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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

REFILED REBUTTAL TESTIMONY

OF

KENT W. DICKERSON

**Q. Please state your name, business address, employer, and current position.**

A. My name is Kent W. Dickerson. My business address is 6360 Sprint Parkway, Overland Park, Kansas 66251. I am employed as Director - Cost Support for Sprint/United Management Company.

**Q. Are you the same Kent W. Dickerson who filed Direct Testimony in this proceeding?**

A. Yes, I am.

**Q. What is the purpose of your rebuttal testimony?**

A. My testimony will show the errors in the costing process BellSouth uses to develop its local loop cost studies and high capacity loop cost studies supported by Ms. D. Daonne Caldwell. The loop cost studies that are in question are:

A.1 2-wire Loops
A.2 Sub-loops
A.4 4-wire voice grade loop
A.5 ISDN digital grade loop
A.6 ADSL compatible loop
A.7 HDSL compatible loop
A.9 DS-1 4-wire Digital Loop
A.10 4-wire 19, 56, or 64 Kbps digital loop
A.13 2-wire Copper Loop
A.14 4-wire Copper Loop
A.16 High Capacity Loops

**Q. Have you reviewed BellSouth's loop cost studies?**

A. Yes, I have. Certain portions of the cost studies are very specific and unique to the various wire centers within the BellSouth territory while other portions use broad, state-wide factors that fail to reflect geographic cost differences.

**Q. Briefly describe your understanding of the process that BellSouth uses to develop its cost studies.**

A. Based on the testimony of Ms. Caldwell and after reviewing the models that BellSouth submitted, it is apparent that BellSouth develops its cost studies using several different models. For loops, the BellSouth Telecommunications Loop Model (BSTLM) is used to develop an average investment per unit, which is then entered into the BellSouth Cost Calculator (BSCC). Within the BSCC, inflation, In-plants, shared cost, and common cost factors are applied to develop monthly costs or non-recurring costs.

**Q. What areas of BellSouth's cost studies do you have concerns with?**

A. I have concerns with several areas. First, BellSouth applies an inappropriate inflation factor to an average per unit cost. Second, BellSouth's In-plant and structure related factors are inappropriately applied.

**Q. What is your recommendation?**

A. I recommend that inflation be removed from all of BellSouth's cost studies and that BellSouth use the capabilities of the BSTLM to develop costs rather than relying on loading factors to determine costs.

**Inflation**

**Q. Has BellSouth applied inflation to its costs?**

A. Yes, Ms. Caldwell discusses the Inflation Adjustment Factor on pages 21-22 of her direct testimony. The inflation factor is also discussed in the documentation BellSouth filed on April 17, 2000.

**Q. Briefly summarize your understanding of BellSouth's Inflation Adjustment Factor.**

A. In it's UNE studies, BellSouth uses TPI factors to adjust the material accounts to reflect the effects of inflation. This is presented in the BellSouth Cost Calculator. Further documentation on how BellSouth utilizes inflation is presented in Part D of the "BellSouth Operating Expense Projection Calendar Year 1999-2002 - Filing Forecast." The exhibits entitled Inflation Factor (I),Load Factors (J), Operating Productivity Factor (K), and Growth Rate (L) of this document define the three components of BellSouth's Inflation Adjustment Factor. BellSouth's Inflation Adjustment Factor is composed of projected inflation rates based on BellSouth's telephone plant indices (TPIs), productivity, and a loading factor. Inflation accounts for percentage changes in Union Wages between 1999 and 2002, Load factors account for forecasted increases in access lines in service between 1999 and 2002, and Operating Productivity accounts for the increases in process improvements between 1999 and 2002. To determine the Inflation Adjustment Factor, BellSouth adds the loading factor to inflation and then subtracts productivity.

**Q. Is BellSouth's methodology logical?**

A. No. BellSouth inappropriately applies growth in access lines to its inflation calculation. The application of access line growth into an inflation factor is inappropriate and illogical.

The investments/costs to which an inflation factor is applied are unit costs. Access line growth appears as new units - not an inflationary adjustment to unit costs. Growth in access lines results in a larger number of cable pairs. Some portions of this growth will no doubt be served by existing aerial and underground structures, feeder and distribution routes thereby increasing structure cost economies of scale resulting in a **lower** per unit cost for those customers

- not higher. Access line growth that is included in any loading factor on unit costs means that a competitor that buys a loop facility must share a burden applicable to BellSouth's or another competitor's growth *even if it has no growth of its own.* If facilities grow, additional units are subject to their own revenue streams. That growth should NOT be arbitrarily loaded onto any unit cost.

The proper method of handling access line growth is to periodically recompute unit costs using total access lines. Such a cost study update would also need to consider any and all technology and operational changes as well. Such a cost study update may result in lower, higher or constant unit costs depending in part on where the line growth occurs. It can not be assumed, as BellSouth has done, that access line growth unilaterally increases unit costs.

**Q. What is the change in the BellSouth 2-wire Loop SL1 statewide average rate when the effects of inflation factor are negated?**

A. Sprint recommends setting the inflation input to 1.000 in the BellSouth Cost Calculator, resulting in the 2-

Wire loop SL1 rate decreasing four percent from $17.86 to $17.10.

**Loadings**

**Q. Does BellSouth apply loadings for engineering and installation ("In-Plants") and poles and conduit among others to the per unit investments developed in the BellSouth Telecommunications Loop Model (BSTLM) model?**

A. Yes. The process for applying loading is discussed in Ms. Caldwell's Direct Testimony.

**Q. How are the "In-Plant" and pole and conduit factors developed and applied in the BSCC?**

A. The factors are developed using state level relationships of the respective loadings to all applicable investments. The statewide loading factors are then applied to the unit investments from the BSTLM. For example, a statewide pole investment to aerial cable investment factor is applied to the average per unit aerial cable investment derived from BSTLM.

**Q. What concerns do you have with the way BellSouth applies the loadings?**

A. While loadings for engineering, installation, poles, and conduit are certainly a necessary part of the cost of a loop, the method BellSouth uses to apply the loadings totally distorts the cost variance between urban and rural wire centers. BellSouth's per pair loadings result in the per pair costs of wire centers in higher density areas to be overstated while per pair costs in the rural areas are understated.

The BellSouth model assumes that as the number of pairs vary, so varies the cost of poles and conduit. All costs adjust at EXACTLY THE SAME RATE. Costs in reality do not follow that uniform variance. The BSTLM has the ability to apply the loadings in a fashion that reflects reality. BellSouth should be required to use its model in a manner such that the resulting deaveraged costs better reflect reality.

**Q. Please give some examples of how costs should vary for what BellSouth describes as "loadings".**

Let me first begin with an explanation of how a cable route is engineered. The engineer normally starts with a records review, which may be accompanied by a field location visit to determine the type of terrain across which the plant will be placed, any obstacles or external conditions that must be taken into account, and the basic route, type, and size of the facility. *These work functions are generic to any size or type of cable.* The engineer will consider such items as whether streets must be opened or bored under, whether rock or difficult soil will require different placement techniques, whether a water obstacle is present, and ultimately whether new cable should be placed as underground, buried, or aerial plant. The density of the area has a large impact on the number and types of obstacles present. All of this activity does not vary with the number of cable pairs (or equivalent cable pairs) being placed, but with the number and types of cable *sheaths* that are determined necessary.

In any given section of cable, it does not cost four times as much to engineer a 400 pair cable as it does a 100 pair cable. Likewise, a 3200 pair cable is not 32 times a 100 pair cable. The engineer requires a relatively small incremental difference in time to note the additional pair counts and their connectivity. For example, an engineer forecasts that an 800 pair cable is needed in a cable route. The engineer reviews maps, reviews the route, and draws the route based on the factors discussed above. The engineer then finds that the forecast understated the future demand, and a 1200 pair cable is required instead of the originally planned 800 pair cable. In this instance, the engineer does not need to pull maps and study them, or make another trip along the route, or redraw the route. The engineering has been completed; only the size of the cable need be changed on the maps, which does not require any more or less time. Engineering cost is most accurately matched to cable sheaths, not to the number of cable pairs. While costs per sheath may vary slightly, it is drastically different from the linear relationship BellSouth proposes.

Unfortunately, BellSouth applies a generic loading factor to an average per unit investment, which results in an erroneous result. In the case of a fiber feeder cable serving numerous digital loop carrier sites, a small fiber sheath such as a 24 fiber cable may carry _thousands_ of digital loop carrier derived loops. Engineering that cable is not hundreds or thousands of times the engineering cost of a 50 pair copper cable. The engineer does relatively the same work to engineer either the 50 pair cable or the 24 fiber cable. Loading engineering costs equally on a per pair basis (or on a per pair equivalent as in the case of fiber) is incorrect.

Engineering loadings that vary by pair count or equivalent pair capacity as BellSouth is proposing are at significant variance from the actual engineering cost relationships to cables being placed. BellSouth should be required to modify its methods to more accurately reflect cost. The BSTLM has the ability to apply placement, structure, and engineering related investments to the network built in BSTLM, but BellSouth has chosen not to use its model's full capability. As a result, the costs are inaccurate.

Q. **Do cost characteristics for installation or placement costs follow a linear relationship to the number of pairs placed?**

A. No. Installation is affected by the same factors that affect engineering. As a result, the construction work requirements do not vary directly with the number of pairs or fibers (splicing being an exception). BellSouth's In-plant factor applies an installation factor to the unit cost. That logic causes installation costs to vary linearly with the number of pairs placed. For example, that logic would propose that a 2400 pair cable has **96** times the installation cost of a 25 pair cable. That is not how installation costs vary. In another example, both 25 pair and 2400 pair 26 gauge underground cables fit into a four-inch diameter conduit. The work operations to install both cables including clearing and setting up the manholes, and rodding the ducts, are the same. Pulling larger diameter cables through the conduit will require more force than that necessary with smaller diameter cables, but the difference in cost does not even remotely approximate the 96 fold increase applied using BellSouth's per pair methodology. For buried and underground plant types, placement costs vary little among cable sizes. Buried cable construction techniques, such as trenching, back hoe trenching, cut and restore concrete, cut and restore sod, laying the cable in the trench, and filling the trench vary little if at all with the size of the cable placed in the trench. Digging a trench for an 800 pair cable does not require 32 times the effort to dig a trench for a 25 pair cable. Aerial placement varies somewhat from small to large cables because of the difference in weight and diameter of the larger cables. The application of an installation loading to a unit cost, i.e. a linear cost per pair relationship, is flawed and should be rejected.

Q. **Please address your concerns with the pole or conduit loading factors used in the BSCC?**

A. First, pole cost does NOT vary in a linear relationship to the number of pairs in the aerial cables. It is partially impacted by cable weight and cable diameter, which are a function not only of pairs in the sheath, but of the gauge of the cable. Pole cost is also affected by clearance requirements, the slope of the ground, the wind conditions, the type of ground into which the poles are placed, and changes in direction, either side to side or up and down, of the pole line. Placing poles down a straight street is less costly than along a winding road. Poles along a straight road need few, if any, anchors and guy wires.

Poles along a winding road need an anchor and guy wire on any pole that has a significant change in cable direction. Road curves can impact the spacing between poles as well.

In the underground plant, a single 4" PVC duct in place has the same cost regardless of whether it carries a 100 pair copper cable, a 2400 pair copper cable, a six strand fiber cable, or a 288 strand fiber cable. The number of pair equivalents contained in each of those four sheaths are drastically different. The larger the capacity of the SHEATH that rides the structure, the lower the **actual** cost **per pair** or equivalent pair for the structure supporting the sheath. Using the above cable sizes each in the same four-inch conduit and assuming each set of four fibers serves 500 digital loop carrier derived loops and the cost of the duct is $100, the number of loops provided by each cable and the duct cost per loop are:

| Size | Number of loops | Duct Cost per loop |
|---|---|---|
| 100 pair cable | 100 loops | $1.00 |
| 2400 pair cable | 2400 loops | $0.042 |
| 6 fiber cable | 500 loops | $0.20 |
| 288 fiber cable | 36000 loops | $0.0028 |

So we see that the duct cost per loop varies from less than a penny to one dollar. Costs are not and cannot be uniform per pair.

**Q. Please summarize your concerns and recommendation regarding BellSouth's linear per pair structure cost loadings?**

A. BellSouth's application of a linear structure cost per cable pair to all of its unbundled loops, regardless of the geographic location of that loop, fails to reflect one of the most basic and significant drivers of geographic loop cost variances, that being customer density. Customer density equates to cable size and yields tremendous economies of scale on per loop structure costs in highly dense urban areas vs. sparse rural areas. BellSouth has attempted to apply great specificity to its customer locations and network design only to take major components of the total loop investment and completely distort the correct unit costs. The result is significantly overstated prices for unbundled loops in BellSouth's urban markets where the demand for unbundled loops is the greatest.

In order for accurate deaveraged prices for unbundled loops to be set, BellSouth's loop cost studies must be modified to reflect structure cost loadings that accurately reflect an appropriate and realistic per loop structure cost loading. These revised structure cost loadings must properly reflect the reality of decreasing structure cost per loop that follows from increasing customer densities and cable sizes in BellSouth's urban markets. Sprint recommends that BellSouth use the capabilities within BSTLM to develop costs for loops and not rely on an external to the loop model erroneous per pair factor loading methodology.

**High Capacity Loops**

**Q. What deficiencies exist in the High Capacity Loop Cost Studies of BellSouth?**

A. Ms. Caldwell introduced the costs associated with High Capacity Loops in her Direct Testimony. Minimal discussion of cost methodology for BellSouth's High Capacity Loop cost studies was provided. While in general, the cost studies appear to be properly conducted, I have concerns with the weighting factors (Probability of Occurrence) used to determine the frequency of occurrence of each Synchronous Optical Network (SONET) Terminal type and the costs associated with various High Capacity Loop bandwidths. My concern is with BellSouth's development of costs for DS3 level High Capacity Loops. Specifically, BellSouth uses a weighting factor, which I will discuss in detail, that appears to be generic, rather than state-specific. The end result is rates that are higher than necessary.

**Q. Were you able to verify the development of costs appearing in Ms. Caldwell's testimony?**

A. To some extent, yes. Using the BellSouth Cost Model's various worksheets contained in the spreadsheets for High Capacity Loops (A.16 through A.16.16), as well as the relational database that contains material cost information, system configurations, etc., I was able to determine the costing methodology used for the calculation of termination costs.

BellSouth's relational database includes the cost of individual transmission terminal and fiber cable components based on the capacity for each cost component, and varying utilizations based on the different possible terminal and bandwidth configurations. For example, the OC-3 Circuit Pack has a specific proprietary material cost which appears in the database in twelve different variations of bandwidth, from DS0 to OC3, and utilizations ranging from approximately 25% to 100%. No explanation is provided for the equipment utilization levels within the study documentation.

Within the relational databases, the individual components are assembled to produce the cost of the various termination equipment pieces needed for High Capacity Loops: central office terminal shelves, common plug-ins, other plug-ins, customer premise terminal shelves, etc.

The cost of each of the items associated with High Capacity Loops is then used in a spreadsheet within the Cost Model. These costs are further assembled to build bays, combine with interface cards, etc., and are then weighted by the "Probability of Occurrence" of the terminal size. The costs for OC3 terminals, OC12 terminals, and OC48 terminals are then [illegible] and a weighted composite cost is generated for [illegible]

Digital Circuit bandwidth, in this case, DS3 circuit capacity.

The weighted DS3 Digital Circuit costs are then used in another spreadsheet within the Cost Model where inflation, in-plant factors and supporting equipment and/or power loadings are applied. The loaded, weighted DS3 Digital Circuit costs, as well as the cost of land, buildings, and aerial cable (building entrance) are also calculated. Depreciation factors, plant factors, tax factors, etc. are applied to each of these to determine the direct and shared costs.

The direct and shared costs are combined, and gross receipts tax and common costs applied to determine the recurring TELRIC cost for a DS3 High Capacity Loop.

Q. **Do you have any concerns regarding these calculations?**

A. Yes. My concern is the Probabilities of Occurrence that BellSouth used to determine a per DS3 cost by weighting the cost of each terminal type. No source material was provided for the origins of these probabilities. The study references only "Network." It is therefore difficult to analyze these weighting factors. The percentage of occurrence of each terminal type is important, because unit costs will decrease in direct proportion as the size of terminal used and the number of circuits provided increase. Interestingly, however, the probabilities used in this Florida proceeding are identical to those used by BellSouth in a similar proceeding in North Carolina, and possibly other state proceedings. I find it difficult to believe that the probability of occurrence for a particular terminal size is the same for BellSouth's territory in all exchanges and all states.

**Q. What do you propose as an alternative to BellSouth's probability of occurrence factor?**

A. Whenever possible, state-specific data should be used. Sprint developed Florida-specific weighting based on terminal sizes and actual customer location data.

**Q. How did BellSouth's Florida-specific weighting factors compare to Sprint's?**

A. Sprint used actual Florida location-specific DS3 demand data to develop probabilities of occurrence of the three terminal sizes. Customers were geocoded and assigned to a unique grid from a grid overlay by wirecenter. Following are Sprint's Florida-specific to probabilities of occurrence for each terminal type:

| | Sprint's Probability of Occurence |
|---|---|
| OC3 | 64.58% |
| OC12 | 22.92% |
| OC48 | 12.50% |

The OC48 terminal types for Sprint's Florida exchanges occurred in the Fort Myers, Tallahassee, and the Winter Park (Orlando) areas. These are the most urban areas Sprint serves in Florida and they have a corresponding concentrated demand for DS3 circuits resulting in the use of the larger OC-48 terminal size. BellSouth has a much greater occurrence of Urban Wire Centers in Florida than Sprint. Logically, I would expect BellSouth's probability of occurrence of DS3 circuits on OC48 systems to be much higher than Sprint's, when in fact BellSouth's study uses a smaller percentage.

**Q. Did you attempt to apply these weighting factors to BellSouth's material cost calculations?**

A. Yes, I did. By simply using Sprint's probability percentages, and BellSouth's actual costs and spreadsheet calculations, the recurring cost for DS3 facility terminations for BellSouth dropped from $407.58 to $378.63. The reason this occurs is because the highest per unit DS3 costs are for OC3 terminals. Using BellSouth's assumed occurrence of this particular terminal size, BellSouth has overstated costs. As stated earlier, BellSouth has more densely populated serving areas than Sprint in the State of Florida. Logically, the frequency of occurrence of OC3 terminals should be lower than Sprint's. OC12 and OC48 terminals are more common in larger urban and suburban areas, so I would expect that by using BellSouth's Florida-specific percentages, the resulting costs would be even lower than illustrated above using Sprint's Florida specific terminal weightings. BellSouth should be required to recompute their DS3 costs based on their Florida specific terminal weighting that will fairly and accurately reflect the economics of their dense urban markets.

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

A. Yes.