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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

PHASE II 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, Supplemental Direct, and Additional Supplemental 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 used in the BellSouth TELRIC Model supported by Ms. D. Daonne Caldwell and in the GTE high capacity loop cost studies supported by Mr. Dennis B. Trimble.

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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 builds its network using several different models. These models develop an average investment per unit, which is then entered into the BellSouth Cost Calculator (BSCC). Within the BSCC, inflation, In-plant structure loading, shared cost, and common cost factors are applied to develop monthly costs or non-recurring costs.

Q. Does Sprint have a similar multi-model study process?

A. Yes, Sprint utilizes several models to develop investment. The investment is then fed into a model that calculates annual charge factors and common cost factors that are applied to investment to develop monthly recurring costs. There are major differences between the process that Sprint uses and the process that BellSouth uses. Sprint passes total investments by account including structure, engineering, and installation investments into the cost calculator for loading while BellSouth passes investments *per unit excluding structure, engineering, and installation* into their BSCC.

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 that are incorrect and inappropriately applied.

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 <u>unit costs.</u> 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 **<u>lower</u>** 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 loading process is presented 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 aerial cable investment per unit 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. The same cost loading is applied to all wire centers regardless of density. This fails to recognize the variance in the quantity of cable pairs (units) that "ride" a single structure or are engineered/installed in a single section. This causes 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.

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

A. Let me first begin with the **engineering costs.** In any given section of cable, it does not cost four times as much to engineer or install 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. Unfortunately, BellSouth applies a common loading factor <u>per unit</u> which incorrectly puts (in the case of the above example) 4 times and 32 times multipliers into the cost development. 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 *<u>thousands</u>* 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 to all loops no matter if the facility is fiber or copper is incorrect.

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 in to 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 circuits being placed, but with the number and types of cable *sheaths* that are determined necessary.

For example, in the Sprint-filed inputs, engineering costs for cable placement *do not change at all* with the size of any cable. Instead, the variance occurs between aerial, buried, and underground plant types. Between buried and underground cable types, where the

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greatest cost variance exists, engineering costs increase 88.9%. Therefore, while *Sprint's actual costs vary by a maximum of 88.9% and only between cable types*, the BellSouth application of a loading per pair would increase engineering by a factor of 350 times between the largest and smallest cable sizes with no variance between aerial, buried, or underground cable. The fiber cables with many times the capacity of the copper cables actually have less Sprint engineering cost applied than the copper. Fiber cable engineering cost inputs range from 39% to 93% of their copper counterparts, not hundreds or thousands of times more as a uniform loading per pair or equivalent pair would impute using BellSouth's methodology.

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.

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

A. No. The construction work requirements do not vary directly with the number of pairs or fibers except for any splicing. BellSouth's model logic 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 <u>**96**</u> times the installation cost of a 25 pair cable. That is not how installation costs vary. For example, Sprint's aerial cable construction cost variance from the smallest (6 pair) to largest (1800 pair) cable increases only 93%. 1.93 times is a long way from 96 times. 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, rodding the ducts, and pulling the cables are exactly the same. 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. What is a reasonable range of cost variance between cable sizes that BellSouth should be using for its installation and loadings?

A. The actual Sprint cost variances represent a measure of that reasonable range. BellSouth should be required to adjust its installation and engineering cost variances to be similarly modeled. The net cost multiplier of the combined engineering and installation costs for Sprint, calculated by dividing the largest (4200 pair) costs by the smallest (12 pair) costs are as follows:

Aerial Copper- Approximately 8.4 times

Buried Copper (Splicing, engineering, & supply expense only) - Approximately 15.6 times

Underground Copper- Approximately 5.3 times

Aerial Fiber - Approximately 1.4 times

Buried Fiber (Splicing, engineering, & supply expense only) - Approximately 2.1 times

Underground Fiber - Approximately 1.8 times

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Sprint's structure cost per line relationships relative to the largest and smallest cable sizes, are far lower than the 350 times for copper or higher for fiber than the BellSouth cost per loop "In-Plant" loading creates. Sprint's factors shown above were developed and documented using actual Florida specific structure cost data provided in Sprint's filing.

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

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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.

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

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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 combined and a weighted composite cost is generated for each Digital Circuit bandwidth, in this case, DS3 circuit capacity.

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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 was able to develop Florida-specific weighting based on terminal sizes and actual customer billing data.

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

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A. Sprint used actual Florida location-specific DS3 demand data to develop probabilities of occurrence of the three terminal sizes. Following is a comparison of Sprint's Florida-specific to BellSouth's probabilities of occurrence for each terminal type:

	BellSouth	Sprint
OC3	75.00%	64.58%
OC12	20.00%	22.92%
OC48	5.00%	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 $378.62. The reason this occurs is because the highest per unit DS3 costs are for OC3 terminals. By assuming a 75% 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. What deficiencies exist in the High Capacity Loop Cost Studies of GTE?

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A. GTE's High Capacity Loop Cost results are incomplete. GTE provides cost results only for DS3 and DS1 level UNEs. By not unbundling OC3, OC12, and OC48 level High Capacity Loops, GTE has denied competitors access to network elements used in its own network. GTE's cost studies are inconsistent with those filed by both BellSouth and Sprint, which provide these higher bandwidth options as UNEs. GTE should be required to provide OC3, OC12, and OC48 bandwidth options.

Q. Does this conclude your testimony?

A. Yes.

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