was not provided to substantiate equipment quantities, based on total demand and the

engineering parameters (*e.g.*, equipment capacity) used to determine required quantities. This information was necessary to verify that all equipment items included in transport electronics investments are utilized to transport Alltel's mobile-to-land traffic; the investments reflect efficient network configuration; and, investments represent the costs the RLECs incur today to purchase and install transport electronics equipment.

Q. Did the RLECs provide this information in their supplemental responses?

A. For each exchange and equipment category (*base*, *line* and *tributary*), the RLECs provided a listing of equipment items, item quantities and unit investments. Exhibit Supplemental WCC-2 is an example using Alliance's response. This information explained the derivation of transport electronics investments, with the exception of Beresford. The total demand for each exchange (particularly the quantities of dedicated or special circuits by bandwidth) was not provided, such that the basis for equipment item quantities could be evaluated. This is key in evaluating whether equipment is efficiently provisioned.

Q. You mentioned that details for Bereford's transport electronics investments were not provided. Please explain.

A. According to its supplemental response, Beresford based its transport electronics investment on its existing equipment and embedded investment in the Beresford central office necessary to connect to the SDN Communications

transport backbone.[19] This is important, because Beresford has by far the highest transport electronics investment per "path" among the RLECs. Exhibit WCC-6.1 in my direct testimony (column D) shows Beresford to have an investment of [redacted] per path compared to [redacted] for the other RLECs. Based on the supplemental information provided by other RLECs, Beresford's investment per path would be [redacted] when derived in the same manner as the others.[20] Beresford provided no rationale for requiring substantially greater transport electronics investment to transport mobile-to-land traffic. In deciding Cost Issue 2.1, the Commission should assure that Beresford, and any other RLECs with similar SDN connections, are not basing transport electronics costs on embedded plant in service. This would be contrary to §51.505(d)(1).

Q. What other considerations are important in deciding transport electronics investments for the other RLECs, based on the supplemental responses?

A. In deciding Cost Issue 2.1, the Commission should consider the following:

- OC-192 optical interface cards. The *line* portion of transport electronics investment in each exchange consists of two OC-192 optical interface

[19] Beresford stated in its supplemental response: "The following detail provides information concerning the pricing used to generate the estimates for the transport equipment necessary for Beresford to connect to the SDN Communications transport backbone. The pricing estimates for this portion of the FLEC engineering model are based on the actual costs for the deployed equipment in the Beresford central office."

[20] Note that unit investments in the range of [redacted] are too high due to the RLECs use of "paths" as the measure of demand for transport electronics.

cards at [redacted] each. These are the largest single components of transport electronics investments. FCC Rule §51.505(b)(1) requires efficient network configuration of SONET rings connecting RLEC exchanges. The RLECs must demonstrate that these large OC-192 rings are justified based on total demand; otherwise, smaller bandwidth rings with lower cost optical interface cards should be reflected in transport costs and rates. In addition, as I discussed in my direct testimony the total demand to which *line* and *common* investments and costs are attributed should adhere to FCC Rule §51.511 by including demand based on "a reasonable projection ... during a reasonable measuring period" and including both the RLEC's own traffic as well as transit traffic utilizing the OC-192 ring.[21] The RLECs' initial cost study documentation and the supplemental responses indicate that transport forward-looking economic costs per unit are based on recent demand, rather than projected demand. One can either conclude that the OC-192 ring proposed by the RLECs is necessary to meet unspecified, future demand (including mobile-to-land traffic), or the RLECs have substantially overbuilt their transport network. In either case, FCC Rule §51.505(b) prohibits the allocation of costs to transport for ring capacity unrelated to the transport of mobile-to-land traffic or for excessive spare capacity.

- 10/100 Base T and Gigabit Ethernet data interface cards. The *tributary* portion of transport electronics investment includes additional investment

[21] See Conwell Direct Testimony, pp. 66-67.

amounts for data interface cards. The RLECs must demonstrate that these investments are necessary for or attributable to the transport of Alltel's mobile-to-land traffic in compliance with FCC Rule §51.505(b).

- Electrical interface cards. The *tributary* investment includes DS-1 and DS-3 interface cards for adding/dropping circuits to the SONET ring. The RLECs must demonstrate that total demand (voice trunks and special circuits) justifies the quantities of these cards at each exchange.

In summary, the supplemental responses identified transport electronics components, quantities and unit investments. The RLECs still have not proven that the selected components represent the lowest cost, most efficient configuration; and, they have not proven that component quantities have been efficiently sized based on projected total demand, including the RLECs' own traffic and transit traffic.

Cost Issue 2.2 – Should forward-looking economic costs per unit be based on total equivalent DS-1 circuits?

Q. Please explain Cost Issue 2.2.

A. The RLECs measure transport demand in terms of "paths," where a path is one voice trunk or one special circuit regardless of its bandwidth. Their cost studies allocate transport electronics investments and costs between voice trunks and special circuits in portion to the quantity of paths for each. This method is incorrect and inconsistent with FCC Rule §51.511 in that it fails to

properly measure the demand that consumes transport electronics capacity and the cause of investment and costs. Transport electronics capacity is not consumed by the number of paths or circuits, but by the combination of circuits and circuit bandwidth. Using the "path" method overstates transport electronics investment and costs for voice trunks, which are used to transport Alltel's mobile-to-land traffic. This causes transport costs to be significantly overstated.

Q. Did the RLECs' supplemental responses include information on the architecture of transport electronics equipment indicating the proper measure for investment and cost allocation?

A. Yes. The RLECs produced a four page document entitled, "OC-192 Equipment Capacity." A copy is included as Exhibit Supplemental WCC-3. This document confirms several key points supporting the use of DS-1 equivalent circuits, rather than paths, as the proper measure for transport electronics investment and cost allocation.[22]

The RLEC cost studies assume four types of *tributary* cards for adding/dropping circuits to the OC-192 ring. DS-1 circuits are interfaced using a 28 port DS-1 card. This card has the capacity for 28 DS-1 circuits. DS-3 circuits are interfaced using an eight port DS-3 card (eight DS-3 circuits per card). The other two cards are for 10/100 Base T and Gigabit Ethernet

[22] DS-1 equivalent circuits also should be used in the allocation of transport outside plant investments and costs.

data interfaces. Voice trunks and special circuits are added/dropped from the OC-192 ring on DS-1 or DS-3 interface cards. There are no DS-0 interface cards, so voice trunks are combined on a DS-1 or DS-3 circuit and connected to the ring.

Two cards (one working and one for protection) are required for each DS-1 and DS-3 circuit in the RLEC cost models, and each card consumes one slot of *common* equipment. The cost models assume there are 14 slots maximum capacity in the *common* equipment.

Consequently, a DS-3 circuit consumes $1/8^{th}$ of a DS-3 card and 1/56th of the *common* equipment capacity.[23] Similarly, a DS-1 circuit consumes $1/28^{th}$ of a DS-1 card and 1/196th of *common* equipment capacity. A DS-0 voice trunk consumes $1/24^{th}$ of a DS-1 circuit, $1/672^{nd}$ of a DS-1 card and only 1/4704th of *common* equipment capacity. This confirms that *common* equipment investment and costs are caused by both the number of trunks and special circuits and their bandwidth. Based on these fractions, a DS-3 special circuit should be allocated 84 times the *common* investment and costs of a DS-0 circuit.[24] However, the path method would allocate the same investment and costs to each.

[23] 1/8 = 1 DS-3 / 8 DS-3 circuits per DS-3 card. 1/56 = 1 DS-3 / (8 DS-3/DS-3 card X (14 slots of capacity / 2 slots for working and protect DS-3 cards).

In addition, *tributary* investments per circuit also vary by bandwidth. A voice trunk (DS-0) on a DS-1 circuit interfaced to the OC-192 ring on a 28 port DS-1 card has a unit investment of [redacted][25] A DS-1 special circuit on the same interface card has a unit investment 24 times greater, o[redacted] A DS-3 special circuit on a DS-3 interface card has a unit investment of [redacted][26] The path method incorrectly allocates the same amount of *tributary* investment to a voice trunk as DS-1 or DS-3 special circuits. This causes transport costs underlying the RLECs' proposed reciprocal compensation rates to be significantly overstated.

Q. What do recommend the Commission decide for Cost Issue 2.2?

A. The supplemental information confirms that DS-1 equivalent circuits be used as the basis for computing transport electronics (and transport outside plant) costs, rather than paths. This will result in a substantial reduction in the transport costs per minute reflected in the RLECs' cost studies. I described on pages 58-63 of my direct testimony methods that can be used to correct the RLEC cost studies.

Q. In your direct testimony on page 83 you indicated that transport electronics and outside plant costs are expected to be $0.0020 and

[24] 84 = 1/56 / 1/4704. 1/4704 = 1 DS-0 voice trunk / (24 DS-0/DS-1 circuit X 28 DS-1 circuits/DS-1 card X (14 slots of capacity / 2 slots for working and protect DS-1 cards).

[25] [redacted]

[26] [redacted]

$0.0025, respectively. Is this still the case after reviewing the RLEC supplemental responses?

A. Yes. Basing the allocation of transport electronics and outside plant investments and costs on DS-1 equivalent circuits, rather than paths, is an essential correction to the RLEC cost studies. The supplemental responses support this. Including DS-1 equivalent circuits for transit traffic also is key. When these changes to the studies, along with others identified in the cost issues, are made, transport electronics and outside plant costs of $0.0020 and $0.0025, respectively, should be expected. These costs, plus $0.0014 per minute for switching, result in transport and termination costs of $0.0059 per minute, or less.

Q. Did the RLECs provide any additional information in their supplemental responses?

A. Yes, they produced information on trunks in service, lines in service and minutes of use. This information may be useful in later re-running the cost studies based on Commission decisions with respect to the 18 cost issues.

Q. Does this conclude your supplemental testimony?

A. Yes.

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CERTIFICATE OF SERVICE

I hereby certify that on the 12th day of June, 2008, a true and correct copy of **Alltel's Supplemental Direct Testimony of W. Craig Conwell,** was sent electronically to:

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