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Initial Brief of Cincinnati Bell Telephone Company

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BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of The Application of Cincinnati Bell Telephone Company for Approval of a Retail Pricing Plan Which May Result in Future Rate Increases	))))	Case No. 96-899 TP-ALT

INITIAL BRIEF OF CINCINNATI BELL TELEPHONE COMPANY

(PUBLIC VERSION)

I. BACKGROUND

A. Legal Basis

On February 8, 1996, the President of the United States signed into law the Telecommunications Act of 1996 (1996 Act). Pursuant to Section 251(d)(1) of the 1996 Act, the FCC was directed to establish regulations to implement certain provisions of Sections 251 and 252. The FCC began, in several dockets, to review and develop rules under the 1996 Act. The FCC issued a comprehensive order and rules with respect to Section 251 and 252 of the 1996 Act in its First Report and Order, In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Docket No. 96-98, FCC 96-325 ("FCC Order").

In addition, this Commission has established a set of Local Service Guidelines, the most recent version of which were issued on rehearing in In the Matter of the Commission Investigation Relative to the Establishment of Local Exchange Competition and Other Competitive Issues, Case No. 95-845-TP-COI ("Guidelines") (Feb. 20, 1997). The Guidelines adopt in substantial part the TELRIC methodology espoused in the FCC Order. In the meantime, several appeals of the FCC's rules regarding Sections 251 and 252 of the 1996 Act were consolidated before the United States Court of Appeals for the Eighth Circuit, which vacated a number of the FCC's rules. Iowa Utilities Board v. FCC, 120 F.3d 753. On certiorari, the United States Supreme Court reversed in part, affirmed in part, and remanded the case for further proceedings. AT&T Corp. v. Iowa Utilities Board, 119 S.Ct. 721 (1999).

The Supreme Court upheld the FCC's jurisdiction to establish rules under the 1996 Act. However, the Supreme Court also determined that the FCC's identification of the network elements that incumbent LECs would be required to unbundle ("UNEs") failed to consider §

251(d)(2) of the 1996 Act, the "necessary" and "impair" standard. The matter was remanded to the Eighth Circuit Court of Appeals for further proceedings on issues that were raised by the parties in that court, but which had not been decided. CBT is a party to that proceeding in which certain substantive challenges to the FCC's TELRIC pricing rules remain pending. In addition, the FCC has recently commenced a notice and comment rulemaking proceeding to determine the UNEs that must be unbundled. Second Further Notice of Proposed Rulemaking, Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Docket No. 96-98, released April 16, 1999.

At the commencement of the hearing, CBT indicated that it was proceeding with this hearing on the basis that its purpose was to determine the rates for the UNEs CBT had agreed to provide in its existing interconnection agreements. CBT reserved the right to contest whether those UNEs would have to be offered in the future. (Mar.1, p. 7).[1] CBT reserved the right not to offer any elements that the FCC does not define as UNEs that ILECs are required to offer in its pending rulemaking proceeding. (Mar. 1, p. 6).

B. Procedural History of the Case

Pursuant to Section 252(b)(1) of the 1996 Act, if the parties to an interconnection arrangement are unable to reach agreement upon the terms and conditions for interconnection, a requesting carrier may petition a state commission to arbitrate any issues unresolved by voluntary negotiation. MCI was unable to reach complete agreement with Cincinnati Bell Telephone Company ("CBT") and thus, exercised its right to seek arbitration pursuant to Section 252(b)(1) of the 1996 Act. On February 10, 1997, MCI filed a petition for arbitration of numerous issues to establish an interconnection agreement between it and CBT. In the Matter of the Petition of MCI

[1] For simplicity of reference, CBT will cite to the transcript of the hearing herein by reference to the date and page number.

Telecommunications Corporation for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish an Interconnection Agreement with Cincinnati Bell Telephone Company, Case No. 97-152-TP-ARB. Among the issues upon which the parties could not reach agreement were rates for interconnection and UNEs. MCI requested in its petition that the Commission establish interim rates in the arbitration proceeding and establish permanent rates in a separate proceeding or in CBT's pending alternative regulation proceeding. By Entry dated March 26, 1997, the Commission concluded that the arbitration proceeding would only determine interim rates for interconnection and UNEs, with permanent rates to be established in conjunction with CBT's pending alternative regulation case.

As part of its arbitration case, CBT filed a number of cost studies for UNEs, including: transport and termination (reciprocal compensation); transit service; unbundled local switching and common transport; Centrex; ISDN; trunk termination; hunting; BLV/EI; listings, local operator and intercept; nonrecurring costs; interim number portability; and unbundled loops. (CBT Exh. No. 8).[2] The arbitration hearing commenced on April 8, 1997 and resulted in a determination of interim rates, subject to the establishment of permanent prices in this case. Subsequent to the MCI arbitration hearing, CBT entered into interconnection agreements with a number of other CLECs, generally adopting the interim rates established in the MCI arbitration and agreeing that such rates would ultimately be replaced by the rates established in CBT's TELRIC proceeding.

The cost documentation that CBT had filed in the MCI arbitration case was incorporated into this case. CBT filed its initial testimony in support of its TELRIC costs on May 20, 1997. On November 17, 1997, the Staff Report of Investigation was released. Testimony in support of

[2] The list omits subpart 20, which was the common overhead cost study. (Mar. 3, p. 165). The common cost allocator has been stipulated for purposes of this case.

parties' objections to the Staff Report was to be filed by December 23, 1997 with respect to TELRIC issues. Intervention was granted to AT&T, MCI, TCG, OCC, The Ohio Cable Telecommunications Association, Time Warner Communications of Ohio L.P., Sprint Corporation, Cablevision Lightpath-OH, Inc., Worldcom, Inc., the Ohio Payphone Association and OCOM Corporation.

The Commission decided to bifurcate proceeding into two hearings: the first would consider CBT's alternative regulation plan; and the second would establish CBT's TELRIC rates. The parties to the alternative regulation proceeding ultimately reached a stipulation, which was subsequently approved by the Commission by order dated April 9, 1998. As part of that stipulation, the parties agreed to negotiate in good faith in an effort to reach agreement on CBT's TELRIC rates. By order dated June 11, 1998, the parties were afforded additional time in which to seek a settlement on rates. After a number of weeks of good faith bargaining, the parties reported that they had reached an impasse. MCI filed a motion requesting that the TELRIC proceeding be set for hearing. The attorney examiner established a new procedural schedule, allowing CBT to supplement its testimony on September 28, 1998. At that time, and over the subsequent weeks, CBT filed a number of additional cost studies in support of its interoffice transport, collocation, directory assistance database and various nonrecurring costs. After receiving several extensions of time, Intervenors filed their responsive testimony on December 23, 1998. Leave was granted to Intervenors to file additional testimony by January 11, 1999 with respect to certain annual charge factor issues.

C. The Hearing

The public hearing on TELRIC issues commenced on March 1, 1999. Eighteen days of hearings have been conducted in this matter. The only parties to submit testimony were CBT,

MCI, AT&T, CoreComm and Staff. CBT presented the testimony of four witnesses (Dr. Vander Weide and Messrs. Bolte, Meier, and Mette). The intervenors presented the testimony of six witnesses (AT&T-Mr. Webber; MCI-Mr. Starkey and Dr. Ankum; MCI and AT&T jointly-Messrs. Hirshleifer and Lee; CoreComm-Mr. Gose). The Staff presented the testimony of five witnesses (Ms. Soliman, Ms. McCarter, and Messrs. Francis, Kotting and Chaney). CBT presented rebuttal testimony by Dr. Vander Weide and Messrs. Meier and Mette. MCI presented rebuttal testimony by Dr. Ankum and Mr. Starkey. The hearings concluded on April 21, 1999. The parties were directed to file intial briefs on May 21, 1999 and reply briefs on June 11, 1999.

CBT's cost studies for UNEs were sponsored by Norbert Mette, CBT's Director of Service Costs. (Mar. 4, p. 7). Mr. Mette's expertise relates to the cost of providing various services by CBT. He testified as to his credentials. (Mar. 4, p. 6). At the hearing, CBT presented a number of cost studies for the Commission's consideration. CBT Exhibit 8 listed the original set of cost studies. CBT Exhibit 9 listed CBT's newer TELRIC cost studies related to collocation, interoffice transport, entrance facilities, cross-connects and nonrecurring charges. (CBT Exh. 9(1-23); Mar. 3, pp. 166-67). Additional studies, originally requested by Staff through data requests, were presented for message waiting indicator and various custom calling features. (CBT Exhs. 10, 11). CBT also presented a modified transport and termination cost study provided in response to Staff Data Request 94. (CBT Exh. 12). During the course of the hearing, Mr. Mette also presented revised versions of certain nonrecurring cost studies for unbundled loops. (CBT Exhs. 13, 14).

There are numerous issues associated with these various cost studies that must be decided by the Commission in order to establish TELRIC rates for CBT. These issues will be addressed in this brief in two major sections. Section II of this brief will address general issues affecting most,

if not all, of the cost studies. These issues include general TELRIC methodology issues, the appropriate cost study period, depreciation parameters, the cost of capital, calculation of annual charge factors and appropriate fill factors. Section III of this brief will address issues that are particular to individual cost studies, such as loops, switching, interoffice transport, collocation and the directory assistance database.

II. GENERAL METHODOLOGICAL ISSUES

A. TELRIC Network Design

In reviewing the forward-looking cost methodology concept, the FCC noted that one question is whether costs should be computed based on the least-cost, most efficient network configuration and technology currently available, or whether forward-looking costs should be computed based on the incumbent LECs' existing network. The FCC then identified three general approaches to this issue. The first would consider the most efficient network architecture, sizing, technology, and operating decisions that are operationally feasible, otherwise known as the "greenfield" approach. Under the second approach, the costs of interconnection and unbundled network elements would be based on existing network design and technology, an embedded cost approach. The final method identified, and the one adopted by the FCC, is developing prices for interconnection and UNEs based on the most efficient technology deployed in the incumbent LECs' existing wire center locations.

The FCC's TELRIC methodology assumes that wire centers will be placed at the incumbent LECs' current wire center locations. FCC Order, ¶ 685. (Mar. 4, p. 15). The FCC found that such an approach encourages facilities-based competition to the extent that new entrants, by designing more efficient network configurations, are able to provide the service at a lower cost than the incumbent LEC. FCC Order at ¶685. The FCC clarified that, in pricing

interconnection and UNEs based on existing wire centers, the incumbent LECs were to reconstruct the local network employing the most efficient technology for reasonably foreseeable capacity requirements.

This approach, according to the FCC, mitigates the incumbent LECs' concerns regarding the existing network while at the same time basing prices on efficient new technology that is compatible with the existing infrastructure. The FCC stated that its approach "most closely represents the incremental costs that incumbents actually expect to incur in making network elements available to new entrants." FCC Order, ¶ 685 (emphasis added).

The Commission's Guidelines adopt a similar approach. The Commission's Guidelines similarly state that "TELRIC studies shall reflect costs that are expected to be incurred during the study period." § V.B.6 (emphasis added). In reviewing its cost studies, CBT urges the Commission to pay heed to the "actual" cost standard and resist the frequent urgings of intervenors in this case to depart from the realistic and practical effort to establish rates based on real costs in pursuit of theoretical and unattainable standards based on "perfect information" that does not exist.

CBT's identification of the characteristics of its network for purposes of establishing prices for interconnection and for unbundled network elements is consistent with the FCC Order and with the Commission's Guidelines. As noted by the FCC Order, the existing network design most closely represents the incremental costs that incumbent LECs will incur in making network elements available to new entrants. CBT has followed this approach to network design in developing its rates for unbundled network elements. The record reflects that CBT, in developing its UNE rates, assumed that wire centers and customers would be in the same locations. CBT performed its TELRIC cost studies based on the most efficient technology

that can be deployed in CBT's existing network configuration and based on CBT's wire center locations. (CBT Exh. 6, p. 18).

B. Study Period

1. Length of Studies

Section V.B.4.b.1. of the Commission's Guidelines calls for a presumption that five years is a reasonable period for a cost study. The Staff found that the periods used by CBT in its TELRIC studies were reasonable and recommended approval of the study periods. No party has made any alternative proposal for the appropriate length of the study period. The Commission should approve the five-year period.

2. Update Factors

Since it has been over two years since CBT originally conducted some of its TELRIC studies, Staff witness Soliman recommended that the five-year period start January 1, 1999, and continue through December 31, 2003. This would necessitate that CBT update investment figures to this period either by using currently available vendor prices, or by applying Telephone Plant Index (TPI) factors. CBT would also need to apply labor inflation rates to bring labor rates up to the study period level. Staff witness McCarter also recommended that CBT update its Telco engineering factor. CBT does not object to these suggestions and agrees that a 1999-2003 study period is appropriate. This will require that CBT be allowed a sufficient period of time after the Commission's Order in this matter in which to update and rerun all of its cost studies with more current inputs.

The Staff Report recommended that CBT's labor rates be updated to 1997 levels, but that loadings for exempt materials, motor vehicles, and exempt supplies be excluded from the labor rates. Mr. Mette objected to such exclusions. The loading is an appropriate means to recover

costs in the labor rates for time reporting employees who utilize this equipment and materials. For CBT to separately identify the use of exempt materials or motor vehicles in order to include these costs in individual UNE cost studies as the Staff Report recommended, CBT's personnel would be required to maintain an unreasonable and costly level of detail regarding each job that they complete. In Ms. Soliman's hearing testimony, Staff changed its position regarding the inclusion of these expenses in labor rates. After a further investigation of the nature of these expenses, she now believes it is not unreasonable for CBT to include them in its labor rates. Staff now recommends the approval of CBT's labor rates, subject to the appropriate labor inflation rates. Since no intervenor filed testimony on this issue, CBT's labor rate loadings should be approved.

CBT, in many instances, applies labor rates in order to calculate its costs. CBT recently entered into a new labor contract with the Communications Workers of America. In order to ensure consistency of results with the TELRIC calculations, CBT proposes to use the new labor rates, as applicable, throughout its rerun TELRIC studies.

MCI witness Starkey objected to the application of CBT's labor rate increases to the installation of Fujitsu equipment, asserting that the vendor provides installation labor. This assertion is without basis. All Fujitsu equipment is installed by CBT's engineering and installation forces. (CBT Exh. 21, p. 12-13). This includes equipment installed at a central office, at a remote terminal site, or on a customer premise. Thus, CBT's labor rate increases apply to installation of Fujitsu equipment.

C. Depreciation

The FCC rules provide that "The depreciation rates used in calculating forward-looking economic costs of elements shall be economic depreciation rates." § 51.505(b)(3). Economic

depreciation was defined by the FCC as the "periodic reduction in the book value of an asset that makes the book value equal to its economic or market value." FCC Order, fn. 1711. (Mar. 2, p. 108). The depreciation rate should "reflect[] the true changes in economic values of an asset . . . ." FCC Order, ¶ 703. The TELRIC methodology is incompatible with traditional rate regulation, including "regulatory depreciation rates." Id., ¶ 632. The Commission's Guidelines similarly require depreciation to "be calculated using the economic depreciation rates that reflect the forward-looking lives of the equipment in a specific location and the economic value of an asset." Guidelines, § V.B.4.b.4.

CBT presented the testimony of Mr. Jim Bolte and CBT's 1997 depreciation study to support the company's position on the applicable economic depreciation lives to be used in the TELRIC cost studies. (CBT Exhs. 2 and 3(A)-(D)). Mr. Bolte is Director of Process Management and Capital Recovery for Cincinnati Bell Telephone, holds degrees in mathematics, education and computer science, and is a Certified Depreciation Professional. (Mar. 2, pp. 5-6). Mr. Bolte is responsible for all depreciation issues at CBT, regulated and unregulated, and is responsible for the establishment of depreciation lives for financial reporting. (Mar. 2, p. 7).

Mr. Bolte testified that CBT's proposed depreciation lives are the appropriate economic lives to be used in TELRIC studies. (Mar. 2, p. 70). The economic life of an asset reflects the useful economic value of a piece of equipment, based primarily on its ability to generate revenues, not its physical life. (CBT Exh. 2, p. 3; Mar. 2, pp. 7-8, 71-72). The economic lives of existing technologies are impacted by new technology, even when still functional. (Mar. 2, p. 73).

A "forward looking" depreciation rate must take into account near-term and long-term technological drivers. (Mar. 2, p. 96). In the FCC's triennial represcription process, CBT presented the FCC with its depreciation study, containing forward-looking projections of

technology changes in CBT's network, considering a very broad picture of long and short term technology drivers. (CBT Exh. 3; Mar. 2, pp. 15-20).

CBT used a number of external sources, including industry publications, statements of other companies, and studies conducted by Technologies Futures Inc. to develop its proposed lives. (Mar. 2, pp. 30-31). CBT internal subject matter experts were consulted regarding CBT-specific plans for network architecture and technologies, which were incorporated into the general industry recommendations. (Mar. 2, pp. 33-34; CBT Exh. 2, p. 4). For example, with digital switching, CBT proposed a 12 year life, at the high end of the TFI range due to recommendations of CBT's engineers. (Mar. 2, p. 34-36). The expected migration to ATM switching makes a 12-year life appropriate. (Mar. 2, p. 35). Metallic cable account lives are becoming shorter due to migration from copper to fiber.[3] (Mar. 2. P. 44; CBT Exh. 3A). Demand for high-speed data and broadband services will further drive this conversion.

The FCC did not adopt CBT's proposals in certain categories of technology-driven accounts such as digital circuit, digital switching and cable accounts. (Mar. 2, pp. 22-23). The FCC's prescriptions for these accounts were not sufficiently forward looking to equate the economic lives appropriate for a TELRIC study. (Mar. 2, pp. 23-24; Exh. 2, p. 4). While the FCC shortened CBT's lives over where they had been, its 1997 decision should not be accepted after several years of additional technological changes without closer review.

Increased competition will increase significantly the risk that CBT's investments will be short-lived. In a competitive world, companies reduce their depreciation lives considerably to

[3] AT&T's cross-examination regarding CBT's data responses on ATM switching and fiber in the loop attempted to distort these facts. (AT&T Exhs. 4, 5, 6, 7; Mar. 2, pp. 40-41, 47-48) As Mr. Bolte and Mr. Meier testified, CBT interpreted these data requests as seeking CBT's current deployment plans. (Mar. 2, p. 38; CBT Exh. 21, p. 14). The forces that cause technological substitution are long-term and impact the lives of the current technology. Thus, CBT's current plans are not determinative of the economic lives of the current technologies. AT&T misuses "forward-looking," implying that CBT's cost studies must use future technology, when the rules actually call for forward-looking costs of the technologies currently deployed in the network. First Report and Order, ¶ 690.

reflect that risk and recover their investment over a shorter period. (Mar. 1, p. 115, 140). CBT appropriately looked at current and future technologies to determine the depreciable life of the current investment. (Mar. 2, p. 55). Even though TELRIC studies are to be based on the most efficient technology currently available (Mar. 22, p. 33), future technologies drive the economic lives of those assets. (Mar. 2, pp. 53-54).

CBT proposes consistent lives across its financial books, regulated books, and LRSIC and TELRIC cost studies. (Mar. 2, p. 21). GAAP accounting rules do not specify the lives to be used for financial reporting and CBT's accountants do not set its economic lives. (Mar. 2, p. 62). CBT's proposed lives are appropriate for regulatory, economic and financial purposes. (Mar. 2, p. 93). To require CBT to use longer lives for TELRIC purposes would create an inappropriate mismatch between the cost recovery for assets used to provide UNEs and those used to provide retail service.

Staff and Intervenors agreed with all of CBT's proposed lives, except for the following accounts:

Account	CBT Proposal[4]	Staff Proposal
2121 Buildings (Large)	40.0	46.0
2124 Gen. Purpose Computers	3.0	5.5
2212 Digital Switching	12.0	15.0
2231 Radio Systems	3.5	5.5
2232 Digital Circuit	9.0	11.0
2421 Aerial Cable – Metallic	15.0	21.0
2421 Aerial Cable – Fiber	22.0	25.0
2422 Underground Cable – Metallic	15.0	24.0
2422 Underground Cable – Fiber	22.0	25.0
2423 Buried Cable – Metallic	17.0	22.0
2423 Buried Cable – Fiber	22.0	25.0
2426 Intrabuilding Cable – Metallic	14.5	18.0
2426 Intrabuilding Cable – Fiber.	20.0	25.0

[4] CBT's proposed economic lives can be contrasted with Ameritech's proposals of 5 years for digital switching and digital circuit equipment (vs. CBT's 12 and 9), and 12 years for outside plant equipment (vs. CBT's range of 15-22).

The parties also agreed on all future net salvage values except for the following:

Account	CBT Proposal	Staff Proposal
2121 Buildings	-10.0	-6.0
2423 Buried Cable –Metallic	-12.0	-10.0
2423 Buried Cable – Fiber	-12.0	-5.0
2441 Conduit Systems	-50.0	-15.0

CBT's proposals satisfy the requirements of the 1996 Act, the FCC Order and the Commission's Guidelines. CBT proposes to use the same economic lives in its TELRIC studies as it uses for retail cost studies and financial accounting purposes. Despite contentions by AT&T witness Lee that GAAP conservatism principles dictate depreciation lives, Mr. Bolte confirmed that his group establishes the lives in order to match the cost recovery of these assets to their economic usefulness. These forward-looking economic lives should be adopted for TELRIC as well. No party has provided any direct evidence that any of CBT's proposed lives are inappropriate. The uniform response of Staff and intervenors has been merely to adopt the lives prescribed by the FCC, without no analysis of whether those lives are truly economic lives.

The FCC did not require use of depreciation prescriptions in TELRIC studies. Absent a clear indication from the FCC that the two should be the same, the Commission should assess CBT's economic lives independent of the prescribed lives. In 1994 and 1995, the FCC developed a streamlined depreciation process in which it established projected life ranges for various categories of plant, based on statistical studies of past approved depreciation rates. The FCC approved ranges generally represent one standard deviation above and below the average approved lives.[5] (Mar. 22, p. 16). The FCC allows depreciation parameters outside the FCC authorized range in triennial represcriptions. The universal service order, cited by AT&T, is not

[5] Third Report and Order, CC Docket No. 92-296, In the Matter of Simplification of the Depreciation Prescription Process, released May 4, 1995, ¶'s 11 and 12. See also, Second Report and Order, CC Docket No. 96-296, In the Matter of the Simplification of the Depreciation Prescription Process, released June 28, 1994, ¶25.

relevant here. There, in contrast, the FCC established parameters for cost studies and required that all depreciation parameters be within its pre-approved ranges. The FCC has not precluded depreciation parameters outside the pre-approved ranges for TELRIC.

AT&T witness Lee agrees that an economic life is the revenue-producing life of an asset. (Mar. 22, p. 9). The lives should represent newly placed plant, taking into consideration everything that is known about the future. (Mar. 22, p. 9). Embedded depreciation rates have no relevance. (Mar. 22, p. 9). There have been a number of technological developments in the four years since the FCC established its ranges, but the FCC has not adjusted its ranges for those developments. (Mar. 22, p. 17). Even though economic lives can change over a short period of time, Mr. Lee has done no substantive analysis of CBT's proposed lives, and continues to advocate lives established in 1997. (Mar. 22, p. 10). Mr. Lee's main justification for the FCC's lives is that CBT's regulated depreciation reserve has been increasing. He admits, however, that one cannot determine the appropriate economic life from embedded depreciation reserves. (Mar. 22, pp. 18-19). While MCI witness Ankum and AT&T witness Webber recommend using AT&T witness Lee's recommendations on depreciation (MCI Exh. 17, p. 5), neither have done any analysis and merely follow what Mr. Lee says. (Mar. 16, p. 79; Mar. 22, p. 61).

Nor did Staff witness Kotting present any substantive analysis. He has not reviewed CBT's 1997 depreciation study to see if events over the last two years have made those proposals appropriate. (Mar. 25, p.128). Even though the TELRIC rules are vague with regard to what is meant by "forward looking" life estimates, (Staff Exh. 7), and the economic life may be different than the projection life, Mr. Kotting is of the opinion that the prescribed projection life is the best available estimate of the economic life. (Mar. 25, p. 118-19). Competition and change in technologies have tended to shorten the service life of equipment. (Mar. 25, p. 124). The forces

that have been shortening economic lives did not cease to advance in 1997. (Mar. 25, p. 125).

If, despite CBT's well-supported depreciation presentation, the Commission imposes the FCC's prescribed lives on CBT for TELRIC purposes, which CBT believes would be improper, at a minimum, the Commission should allow CBT to update its TELRIC rates in the event it obtains shorter prescribed lives in the future. During the lives of these TELRIC rates, CBT likely will be subject to at least one more FCC-directed depreciation represcription proceeding. Mr. Kotting agreed that if a represcription results in different lives, theoretically, those projection lives should be used for TELRIC purposes. (Mar. 26, p. 126). Mr. Lee also agreed that it would be reasonable for CBT to seek new depreciation rates for TELRIC, as those lives would then be appropriate lives for TELRIC. (Mar. 22, pp. 14-15). Thus, at a minimum, CBT should be allowed to adjust its depreciation lives without the necessity of another TELRIC investigation.

D. Cost of Capital

CBT proposes to use the cost of capital recommended by Dr. Vander Weide. (CBT Exh. 1). Dr. Vander Weide is a research professor of finance and economics at the Fuqua School of Business at Duke University and has published extensively in the areas of finance and economics. He provides financial and economic consulting to firms in the electric, gas, telecommunications, water and insurance industries and has testified in numerous cases before state and federal agencies. (Mar. 1, p. 9). Dr. Vander Weide recommended a cost of capital of 12.65%, based on a 6.94% estimate of CBT's forward-looking cost of debt, a 14.30% estimate of CBT's forward-looking cost of equity, and a forward-looking capital structure of 22.45% debt and 77.55% equity on a market value basis. (CBT Exh. 1).

AT&T and MCI jointly sponsored Mr. John Hirshleifer to provide a cost of capital calculation. (AT&T/MCI Joint Exhs. 3, 4). He performed both discounted cash flow ("DCF")

and capital asset pricing model ("CAPM") analyses. The Staff presented Mr. Chaney as their cost of capital expert. (Staff Exh. 8). Mr. Chaney's methodology was similar to that in the Staff Report, and used the method for determining the rate of return in a traditional rate case. (Mar. 26, p. 20). MCI witness Ankum and AT&T witness Webber echoed Mr. Hirshleifer's recommendations, but again, did no analysis of their own and added nothing to Mr. Hirshleifer's testimony. (Mar. 16, p 80; Mar. 22, p. 61). CoreComm witness Gose presented lengthy testimony on the cost of capital, although this is not his area of expertise and he has never done a cost of capital analysis. (Mar. 18, p. 15). He also relied upon the analysis done by Mr. Hirshleifer, did not perform any calculations, and added nothing to the analysis. (Mar. 18, pp. 10, 24-25).

1. The Governing Standards

Section 252(d)(1) of the 1996 Act establishes that the rates charged for interconnection and unbundled elements are to be cost-based, nondiscriminatory, and may include a "reasonable profit." The Commission addressed the issue of cost of capital in Guideline V.B.4.b.3: "The TELRIC of an element shall be calculated using the forward-looking cost of capital (debt and equity), which includes a reasonable level of profit. The currently Commission-authorized rate of return shall be a starting point for the TELRIC calculation." The FCC endorsed use of the currently authorized federal rate of return (11.25%) in TELRIC studies as a point of beginning. The FCC recognized that, as a matter of theory, increase in risk due to local exchange service competition can increase an incumbent LECs' cost of capital.

Since the Commission last authorized a rate of return for CBT, Congress has passed the 1996 Act, which removes barriers to entry into the local exchange market. (CBT Exh. 1, p. 16). The FCC and this Commission have required CBT to provide unbundled network elements at

wholesale rates to its competitors. Technological advances have progressed to the point where it is economically feasible for competitive local exchange carriers to provide facilities-based local exchange services to CBT's customers. In addition, CBT's competitors have greatly strengthened their competitive position through widely-publicized mergers and acquisitions. These factors cause CBT's business risk to be considerably greater than it was at the time the Commission last authorized a rate of return for CBT.

2. Risk Analysis

Dr. Vander Weide studied the risk of investing in the facilities required to provide unbundled network elements. (CBT Exh. I, Appendix 1). Dr. Vander Weide is the only cost of capital witness to address competitive effects. Appendix 1 contains his qualitative study, based on his years of experience in the telecommunications industry, his understanding of the market, financial analysts' reports, and public statements of competitive companies. (Mar. 1, pp. 48-49). The numerous competitive reasons described therein show that CBT will face more risk in the future than it has in the past, justifying the proposed risk-adjusted cost of capital. Dr. Vander Weide identified NECs that have approved interconnection agreements and at least four that have installed switches in CBT's territory. MCI began making investments several years ago to provide local exchange service. (Apr. 21, p. 95). Time Warner has an active facilities-based network. TCG is now owned by AT&T and is one vehicle it uses to provide local exchange service. (Apr. 21, p. 96). Companies that build their own facilities undoubtedly increase risk and thereby increase CBT's cost of capital. (Apr. 21, p. 98).

No intervenor has introduced evidence that CBT's risk going forward is any less than what is has been in the past. It is obvious from the level of interest shown by competitors in CBT's service territory, including the installation of several competitive switches, that CBT faces

the risk of losing substantial portions of its business. Dr. Ankum cited the potential SBC/Ameritech entry into Cincinnati as a force that would drive up CBT's cost of capital. (Apr. 15, p. 18). There is already DS1 and DS3 competition. (Mar. 2, p. 131).

TELRIC, by itself, whether or not there is actual competition, imposes a risk on the company, because it always uses the latest technology, and CBT can never recover its original cost. (Mar. 1, p. 122). TELRIC studies assume that CBT will construct new facilities and price them on what it would cost to build on a forward-looking basis. (Mar. 1, p. 60). TELRIC requires CBT to take the risk of building a network from scratch at forward-looking costs, using a 15-year to 20-year life, but purchasers of UNEs only make short-term commitments, so there is significant risk in building that network. (Mar. 1, p. 62; Apr. 21, p. 52; CBT Exh. 25, pp. 7-8). If CBT is using the least cost technology and another technology becomes available that has lower cost and CBT must continue to depreciate its network investment based on prescribed depreciation lives, then CBT is unlikely to recover its actual cost of network investment. (Mar. 1, p. 110).

In theory, the TELRIC standard presumes the existence of competition. If competition were not presumed to exist, there would be no economic justification for its use. (Mar. 1, p. 17). TELRIC is intended to calculate prices that would exist if we had competition and mimic its results. (Mar. 22, p. 93). The actual state of competition is irrelevant for purposes of setting TELRIC pricing under principles established by the FCC, which anticipate the prices which would be set in a fully competitive market, using a forward-looking economic cost standard. (Mar. 1, p. 18). If one assumes there is competition when determining inputs such as fill factors and other elements in the TELRIC cost study, but that there is no competition when estimating the cost of capital, one certainly will not replicate prices in the competitive market. (Apr. 21, p. 102).

Intervenors argue simultaneously that CBT must price network elements as if CBT is subject to competition, but that the cost of capital should not reflect a competitive market. The Commission should not adopt inconsistent sets of assumptions. If TELRIC studies are to assume that CBT must use the most efficient network technologies and cost inputs because of competitive pressures, those same competitive assumptions must be used in determining the appropriate risks for establishing the cost of capital. Otherwise, CBT would be whipsawed, requiring low cost inputs because of competition, and simultaneously requiring a low cost of capital because of the absence of competition.

The FCC has stated that TELRIC prices must send correct economic signals to competitive entrants, whether they should build their own facilities or purchase network elements. (Mar. 1, pp. 19-20; Mar. 16, pp. 174-75; Mar. 22, pp. 94-95). If TELRIC costs are set too low, that would incorrectly discourage firms from building facilities. (Mar. 18, p. 30). To replicate the costs a firm would experience to enter the market, the cost of capital should reflect what the firm would experience if it were going to build a network. (Mar. 18, pp. 31-32).

Hirshleifer and Chaney both made the faulty assumption that CBT is a monopoly provider. Mr. Chaney failed to do a risk-adjusted cost of capital and made no effort to determine whether there was any change in risk to CBT, even though competitors building their own switches would increase the risk to CBT. (Mar. 26, pp. 13-14). In addition, the Commission recently approved a stipulation that will likely result in Ameritech rendering service within CBT's serving area. If CBT is not a monopoly provider of UNEs, the cost of capital should reflect a higher risk. (Mar. 26, p. 20). His analysis incorrectly assumed that Cincinnati Bell would have 100 percent of the market and would be the only provider of UNEs. (Mar. 26, p. 15; Guidelines § VIII). Time Warner's use of its cable television facilities to provide telephone service would change the risk to

Cincinnati Bell of providing unbundled loops. (Mar. 26, pp. 16-17).

3. Weighted Average Cost of Capital

Economists define the weighted average cost of capital as a weighted average of the market cost of debt and market cost of equity. (CBT Exh. I, pp. 6-7; Mar. 1, p. 26). The market cost of debt is determined by the market interest rate that a firm would have to pay on newly-issued debt obligations. Economists generally use market models such as the discounted cash flow model to estimate a firm's cost of equity. (CBT Exh. 1, p. 8). Competitive firms equate the required rate of return to their average cost of capital, where the average cost of capital is the weighted average of the cost of debt and the cost of equity using a market value capital structure. (CBT Exh. 1, p. 11).

a) Cost of Debt

Dr. Vander Weide measured the market cost of debt investments by using the 6.94% yield to maturity on Moody's A-rated industrial bonds for March 1998. CoreComm witness Gose agreed that Dr. Vander Weide's cost of debt proposal of 6.94% was reasonable. (Mar. 18, p. 52).

Mr. Hirshleifer used the yield to maturity of all outstanding CBT and CBI debt issues of 6.73%. This analysis is inconsistent with the position that CBT's cost of capital, not CBI's, is the result sought. If only the CBT debt shown on Attachment JH-3 is considered, the yield to maturity would increase to 6.90%.

Mr. Chaney's analysis, which properly took into account only CBT's debt, and which is the most current calculation, determined that CBT's cost of long-term debt was 7.07% as of December 31, 1998. (Staff Exh. 8).

b) Cost of Equity

i) DCF Analysis

Dr. Vander Weide measured the market cost of an equity investment in CBT by applying the DCF Model to the S&P Industrials which yielded a cost of equity of 14.30% for the S&P Industrials. (CBT Exh. 1, Schedule 3). Dr. Vander Weide used a single-stage DCF model, assuming quarterly dividends and accounting for flotation costs. Both because of his views of the risks that must be assumed for TELRIC, and his assessment of the real risks going forward, Dr. Vander Weide used the S&P industrials as his proxy group. (Mar. 1, p. 65). To be conservative, he eliminated the highest and lowest quartile of DCF results. (Mar. 1, p. 72). The S&P industrials represent average competitive companies, neither high nor low risk, and a fair representation of the risk that CBT will face on a forward-looking basis in a competitive environment. (Mar. 1, p. 66).

For his DCF analysis, Mr. Hirshleifer used a three-stage model using five-year growth estimates, a linearly declining growth rate for years 5 to 20, and then the growth rate of the economy in year 20 and beyond. Long-term growth forecasts in the DCF analysis were derived by averaging the forecasts from WEFA and Ibbotson Associates.

Mr. Chaney also used a three-stage DCF model, but his calculations are an improvement over Mr. Hirshleifer's analysis because Mr. Chaney used a longer 25-year growth period. He also used a higher, more realistic long-term growth rates for the economy as a whole of 6.4%. Mr. Chaney also used the average of the last twelve months' high and low daily closing stock prices. On his attachment JH-13, Mr. Hirshleifer did an alternative calculation using the that method, which increased the cost of equity by 15 basis points.

Hirshleifer and Chaney both used a group of telecommunications holding companies to estimate CBT's cost of capital. This group was limited to large companies whose predominant business was local telephone service. Dr. Vander Weide contends these companes are poor

proxies because the traditional models produce understate the true costs of equity for companies that are experiencing deregulation, competitive entry, dramatic industry restructuring, and profound technological change. While Mr. Hirshleifer's analysis is based on companies much larger than CBT, his analysis did not reflect the mid-sized risk premium of 1.04% reported by Ibbotson. (CBT Exh. 18; Mar. 23, p. 69).

Mr. Hirshleifer's and Mr. Chaney's basic growth assumptions are arbitrary and inconsistent with the evidence that a company's earnings can grow at the analyst's expected growth rate for many years. (Apr. 21, p. 25-26). Their use of the long term growth rate of the economy understates CBT's cost of capital. Mr. Hirshleifer contends that the long term growth rate is only 5.5%. However, the S&P comparable companies used by Mr. Hirshleifer for his CAPM risk premium analysis, which supposedly reflects the economy as a whole, show a growth rate in excess of 9%. Both statements cannot be true at the same time. Mr. Hirshleifer also incorrectly eliminated the growth component in the first dividend payment. (CBT Exh. 25, p. 5; Apr. 21, p. 20).

The DCF results are also skewed by pending telecommunications mergers. When companies are in the process of merging, their stock prices run up, but analysts don't change their growth forecasts for those companies until the merger actually occurs. The high stock price increases as a result of the merger, but growth estimates do not, so the DCF results understate the true DCF cost of equity. The SBC/Ameritech merger announcement substantially impacted their stock prices. (Mar. 26, p. 26). This is demonstrated in Mr. Chaney's DCF calculations, because SBC and Ameritech have the second and third lowest results. (Mar. 26, p. 27; Staff Exh. 9, Schedule 3).

(1) Quarterly Dividend Model

Dr. Vander Weide recommends using a quarterly DCF formula. (CBT Exh. 1, Schedule 3, p. 4). All parties agreed that dividends are paid quarterly. (Mar. 18, p. 52). Only Dr. Vander Weide's quarterly DCF analysis properly accounts for the timing of dividends. CoreComm witness Gose acknowledged that it costs a company more to pay dividends quarterly than at year end, because the company has use of the money for a shorter period of time. (Mar. 18, p. 54). When CBT pays dividends quarterly, it gets less benefit of compounding than if it paid them annually. If CBT didn't pay dividends until year end, it would benefit from more monthly compounding. (Mar. 23, p. 93). This does not double count the compounding of earnings between dividend payment dates as claimed by intervenors. Dividend payments are a cost to the company and only a rate of return that will yield sufficient cash flow to fund quarterly dividends will compensate the company for its cost of capital. Hirshleifer and Chaney use an annual DCF model, even though companies pay dividends quarterly. (Mar. 26, p.34). This causes them to understate CBT's cost of equity by an additional 30 to 40 basis points. (CBT Exh. 25, p. _).

(2) Flotation Costs

Dr. Vander Weide included flotation costs in his calculations in order to cover issuance costs that would be incurred to raise capital. Mr. Chaney also included flotation costs, explaining they must be allowed. Only the yield to the company, total investment less issuance costs, is equity available for company operations, yet the investor is paid a return on the full amount of investment. A greater return, therefore, must be earned on the lesser amount that can be invested. (Staff Exh. 8).

While correctly acknowledging that there must be an adjustment for flotation costs, Mr. Chaney incorrectly limited flotation costs to only a portion of CBT's capital requirements. In his

Table 2, Mr. Chaney calculated the amount of Cincinnati Bell's book equity that was externally generated. (Mar. 26, p. 30). Under a long-run TELRIC analysis, all equity would be externally generated. By applying the issuance costs only to the externally generated debt, Mr. Chaney diluted his estimated issuance cost of 3.5% down to 1.404%. (Mar. 26, p. 31).

Mr. Hirshleifer refused to make a flotation cost adjustment. The failure to include flotation costs causes Hirshleifer to underestimate the forward-looking economic cost of capital by an additional 20 to 30 basis points. (CBT Exh. 25, p. ___). CoreComm witness Gose acknowledged a company incurs flotation costs on initial offerings. (Mar. 18, p. 54). However, he proposed the novel and unsupported theory that flotation costs are offset by brokerage commissions. Cost of capital is determined from the company's viewpoint, which doesn't pay brokerage commissions. (Mar. 18, p. 56). Mr. Gose knew of no financial expert who considers brokerage commissions in determining cost of capital. (Mar. 18, p. 58).

ii) Capital Asset Pricing Model ("CAPM")

The CAPM is a form of risk premium analysis using: 1) a risk-free investment as a base; 2) a risk premium reflecting stock market returns in excess of the return on the risk-free investment; and 3) beta as a measure of the relative risk of investing in a given company.

(1) Risk-Free Rate

For his CAPM analysis, Mr. Hirshleifer did both short-term and long-term calculations, using six-month Treasury bills and 20-year Treasury bonds as his risk-free rates of return. Mr. Chaney estimated the risk-free rate component of his CAPM by taking a weighted average of the yield to maturity on 10-year and 30-year Treasury bonds over the last 13, 26, 39, and 52 weeks, obtaining an average of 5.12 percent. Mr. Chaney should have used the current interest rate on long-term bonds. (Apr. 21, p. 36). His calculated average is 70 basis less than the current 5.81

percent interest rate on long-term bonds as reported by the Federal Reserve.

(2) Risk Premium

Mr. Hirshleifer made a judgmental determination of the historical risk premium of large company stocks is 7.5% percent over short-term bonds and 5.5% over long-term bonds. Mr. Hirshleifer's approach underestimates the market risk premium. Dr. Vander Weide testified that the most appropriate risk premium is the arithmetic mean for the period 1927-1998. Mr. Hirshleifer's choice of risk premium was contrary to the recommendations of Ibbotson & Associates, numerous financial experts, and even Mr. Hirshleifer's colleague, Dr. Cornell's prior writing. (Apr. 21, p. 28). According to attachment JH-10, the arithmetic average premium of stocks over treasury bills over the period 1926-97, as reported by Ibbotson Associates, was 9.15% over short-term treasury rates, and 7.36% over long-term bonds, (Mar. 23, pp. 66-67), not the judgmentally derived 7.5% and 5.5% used by Mr. Hirshleifer. In addition, when Mr. Hirshleifer updated his analysis in December, 1998, he added 1997 data to JH-10. (Mar. 23. 67). Stock returns through 1997 were higher under both the arithmetic and geometric averages, but Mr. Hirshleifer did not adjust the risk premium upwards to account for this. He actually decreased the risk-free rate based on short-term interest rate fluctuations, without increasing the risk premium, causing an inconsistency between the risk-free rate and the risk premium. (Mar. 23, p. 67-68).

(3) Beta

Beta is the sole company specific measure of risk in the CAPM. (Mar. 18, p. 39). The higher the beta, the higher the risk. (Mar. 18, p. 38). Mr. Hirshleifer used individual companies' historical betas to produce a risk premium specific to that company. He adjusted the betas by first unlevering the company-specific betas to remove the effect of debt. He then averaged them

among all companies in the comparison group, and then releveraged the average beta according to individual company capital structures. (CBT Exh. 16). The effect of doing this was to convert those companies having the highest individual betas into companies with the lowest betas for purposes of the CAPM calculation. Mr. Hirshleifer's relevering exercise lowered CBI's raw beta from 1.11 to 0.68.

The flaw in Mr. Hirshleifer's approach was reverting to each company's individual capital structure for relevering purposes. This dramatically lowered the relevered beta for companies with low debt structures. (Mar. 23, pp. 56-62). If one assumes that there is an optimum capital structure for a company offering UNEs, it ought to be the same for all companies. Mr. Hirshleifer recommends a debt structure far above the 10% level he used to relever Cincinnati Bell's beta. (Mar. 23, pp. 59-60). The company with the debt/equity ratio the closest to Mr. Hirshleifer's recommendation was SNET. Relevering the beta using its capital structure would result in a beta of 0.8, (Mar. 23, p. 95), but his CAPM model did not use any betas as high as 0.8. Mr. Chaney used betas ranging from 0.7 to 0.9. (Mar. 26, p. 30).

Mr. Hirshleifer's use of a five-year historical beta, rather than the higher one-year beta, a significantly lower risk premium, and deflated betas all caused him to significantly underestimate CBT's CAPM cost of equity. A correct application of the CAPM would produce cost of equity estimates at least 410 basis points higher.

c) Market Weighted Capital Structure

In determining the weighted average cost of capital a debt/equity capital structure must be established. A market value capital structure is appropriate because forward-looking economic cost is based on market values. (Mar. 1, p. 102). Investors measure the risk and return on their investment portfolios using market value weights because market value weights are the best

measure of the amounts the investors currently have invested in each security in the portfolio. From the investor's point of view, the historical cost or book value of his investment is entirely irrelevant to the current risk and return on his portfolio.

Mr. Hirshleifer averaged book and market value capital structures, while Mr. Chaney used only book value capital structure weights. (CBT Exh. 25, p. 2; Apr. 21, pp. 17-1). Economic and financial theory incontrovertibly require the sole use of market value capital structure weights to calculate a company's weighted average cost of capital. (CBT Exh. 25, p. 3; Apr. 21, p. 19). Book value capital structure weights are inconsistent with forward-looking economic costs and the economic and financial theory of corporate valuation. The use of book value equity weights by itself caused Mr. Hirshleifer to underestimate CBT's cost of capital by at least 51 basis points, and Mr. Chaney to underestimate CBT's cost of capital by 94 to 152 basis points.

Mr. Hirshleifer acknowledges that the forward-looking capital structure of a company should be calculated using market weights. (Mar. 23, p. 72). However, instead of using a market value weight, he used an average of book and market weights. In addition, Cincinnati Bell's own book value of debt was only 44 percent, but Hirshleifer used the weighted average of his group of companies of 57 percent. (Mar. 23, p. 77). Had he used Cincinnati Bell's specific debt/equity ratio (as he did when relevering the beta), the final result would be higher.

While the use of book capital structures for TELRIC cost of capital analysis is clearly improper, Mr. Hirshleifer's reliance on CBI's public balance sheet to determine the book capital structure introduced a further downward bias. Like most local exchange companies, Cincinnati Bell took significant write-offs for FASB 71, which required the use of different depreciation rates for financial reporting purposes if the carrier believed regulatory depreciation wouldn't allow capital recovery. The write downs on the financial books reduced

equity, resulting in a higher debt to equity ratio on the financial books than on the regulated books. (Mar. 22, p. 53). Mr. Hirshleifer used book values from the public financial statement, not the regulated balance sheet which has more equity, resulting in a lower overall cost of capital. (Mar. 23, pp. 73-74; Mar. 18, p. 47-49). On the issue of depreciation, intervenors contend that CBT should use regulated depreciation lives, however, when it comes to capital structure, intervenors are taking a contradictory position that takes advantage of the much higher financial depreciation, skewing the cost of capital downward. (Apr. 21, p. 100; Mar. 18, p. 48).

4. Mr. Hirshleifer's Results Fail the Test of Reasonableness

Mr. Hirshleifer's analysis fails the test of reasonableness in several respects. (CBT Exh. 25, p. 6). His DCF results fail the common sense standard that the cost of capital should increase with the risk of an investment. His companies with the highest betas have the lowest DCF results, and vice versa. While claiming that local exchange service is less risky than interexchange service, his methodology produces lower DCF results for interexchange carriers than for local exchange carriers. (CBT Exh. 25, p. 6) While claiming that his telecommunications proxy group is significantly less risky than the S&P 500, his average DCF result for the S&P 500 is significantly lower than his average DCF result for the telecommunications proxy group. (CBT Exh. 25, p. 7; Apr. 21, p. 44). These anomalous results provide convincing evidence that Mr. Hirshleifer's DCF methodology does not provide reasonable cost of equity estimates.

5. "Reasonable Profit"

The statute and the Commission's Guidelines allow CBT to earn a "reasonable profit." Most economists provide a range of reasonable returns, and the decision of what return within the range is to be based on other factors at the discretion of the Commission. (Mar. 26, p. 23).

CBT's consistent high quality of service should be rewarded by allowing CBT a rate of return at the high end of the allowable range. (CBT Exh. 7; Mar. 1, p. 135). Cincinnati Bell has a very high quality brand name and an excellent reputation for customer service and was ranked No. 2 by J. D. Power for customer satisfaction. (Mar. 1, p. 65). CBT should be rewarded for its ability to provide high-quality service by authorizing the highest rate of return. (Mar. 1, p. 136).

E. ANNUAL CHARGE FACTORS

Annual charge factors ("ACFs") are developed to convert capital investments associated with the provisioning of unbundled network elements into monthly costs and to apply expense factors to capital investments. For any particular UNE, the investment associated with that UNE is multiplied by the ACF to derive an annual cost. The annual cost is then divided by 12 to derive the monthly cost. The monthly costs of all UNEs are multiplied times 1.13, the stipulated common cost factor, to develop the company's prices for UNEs. CBT's ACFs were developed by Mr. Mette. The methodology for doing so was described in his direct testimony, as supported by CBT's response to Staff Data Request 52. (Staff Exh. 2). As proposed by CBT in this proceeding, the ACFs account for four general types of costs: capital costs; maintenance expenses; direct administrative expenses; and new costs.

CoreComm witness Gose offered a revised set of ACFs, but his proposal is severely flawed. Gose did no actual analysis of maintenance or direct administrative expenses. (Mar. 18, p. 82). His initial set of ACFs considered only the capital cost component of the ACFs, and left out all maintenance expense, direct administrative expense and new cost factors. (Mar. 18, p. 82). He was unaware that CBT's ACFs included expenses not calculated by ECONCOST. (Mar. 18, p. 68). Even then, he contended that the revised ACFs were too high because they incorporated embedded maintenance costs and operational support, (CoreComm

Exh. 3, p. 3), which was obviously incorrect because he had only included modified ECONCOST results that do not include maintenance or OSS costs. Upon learning that he had omitted significant expense components, Mr. Gose recalculated his ACFs by adding the modified (and, as shown below, flawed) maintenance expense ratios advocated by Mr. Behounek. He relied entirely on Mr. Behounek's review of the ACFs and personally did nothing to analyze the components of the ACFs (Mar. 18, pp. 69, 81). He still failed to account for direct administrative expenses and new costs, (Mar. 18, pp. 71-72), though he acknowledges they must be accounted for to ensure that CBT recovers its costs to provide UNEs. (Mar. 18, p. 72). Therefore, Mr. Gose's ACF recommendations should be rejected in their entirety.

1. Capital Costs

CBT used an economic cost model known as ECONCOST to calculate the capital cost component of the ACFs. The ECONCOST model calculates the capital cost portion of the ACF based on the cost of capital, economic life characteristics of CBT's plant, and various tax inputs. CBT's response to Staff Data Request 52 provided a description of the inputs to the ECONCOST model and descriptions of the functions it performs. (Staff Exh. 2).

Staff witness Soliman confirmed the reasonableness of using the ECONCOST model to calculate the capital cost portion of CBT's ACFs. (Staff Exh. 3, p. 19). Ms. Soliman reviewed the explanatory notes and the descriptions of algorithms CBT provided through Staff Data Request 52 and used them to determine the reasonableness of the model. (Mar. 24, p. 52-53). Intervenors received the same information regarding the ECONCOST model. (Mar. 24, p. 54). These explanatory notes were accompanied with a sample report for one plant account explaining how the model calculates different capital cost components. Ms Soliman did not have any specific

concerns with the methodology or general assumptions in the ECONCOST model that would lead her to conclude that the model was not reasonable.

Ms. Soliman found it reasonable to use inflation factors in calculating the capital cost associated with an investment as CBT did within the ECONCOST model and this is consistent with Section V.B.4.b.6. of the Commission's Guidelines. There are two inflation indices used by the ECONCOST model for each plant account. The labor rate index is used to calculate the cost of removal, and the plant material index rate is used to calculate the value of the initial investment and the material salvage value. CBT used a rate of [redacted]% for labor inflation based on the September 1995 forecast developed by Joel Popkin and Company for CBT. This forecast represented the average wage growth per year during the forecast period of 1995-2003 and is reasonable considering CBT's recently negotiated union contract.

The Staff Report recommended that where CBT does not have updated investment data available to it, the current investment amounts should be updated using a TPI factor. According to Staff witness McCarter, this continues to be Staff's recommendation. When the company uses the TPI factor to update investment figures, it will update the investments to 1999 figures. Ms. Soliman believed it was reasonable to use these indices in the 1996 time frame since it was the most recent data available. Her recommendation is that when CBT recalculates its TELRIC studies it should apply the most recent TPI factors to the most recent investment.

Dr. Ankum criticized the labor inflation rate used by CBT, but compared it to general inflation, not wage-specific information. (MCI Exh. 17, p. 7). Dr. Ankum agreed that the most accurate index to determine inflation for labor rates would be one that actually measures labor rates. (Mar. 16, p. 81). However, he did not consult any labor specific index. The GDPPI recommended by Dr. Ankum measures a number of other costs besides wages. If wages are

increasing and material costs are decreasing, the GDPPI would distort labor costs. (Mar. 16, p. 82). Telecommunications carriers compete for workers and CBT is a price taker who must pay the market rate. (Mar. 16, p. 83). Much of Cincinnati Bell's labor cost is governed by its collective bargaining agreement, the most recent of which should be considered to determine the appropriate wage rate. (Mar. 16, pp. 84-85).

No other party to this proceeding has presented any capital cost model alternative to ECONCOST. AT&T witness Webber suggests that CBT's ACFs be recalculated with different inputs, but never suggests that the ECONCOST model not be used. Dr. Ankum visited CBT and was given the opportunity to obtain alternative runs of the ECONCOST model. (MCI Exh. 19, p. 4; Mar. 16, p. 176). Dr. Ankum complained that he could not see the actual algorithms used by ECONCOST, but he was given the same descriptions of the inputs and algorithms as Staff and performed only a limited review of them. Dr. Ankum has not identified any specific disagreement with how the model is described or any flaw with the model. (Mar. 16, p. 178). In fact, his testimony recommends that the ECONCOST model be used if the inputs are adjusted as recommended by MCI. (MCI Exh. 19, p. 6 and Tr Mar. 16, p. 179). Dr. Ankum provided no alternative method or model to calculate capital costs.

As discussed above, CBT disputes the recommendations of Mr. Lee and Mr. Hirshleifer regarding depreciation and cost of capital. However, to the extent the Commission adopts positions on cost of capital and economic depreciation lives any different than those proposed by CBT, the ECONCOST model will need to be rerun using those assumptions. Those recalculated results would then be used as inputs for calculating the ACFs used in CBT's TELRIC studies

2. Maintenance Expense

The maintenance portion of CBT's ACFs was created by analyzing the ratios of maintenance expenses incurred in connection with various plant accounts to the investment dollars in those accounts. After review of the Staff Report and initial testimony of intervenors, Mr. Mette made a number of recommendations of how he would modify the maintenance expense portions of the ACFs when rerunning CBT's cost studies. The Commission should adopt Mr. Mette's ACFs as so modified.

The calculation of the maintenance expense component of the annual charge factor would be changed from the original filing in two ways. First, the calculation would be updated to include maintenance expenses through end-of-year 1998. Secondly, CBT would use regression analysis to trend maintenance expenses by each maintenance account based on years 1992 through 1998. Mr. Mette provided input data and results of such a regression analysis using the then available data through 1997 as Exhibit 1 to his testimony. (CBT Exh. 7). Dr. Ankum agreed that the calculation would be improved if it included 1997 and 1998 data, (Mar. 16, p. 90), and presented no specific criticisms of Mr. Mette's calculations. Mr. Gose also agreed that the analysis should be updated with more current data. (Mar. 18, p. 78). Mr. Gose did not study Mr. Mette's revised calculation and could not comment on whether it is correct. (Mar. 18, p. 79).

Staff witness McCarter concurs with Mr. Mette's proposal to trend the maintenance factors to project future maintenance factors, recommending that, if 1998 data is available, it should be incorporated into the trend analysis. CBT expects to do this.

Mr. Mette's trending analysis was triggered by comments in the prefiled testimony of Mr. Behounek, adopted by Dr. Ankum. (MCI Exh. 17; Mar. 16, pp. 6, 15). Mr. Behounek had performed a trending calculation to project lower future maintenance expenses. (MCI

Exh. 17, p. 14). However, for several reasons, Mr. Behounek's calculations should be rejected in favor of Mr. Mette's. Mr. Behounek used a single composite reduction for all maintenance expense components, without regard to the relative weighting of the expenses for the specific class of plant. (MCI Exh. 17, p. 15). Mr. Behounek's regression analysis gave equal weight to the rate of change of each expense category, even though, for example, buried fiber cable maintenance represents less than 1% of CBT's total maintenance expense while circuit equipment maintenance represents nearly 14%. Such averaging distorts the overall results. (Mar. 16, p. 91-92). Clearly these percentages cannot be given equal weighting. Dr. Ankum agreed on cross-examination that weighting of these accounts is more accurate and the Commission may want to consider using the results for the individual accounts, as recommended by CBT, rather than an overall average change. (Mar. 16, p. 93). Staff witness McCarter also disagrees with Mr. Behounek's recommendation to use one composite maintenance factor for all maintenance expenses. Expense changes are different for various types of plant and some factors are actually increasing.

In addition, Mr. Behounek's analysis was inaccurate because the historical data he used in his regression analysis was not comparable. Over time, CBT made changes to the methodology underlying the calculation of the maintenance expense component of the annual charge factors. For example, prior to 1995, right to use fees for switching and circuit equipment were included in the maintenance expense factor, but in 1995 these fees were moved directly into the appropriate cost study. Also, prior to 1994, maintenance expenses associated with support assets such as motor vehicles, tools and general purpose computers were included in the maintenance expense component, but later were removed and included in the direct administrative and corporate overhead components. The historical factors must be restated to reflect a consistent methodology

before they can be used in a regression analysis.

Mr. Mette used the restated factors as the basis of his regression analysis, which Dr. Ankum agreed would yield a more accurate result. (Mar. 16, p. 94). In addition, more recent changes should be weighted more heavily than future changes. (Mar. 16, p. 95). Mr. Mette did that in his analysis but Mr. Behounek did not.

Mr. Behounek also recommended that the portion of certain maintenance expenses common to loops and interoffice facilities that is attributable to interoffice facilities should be excluded from the annual charge factor for loops. (MCI Exh. 17, p. 10). However, CBT's plant records do not allow it to distinguish between loop and interoffice investments. (Mar. 16, p. 86). Dr. Ankum agreed that the data in the numerator and the denominator of the ACF calculation should be treated in the same fashion and, if it is not possible to remove the interoffice investment component from the denominator, a ratio that keeps both maintenance expense and investment in the calculation is a better way to determine the maintenance ACF than excluding interoffice maintenance expense from the numerator but leaving the comparable investment in the denominator. (Mar. 16, p. 87).

Ms. McCarter agreed with Mr. Behounek that maintenance expenses attributable to interoffice facilities should be removed from loop costs. However, in order to create a maintenance factor related solely to interoffice, there must be some means of determining which cable and wire facilities were related only to interoffice facilities. Otherwise, due to the mismatch between expenses (related only to interoffice) and the investment (both interoffice and loop) the resulting maintenance factor would be too low. CBT has no way of isolating the investments because the investments are booked as a lump sum. Since ACFs are essentially ratios, not

absolute dollar amounts, the ratio of expenses to investments will be more accurate if the numerator and denominator are stated on the same terms.

Dr. Ankum also recommends removing subscriber line testing expenses from the maintenance factor for loops, when it cannot be done by CBT's switch on unbundled loops. (MCI Exh. 17, p. 11). However, when Cincinnati Bell sells an unbundled loop, it does not shed any responsibility for maintaining and testing the loop. (Mar. 16, p. 87-88). When CBT performs testing, it should be compensated for that expense. If CBT must exclude expenses for testing done by the switch, it should also add back new expense for testing that would have to be done some other way. (Mar. 16, p. 89).

3. Direct Administrative Expense

Dr. Ankum adopted Mr. Behounek's testimony on direct administrative expenses without himself having reviewed the underlying data. (MCI Exh. 17, p. 18; Mar. 16, p. 98). The expenses Dr. Ankum is requesting be excluded include billing systems that CBT will use to bill for UNEs and Bellcore license fees that support CBT's provision of UNEs. (MCI Exh. 17, p. 17). Only those that pertain to retail operations should be excluded. (Mar. 16, p. 99). Any system that is used to provide unbundled elements should not be excluded, but Dr. Ankum made no effort to isolate those expenses from the general category of Bellcore license fees. (Mar. 16, p. 100).

Dr. Ankum recommends that whatever adjustment the Commission approves for the maintenance expense factors (which, as described above, varies by plant category), that CBT use the same adjustment to reduce capital costs associated with support assets that are included in the direct administrative factor. This recommendation assumes (without evidentiary basis) that ongoing expenses are a proxy for capital investments. (Mar. 16, p. 101). Dr. Ankum's capital

cost reductions related to support assets should be rejected.

He also recommends an adjustment to certain other expenses such as furniture and computers based on a productivity factor. (MCI Exh. 17, p. 21). The FCC rejected the concept of a price cap adjustment in TELRIC. FCC Order, ¶¶ 837-38. Dr. Ankum's recommendation assumes CBT would have declining investment in furniture and computers. (Mar. 16, p. 102). There is no evidentiary basis for this proposed reduction. Capital account investments of this sort do not diminish due to productivity in the real world. (Mar. 16, p. 103). The FCC has never recommended that its productivity factor be used in a TELRIC proceeding. The FCC has never determined that CBT itself has experienced 6-1/2% productivity gains. A regression analysis of CBT's actual data would be a better measure of CBT's productivity gains than using an industry figure. The regression analysis Mr. Mette proposes to do is already a form of productivity analysis. (Mar. 18, p. 77). The Commission should not apply both trending and a productivity factor.

Staff witness McCarter addressed the direct administrative component of CBT's ACFs. Ms. McCarter recommended that Mr. Mette conduct a trend analysis on the Direct Administrative component similar to the one he has proposed for trending the maintenance component of the ACF. While CBT is willing to undertake such an analysis, the Commission should know that the data available to CBT to do a trend analysis for direct administrative expenses is less consistent over time than the data available for maintenance expenses. CBT will propose the most reasonable means it can determine in which to conduct a trend analysis but anticipates there will be fewer years of data.

Ms. McCarter disagreed with Mr. Behounek's recommendation that CBT reduce its investment base for Motor Vehicles, Garage Work Equipment and Other Work Equipment by the

same reduction he proposes for maintenance factors in general. First, use of an average maintenance factor reduction is incorrect. Second, by trending the direct administrative component of the ACF these costs will be adjusted. Ms. McCarter also disagrees with the reduction of these expenses by a productivity offset. There is no evidence that these expenses will decline in the future or that productivity gains will be related to these assets.

Ms. McCarter disagreed with Mr. Behounek's recommendation that all information expenses associated with End-User Billing should be removed from the Direct Administrative ACF calculation. These systems will be used to track and bill UNEs to the NECs. To the extent that these databases are used to process UNEs, these systems should be included in the Direct Administrative component of the ACF. Ms. McCarter now concurs with Mr. Mette that it is inappropriate to require specific UNE billing expenses to be separated from the respective UNE for cost recovery purposes. (Staff Report, pp. 94, 97). Directly attributable billing costs should be recovered from the respective UNE.

Ms. McCarter agreed with Mr. Mette that there are many function codes that contain activities which will still be carried out even if the NEC provides service to end user customers. (Staff Exh. 6). Ms. McCarter recognized that many function codes contain a mix of wholesale and retail activities, so she did not recommend the blanket exclusion of these entire function codes. Rather, she recommended that CBT conduct a study to examine each function code to assess the retail-only activity and to allocate expenses that are jointly incurred to provide UNEs and retail services. CBT agrees to conduct such a study.

Ms. McCarter went on to recommend that, if CBT can not determine how much wholesale activity is being accounted for within each code, all the expenses in that function code should be eliminated. CBT disagrees. The only expenses that should be eliminated are those

generated by retail-only activities. Expenses that occur to provide both UNEs and retail services should remain in the Direct Administrative component of the ACF since investment associated with both UNEs and retail services are included in the ACF calculation.

4. New Costs

The new costs component of the ACF represents costs CBT will incur to make UNEs available that it has not historically incurred. They include modifications to existing software systems, the CLEC service center, new software systems and access to OSS. Staff correctly expressed concern that the new costs component in CBT's original cost studies did not include all costs CBT would incur, as CBT had not yet incurred those costs. Staff would provide CBT with a means to identify, support, and recover such costs. Intervenors have generally not commented on the new cost component of the ACFs.

CBT originally assigned all OSS costs to the new costs component of ACF, Staff objected to this treatment because: 1) it assumed that all OSS systems would be used equally to provide all UNEs; and 2) that NECs who used only manual interfaces would be forced to pay for the automated interfaces as part of the UNE price. Staff discussed three categories of costs to be included in the OSS cost study: existing OSS systems; changes to existing OSS systems to enable CBT to provide UNEs; and implementation and ongoing use of new systems that provide access to CBT's OSS (e.g., gateway systems).

The Staff Report had originally recommended that all new costs identified by CBT be removed from the ACFs and included in a separate OSS TELRIC cost study, apparently under the belief that all new costs were OSS related. Ms. Soliman testified that she does not now believe it reasonable to have only one cost recovery mechanism for these costs, so she revised the Staff's recommendation. (Staff Exh. 3). She now believes it is reasonable to keep existing systems costs

in the direct administrative expense portion of the ACF calculation because these costs are not caused by a NEC requesting use of systems apart from the UNE itself. She also now agrees that costs to modify existing systems to enable CBT to provide UNEs, which can be directly attributed to a specific UNE, can be recovered from NECs purchasing that UNE. Ms. Soliman still believes that costs associated with new systems to allow NECs electronic access to CBT's OSS should be included in a separate OSS TELRIC study. She recommends that these costs be allocated to various UNEs based on a reasonable forecast of the NECs' demand for electronic access to CBT's OSS. This could be a new rate element or be added to the per-order nonrecurring charge of the relevant network element.

CBT agrees with Ms. Soliman's recommendations insofar as existing system costs should remain in the direct administrative portion of the ACFs, and that costs associated with particular UNEs should be allocated to individual UNE studies. However, CBT disagrees with creating a separate charge for electronic access to CBT's OSS. There are several reasons for this. First, many of the OSS functions are preordering activities that are not easily measured or billed. CBT has no way of monitoring usage. Second, CBT has no meaningful forecast information regarding the projected usage of OSS.

Although some of these new costs are OSS related, a significant portion of them are associated with changes that CBT made to its existing systems in order to bill unbundled network elements. Other costs are for additional personnel and equipment costs required for CBT's NEC business office. These costs cannot be associated with OSS related functions. (CBT Exh. 6, p. 6).

To the extent that new costs are not OSS related, CBT seeks the ability to include these costs in the appropriate TELRIC cost study. Some costs, for example, billing costs for a UNE,

can be attributed to individual UNEs and should be considered as part of the cost of providing that element. It is reasonable and appropriate to include this cost in the cost of the unbundled element, not in an OSS cost study. (Mar. 8, p. 101). Other new costs are neither attributable to OSS nor to a particular UNE and should remain in the ACFs. Once the TELRIC order is issued, CBT will develop updated ACFs and cost studies. At that time the new costs will be specifically identified and allocated to the appropriate UNE study, or left in the ACFs.

Mr. Francis agreed that CBT will incur new costs associated with the provisioning of UNEs and should be afforded the opportunity to recover those types of costs. (Mar. 24, pp. 96-97). However, he recommends that these costs only be recovered for a certain period of time to the extent they are one-time up-front costs, not recurring costs. (Staff Exh. 4, p. 6). He suggested that CBT track the recovery of these costs and after they are recovered, CBT should remove the new cost factor from the ACF. (Mar. 24, pp. 100-01). CBT does propose to track the recovery of one-time costs to ensure that over recovery does not occur. CBT's original method of including these costs in the ACFs was not intended to recover these costs indefinitely. Because the new one-time costs are separately identifiable in the ACFs, it is possible to track recovery of these costs over the course of time. Therefore, CBT is proposing to calculate the percentage of new costs relative to total costs and track their recovery based on the revenues collected by CBT. Once the total of these costs are recovered, the new costs component of the ACFs would be removed and rates recalculated.

5. Gross Receipts Tax

CBT's original TELRIC studies included Gross Receipts Tax. Staff recommended that Gross Receipts Tax be removed from the cost studies. Since CBT will not pay Gross Receipts

Tax on unbundled network elements, CBT will change its study methodology to exclude Gross Receipts Tax as a cost of providing unbundled network elements.

E. FILL FACTORS

1. The Applicable Standards

Fill factors are used to develop unit investments for facilities and equipment. For example, since the number of working pairs in a cable will be less than its total capacity, it is necessary to adjust the total investment per physical pair by a fill factor to develop the investment per working pair. The FCC determined that per-unit costs are to be derived "by dividing the total cost associated with an element by a reasonable projection of the actual total usage of the element." FCC Order, ¶682 (emphasis added). The FCC's TELRIC methodology requires the use of reasonably accurate fill factors (estimates of the proportion of a facility that will be "filled" with network usage). The Commission's Guidelines also require a "reasonably accurate fill factor" defined as "the proportion of a facility that will be filled with network usage." Guideline § V.B.4.b.8 (emphasis added).

Intervenors urge the Commission to direct CBT to use the utilization factors that were ordered in Ameritech's TELRIC case. The result in the Ameritech case was a product of the record in that proceeding, including Ameritech's own past practices in conducting cost studies. The facts of that case are not applicable to CBT. Furthermore, CBT was not a party to the Ameritech proceeding and has not been made privy to the confidential evidence introduced in that case. The intervenors refused to provide CBT with such material in discovery and intervenor witnesses refused to testify on the same subjects at hearing. (Mar. 16, pp. 104-05; Mar. 17, pp. 28-29; Mar. 25, pp. 57-58). To impose Ameritech fill factors on CBT under these circumstances would be a gross violation of CBT's due process rights.

No intervenor in this case has presented a proper basis for determining the appropriate fill factors for CBT. The Ameritech fills are inappropriate for CBT. The Ameritech case used fill factors that were described as the maximum "usable capacity." (Staff Exh. 3, pp. 29-30; Mar. 25, p. 70). Ameritech had failed to prove that a deviation from maximum usable capacity, which it had been using for some time, was appropriate. (Mar. 22, p. 101). Only after the adoption of TELRIC as the pricing standard for UNEs did Ameritech attempt to lower the fills it had itself recommended for LRSIC studies. These fill factors apparently came from something called the "ACAR," a document CBT has never seen and which no party has been able to share with CBT. The testimony has been that the ACAR fills are based on "usable capacity," defined by Ameritech as the maximum sustainable physical capacity of the network less the capacity required for maintenance, testing, and administrative purposes. (Mar. 22, p. 101). The TELRIC standard is not maximum capacity, but rather, the expected capacity.

Ms. Soliman agrees that CBT should not base fill factors on "usable capacity." (Staff Exh. 3, pp. 29-30). The Commission's Guidelines, as well as the FCC's First Report and Order, require CBT to use a reasonable projection of the actual total usage of the element during a reasonable measuring period. A fill factor should represent the portion of the network facility that will be filled with usage during that study period, not the portion of the network facility that can be filled with network usage. "Usable capacity" reflects the portion of the network facility that can be filled with the network usage and, therefore, is inconsistent with the rules.

Ms. Soliman also is of the opinion that intervenors who advocate the use of Ameritech's fill factors are misusing the Commission's decision in Case No. 96-922-TP-UNC. The Commission rejected Ameritech's modified "fresh look" and "target capacity" fill factors due to Ameritech's failure to justify the reasonableness of its proposal. Based on the limited options and

information presented on that record, the Commission adopted Ameritech's ACAR fill factors. No intervening party has explained why the use of "usable capacity" fill factors from Ameritech's ACAR manual is appropriate to reflect CBT's forward looking fill factors. It is unreasonable to use Ameritech's fill factors to calculate CBT's TELRIC costs. In this proceeding, there is enough data about CBT's fill factors to decide the appropriate fill factors for these facilities. The Commission already has rejected an MCI proposal to use Ameritech cost data as a surrogate to set interim rates in the CBT/MCI interconnection agreement (Arbitration Award at 31). Similarly, it is not reasonable to base CBT's permanent TELRIC-based rates on Ameritech's network characteristics.

In support of CBT's position on fill factors, CBT presented the testimony of Messrs. Mette and Meier (CBT Exhs. 4-7). Mr. Mette testified that his TELRIC studies used estimates of the fill factors that CBT would expect to see in a forward-looking network. He consulted with Mr. Meier, a CBT outside plant engineer, on what those fill factors should be with respect to outside plant. Mr. Meier drew from his knowledge of CBT's engineering practices and the known fills in CBT's current network, to develop a set of forward-looking fill factors to use in cost studies. For switching and interoffice fills, Mr. Mette drew on the expertise and experience of engineers in those fields. Mr. Mette testified that the fill factors he proposes here are the same that he uses in CBT's retail LRSIC studies.

Mr. Francis opined that the forward-looking capacity that CBT will utilize in a competitive environment should fall somewhere between the capacity that CBT experienced historically and the maximum usable capacity. Mr. Francis acknowledges that CBT could use its current or actual fill factor data as a starting point. (Staff Exh. 4). Current fills are an appropriate starting point in the calculation of reasonably expected total usage. That is the basis upon which CBT has

estimated its forward-looking fills. For the forward-looking fills to be different from the existing fills, one would have to conclude that, going forward, the network would be designed and built differently than it is today. However, no party to this proceeding has identified a different method of designing and constructing CBT's network than the manner in which it has been done. CBT designed its network and determined the TELRIC costs on a going-forward basis on the assumption that its present engineering practices are essentially how it will continue to operate in the future. The way CBT is administering the network today and for the next three to five years is the most efficient way to administer that network. (Mar. 3, p. 151). Mr. Meier opined that the way CBT designs today, is the least cost, most effective network. (Mar. 3, pp. 136-37).

Mr. Mette testified that he has not seen any studies that project how a competitive environment would impact a local exchange carrier's fill factors. He believes that if NECs install alternative networks to compete with CBT, CBT's facilities would become less utilized. As the carrier of last resort, CBT would continue to need spare facilities to serve customers who request service or who choose to return to CBT from a NEC. This obligation will also cause downward pressure on CBT's fill factors.

The Staff Report made several recommendations for the fill factors in CBT's studies, dependent on the type of equipment and facilities to which the fill factor applies. The Staff believes that fill factors should be driven closer to capacity in a competitive environment. However, this observation is contrary to the position that CBT is not subject to significant facilities-based competition. Unless another carrier were to build loop facilities in CBT's territory, there is no reason why CBT's design and construction practices would be different in the future. (Apr. 15, pp. 7-8). It is inconsistent to argue for some purposes that CBT is a monopoly provider not subject to competitive pressures, but for purposes of fill to contend that

future fills would be driven upwards because of facilities-based competition. Mr. Francis concedes that facilities-based NECs could also cause CBT's loop utilization to decrease. (Staff Exh. 4).

AT&T contends that the TELRIC methodology assumes that CBT has perfect information and static demand. (Mar. 2, p. 185). CBT does not have perfect information and demand is not static. The TELRIC study did not assume perfect customers with perfect growth patterns. (Mar. 2, p. 187). There is nothing in the FCC order or this Commission's Guidelines that calls for an assumption of "perfect information."

2. Loop Fill Factors

CBT witness Meier explained in detail the design criteria CBT uses to design outside plant. His direct testimony supported CBT's proposed outside plant fill factors. (CBT Exh. 4). Mr. Meier is an integrated planning specialist in the Network Engineering and Construction (NE&C) Department of CBT. Mr. Meier's job is to develop plans for placing copper and fiber optic cable and electronics, and includes identifying the costs associated with those plans. Prior to this position, Mr. Meier had served as an outside plant engineer and as an outside plant cable splicer. Mr. Meier has 25 years experience with CBT.

Mr. Meier testified that CBT does not expect to change its current design criteria going forward. No witness identified any unreasonableness in CBT's design practices, nor did they identify any reasonable alternative engineering design criteria. No other witness had any engineering credentials to contest CBT's practices and, in fact, when asked specifically how CBT should design its network, every other witness indicated that they were not qualified to provide design rules. The Commission has never in the past criticized CBT's engineering design, nor disallowed any outside plant investment for purposes of CBT's regulated rate base.

Mr. Meier explained how CBT's forward-looking cable fills were established and supported the cable fills used in cost studies for copper distribution cables, copper feeder cables, fiber optic cables, and loop electronics. Fill factors are not used as an input to the engineering design process for outside plant facilities and equipment. When an engineer designs for the placement of an outside plant cable or a piece of electronics, the engineer uses established engineering and economic principles to design the facilities and equipment in order to minimize the overall cost of placing the facilities or equipment. Cable sizes are chosen to meet expected customer demand while minimizing the overall cost of placing the cable, including considerations for future reinforcement. The end product of the engineering design process is the most cost-effective means to provide telephone service in a given geographic area. The actual usage of that facility is what determines the fill factor. As a result, the fill factor is best viewed as an output of the engineering design process and not as an input to this process. AT&T witness Webber agrees with Meier that fill factors do not cause the design, they result from it. (Mar. 22, p. 139).

a. Distribution Cable

Mr. Meier explained the major components of outside plant. Distribution cable originates at a Serving Area Interface ("SAI") and terminates at a drop terminal near the customer. The SAI is a cross-connect box that allows a feeder cable to be connected to distribution pairs. When distribution cables are designed, the geographic area to be served must first be defined. Next, a projection is made of the demand for telephone lines in that area. CBT uses industry guidelines to plan for two pairs to serve every household in the area. Placing two pairs in a pedestal for every living unit keeps CBT from having to make repeated visits to rearrange facilities to take a pair from one pedestal and put it in another. (Mar. 2, p. 157). While larger drop terminal equipment might allow more flexibility, this increases the length of individual drops and the complexity and

cost of managing them. (Mar. 2, p. 160-61). CBT plans for business pairs based on the size and the types of businesses expected to locate in the area. In addition, CBT has to plan for future growth and development in the area and attempt to determine the maximum need for loops. CBT plans for the ultimate number of residence and business lines expected in the area because the goal in planning distribution cables is to avoid subsequent cable reinforcement since the cost of reinforcement of distribution cable outweighs the cost of initially placing additional capacity.

CBT believes that provisioning two lines per living unit is the most efficient way of providing service. Mr. Meier is not aware of any discussion in the current environment that suggests that the two distribution pairs per living unit assumption will change in the future. (Mar. 3, p. 118). CBT knows that installing two lines per living unit works, and it has elected to continue doing that. (Mar. 3, p. 124). It has examined the possibility of reinforcing distribution cables. However, this is a costly, labor intensive and disruptive process. (Mar. 3, p. 71). CBT operates under budget constraints and acts to control its costs, which means that is has the incentive to avoid the need to reinforce which would increase future costs. (Mar. 3, p. 119). The additional cost of initial installation is minimal compared to later reinforcement. (Mar. 3, p. 126).

Design factors that impact the expected fill for distribution cables include structure limitations, timetable delays in developments, and cable size limitations. In aerial and underground areas, it may be necessary to place a larger cable initially due to space limitations on pole lines or in conduit. (CBT Exh. 4). Time delays in completing a development or changes in plans occur on nearly all subdivisions or business parks when a developer only completes a section at a time. However, from the beginning of the development, the total cable requirements are placed in order to save the future cost of placing additional cable.

Cable fills are impacted by the fixed standard sizes of cables. These size limitations can

have a significant effect on cable fills, especially if the number of pairs needed is only slightly larger than the closest available cable size. In practically all cases, the number of customers to be served on a given street does not neatly match the available cable sizes, an efficiency loss known as "breakage." (Mar. 16, p. 147; Mar. 17, pp. 41-42). Mr. Mette provided an example of a breakage calculation with his rebuttal testimony (CBT Exh. 22), demonstrating that fills can be deflated as much as 25% simply due to breakage. A further example of breakage was demonstrated during Dr. Ankum's cross-examination, changing what he advocated as an 85% fill to approximately 32% due to the effects of breakage and of terminating pairs at different points along the cable. (Mar. 16, pp. 149-54).

After explaining how its network is designed, Mr. Meier explained how CBT estimated its forward-looking distribution cable fill factor. Since CBT expects to continue designing its distribution network much the same as it has in the past, a good starting point is the fill factor that has resulted from past design and construction practices. In 1992 CBT conducted a random sample of [redacted] working SAIs and calculated distribution cable fills by comparing the total working distribution pairs to the total number of distribution cable pairs available in the cable. The result of this study was an average distribution cable fill of [redacted]% over CBT's entire operating area. A more recent study to measure the fill factor in distribution cables was conducted in 1998. That study calculated the fill factors separately for Ohio and Kentucky. The Ohio distribution cable fill was [redacted]%, the Kentucky result was [redacted]%, and the overall distribution fill factor was still [redacted]%, the same as in 1992. From the results of these studies, Mr. Meier concluded that the distribution fill factor in the network is very stable. Even with a significant increase in the number of working lines, due to ongoing expansion of the network as a whole, the fill factor for distribution cables did not change. Since CBT's network construction has been based on the same prudent

engineering assumptions CBT expects to use for the foreseeable future, there is no reason to believe that future network usage would vary materially from the current experience.

AT&T witness Webber challenged CBT's fill factors for purposes of the TELRIC studies. (AT&T Ex. 10) Mr. Webber presented no factual basis for fills other than citation to the Commission's Ameritech decision and two Indiana and Michigan decisions. (Mar. 22, p. 116). Mr. Webber could provide no detail on how those fill factors were calculated or how they were used by those companies in their cost studies. (Mar. 22, p. 142, 145). He could only state that commissions have approved such figures. (Mar. 22, p. 117). Mr. Webber is not an engineer and has never actually been in the position of designing or constructing a telecommunications network. (Mar. 22, p. 111). Mr. Webber has not tried to model what a least-cost, most efficient network would look like in Cincinnati Bell's territory. (Mar. 22, p. 96).

Mr. Webber assumes that the designer of the network has perfect knowledge of where customer demand will occur, but could not show where either the FCC or this Commission has said that the ILEC should assume perfect knowledge. (Mar. 22, p. 102). Mr. Webber suggested that CBT use dramatically less spare cable, but somehow still manage to make the spare appear precisely where it will be needed. (Mar. 22, pp. 108-09). His design recommendations were not only impractical, he could not point out any network that was built that way. (Mar. 22, p. 110). He did not take into account any additional costs that would be incurred in order to make the spare pairs appear in the correct locations when customers order service. (Mar. 22, p. 115). Mr. Webber's design ideas are so incredible and out of line with real engineering practice, he suggested putting only one line drops in where customers only take one line, which would mean if somebody ordered a second line, CBT would have to replace their drop. (Mar. 22, p. 112).

MCI witnesses Starkey and Ankum recommended application of the Ameritech 85% distribution fill. They provide no basis for using that figure other than the Ameritech order. CBT has already discussed why the order is not valid precedent in this case. CoreComm witness Gose recommended the 85% fill because he had seen it in the BOC Notes on the Network. (Mar. 18, pp. 132, 136). However, 85% was used in that publication as a point to consider reinforcement of individual cables, not a design criteria to try to achieve on a system wide basis. Mr. Gose stated that, with 4% growth, a network designed with 85% fill would last less than four years before it has to be reinforced. (Mar. 18, pp. 120-21). That simple observation indicates why it is a reinforcement criteria, not a design criteria. The ramifications of loop design on future reinforcement costs must be considered in evaluating the true least-cost network.

Staff recommended that the fill factors CBT used in its unbundled loop studies be rejected. It stated that fill factors should not reflect current actual usage, but a forward-looking projection of network usage. Mr. Francis provided the Commission with alternatives which he feels comport with the Commission Guidelines. He did not attempt to develop a specific fill factor assumption for distribution plant. However, he provided for consideration a range of 55% to 65% for distribution fills. That range reflected a variety of state determinations Mr. Francis had reviewed as well as the different proposals in this case. (Staff Exh. 5). The middle point of 60% for distribution fills also reflected the [redacted] for distribution fills.

The orders cited by Mr. Francis approved fills as low as 40% in Missouri and Texas. In one of the orders cited by Mr. Francis, the Texas Commission specifically instructed SBC to place its cable for the ultimate service requirements, the same criteria used by CBT. Mr. Gose's testimony cited decisions from New York and Maryland approving distribution fill of 50% and

Georgia at 47%. (CoreComm Exh. 2, p. 38). New York is one of the densest telephone areas in the United States. (Mar. 18, p. 135).

The New Jersey Board of Public Utilities approved a 30% distribution fill for Bell Atlantic. Case No. TX95120631 (Dec. 2, 1997). The New Jersey Board stated that Bell Atlantic had used this fill historically to meet its regulatory obligations to fulfill service requests within five days, an obligation that had not changed. CBT is subject to similar requirements under the Commission's Minimum Telephone Service Standards. The New Jersey Board determined that a 30% fill was an appropriate balance of the economic tradeoff between installing additional capacity at the outset and the cost to reinforce in the future. Id. at p. 80. For the same reasons, CBT's proposed [redacted]% fill is appropriate and should be approved.

The Commission must be cautious of recommendations to use high fill factor results from other cases and other jurisdictions as there appears to be inconsistent use of the term "fill factor" which could cause confusion and lead to comparisons of numbers that are not fill factors or which are not expressed on the same terms. Mr. Mette testified that the term "fill factor" is used by some companies parties to refer to cable sizing factors as fill factors. For example, proxy models used by some for universal service support calculations, such as the HAI model, use inputs labeled as fill factors that actually act as cable sizing factors. A cable sizing factor is used to determine the size of cable needed to serve a given quantity of demand. For example, a cable sizing factor of 50% would say that if there is a need for 60 pairs, then the minimum number of pairs required is 120. The smallest cable that satisfies the number of pairs required is 200 pairs. A cable sizing factor of 50% is clearly not the same as a fill factor of 50%, as the foregoing example would result in a 30% fill. Mr. Mette demonstrated that the HAI model calculates a set of distribution and feeder fill factors that result from the model's inputs, which are much lower than what has

been reported as the "fill factor." (CBT Exh. 6, Attachment 5)[6]. The calculated fill factors are very similar to the fill factors advocated by CBT.

Particularly in the case of distribution cable, it is important to understand how CBT's cost studies work, before establishing a fill factor based on results from other cases. As discussed above, the purpose of the fill factor is to unitize the total investment in a cable across the working pairs. Distribution cable, however, does not go from a single point to single point, but connects numerous geographically diverse customer locations. The number of working pairs, and thus the fill, in a distribution cable will be different depending upon where within the length of the cable it is measured.

CBT's loop cost studies develop average cable costs by type of plant (aerial, buried or underground) on a per pair foot basis. (Mar. 5, pp. 171-73). These unit costs are then applied to an "average" loop, the distance of which is measured to the customer premise. (Mar. 18, pp. 126-131). However, as was demonstrated numerous times during the hearing, when a loop is terminated at a drop terminal to an individual customer, the cable pair does not stop at that point. Hence, the cost study must account for the cost of the copper pairs that continue down the street in that cable, but which are not counted in the length of the average loop. Otherwise, the cost study will not recover the full investment. (Mar. 18, pp. 131-32; Mar. 24, pp. 141-46).

Fills of the magnitude recommended by intervenors are not only unrealistic from a design and engineering standpoint, they virtually guarantee that CBT could not recover the cost of its distribution network. An example used in hearing was a 100 pair cable, 1000 feet in length. Under CBT's design criteria, this cable would serve approximately 50 households, which if they had a 20% take rate on second lines, would require 60 active pairs. The way intervenors would

[6] To avoid confusion over the citations herein, where exhibits were attached to Mr. Mette's prefiled testimonies, those documents are referred to as "Attachments" rather than "Exhibits" in order to avoid confusing citations such

calculate this fill would result in a 60% fill. However, using 60% in CBT's cost studies would not recover the cost of the cable. The average distribution length on the cable would be 500 feet, meaning that 30,000 pair feet (60 pairs x 500 feet per pair) out of 100,000 available pair feet, or an effective fill of only 30%. CBT's method of measuring fill near the midpoint of the cable would count approximately half of the total active pairs as active at that point (the other half having terminated closer to the SAI) and yield the correct fill of 30%.

Fill is relative depending upon the point at which it is measured. CBT's [redacted]% fill measures a cross section view of what facilities are working. Near the SAI, the distribution fill may be high, but as customers drop off at terminals, the fill decreases along the cable until one gets to the end, where the fill is very low. (Mar. 3, p. 37-38). There are going to be dead pairs that can never be utilized, but CBT still has to recover that cost. (Mar. 3, p. 40).

Mr. Webber agreed that CBT's loop study develops the cost of cable on a per pair foot basis and that this is a reasonable way to start. (Mar. 22, p. 119). To price loops, one must model a typical loop and for distribution, it would be reasonable to pick out an average loop. (Mar. 22, p. 120). The fill factor is applied to the average investment per foot in order to unitize the investment dollars over the portion of that facility that is used. (Mar. 22, p. 121). Any cable is going to have dead pairs because it is inefficient to strip out the pairs and is easier to leave them there. There is a loss of usable capacity due to these dead pairs that become unusable. (Mar. 22, p. 135). Webber acknowledged that, under this scenario, using a fill factor based on a pair count to recover costs that are based on pair feet of cable, could result in an under-recovery of the total investment. (Mar. 22, pp. 124-25). It does not matter what fill factor is assumed; even at 100 percent fill CBT still would not recover the cost. (Mar. 22, p. 127). Webber agrees that CBT should price so that it recovers its distribution investment. (Mar. 22, p. 128, 131). The cost

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as "CBT Exh. 6, Exh. 5."

study must make sure that each customer is actually paying the whole cost of the loop that they are using. (Mar. 22, p. 134).

Mr. Starkey also agreed that if a different fill is used, the cost study would have to be adjusted as necessary to assure full cost recovery. (Mar. 17, pp. 37-39). This is a major reason why the 85% fill he recommends is meaningless standing alone. A fill can only have meaning in the context of how it is used in a cost study. Only CBT has provided a distribution fill that has a rational connection to how its cost studies are structured. For example, Mr. Gose would simply substitute a different fill in CBT's loop model, with no consideration for the implicit changes that it would require with respect to demand or the sizing of the cables in the network. (Mar. 18, pp. 133-34, 146-48). Mr. Francis did not know how other companies' models used the various fills he cited from other states. (Mar. 24, pp. 147-49).

Simply substituting a new fill factor in a cost study may distort the actual cost of the network if one does not also redesign the network. (Mar. 22, pp. 146-47). Sizes of cables would have to change to use higher fills. (Mar. 24, p. 150). Higher fills result in smaller cable sizes, causing the cost per pair foot to increase. (Mar. 16, p. 140; Mar. 17, p. 40). Since the cost study is based on the cost per pair foot, if that is not adjusted, then the whole cost study is going to understate loop costs. (Mar. 22, p. 140). Costs such as trenching, cable placing labor, and poles are not significantly different because of different cable sizes. (Mar. 16, pp. 123-125; Mar. 22, p. 141).

It is obviously wrong to simply substitute fills into a cost study without understanding the context in which the fill is measured along with the context in which the fill is used in the study. Dr. Ankum was completely unfamiliar with how CBT's loop cost model worked, but still recommended using the Ameritech fills. (Mar. 16, pp. 127-29). No intervenor witness was even

able to explain how the Ameritech fills were utilized in Ameritech's cost studies. (Mar. 17, p. 31). CBT has been denied access to any information about the development or usage of fills by Ameritech, but is being asked to accept the raw fill numbers out of context. The Commission must decide this case on the evidence presented in this record and which was subjected to thorough cross-examination. There is no basis for reaching any conclusions on fill factors other than those advocated by CBT's witnesses. When considering all of the costs of operating a telephone network -- the physical material and the labor for installation and the labor to perform rearrangements and reinforce facilities -- the way CBT engineers its network is most efficient and lowest cost and the fills derived from that network should be used to determine its cost.

b. Copper Feeder Cable

Copper feeder cables originate at a central office and terminate at the SAI. To design feeder plant, CBT's planning engineers first determine whether copper cable or fiber optic feeder with loop electronics is the least-cost technology. The distance threshold between copper and fiber is [redacted] feet in CBT's Band 1, so CBT's cost studies assume the use of copper cables for loops under [redacted] feet and fiber optic cables for longer loops in Band 1. The threshold distances in Bands 2 and 3 are [redacted] feet and [redacted], respectively.

Copper feeder cables are designed for a specific route from the central office, based upon a projection of the number of residence and business pairs required for the entire route. This projection is based on the existing lines and the expected growth for the next 5 to 7 years. (CBT Exh. 4). Feeder fill is impacted by available cable sizes and structure limitations as are distribution cables. Feeder plant is studied for possible reinforcement when a route reaches [redacted]% of its capacity, or when growth cannot be handled by the existing facilities. Reinforcement of feeder cables is much easier than distribution cables because these tend to be point to point routes and

are placed either in conduit or on poles. CBT's unbundled loop cost studies do not assume buried feeder cables in Band 1, which is commonplace with distribution cables, and less than 4% buried cables in Bands 2 and 3.

On a forward-looking basis, CBT expects to use copper feeder only for loop lengths less than the copper – DLC threshold. When copper is the medium of choice, it would be planned using the same sound engineering principles that CBT has used in the past. Mr. Meier concluded that a reasonable forward-looking fill factor for copper feeder cable is [redacted]%. The copper feeder cable fill factor can be measured by CBT's OS-Plant Assignment System. From 1992 to 1998, feeder fill varied between [redacted]% and [redacted]%, (Mar. 2, p. 172), showing that it is stable and significant changes are not anticipated.

Mr. Francis recommended 67% for copper feeder as being both within his proposed range of results from other proceedings and consistent with the fills he recommends for fiber feeder. (Staff Exh. 4). There is no inherent relationship between copper feeder fills and fiber feeder fills as fiber feeder depends upon the number and type of electronics used, not the number of telephone lines served. Mr. Mette did not agree with this recommendation. CBT measured its copper feeder fill as [redacted]% as late 1997 and CBT's cost study used a fill factor of [redacted]%, even though the copper feeder fill factor may have decreased over time. CBT's proposed fill should be approved as the only fill supported by the evidence in this case.

c. Fiber Feeder Cable

A digital loop carrier system is a pair gain technology that utilizes electronics that are located in the central office and in the field. In the central office, electronics multiplex multiple individual loops or channels together to a higher speed signal, and transport that signal over fiber optic cable to a remote terminal which also performs a multiplexing function to break down the

high-speed signal into individual channels for termination on individual loops. (Mar. 4, p. 38). Fiber optic cables are used to feed the DLC remote terminal sites. Remote terminal sites require four fibers for each multiplexer activated. Each remote terminal site is designed to have a minimum of [redacted] fibers, which is the smallest cable CBT purchases. The route from a central office is designed for the ultimate number of fibers required. For example, if a central office route has a new remote terminal planned, with three additional remote terminals planned for the future, CBT would place a [redacted] fiber cable to handle the currently planned new site and the 3 future sites. However, only 4 fibers may be utilized initially. (CBT Exh. 4).

Fiber optic cable fill factors are also affected by the availability of standard size cables. Engineering and installation costs account for the majority of the cost of placing a fiber cable. In order to avoid incurring these costs again, it is most efficient to install additional cable capacity at the time of the initial placement. The cable is sized to satisfy the ultimate expected demand in the area, even though only 4 fibers may be required for immediate use. This gives CBT's engineers greater flexibility to increase a route's capacity either with higher speed electronics, which would not use additional fibers, or by using additional multiplex systems and fibers. (Mar. 24, pp. 156-59). This flexibility allows for cost effective management of CBT's cable plant because the relative cost of upgrading electronics versus additional electronics changes over time. Also, the incremental cost of a larger fiber optic cable is small relative to the installation cost of placing the cable. (Mar. 19, p. 50-51).

The Staff Report recommended that the fiber optic fill factor be increased by a factor of two. Mr. Mette disagreed with this for several reasons. First, CBT's fiber optic cable fill as of November, 1997 was only [redacted]%. If any change was to be made, Mr. Mette recommended that the adjustment be made in the same manner as is proposed for circuit equipment, i.e., projections

based on the last five years and the use of the study period midpoint. Such an adjustment would be significantly less than doubling the fill factor.

Mr. Webber has no independent reason for his fiber fill recommendation other than the fact that it was approved in the Ameritech case. (Mar. 22, p. 144). Mr. Starkey recommended that fiber fills be treated the same as the electronics, which begs the question, because this assumes that all fiber strands are in use. The entire cost of the fiber cable must be recovered, not just those strands that are providing service. (Mar. 17, pp. 41-52).

d. Electronics

Where fiber optic cables and electronics are used for feeder, prudent engineering practice for digital loop carrier ("DLC") electronics is to install all plug-in equipment and activate a complete DLC system at the same time. Each DLC system consists of 96 channels with 4 shelves containing 24 channels per shelf. Activating a complete system at a time reduces return visits and provides for greater flexibility for CBT's personnel meeting service on demand. Installing one card at a time would result in higher electronics fills; however, it is inefficient to make daily field visits to install plugs at any given site. (Mar. 3, p. 14). Overall efficiency is served by installing complete systems at a time, avoiding costs and delays of individually ordering plug-ins and making numerous field visits to perform the installation. An additional factor in determining the electronic fill factor is that each channel plug-in supports four channels. Plug-ins used for POTS can be well utilized, but those used for services other than POTS, such as coin phones and digital data circuits, may only use one or two channels per plug-in and thus have considerably lower utilization. This, of course, reduces the overall electronics fill factor.

The fill on loop electronics equipment can be calculated through an automated process using CBT's loop assignment system, which generates a quarterly report identifying available and

working pairs associated with (DLC) systems. CBT's recent report shows an electronics fill of [redacted]%. Mr. Meier concluded that a forward-looking fill factor of [redacted]% is reasonable for loop electronics. (CBT Exh. 4). The level of the electronic fill factor has been relatively constant and is expected to continue in the future since CBT is not planning any changes in its engineering design practices for this equipment.

For DLC electronic equipment, Mr. Francis recommended using the same fill factor as for DS0 interoffice electronic circuit equipment, as discussed in Ms. Soliman's testimony. This suggestion should not be adopted. Fills for loop electronics bear no relationship to fills on interoffice circuits. Loop facilities serve distinct geographic areas and are entirely dependent upon the demand in that localized area. On the other hand, interoffice facilities work on larger economies of scale and can aggregate large amounts of traffic more efficiently. (Mar. 24, pp. 134-36).

3. Switch Fills

Mr. Mette presented several switching studies which used fill factors measured on CBT's network. No witness presented any contrary testimony about what the reasonable expectation for a forward-looking switch fill would be. The switch fill is designed to recover the cost of the entire capacity that is needed to efficiently serve customers and which must be purchased due to the vendor-related design of the equipment involved.

The Staff Report and Staff witness Soliman recommended that CBT reexamine and adjust its switch fills. Ms. Soliman recommended that CBT project the fill factor to the midpoint of the five year study period based on the change in the fill factor during the past five years. Mr. Mette testified that this is not necessary as CBT's switch fills already represent forward looking fills. The fill factors used in the Switching Cost Information System ("SCIS") model are entered on a

central office specific basis and are generally between [redacted]% and [redacted]%. Mr. Mette conferred with CBT's engineers who expect the standard forward-looking fill to be [redacted]%.

Staff witness McCarter agreed with CBT's switch fills. Switch provisioning does not have the complex dynamics associated with it that are associated with other types of plant. Switches tend to be modular based, so the switch can be sized closer to demand. This has happened in practice with CBT's switches. She disagreed with Mr. Webber's recommendation that CBT use Ameritech's switching fill rate. CBT's proposed fills are high and it is unnecessary to impose Ameritech's fills on CBT as a means to increase this already high switch fill. (Staff Exh. 6).

4. **Interoffice Facilities**

CBT proposes a fill factor of [redacted]% for all SONET facilities. Although CBT's actual utilization for OC-3 and OC-12 rings are [redacted]% and [redacted]% respectively, CBT's marketing and network architecture planning personnel expect the average fill over the economic life of the ring to be approximately two-thirds of capacity. However, consistent with its proposed fill factor for other electronics of [redacted]%, CBT proposed [redacted]% for the SONET equipment and rings. (CBT Exh. 7). Ms. Soliman found CBT's proposed fill factor of [redacted]% reasonable for SONET rings and equipment. (Staff Exh. 3).

Staff notes that, in its transport and termination study, CBT proposed fill factors of [redacted]%, [redacted]%, and [redacted]%, respectively, for its DS0, DS1, and DS3 facilities and the associated electronic equipment.[7] The Staff recommended that CBT adjust its DS0, DS1, and DS3

[7] CBT would point out that the Transport and Termination study, which was developed using NCAT, is based solely on DS0 circuits. The fills used in that study represent fills of lower speed channels within higher speed signals. For example, the DS0 fill represents the number of assigned DS0 channels within a DS1, the DS1 fill measures the number of assigned DS1 channels within a DS3, etc. To determine the DS0 fill on a total system basis, the three fill factors are multiplied together in this study. CBT's actual SONET ring fill for OC-3 rings was measured based on assigned DS1s out of 84 DS1s in CBT's OC-3 rings. The actual SONET ring fill for OC-12 rings was measured based on assigned DS3s out of 12. As discussed previously, CBT then developed the [redacted]% overall fill to apply in both of these rings and to OC-48 rings. Although CBT did not apply an additional fill in its Dedicated DS0 Interoffice study to develop DS0 costs, CBT believes that an additional fill calculation is

interoffice facility fill factors to reflect the level of increase in the utilization of these facilities that CBT actually experienced from December 1992 to June 1997 over the five year study period. Staff proposed that the adjusted fill be the projected fill factors to the mid-point of the five year study period. Staff also recommended that the same forward looking fill factors be applicable to electronic equipment unless the adjusted fill factors exceed the electronic equipment's usable capacity, in which case, CBT should use such usable capacity as the fill factor for electronics.

Ms. Soliman estimated that from December 1992 to June 1997, the fill factors increased from [redacted]% to [redacted]% for DS0 facilities, and from [redacted]% to [redacted]% for DS1 facilities, an average increase of approximately [redacted]% per year. Applying this rate of increase through the mid-point of the study period would result in projected fill factors of approximately [redacted]% for DS0 facilities and [redacted]% for DS1 facilities. Ms. Soliman applied the same increase to CBT's proposed fill factor for DS3 facilities and estimated a fill factor of approximately [redacted]% for DS3.

CBT does not object to Staff's recommendation regarding DS0, DS1, and DS3 interoffice facilities for purposes of its transport and termination studies. CBT continues to believe that [redacted]% is a forward-looking fill factor for the electronics used for dedicated interoffice transport.

5. Conclusion on Fill Factors

CBT has justified the reasonableness of its fill factors. CBT should use the fill factors set forth in Mr. Meier's testimony and as used in Mr. Mette's TELRIC cost studies for purposes of determining an estimate of the proportion of a facility that will be filled with network usage. The fill factors CBT proposes here lead to appropriate per-unit costs for UNEs. CBT has reasonably supported its fill factors and they should be approved. The intervenors presented little, if any, actual evidence to rebut CBT's proposed fill factors.

To follow the intervenors' simplistic substitution of Ameritech fill factors would not allow

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appropriate for calculating these costs.

CBT to recover its costs. There is no valid evidentiary basis for to adopting the Ameritech fill factors based on the record in this case. The assumptions contained within the ACAR were developed by Ameritech and have not been shared with CBT or made a part of this record. All indications from the order in the Ameritech case are that the result was an anomaly based upon the evidence presented in that case and were dictated largely by Ameritech's voluntary past practices of using those fills in retail cost studies. Ameritech's fills were clearly described as maximum utilization factors, not the fills that actually will be expected in the network. The only fills appropriate for CBT are those that it has proposed herein and supported with evidence. These fills satisfy the TELRIC standard because they are a reasonable estimate of the fills that CBT expects to see in its network.

F. Common Costs

The FCC recognized that incumbent LECs should be afforded an opportunity to recover a reasonable measure of the forward-looking joint and common costs associated with the provision of UNEs. FCC Order, ¶694. Forward-looking common costs are economic costs efficiently incurred in providing a group of elements or services that cannot be attributed directly to individual elements or services. 47 C.F.R. §51.505(c)(1). In adopting the TELRIC methodology for the pricing of UNEs, this Commission adopted a similar position on common costs. Forward-looking common costs are defined as economic costs efficiently incurred by an ILEC's operations as a whole in providing a group of elements or services that cannot be attributed directly to an individual element or service. Guidelines § V.B.4.c.1. A reasonable method of recovering common costs is to use a fixed allocator mark-up over the sum of the TELRIC and allocated joint costs.

In the alternative regulation portion of this proceeding, all parties stipulated to a 13%

common cost markup for purposes of TELRIC. The Commission approved this stipulation in its April 9, 1998 Order. Therefore, for purposes of this proceeding, no further decisions must be made with respect to common costs. CBT's TELRIC cost studies should all automatically include a 13% markup over the direct and joint costs developed in CBT's cost studies to account for common costs.

G. Nonrecurring Charges

CBT will incur certain nonrecurring costs in order to provision unbundled elements to new entrants. The intervenors do not debate that general principle. CBT, consistent with the FCC's costing principles and the Commission's Guidelines, developed NRCs incurred on a forward-looking basis, where appropriate, in the TELRIC studies. As described by Mr. Mette, these NRCs reflect estimated work times multiplied by CBT's labor rates. (CBT Exh. 5, p. 18). He further described developing the cost studies based on documentation of service order flows and procedures. (Mar. 5, p. 8; CBT Exh. 5, p. 19).

The individual nonrecurring work time estimates were developed through interviews of subject matter experts (SMEs) who are actually assigned to perform the specific tasks and who have experience and expertise in the provisioning of telecommunications services. CBT conducted interviews for all NRCs. (Mar. 5, p. 26). In many cases, CBT has no experience in provisioning UNEs to new entrants so it conducted the SME interviews as a basis for determining the forward-looking work time estimates. CBT's approach allowed for the best information available to be determined and is entirely consistent with the FCC's TELRIC principles which require that the studies and corresponding rates reflect the costs that CBT actually expects to incur in placing unbundled elements in service in the future. (Mar. 5, p. 10).

Mr. Mette's supplemental testimony discusses CBT's latest nonrecurring rate structure proposal in which the nonrecurring costs will be classified as being either on a per-order or per-item basis. (CBT Exh. 7, pp. 27-29). These rates will be developed by dividing the relevant tasks included in the original cost studies into those that are attributable to the order as a whole and those that vary according to the number of UNEs contained on the order. (CBT Exhs. 13, 14). The charge per order will cover non-volume sensitive costs such as establishment of the service order and travel/setup time for field technicians. A second charge per item ordered on the same service order will cover volume sensitive costs such as circuit design and testing. It should be noted that to be considered the same order, all unbundled network elements ordered must be for the same customer, location and due date.

Although the testimony on this issue focused on loops, it is not CBT's intent to restrict this approach to loops but to apply it to all appropriate UNEs. (Mar. 5, p. 18). As such, new rates will be created for loops, ports, and loop/transport combinations. However, CBT believes that there are other elements that will not enjoy economies of scale which will permit this division. For example, interoffice facilities are generally provisioned one element at a time and are rather complex service orders to provision. (Mar. 5, p. 36). Thus, CBT does not propose to create separate per-order and per-element charges for these elements.

Mr. Francis summarized Staff's unbundled loop NRC recommendations as: first, CBT should create alternative rates for loop NRCs reflecting manual versus electronic interfaces; second, CBT should develop NRC costs on a per-occasion and per-location basis taking into consideration the probability of multi-loop orders; third, CBT should recover the cost of field work to take into consideration multi-loop orders and to reflect whether a customer visit is required or not. CBT agrees to prepare separate manual and electronic interface rates, and will

break its NRCs into per-order and per-loop charges.

Mr. Francis believes the new rate structure proposal is reasonable and in line with the recommendations in the Staff Report. Further, Mr. Francis stated that it would be reasonable for CBT to break-up the cost components in the original proposed unbundled loop establishment NRC into a per-occasion, per-location charge and a per-loop charge. While Mr. Francis' prefiled testimony stated that CBT's loop NRCs did not take into account that multiple loops may be ordered at the same time for the same location (Staff Exh. 4), this testimony was prepared before his review of CBT Exhibits 13 and 14, which do just that. (Mar. 24, p.110-13).

MCI's recommendations in relation to the nonrecurring cost studies rely on flawed assumptions regarding the level of automation in provisioning the network. MCI has been involved in numerous TELRIC proceedings, but has come forward with no studies of its own to counter CBT's justification of the nonrecurring charges. (Apr. 15, p. 93). The Commission should reject MCI's arbitrary and punitive recommendation to reduce CBT's nonrecurring costs by 50%. (MCI Exh. 21, p. 55).

The following is a discussion of specific nonrecurring charges, which include the service order charge, line connection charge, loop establishment charge, loop qualification and conditioning charges and access to OSS, and a discussion of the suggestion that CBT perform time and motion studies. CBT has reasonably justified all nonrecurring charges ("NRCs").

1. Service Order Charge

The service order process will be used by NECs to order UNEs from CBT and involves the transmission of a service order manually or electronically from the NEC to CBT, coupled with various manual tasks performed by CBT service representatives to ensure accuracy. The manual tasks include accessing the ordering system, screening the order, resolving any discrepancies, and

formatting and entering the order for distribution to the provisioning systems.

Staff's recommendation with respect to CBT's proposed service order charge, which is to be applied in conjunction with the line connection charge for migration of an existing loop, is to develop separate rates for manual and electronic interfaces. Additionally, since CBT originally developed its service order costs based on its current ordering system, which is largely manual, Mr. Francis recommends that CBT should remove these manual functions from the electronic service order cost calculation. He further recommends that the electronic interface cost should be recovered in a TELRIC for access to OSS functions. This would give NECs the opportunity to choose between using a manual or electronic interface. (Staff Exh. 4).

The intervenors claim that use of an electronic interface will eliminate all manual processing costs. As stated above, this is not the case and Mr. Mette has testified that even with an electronic interface, manual intervention will be required for downstream processing of orders. At this point in time, it is not clear how many NECs will submit electronic orders for UNEs. CBT has had an electronic interface available for over a year, but it has not been used by a NEC. Therefore, CBT adopts Staff's recommendation of creating a set of manual order rates and a set of electronic order rates, with the difference between the two being the avoided work time of the order processing clerks and the cost of the electronic interface equipment. (Mar. 24, pp. 22-23, 102). CBT does not know that there will be a material difference between the two rates. In fact, it is possible that the electronic order interface will have a higher cost than the manual interface due to the need to recover the significant cost of developing the electronic systems from relatively few orders. (Mar. 8, pp. 25-26, 132; Apr. 15, p. 85).

2. Line Connection Charge

CBT's proposed line connection charge includes the costs of tasks required to physically

move an existing loop from CBT's network to the NEC's network. The specific steps which must be performed include the assignment of a cable and line pair, the forwarding of the order to the provisioning center, coordinating the loop cut-over with the NEC, and running a jumper to connect the loop to the NEC's facilities.

The Staff Report recommended that CBT's estimated labor time included in the line connection charge for central office network field maintenance personnel be changed to the same estimated labor time used in the development of the new loop establishment nonrecurring charge. (Staff Exh. 4). Mr. Mette disagrees with this recommendation. Loop migrations require screening of the service order and scheduling of a technician to coordinate loop cut-over with the NEC. (CBT Exh. 22, p. 48). This coordination is necessary because there is live service on the loop and service interruption is to be minimized. Obviously, this coordination activity is not necessary in the case of a new loop. For this reason, CBT's time estimate included in the line connection charge for existing loops is greater than for new loops.

MCI argues that CBT failed to document time estimates involved in line connection activities. MCI has offered no counter-evidence to the work times presented by CBT, only arbitrary 50% rate cuts that have no basis. Despite the protestations to the contrary, CBT has adequately supported the work time estimates included in the line connection charge through cost study documentation and various data requests.

3. Loop Establishment Charge

In developing nonrecurring charges for new loops, CBT assumed that the work functions required will be similar to the process that CBT uses to provision, track, and maintain special circuits. (CBT Exh. 6, p. 14). CBT developed its new loop NRCs with this assumption because that is how it expects to handle unbundled loops in the future.

The electronic interface that CBT has made available was taken into consideration, but it does not change any of the downstream processes to install a new loop. When an unbundled loop order comes in through the electronic interface for the ordering process, the electronic interface provides acknowledgment messages back to the NEC and completion messages when the order is completed. But when that order comes in electronically, a service representative must manually review the order, validate portions of it, and input it into CBT's OS/Order system. The electronic interface provides ordering capabilities but in terms of the impact on the service representative and what she or he would need to do, there was no significant decrease in the times that CBT has included in its cost study. (Mar. 5, pp. 11-15).

MCI claimed that there was no documentation to back-up the estimated tasks and associated time intervals which are a key factor in determining the level of the nonrecurring charges included throughout many of CBT's studies. CBT believes that it has included sufficient documentation to support its work functions and time estimates. MCI has participated in numerous TELRIC proceedings around the country and its witness was knowledgeable of other ILECs' work times for NRC activities, but MCI failed to introduce any evidence of different work times for these tasks to contradict CBT's claimed work times. There is no evidence in the record to dispute any of CBT's time estimates.

Additionally, MCI witness Starkey proposed to remove 50% of the technician field time on the assumption that use of DLC systems would automate a portion of the field installation time on loops. Mr. Starkey's assumption is wholly without foundation, as it was demonstrated during cross-examination that very little field time would be avoided for cross-connects on new loops as they occur at an SAI and not at the DLC site. The only time field work might be avoided is if cross-connects were already in place both at the SAI and the customer drop and the loop was

assigned to an existing line card in the DLC site. If all of these things were true, it is unlikely that this loop would be a new loop. Mr. Starkey's recommendation also assumes the use of automated cross-connects, a system that is not employed by CBT. Mr. Meier testified to the technical reasons why CBT did not find the use of electronic cross-connects to be effective and indicated that the cost of such a system would probably outweigh any benefits that would be gained. Further, such systems that are currently available do not interface directly with ordering systems, so there would still be manual labor involved to provision the electronic cross-connect.

4. Loop Qualification and Conditioning Charges

CBT's proposed qualification charge is a nonrecurring charge that would be assessed to a NEC requesting some sort of loop conditioning, load coil removal or other kind of service in addition to a POTS loop. (Mar. 5, p. 40).

CBT proposed a nonrecurring rate charge to recover the cost when a NEC requires that load coils be removed from an unbundled loop. Load coils may be present on long copper loops in CBT's network. A load coil is equipment that is put on a copper loop to ensure that there is an adequate quality signal for primarily voice communications. (Mar. 4, p. 71). Digital services such as ADSL will not function over a loop with load coils. (Mar. 4, p. 76). Load coil removal costs are forward-looking costs because CBT will incur these costs for any loop having load coils and for which a NEC requires that these load coils be removed. (CBT Exh. 5, p. 26; Mar. 4, p. 80).

CBT's proposal regarding load coils is consistent with the FCC's Interconnection Order, ¶ 382:

> Our definition of loops will in some instances require the incumbent LEC to take affirmative steps to condition existing loop facilities to enable requesting carriers to provide services not currently provided over such facilities. For example, if a competitor seeks to provide a digital loop functionality, such as ADSL, and the loop is not currently conditioned to carry digital signals, but it is technically feasible to condition the facility, the incumbent LEC must condition the loop to permit the transmission of digital signals. Thus, we reject BellSouth's position that requesting carriers "take the LEC networks as

> they find them" with respect to unbundled network elements. As discussed above, some modification of incumbent LEC facilities, such as loop conditioning, is encompassed within the duty imposed by section 251(c)(3). The requesting carrier would, however, bear the cost of compensating the incumbent LEC for such conditioning.

It is clear from this that the FCC envisioned that a NEC would be responsible for the costs incurred when additional conditioning is required on a loop. Mr. Gose agreed with this interpretation. (Mar. 19, p. 65). Footnote 826 of the FCC order indicates that the FCC considered the removal of load coils to be a form of conditioning. If CBT did not charge for this work, then CBT would have no means to recover this cost.

Staff agrees that it appears clear that the FCC Order, ¶ 382, considered the likelihood that certain unbundled loops may need conditioning in order to provide certain types of service above the typical voice grade POTS loops. When a competitor seeks to provide digital loop functionality, such as ADSL, and the loop is not currently conditioned to carry digital signals, but it is technically feasible to do so, the incumbent LEC must condition the loop at the requesting carrier's expense. In footnote 826, the FCC states that conditioning may involve removing load coils and bridge taps. Therefore, Staff believes that CBT's request to be compensated for this type of conditioning is consistent with the FCC Order. (Staff Exh. 4).

However, Staff disagreed with CBT's proposed qualification charges. Mr. Francis believed there should be an inventory system where CBT could identify the type and location of any loop at any given time. (Staff Exh. 4). There is no such inventory system, nor would it have been cost effective to develop one. (CBT Exh. 22, pp. 44-46). Conditioning requires knowledge of the transmission characteristics of individual loops, which can only be known by researching individual loops. The vast majority of CBT's loops have been used solely for voice grade traffic, where there is generally never any need to test the loop absent a report of trouble. The type of information that Mr. Francis assumes CBT could record in a database simply is not routinely

gathered and there are significant costs involved to obtain this information on a specific loop for a specific purpose.

Mr. Francis also objected to the magnitude of the conditioning charges, suggesting that, to the extent certain conditioning costs are OSS related, those costs should be removed from this charge, and that CBT's labor time estimates be tested with a time-and-motion study. (Staff Exh. 4). The only OSS-related effect on conditioning would pertain to order taking. None of the downstream processes can be automated. Thus, the OSS impact on these charges should be the same as for the service order charge. CBT derived its work time estimates from interviews of foremen who are knowledgeable of the tasks that are involved with removing load coils. No witness presented any evidence that these times were unreasonable. Only actual experience performing this work could derive a better estimate. CBT believes it has sufficiently justified the methodology as well as the inputs which make up this rate element.

5. **Access to OSS**

Many of the Staff's recommendations associated with CBT's NRCs center on the assumption of NECs having electronic assess to CBT's systems. Even when a NEC has electronic access to CBT's ordering function, this has no impact on downstream systems and the tasks associated with provisioning of unbundled elements. CBT's ability to perform these downstream functions is not affected by whether a NEC submits its order through CBT's electronic ordering interface or the order is entered through a CBT service representative. The ability to provision unbundled network elements is determined by CBT's downstream systems, not the ordering system.

CBT would like to reiterate that these processes are applicable to CBT retail services, as well as NEC service orders. The same level of manual intervention will be experienced whether

the service order is for unbundled elements or for retail services. With respect to unbundled loops, CBT must treat these loops as special circuits in order to provision, track, and bill them. (CBT Exh. 7).

MCI witness Starkey has charged, based solely on inferences with no evidence, that CBT's electronic ordering interface is deficient. (Mar. 17, pp. 73-74; Apr. 15, p. 81). Mr. Starkey has never seen CBT's interface, has no information on what it can or cannot do, and MCI has not tried to use the interface (after demanding in CBT's arbitration case over two years ago that CBT immediately implement such a system). CBT, having complied with the requirements to implement such a system, has invested millions of dollars in a system that no one has chosen to use. CBT is entitled to recover the cost of that system.

The Staff Report had recommended that the cost of the Loop Assignment Center (LAC) when provisioning new unbundled loops should be recovered through a separate rate for access to OSS functions, not in the NRC for unbundled loops. Mr. Francis now agrees that CBT's cost associated with manual LAC functions should be recovered in the unbundled loop establishment NRC. (Staff Exh. 4). Staff has changed its recommendation under the belief that the LAC functions will occur only in CBT's manual system and would not be performed when a NEC submitted electronic orders. Mr. Francis' analysis incorrectly assumes that the LAC will be replaced by access to OSS. The LAC function is inherently manual and consists of various tasks necessary to locate and provision loop facilities at a requested location. For example, if an order comes in and there is not a vacant pair available at that location, CBT automatically sends that order to engineering to design a loop. The automatic assignment process ends and CBT personnel have to manually research that facility. Technicians have to be dispatched to go out and provision the loop. (Mar. 3, p. 134).

Mr. Francis also appears to believe that the manual inventory tracking and assigning of loops performed by the LAC could be replaced by the Fujitsu FACTR system. Mr. Francis' understanding that the Fujitsu FACTR system may do some of the same things that the manual LAC system does is incorrect and apparently based on MCI witness Starkey's claims. The Fujitsu FACTR System does not allow the removal of the manual Loop Assignment Center (LAC) duties. Even though the FACTR system is a computerized system, it is a system used to provide local loops and is not an assignment system. There is no electronic interface in this product that can interact with any assignment system, including CBT's current assignment systems such as COSMOS and OS-Plant. As Mr. Meier testified, he has no knowledge that such an interface is planned in the future. The LAC will still be necessary to locate loop facilities available to serve a particular location. (CBT Exh. 21).

6. Time and Motion Studies

The Staff Report recommends that a time and motion study be performed for all nonrecurring activities associated with unbundled services. Mr. Francis has now altered Staff's recommendation to say that CBT should update its NRC studies to incorporate the results of time-and-motion studies prior to the end of its alternative regulation plan or any extensions to CBT's plan, which expires July 2001. In Mr. Mette's opinion, this study is unnecessary. The cost and time requirements of performing this type of study are prohibitive, and it is CBT's belief that the changes in the time estimates that may be indicated would be inconsequential. CBT recognizes that, as it gains experience in installing unbundled network elements, it will be able to provide better estimates for the times associated with installing these elements. However, a time and motion study is not required to make this happen. CBT's subject matter experts are experienced in their areas and have provided reasonable time estimates for completion of

nonrecurring activities associated with unbundled services and will be able to refine these estimates as CBT's experience develops. Also, since CBT developed its time estimates using a best case scenario where no unusual problems are encountered, CBT is concerned that it may have actually underestimated times because of all the complexities that occur in practice. (Mar. 5, pp. 14-17).

CBT is not sure exactly what Staff believes a time and motion study should entail. CBT objects to any process that would require it to engage special consultants or add costly personnel solely for the purpose of measuring and recording activities. At most, any study should only require the recording of observations of work times so long as they can take place while performing the work in the ordinary course of business. CBT also believes that the results of any such observations should only be used for future NRC cost studies. CBT's NRC times have been known to all parties to this case for quite some time and no party has presented any evidence of alternative work time for any given task. The only evidence in this case, which has now been pending for over two years, is CBT's evidence.

H. Imputation

CoreComm witness Gose presented a "price squeeze" analysis, apparently intending to show that a competitor could not profitably provide residential service using UNEs at CBT's proposed rates. While CBT disputes the accuracy of many of Mr. Gose's assumptions and the results of his calculation, to further discuss the problems with his study would be a diversion from the real issues of this case. CBT believes that it is likely that the cost to provide residential service using UNEs at TELRIC rates will exceed CBT's residential rates. However, this is not relevant to what the UNE rates should be. UNE prices are to be set according to costs and have no relationship to retail rates. (Mar. 16, p. 173; Mar. 17,p p. 138-39; Mar. 19, pp. 60-61). CBT

has no choice but to price UNEs on a different basis than that on which the company sets retail prices since the FCC and this Commission require the pricing of UNEs to be done on a TELRIC basis. It would be improper to artificially lower the price of unbundled network elements just so CoreComm could assemble the piece parts necessary to provide residential service at a lower cost. Mr. Gose acknowledged that CoreComm's decision to focus only on the residential market may simply be a bad business decision because it may not be economical to provide service at rates comparable to those of CBT without having the subsidies provided by business and other services. (Mar. 18, pp.23-24).

III. UNBUNDLED NETWORK ELEMENT COST STUDIES

A. Loops

There are actually six different unbundled loop studies, one for both residence and business lines in each of Bands 1, 2 and 3. (Mar. 4, p. 21). Within each study there are cost estimates for two different types of loop architectures, one that incorporates copper facilities through the entirety of the loop, and one that incorporates the use of digital loop carrier or DLC electronics. Each of these studies is an output from the Loop Cost Analysis Tool ("LCAT") that CBT used to develop its loop costs. (Mar. 4, p. 22). CBT took samples of loops broken down by the bands that are proposed, and identified the length of all of the sampled loops. (MCI Exh. 7). Digital loop carrier technology is used at a threshold of [redacted] feet in Band 1. Thus, CBT looked at all Band 1 sample loops less than [redacted] feet, and calculated the average length of those loops for copper loops. Conversely, CBT looked at all the Band 1 sample loops over [redacted] feet long, developed the average length of those loops, and that is the length used for DLC loops. (Mar. 4, p. 26). Mr. Mette testified that it was reasonable to use the sample because the characteristics of the loop network are not expected to change on a forward-looking basis, since

the FCC's TELRIC methodology requires an assumption that the ILEC's wire enters remain in their existing locations.

Mr. Mette testified that the unbundled loop rates reflect the full economics of scale resulting in CBT's network. These economies are incorporated through the use of all CBT loops in accordance with the "total element" requirement of TELRIC. Characteristics of CBT's outside plant such as cable sizes and types of plant, i.e. aerial, buried, and underground, were extracted from CBT's plant records and discussions with CBT engineers. CBT's assumption concerning the length of the customer drop was based on discussion with its engineers. Information derived from CBT's plant records were used only to obtain characteristics of the network not for investment amounts.

The characteristics of the feeder and distribution networks were then input into LCAT to calculate the cost of the outside plant for average feeder and distribution routes. Mr. Mette consulted with CBT outside plant engineers, principally Mr. Meier, to obtain design criteria for the feeder and distribution cables on the most efficient basis using forward-looking technologies. CBT used forward-looking costs from its vendors for the redesigned, forward-looking network as it will be constructed in the future. (Mar. 3, p. 150). All costs represent the cost of constructing new facilities. (Mar. 3, p. 152). Fill factors and ACFs were applied as discussed supra.

All of these various inputs resulted in specific costs for two different loop types, copper and DLC, which were developed separately for loops used to serve business and residential customers in the three distinct geographic bands. CBT has proposed to charge an average loop rate by geographic band. CBT combined the copper and DLC loop costs into a composite rate according to the proportions of loops with lengths less than and greater than the threshold length. Further, CBT combined the cost of business and residential loop rates into a single loop rate in

accordance with the actual proportion of such loops within CBT's existing network. This is required in order to comply with the FCC rule prohibiting price discrimination according to customer classification.

No party has challenged the general method of development CBT has employed to determine rates for the different loop types. Intervenors' primary challenge to CBT's loop studies pertain to fill factors, which have been discussed above. Beyond fill factors, other issues raised by intervenors include cable trenching costs, pole and conduit factors, the [redacted]% miscellaneous loop investment loading, the use of 100% fiber feeder plant, integrated versus universal digital loop carrier, transmission equipment discounts, the inclusion of the network interface device in the loop costs, and weighting of business and residence loop costs. Discussion of these issues follows.

1. **Cable Trenching Costs**

CBT incurs trenching costs whenever CBT buries cable. CBT has established contracts with third parties who dig the trenches when cable is placed. CBT has one contract that is specific to trenching for buried service wires, i.e. drop wires, and a second contract for trenching related to feeder and distribution cables. The costs for these two contracts are very different. The Spectronics buried service wire contract is for buried drop wire placed from a distribution terminal to the customer network interface device. (CBT Exh. 4, Attachment 6). The A.J. Daniel & Company conduit and buried cable contract is used when placing buried cable. (MCI Exh.9). The $[redacted] figure for trenching, placing and restoring cable assumed in the CBT loop study, includes the $[redacted] "Trenching Unit Rate", the [redacted] "Placing Unit Rate" and the [redacted] "Restoration Unit Rate" from this contract. (Mar. 4, p. 63). This is the minimum cost when digging with a backhoe and placing a cable in a trench and backfilling. These are considered

minimum costs because they are based on ideal conditions. Costs may be higher due to soil content, trench depth, and special restoration requirements. Also, this contract's prices will increase in 1999. The applicable figures contained in Exhibit B to that contract, Items 203A, 310A, and 824, comprise the $[redacted] used for 1999. (CBT Exh. 7, Exhibit 6; Mar. 5, pp. 5-6).

MCI inappropriately argued that the service wire placement contract should apply to distribution cable trenching. CBT recognized the difference between these contracts in its TELRIC cost studies. Since the contracts apply to two different types of outside plant facilities, the TELRIC studies used the appropriate contract costs for the specific outside plant to which the contract applies. It would not be appropriate to use the contract price for trenching buried drop wires and assume that this cost could apply to trenching feeder or distribution cables. Therefore, CBT's TELRIC studies properly maintained this distinction when establishing the cable costs. CoreComm witness Gose reviewed the same contracts as Mr. Starkey, but did not contest CBT's position on trenching. (Mar. 18, pp. 118-20).

2. Pole & Conduit Factors

Pole and conduit factors are used to assign pole and conduit investments to aerial and underground cable investments. The pole and conduit factors were developed based on CBT's total investment in poles, conduit, aerial cable, and underground cable. After assigning CBT's total pole investment to copper and fiber cables, the pole factors were calculated as ratios of CBT's total investment in poles to CBT's total investment in aerial copper and aerial fiber cable, respectively. In the same manner, the conduit factors were calculated as ratios of CBT's total investment in underground conduit to CBT's total investment in underground copper and fiber cable, respectively.

With respect to CBT's proposed investment factors for support structures, power and common equipment, and land and building, the Staff Report recommended that CBT recalculate these factors based on only Ohio plant and investments. MCI witness Starkey made the same recommendation and provided a concept for calculating the support structure factor based on Ohio-only data (MCI Exh. 20, pp. 13-14). Mr. Francis agreed with this concept as a reasonable alternative, but pointed out that he would prefer that CBT develop the factors based on its Ohio plant and investments, rather than a pole count. CBT has agreed that it should limit these calculations to its Ohio investment. (CBT Exh. 7, p. 32-34).

Finally, the original calculation of these factors did not recognize that CBT receives revenue for pole attachments and conduit occupancies. This revenue contributes towards the recovery of the pole and conduit investments. In order to adjust the calculation of the factors, CBT will develop the pole and conduit investment amount that is being recovered by the revenues. This investment amount will be used to reduce CBT's total pole and conduit investments when CBT calculates the pole and conduit factors.

3. [redacted]% Miscellaneous Loop Investment

CBT developed its unit cable investments by "building up" the costs by identifying the specific components that would be required to install the cable. The advantage to this approach is that it explicitly identifies each component of cost that is included in the unit investments. The disadvantage is that it is practically impossible to identify every single item of cost on an itemized basis. Some costs are simply too small to identify individually or others do not occur on every installation. Therefore, CBT included a [redacted]% loading factor as a means to capture the miscellaneous costs that CBT could not itemize on a unit basis. CBT's [redacted]% assumption was based upon discussions with CBT's engineers. (CBT Exh. 6, pp. 24-25; Mar. 4, p. 69-70).

There are numerous types of costs that are included in the loading factor, such as shipping and warehousing costs, unanticipated job interruptions due to emergencies or changes in the weather, easement costs, and garage time costs. In addition, CBT can incur additional costs for cable such as when requesting a cable cut to a non-standard length. Although it is difficult to itemize the amount or frequency of these costs for each job, they represent real costs and should be included in the unit cable investments.

The Staff Report recommends that the [redacted]% loading factor for miscellaneous costs be excluded from the calculation of the copper and fiber optic cable unit investments. Mr. Francis testified that these costs were unreasonable because they lacked sufficient support. (Staff Exh. 4). Despite Mr. Francis' statement, Mr. Mette did provide additional support for these costs. With his testimony in response to the Staff Report, Mr. Mette provided specific cost calculations demonstrating [redacted]% of the markup. (CBT Exh. 6, Attachment 3, Part 1). This calculation showed the costs incurred by CBT for easements and warehousing costs in 1996 for each cable type. The calculation demonstrated that these costs represent [redacted]% of the total installed investment. The remainder of the [redacted]% markup represents intangibles and estimation error, including such things as bad weather allowances. Mr. Francis acknowledged that he did not consider Mr. Mette's analysis in reaching his opinion and that it might change his mind. (Mar. 24, p. 182-83, 186-87).

Mr. Mette also performed a separate reasonableness check on the [redacted]% loading. (CBT Exh. 6, Attachment 3, Parts 2 and 3). This check compared the unit investments used in CBT's cost studies with its actual 1996 investment data. This Exhibit showed that, with the exception of aerial fiber optic cable, the study unit investments were all less than the actual costs incurred by CBT in 1996. If the [redacted]% loading factor was not appropriate, the cost study unit investments

should be larger than the actual unit investment that CBT experienced.

4. **100% Fiber Feeder Plant**

The Staff Report recommended that CBT's unbundled loop cost study should assume that there will be 100% fiber optic cables in the feeder network. For the unbundled loop services in its loop study, CBT assumed that feeder plant would be provided through two technologies. For customers who are relatively close to their serving central office, the feeder plant will be provided solely through the use of copper cables. For customers further away from their serving central office, the feeder plant will be provided through a combination of fiber optic cables and the appropriate DLC equipment. CBT's total feeder cost is the weighted average of the costs of these two serving technologies.

CBT assumed 100% copper feeder cables for customers close to the serving central office because this is the most economical means to serve these customers. The fiber optic cable and electronics option is only viable in the case of the longer loops. For shorter loops, the cost of the DLC electronic equipment is too high to justify fiber optic cable at these lengths. CBT's cost study accurately reflects the use of copper feeder cables for the shorter loops and is consistent with the manner in which CBT's engineering personnel design CBT's outside plant facilities. Therefore, it is inappropriate to assume 100% fiber optic cables in all feeder plant. Making this assumption would increase the cost of CBT's unbundled loops.

No party agreed with the Staff's recommendation, so Mr. Francis reconsidered his analysis and concluded that the costs associated with electronics may cause a fiber DLC system to be uneconomical for short loops. He revised Staff's recommendation to the extent that CBT's copper loops can provide similar quality as that of a fiber system at an equal or lower cost, which he believes it can. (Staff Exh. 4).

5. Integrated versus Universal Digital Loop Carrier

For those loops where the appropriate serving technology is digital loop carrier, CBT assumed the use of universal DLC ("UDLC") in its cost studies. Mr. Meier explained in detail how a UDLC system works (CBT Exh. 21) and CBT will not repeat that detail here. Suffice it to say that such a system presents a DS0 interface that is directly accessible in the central office, and can be easily unbundled and handed to a NEC. CBT uses UDLC for all of its own non-switched services.

Integrated DLC ("IDLC"), on the other hand, as its name implies, integrates the loops directly into the switch. CBT uses integrated DLC technology only for its switched services. The integrated DLC system terminates on a FLM 150 optical/electrical multiplexer, which develops a DS1 interface that is connected to the central office switch. Rather than use loop electronics to create individual loop appearances in the central office, the switch performs this function. Individual loops cannot be isolated in such a system without additional equipment. In an unbundled loop environment, the switch is not available as a means of isolating individual loops. The most advanced integrated DLC systems use the GR-303 protocol, which takes integration a step further. GR-303 uses the remote terminal of the DLC system to perform concentration functions.

Various intervenor witnesses in this proceeding, primarily MCI witness Starkey, have objected to the use of universal DLC technology to develop the rates for DS0 loops. The principal objection to the use of universal DLC is that it requires additional electronics in the central office that are not present in an integrated system. Intervenors recommend that CBT be required to develop its costs for unbundled DS0 loops assuming that integrated DLC equipment is used. CBT disagrees with the use of integrated DLC equipment in its unbundled loop cost studies

for a number of reasons.

First, an incumbent LEC is not required to provide as an unbundled element equipment that it does not already use in its network. CBT does not use the integrated DLC technology for non-switched services. When CBT needs access to a loop outside of a switch, the loop is always provisioned on copper or universal DLC equipment.

Second, if the unbundled loop cost study assumed the use of integrated DLC, it would not be developing the cost of an unbundled loop. Unbundled loops cannot be provided on integrated DLC without additional equipment that increases the cost of an individual loop above where it would be assuming UDLC technology. MCI wishes to ignore these central office electronics. However, as Mr. Meier explained, and as Mr. Starkey, Mr. Gose and Mr. Francis all agreed at hearing, the only way to obtain a DS0 loop from an integrated DLC system is either to "hairpin" the loop using the switch, or to use demultiplexing equipment to derive a DS0 loop channel from a DS1 bit stream. Either method requires additional equipment that would have to be factored into the cost equation.

Hairpinning uses the switch to separate out individual DS0 circuits. The cost of the additional switching resources needed for this purpose are not included in CBT's current cost studies. (Mar. 4, p. 44). The extra costs associated with hairpinning loops out of the switch would be more expensive than CBT's proposal to use universal DLC. (CBT Exh. 21, pp. 5-6). Demultiplexing an individual loop also requires additional electronic equipment in the central office to perform that function. This is essentially what the UDLC central office equipment does. The cost of the demultiplexer and associated equipment would equal or exceed the cost of UDLC equipment.

All of this assumes, although no party has proven, that it is technically feasible to pull

individual DS0 circuits out of an IDLC system. Mr. Meier explained at length in his rebuttal testimony (CBT Exh. 21), the complex technical issues associated with doing this, particularly if the IDLC system is GR-303. While Mr. Starkey cavalierly assumes that GR-303 technology can be unbundled, he has no direct technical knowledge of this and had no answers for the various technical issues Mr. Meier raised. Most importantly, Mr. Starkey admitted that, at best, a DS1 signal could be unbundled from a GR-303 system. Thus, any discussion about using GR-303 is not even a discussion about unbundled loops, but about trying to force sharing of a complex system, and is far afield of the purpose of this hearing, which is to set a price for individual loops.

Even if GR-303 is discussed, Mr. Meier clearly pointed out that sharing a GR-303 system between different carriers is not a simple task. CBT has not done this within its own network and there has been no showing that it is technically feasible. In any case, such a system cannot be used to share individual loops, but really involves the dedication of entire systems to each carrier. The remote terminal in the field must be in constant communication with a GR-303 switch module so that basic functions such as channel assignment and system operations can be maintained. These issues are far too technically complex and untested to address in this forum.

The original purpose of this hearing was to determine the rates for UNEs in the MCI/CBT interconnection agreement. There is nothing in the contract that says MCI is entitled to have an unbundled loop provisioned on an IDLC system. In fact, the parties recognized in the agreement that unbundled loops would not be provisioned on IDLC, let alone GR-303 type equipment. Schedule 9.5 of the agreement,[8] which has been approved by the Commission, provides that if a loop requested by MCI happens to be provisioned on an IDLC system, then CBT will move the loop to a spare physical facility. Only in the event that no spare physical facility exists, can MCI

[8] CBT's agreement with CoreComm has an identical provision in Schedule 9.5, Section 2.1.2. While AT&T has no interconnection agreement with CBT, it has acquired TCG, who does have a contract with CBT containing this

make a bona fide request to have the loop demultiplexed from the IDLC system. The process for bona fide requests calls first for a determination whether the request is technically feasible and, only if so, do we proceed to a process for determining the cost. Clearly, the cost of demultiplexing would have to be included in the price. The additional equipment required to derive a DS0 loop cannot be ignored when there are added costs to perform demultiplexing. The prices to be paid for unbundled loops should not be based upon an assumption of integrated DLC technology that the parties agreed would not be used to provision the service.

The Commission must not require CBT to price unbundled loops as if they were provisioned on integrated DLC. No party has demonstrated on this record that it is technically feasible to unbundle IDLC loops or, even if it was, that the processes that would be required to unbundle IDLC loops would be the least cost technology. Only the UDLC architecture used by CBT in its cost studies supports the provisioning of unbundled loops. The Commission should approve this form of DLC as the only proper means of establishing the applicable rates for unbundled loops.

Staff witness Mr. Francis has only investigated CBT's proposed UDLC architecture and testified that Staff still accepts CBT's rationale for using it. (Staff Exh. 4). However, knowing that CBT is using IDLC for switched services, Mr. Francis thought that it appeared that CBT might be able to provision unbundled loops using IDLC architecture. (Staff Exh. 4). However, Mr. Francis did not know whether this is true, and had no basis for determining whether unbundled loops provided on IDLC technology would be lower cost than UDLC. (Mar. 24, p. 171).

Mr. Francis acknowledged that his knowledge of DLC systems is limited. He stated what he believed to be the advantages of IDLC systems. However, he was unaware of the technical

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same provision.

limitations of IDLC that make its unbundling impractical. The direct integration of IDLC into the switch is exactly what makes it difficult to unbundle. CBT has shown that the only practical way to share a GR-303 DLC system is at a DS1 level (and more likely at an even higher system level) and that it is far more complex than simply handing off a DS1 signal. In essence, both carriers end up sharing a system and there are many technical issues that remain unresolved.

Mr. Francis can only speculate on whether IDLC architecture can be used for unbundled loops. The detailed operational considerations of trying to unbundle loops from an IDLC system were explained thoroughly by Mr. Meier, the only witness in this case with direct technical knowledge of DLC technologies. (CBT Exh. 21). It is not been established by any party to this proceeding that it is technically feasible or lowest cost to provision unbundled loops on an IDLC system.

MCI has also tried to suggest that the only limitation preventing CBT from unbundling GR-303 loops was its inventory tracking system. However, this issue is a red herring, not relevant to whether a loop can be unbundled. The inventory tracking system issue is only relevant to whether the electronic cross-connect capabilities can be used on a Fujitsu FACTR system. Before we can even consider tracking the cross-connects in such a system, we must first determine whether the individual loops (cross-connected or not) can even be unbundled. If they cannot, the cross-connect issue is irrelevant. Mr. Meier has adequately demonstrated that individual loops cannot be unbundled. CBT's inventory tracking system is only an additional reason why IDLC technology is not the appropriate technology of choice in CBT's network and should not be used as the basis for pricing unbundled loops.

MCI witness Starkey also suggested that the FACTR cross-connect system would somehow avoid manual provisioning costs for unbundled loops. Mr. Meier likewise refuted this

point. Whether a loop is provisioned on digital loop carrier or on copper, a physical connection must be made at both the drop terminal serving the customer and at the SAI, where a main feeder pair is connected to a local distribution pair. (Mar. 3, p. 49). The only way to avoid a field visit is if the loop is prewired all the way from the customer premise to the DLC remote terminal site, requiring a line card to be installed, ready and available in the remote terminal. (Mar. 17, p. 161-62). The chances of this occurring are remote.

However, even if one is to assume that all these independent steps have all taken place, intervenors contentions about loop feeder electronics and distribution fills would have to be discarded as well. In furtherance of this same argument about automated cross-connects, Mr. Gose advocated that two pairs to each household ought to be connected through all the ways from the customer to the remote terminal. (Mar. 18, pp. 110-14). This assertion validates CBT's distribution cable design and implicitly validates CBT's distribution fill. However, to carry it out, would also require a significant lowering of CBT's feeder and electronics fills in order to accommodate so many more "standby" loops.

Finally, as Mr. Meier explained, there really is no way to automatically provision an electronic cross-connect on a Fujitsu FACTR system. This must be done one circuit at a time by connecting a computer to the system. Fujitsu does not even make an interface that would allow an OSS provisioning system to control the assignment of individual cross-connects. This idea is nothing more than Mr. Starkey's pipe dream, is totally speculative, and provides no reasonable basis for a TELRIC cost study.

6. Transmission Equipment Discounts

CBT proposed a change to the manufacturer's discounts that would be applied to the price that CBT pays for the transmission equipment used in CBT's TELRIC cost studies. CBT's

TELRIC studies used the base year, 1996, discounts. These discounts are shown in Exhibit 7 to Mr. Mette's September 28, 1998 Supplemental Testimony. CBT's contract with its vendor for transmission equipment depends on the type of equipment purchased, the year that it is purchased, and the total amount of purchases that CBT makes with this vendor. CBT estimates that its expenditures with this vendor will enable CBT to receive the middle level of discounts shown in the second table on Exhibit 7. Based on this table, CBT is proposing to use the discounts shown in the 1999 column of this table. This would provide for an [redacted]% discount and is based upon CBT's purchase of $[redacted] of Fujitsu equipment during 1997 and 1998. This discount represents the midpoint of the discounts over the contract life.

However, there are other restrictions on the application of these discounts. As shown in the notes in Exhibit 7, transmission equipment is classified as either "hardwire" or "plug-in" equipment. Hardwire equipment includes items such as cabinets and common equipment such as power equipment. Plug-in equipment is associated with individual customer terminations on the equipment. As noted in Exhibit 7, the only portion of the hardwire equipment that is subject to these discounts is the shelves. A shelf is the hardwire equipment in which the plug-ins are mounted. Other hardwire equipment such as cabinets do not receive any of these discounts.

In his supplemental testimony (MCI Exh. 21, p. 65), Mr. Starkey contends that CBT should use the discounts applicable to a $[redacted] level of purchases. There is no basis for applying this level of discount. The undisputed evidence is that CBT's purchases qualified for the $[redacted] level discount, but were not sufficient for a $[redacted] level discount. (CBT Exh. 22). The discounts should be applied as suggested by CBT. Mr. Francis agreed that the discount applicable to a $[redacted] dollar level of investment was the appropriate choice for 1999. (Staff Exh. 4). As discussed above, the contract contains different discounts for different types of

equipment. On cross-examination, Mr. Starkey acknowledged that certain equipment receives lower discounts, and that other equipment is not discounted at all. (Mar. 17, pp. 54-58).

7. Inclusion of Network Interface Device (NID) In Loop Cost

The Staff Report recommended that a separate charge be established for the NID and that the cost of the NID should not be included in the cost of the unbundled loop. This recommendation is not consistent with how the Company expects to provision its unbundled loops. It is CBT's forward-looking engineering policy to provision every loop with a NID when the loop is initially installed. Therefore, it is more appropriate to include the cost of the NID in the unbundled loop cost in order to avoid the additional cost associated with establishing a separate rate element for the NID. CBT identified a separate cost component for a NID, but included the NID cost with the cost for the drop because an unbundled loop must be terminated on a NID. No intervenor has indicated an objection to CBT's treatment of the NID and no intervenor has suggested that it would terminate a CBT unbundled loop onto a NEC NID. Therefore, there is no substantial reason to separate the loop from the NID for pricing purposes.

8. Weighting of Business and Residence Loop Costs

CBT's average loop costs were developed in each band separately for loops used to serve business and residence customers. CBT had originally proposed to weight loops [redacted]% business and [redacted]% residential to develop an average unbundled loop rate, expecting that this would be a reasonable projection of the types of loops CBT expected to sell as UNEs. Upon reflection, however, CBT has determined that this would be inconsistent with the TELRIC methodology. The increment that forms the basis for a TELRIC study should be the entire quantity of the network element. (Mar. 4, p. 10). CBT proposes to change its loop studies to weight the cost of business and residential loops according to the actual quantities of each type of loop in its

network. (CBT Exh. 7, p. 37). In this manner, CBT's cost will be based on the total loops provided and be consistent with the Commission's Guidelines V.B.4.b.11 and V.B.4.b.12.

Such a change is obviously necessary to comply with TELRIC. No witness has presented any reason why this should not be done, only noting that the loop weighting should be done separately for each rate band. Mr. Gose used the actual weights himself in his efforts to analyze CBT's loop studies. (Mar. 17, pp. 12-13; Mar. 18, p. 88). CBT agrees and intends to do the loop weighting according to the loop population contained in each rate band.

In addition, Mr. Gose pointed out that non-recurring charges for loops made assumptions with regard to field visits, based on the same business and residence customer ratio as was originally used in the loop studies. As Staff witness Francis recommends (Staff Exh. 4), CBT agrees that, as the relative weighting of business and residence loops changes, so should the percentage of field visits used to develop the loop establishment NRCs.

B. Switch Based Cost Studies

1. Unbundled Local Switching

Unbundled local switching offers access to the switching capability of CBT's switches through a line side or trunk side port. Through a line side or trunk side port, the purchasing carrier has access to the features, functions, and capabilities of the switch. The unbundled local switching studies developed the costs and the rates for a number of different switch port types, local switching usage, and various features. Nonrecurring charges were also calculated. Port rates were developed by examining the monthly costs associated with providing the port as an unbundled element.

CBT's basic cost methodology for developing switching costs relies on two Bellcore cost models. These two models are the Switching Cost Information System ("SCIS") and Bellcore's

Network Cost Analysis Tool ("NCAT"). The local switching usage cost was calculated through the NCAT model on a per minute basis by combining the setup, average call duration, and cost per minute for CBT's forward looking mix of central office switches. Fill factors used in the local switching cost study were applied to the line card connections used to provide unbundled ports.

There has been very little comment on CBT's switching studies, which may be due to the fact that most NECs are installing their own switches. AT&T witness Webber withdrew his prefiled testimony which had contended that CBT should not have based its studies on "average" type runs. (Mar. 22, p. 58). Mr. Mette explained the difference between the marginal and average options for developing costs with NCAT and SCIS. (CBT Exh. 4, pp. 3-6). These cost models have two primary options, referred to as a "marginal" study or an "average" study. In basic terms, a marginal study can be thought of in terms of developing the cost of the next unit produced. An average study, however, can be thought of in terms of the average cost of all units produced. CBT's original studies are average studies and are the appropriate means to calculate the TELRIC costs for UNEs because they consider the total quantity of the element, including joint and shared costs in accordance with Guidelines 5.B.2.a.3 and 5.B.4.c.3.i.

CBT's original TELRIC studies had excluded the cost of central office switch features from the cost of the unbundled ports because CBT was proposing that these optional features would be purchased based on the resale price for these features. The Staff Report challenged the manner in which CBT originally proposed to recover feature costs associated with ports. To correct this item, CBT agreed with the Staff Report recommendation that feature costs be included with the port charge. However, the features included with the port will be dependent on the type of port that is purchased. For example, an Analog Basic port cannot have the same features included with it as can be included with an ISDN Basic (BRI) port. The list of the

features that will be included with each port is shown in Attachment B of Exhibit 3 to Mr. Mette's Supplemental Testimony. (CBT Exh. 7). The price for the unbundled ports will include the TELRIC cost of each feature. CBT provided cost studies for the features in response to PUCO Data Request 54. Staff witness McCarter concurs with CBT's new proposal. (Staff Exh. 6).

Further, AT&T had objected to the inclusion of access to local operators and directory listings with each port. CBT's original TELRIC studies included both the cost of directory listings and access to local operators in the cost of the unbundled ports. This was done since CBT believed that the NECs would want local operator assistance and a directory listing for each port that they purchased. CBT agreed to remove these items from the port charges and create separate charges for access to local operators and directory listings. Staff witness McCarter agrees with this recommendation.

The only remaining issue raised with respect to CBT switching studies has been fill factors, which were addressed in the section on fill factors above.

2. Transport and Termination of Local Traffic

The transport and termination study was done to develop the rates CBT will charge NECs for the transport and termination of their local traffic on CBT's network. The costs for Transport and Termination were developed using NCAT. CBT's original studies used both originating and terminating usage data in order to develop these costs.

Staff recommended that the costs associated with originating a call on CBT's network should not be included in the calculation of cost for transport and termination of local traffic. Since the Transport and Termination rates are only applicable to terminating usage, Staff recommended that CBT use only terminating usage to develop these costs. This issue was first identified in PUCO Staff Data Request 94. Subsequently in PUCO Staff Data Request 97, CBT

provided a revised NCAT study that only used terminating usage data, (CBT Exh. 12), following the methodology CBT expects to use for the final cost study for transport and termination. (Mar. 4, p. 5). The terminating usage study simply develops the Transport and Termination costs using those facilities and equipment that are needed to transport and terminate the terminating usage. There are no costs associated with originating usage included in these cost studies. When CBT files its cost studies in compliance with the Commission's Order in this proceeding, CBT will follow this methodology.

3. Transit Service

In its objections, MCI argues that the rate resulting from the Transport and Termination Study should be the rate which is applied to transit traffic. As noted by Staff witness McCarter, this would be inconsistent with the MCI/CBT Arbitration Award in which the Commission decided that access rates are appropriate for transit service. (Staff Exh. 6). Furthermore, the Commission's Guidelines state that access rates are the appropriate rates for transit service.

4. Unbundled Tandem Switching Cost Study

Staff witness Soliman questioned whether CBT had done a tandem switching study. She was not clear which TELRIC study that Mr. Mette believed had provided the unbundled tandem switching capability and she recommended that an additional tandem switching study be provided by CBT. CBT's unbundled tandem switching study is included with its Transport and Termination study. CBT developed a recurring rate per minute for tandem switch usage. CBT believes that it has performed all required tandem switch studies. There are no additional tandem features for functions CBT provides to NECs. CBT urges the Commission to find that it has provided all required TELRIC studies for tandem switching within its Transport and Termination cost study.

C. Interoffice Transport

CBT provided cost studies for Common Transport and for Dedicated Interoffice Transport, which included both dedicated interoffice transport circuits between CBT wire centers, and entrance facilities between a CBT wire center and a NEC location.

1. Common Transport

CBT's proposed rate structure for Common Transport was developed on a per minute basis. Page 82 of the Staff Report stated that the rate structure for Common Transport should be developed on a per minute per mile basis, similar to the rate structure for Tandem Transport Facility Mileage. Common Transport includes a combination of local tandem (to be distinguished from access tandem) switched and direct routed traffic. (CBT Exh. 5, Attachment 2, Part 4). CBT objected to the Staff's recommendation because the path a call will take in its network is not predetermined or recorded when the call is made. Therefore, it is not possible to determine whether the call will route through the local tandem or route over direct facilities between switches. Without this information, CBT would be forced to recover switching costs on a per mile basis. CBT believes that this is not appropriate. This differs from the Tandem Transport Facility Mileage charge, which contains no switching costs and recovers only interoffice facilities between the access tandem and an end office. In light of this explanation, Ms. McCarter changed Staff's recommendation with respect to this study and now concurs with CBT's proposed method of recovery. *(Staff Exh. 6, p. 7).*

AT&T witness Webber asserted that CBT's common transport study was flawed because it developed separate rates for common transport among and between CBT end offices and for transport between a CBT end office and CBT's single access tandem. Mr. Webber provided no basis why CBT should not be allowed to develop separate rate elements. He admitted during

cross-examination that the cost of the two types of common transport could have very different costs, such that using a blended rate would create arbitrage opportunities for transport services. He agrees that CBT has developed a rate for common transport between end offices, (Mar. 22, p. 69), and that CBT's tandem transport and termination rate captures the same costs as would be included in common transport between the access tandem and an end office. (Mar. 22, pp. 70-71).

Mr. Webber relied solely on the FCC's definition of "common transport" in its Third Order on Reconsideration as his basis for objecting to CBT's rate structure. (Mar. 22, p. 67-68). The only restriction the FCC placed on rates was that they be based on usage, which CBT's rates are. (Mar. 22, pp. 71-72). Nothing in the FCC's order indicated that only a single rate element was permissible for common transport. To the contrary, like any other UNE, the FCC has permitted ILECs certain flexibility to deaverage rates. The FCC has never said that common transport rates cannot be deaveraged. (Mar. 22, p. 73). Staff witness McCarter is in agreement with CBT's proposal to have two separate common transport rate elements and rejects Mr. Webber's criticism. (Staff Exh. 6, p. 6-7). The Commission should approve CBT's study as presented.

2. Dedicated Transport

In general, these cost studies followed the same methodologies and inputs that were used in the other cost studies that were filed with the Commission in this proceeding. Investments for particular interoffice transport rate elements were identified and then converted into monthly rates through the application of annual charge factors. The interoffice transmission rate elements fall into four categories: Entrance Facilities; Dedicated Interoffice Transport; Optional Features and Functions; and Non-Recurring Charges. Mr. Mette's studies contain descriptions of the

methodology used to develop each cost study input and documented the calculations. Due to the size of the files and number of calculations involved in the Dedicated Interoffice Transport studies, copies of these studies were provided to intervenors on electronic computer disks.

a. Entrance Facilities

An entrance facility is a circuit from a NEC location to its serving CBT central office. (Mar. 4, p. 123). CBT's interconnection agreements also define entrance facilities in this manner. CBT developed unbundled entrance facility rates for DS1, DS3, OC-3, OC-12, and OC-48 circuits. The Entrance Facility study is based on the use of fiber optic transmission equipment. (Mar. 3, p. 163). CBT also identified three predominant configurations that are used to provide Entrance Facilities: a) one CBT central office ("CO") and one non-CBT location ("point-to-point"); b) one CBT CO and two non-CBT locations; or c) two CBT COs and two non-CBT locations. (Mar. 4, p. 125). CBT then identified the SONET rings and the point-to-point type arrangements that the company uses to provide Entrance Facilities to develop the characteristics such as fiber lengths of the three different configurations. (Mar. 4, p. 124).

CBT did not have forecast information from any NEC, but knew that many of the IXCs are NECs. Therefore, it used IXCs as a surrogate to estimate the types of facilities to be used to provide these services. (Mar. 4, p. 129). CBT calculated the cost of each of these configurations and then generated a weighted average cost based on the number of existing entrance facility circuits in each configuration. Mr. Mette included the multi-node rings in the study because they are the serving method that is used most frequently. Customers often want this arrangement because it provides greater security for their traffic whereas the point to point scenario provides no route diversity on the cable. (Mar. 4, p. 134). IXC customers typically request route diversity

because it is critical to maintain service at all times. (Mar. 4, p. 135). The multiple location scenarios are also used because they increase the utilization of the equipment. (Mar. 4, p. 135).

The cost of fiber optic cables was developed in much the same manner as CBT developed these costs in the loop studies. CBT developed the cable investments, used fill factors to unitize the investment, included support structure for poles and conduit, and applied annual charge factors to develop the recurring costs. Electronic equipment costs were developed in much the same manner as loop electronics. CBT used a [redacted] percent fill factor for interoffice electronics. (Mar. 4, p. 136). CBT obtained information from its engineering department about the utilization of its SONET rings, which was approximately [redacted] percent. From discussions with engineers and marketing personnel, CBT's expectation is that a higher fill would be expected over the life of that equipment. The expectation was that at least [redacted] or [redacted]% would be used, so for purposes of these studies CBT rounded [redacted]% up to [redacted]%. (Mar. 4, pp. 136-37).

Mr. Mette provided a generic template illustrating the various calculations used to develop the electronics costs. (CBT Exh. 7, Attachment 11). Once the fiber optic cable and electronics costs were developed for the various means to provision the service, these costs were averaged based on the expected proportion that each technology will be used to provide the service. CBT proposed a flat monthly rate to recover the cost of both the fiber facilities and the SONET electronic equipment.

Ms. Soliman agreed with CBT's entrance facilities study, with the exception that she recommended that CBT establish separate rates for each of the three configurations. She also recommended that the rate for the point-to-point configuration should only apply to existing point-to-point dedicated facilities. For newly constructed SONET rings, she recommends that CBT develop new TELRIC-based rates that appropriately reflect the cost of providing such

facilities. The point-to-point entrance facility rate would be used as an interim rate until CBT can develop rates for newly constructed entrance facilities. CBT accepts this recommendation.

b. Dedicated Interoffice Transport

The Dedicated Interoffice Transport rate elements consist of fixed charges per month and charges per air mile between two CBT central offices. The fixed charge per month recovers the costs of the electronics required to provide the service. The per mile charge recovers the cost of outside plant, which includes all fiber optic cables and support structure, i.e., poles and conduit. CBT's forward looking technology for all interoffice outside plant is based on fiber optic transmission equipment. To perform this study, Mr. Mette assumed that CBT's interoffice network is constructed on a forward-looking, least cost technology basis, using fiber optic transmission equipment and SONET rings. (Mar. 4, p. 142). CBT developed rates for DS-1, DS-3, OC-3, OC-12 and OC-48 transmission speeds.

In the study, CBT used its existing central office locations and considered all Ohio interoffice circuits in its network. (Mar. 3, p. 164). CBT's methodology for developing its costs was based as follows:

1) Assuming interoffice circuits would be provisioned on SONET ring technology, CBT identified the inventory of potential rings that would be used.

2) CBT developed an inventory of interoffice circuits carried over the SONET rings identifying each circuit, the wire centers it connects, and the rings that the circuit traverses.

3) For each of the rings, CBT determined the electronics equipment and fiber optic facilities needed to provision the ring. The total cost of the electronics equipment was divided by the capacity of the ring to calculate the cost per circuit. Similarly,

the total cost of the fiber optic facilities needed to provision each ring was divided by the capacity of the ring to calculate the fiber optic cable cost per ring.

4) CBT assigned the electronics and fiber optic cable cost to each circuit based on the rings required to transport the circuit and the cost of these rings.

5) CBT developed the average electronics costs per circuit based on all of the individual circuit costs.

6) CBT developed an average cost per mile for fiber optic cable based on the total air miles in the network.

The design of CBT's interoffice network is a sector / node design where sector offices home to node offices, which are all interconnected. (Mar. 4, p. 145). A map contained in the study shows the sector / node relationships. (Mar. 4, p. 146). CBT's network has two major hubs, the [redacted] central offices, and a number of other node offices. (Mar. 4, p. 162). All node offices have direct paths to both hub offices. However, any particular circuit will only be provisioned through at most one hub office. The cost study shows the two different ways that a particular circuit could be provisioned (Mar. 4, p. 164) and it reflects the average cost of the two routes. (Mar. 4, p. 166-67).

For purposes of the cost studies, CBT assumed a forward-looking network architecture to comply with the TELRIC requirements. (Mar. 17, p. 18). Mr. Mette's cost group worked with CBT's engineers to identify how CBT's network would be designed on a 100% fiber SONET basis, and what rings would be needed to carry that traffic. The engineers provided that information in terms of all the different SONET rings that would be needed to carry that traffic. The engineers considered the total demand for all services, dedicated and switched, and designed the rings to meet that demand. (Mar. 4, p. 152). Switch and trunk interoffice engineers use

traffic engineering theory to convert traffic into a number of trunks required, and use the number of trunks to determine what speed rings to use. (Mar. 4, p. 152). Interoffice engineers work in terms of trunks rather than in terms of calls. (Mar. 4, pp. 152-53). Once traffic volume is turned into trunks or circuits, that number of trunks or circuits determines the network design. (Mar. 4, p. 158).

No intervenor challenged any of CBT's investment inputs used in the interoffice transport studies. (Mar. 19, p. 6). MCI witness Ankum raised several challenges to the structure of the study. CoreComm witness Gose echoed many of the same issues. Staff witness Soliman made several recommendations for changes to the studies. CBT will address each of these in turn.

Dr. Ankum raised three concerns, none of which are valid. He claimed that CBT's study did not use least-cost routing; that the sizing of SONET rings was improper; and that rates should be deaveraged. (Mar. 16, p. 16). Dr. Ankum's comments were generally based on a superficial analysis or isolated examples, which were not representative of the study as a whole. Even if Dr. Ankum's issues could be considered valid concerns, they are so minor as to be of negligible impact.

i) Least-Cost Routing

Once the necessary rings were designed, Mr. Mette applied CBT's interoffice routing rules to determine how each circuit would be provisioned between the two central offices connected by the circuit. For a given circuit, the cost study's spreadsheets take the electronic and fiber investments and calculate the cost of that circuit. (Mar. 4, pp. 150-51). Costs were calculated at a per-DS3, per-DS1, and per-DS0 level. (Mar. 4, p. 159).

Because Mr. Mette assumed there was an equal chance of using a route through either of the two hubs, (Mar. 17, p. 22), Dr. Ankum suggests that the study is not a "least-cost" study. He

says the failure to pick the cheaper of the two routes "considerably" raised the cost of transport. He could not quantify "considerably," except "large enough to make a difference to the client." (Mar. 17, p. 23). Dr. Ankum suggested a formula, intended to pick the least cost route.[9] The DS1 study examined 3,184 circuits. (CBT Exh. 22, p. 30). The complete circuit table was provided on computer disk. (Mar. 17, p. 24). Although Dr. Ankum contended that virtually all circuits would have a lower cost using his formula, he never performed the calculation to see if that was true. (Mar. 17, p. 26).

Dr. Ankum stated that his correction would generate "substantial efficiencies" (MCI Exh. 18, p. 9), even though he really did not know whether there would be any significant impact. (Mar. 17, p. 27). Dr. Ankum only pointed out one example, a circuit from the Avondale to Rossmoyne central offices, where it made any difference which way the circuit routed. (Mar. 17, p. 28).

Dr. Ankum agreed that one could determine the exact impact by calculating the total investment as Mr. Mette had costed these routes, and comparing that to the total investment as Dr. Ankum says it should be costed. However, Dr. Ankum did not do these calculations. (Mar. 17, p. 29). Mr. Mette did these calculations, which resulted in a total investment from his method of $[redacted] and $[redacted] from Dr. Ankum's method. This is a total difference of only $[redacted] or 0.[redacted]%. (CBT Exh. 22, p. 30). Only [redacted] of the [redacted] circuits experienced any change.

Dr. Ankum's suggestion also requires that there be available capacity on the lower cost route. (Mar. 17, p. 33). If least cost routing requires more traffic on that route than its capacity, it cannot be routed in this manner without either adding a second ring, or increasing the size of

[9] If used literally, his formula would result in selecting routes which don't connect. Therefore, he proposed an additional constraint in amended testimony to correct that problem, but never did provide the new formula. Mr.

that ring. (Mar. 17, p. 35). If splitting the traffic would be cheaper than adding capacity to send all the traffic on one route, then that's the network configuration that should be used. (Mar. 17, p. 40).

Mr. Gose echoed Dr. Ankum's least-cost routing ideas, but did not know their impact either. (Mar. 19, p. 22). He appears to believe that the decision on which of the two paths to route a given circuit can be changed dynamically according to traffic patterns. (Mar. 19, pp. 23-24). This demonstrated his lack of understanding of dedicated transport, which takes a fixed path and does not change. Mr. Gose presented his own attempt at demonstrating a price disparity between two routes, but chose alternative circuit paths that did not even exist in CBT's network. (Mar. 19, pp. 40-41).

Ms. Soliman expressed a concern over averaging of alternate routes for interoffice circuits, much like Dr. Ankum's "least-cost" routing argument. Ms. Soliman recommended that the Commission require CBT to revise its interoffice study model to reflect the actual route used for each circuit and provided two alternative methods: 1) identify the hub office through which each interoffice circuit is actually routed and include only the costs associated with that route; or 2) use the probability of a circuit being routed through the [redacted] hub or the [redacted] hub instead of the equal probability assumption used by CBT. Such a probability would be calculated based on the total DS3 capacity available over SONET rings passing through each hub office.

As Mr. Mette indicated in rebuttal testimony, this issue has a very small dollar impact on the overall cost of interoffice transport. To use Ms. Soliman's first alternative in a cost study is problematic in that the actual route of a given circuit is not known until it is actually provisioned. Therefore, unless every circuit is individually traced in CBT's network to determine its route, which is administratively burdensome and unnecessary, it is impossible to set overall transport

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Mette has provided a correct version of Dr. Ankum's proposed formula. (CBT Exh. 22, p. 30).

element prices until this information is known. If her second "actual probability" method is used, the results are virtually identical to what CBT has already done. Mr. Mette explained in his rebuttal testimony that the probability of a circuit routing through [redacted] and the probability of routing through [redacted]. (CBT Exh. 22, p. 32). This is almost the same as the [redacted]% [redacted] assumed in CBT's study. In addition, there are a small number of circuits in the network for which there is any cost difference between the alternative routes. Changing the weighting to [redacted]%/[redacted]% makes virtually no difference over a total of over $[redacted] in investment.

ii) Sizing of Rings

Dr. Ankum's second point is his claim that bandwidth on a higher capacity ring costs more in CBT's cost study than bandwidth on a lower capacity ring. (MCI Exh. 18, p. 10). However, he agreed that an OC-12 ring has a lower cost per DS1 circuit than an OC-3 ring, and an OC-48 ring has a lower cost than an OC-12 ring per circuit when all rings have the same number of nodes. On all rings in Mr. Mette's study that have the same number of nodes, that comparison holds true. (Mar. 17, p. 41).

Dr. Ankum was also forced to admit that multi-node rings are more expensive than two node rings, both in real life and in Mr. Mette's study. A ring that only connects two offices needs two sets of electronics, but a ring that connects three offices needs three sets of electronics and handles only the same number of circuits. The ring that has three offices costs more than the ring that has two offices because the electronics investments are larger. (Mar. 17, p. 42).

Dr. Ankum discussed an example of two rings that are used in CBT's study. These are designated as rings 140 and 149. His example proves nothing as these rings are not only different speed rings, they have different numbers of nodes. (MCI Exh. 18, p. 12). He was comparing a

seven-node OC-48 ring to a two-node OC-12 ring, so it is not surprising that the ring with seven sets of electronics would cost more than one with two. (Mar. 17, p. 43). In fact, ring 140 is not even in Ohio and is not used in calculating the interoffice costs. (CBT Exh. 22, p. 34). Dr. Ankum could not show any ring in Cincinnati Bell's cost study where a higher speed ring was more expensive than a slower speed ring, when both rings serve the same number of offices. (Mar. 17, p. 45).

He suggests that Cincinnati Bell should have to prove that a multi-node ring is more efficient than a series of two office rings before connecting three offices with a single ring. (Mar. 17, p. 46). CBT did so at the hearing. With two individual rings, there are two sets of electronics on each ring, or four total sets of electronics. Using one ring for three offices requires only three sets of electronics. So the price of having two separate rings is an additional set of electronics and additional fiber. (Mar. 17, p. 47). If the traffic between these three offices is within the capacity of a single ring, using a three-node ring is cheaper on a per-circuit basis. (Mar. 17, p. 48). A multi-node ring is also more efficient than a series of two-node rings because a circuit can go directly between any two offices on the same ring. If CBT used separate two-node rings, many circuits would have to traverse two separate rings and have a higher cost. (Mar. 17, p. 49).

Dr. Ankum spent a significant amount of time on redirect positing an example with respect to ring 299, a three node OC-48 ring, which he claimed could be replaced more cheaply with three OC-12 rings. However, Dr. Ankum's example relied upon two conditions that he did not know to be true, that the traffic on that ring could be accommodated on three OC-12 rings, and that no leg on the ring required more capacity than an OC-12. (Mar. 16, pp. 194, 197). More importantly, despite his general statement that larger rings could be replaced with smaller rings more cheaply, and after having the study for months to review, this single ring is the only one he

could find to question.[10] (Apr. 15, p. 29). On further examination, it became apparent that there were no OC-12 rings in the study that could be replaced more cheaply with OC-3 rings and OC-48 rings are always cheaper than OC-12 rings with the same number of nodes. (Apr. 15, p. 26-28).

Mr. Gose raised a different sizing issue. He contended that a concentration ratio should be applied to CBT's dedicated interoffice transport. (CoreComm Exh. 2, pp. 80-81). Mr. Gose's proposal made no sense and he clearly did not understand the difference between switched and dedicated circuits. Dedicated trunks are the units to be priced by CBT. It is the user of the circuit who determines what degree of concentration its switch will use over that trunk. Concentration ratios have absolutely no relevance to dedicated circuits. (Mar. 19, pp. 59-60). Mr. Gose's issue is akin to asking what gas mileage a particular highway can attain. The highway does not have a gas mileage, the vehicles that travel over it do.

iii) Deaveraging

Dr. Ankum's third topic was the issue of averaging by rate band. The fixed rate attributable to the electronics portion of interoffice transport has been deaveraged by rate band. The change Dr. Ankum recommends is to deaverage the fiber mileage rate by band, as well. However, Dr. Ankum did not have an answer as to how to cost fiber when a circuit crosses rate bands. (Mar. 17, p. 51). Since many circuits cross rate bands, CBT believes it is far more reasonable to treat all fiber mileage the same and to only deaverage the fixed electronics costs.

CoreComm witness Gose went to a further extreme and recommended that each interoffice circuit be priced individually. This would cause CBT to create hundreds of different rates, which is not practical. (CBT Exh. 22, p. 33). Even Dr. Ankum agreed that it is simpler to have one price that applies to all. (Mar. 17, p. 52).

[10] The same ring was involved in his least-cost routing discussion.

iv) Kentucky Circuits

Staff witness Soliman generally found Mr. Mette's dedicated transport cost studies acceptable, generally agreeing with his basic assumptions and finding them to be consistent with the TELRIC methodology. Apart from fill factors and averaging of alternative circuit routes, discussed above, her only concern was the treatment of Kentucky rings and circuits.

Ms. Soliman appears to believe that CBT's cost study included SONET rings that are located in Kentucky or which connect locations in Ohio and Kentucky. As Mr. Mette indicated in his rebuttal testimony, there are no Kentucky costs included in the study. (CBT Exh. 22, p. 34-35). Kentucky rings and circuits were listed on the inventory tables in the cost study, but the costs of these rings and circuits did not form a part of the study. Ms. Soliman recommended that CBT rerun its study excluding all circuits that are entirely located in Kentucky. This step is unnecessary, as those circuits were not considered in the study. However, Ms. Soliman is recommending that the study include circuits that have one end terminating in Ohio and the other end in Kentucky. (Mar. 24, p. 38-39).

As explained in Mr. Mette's rebuttal testimony, including these interstate circuits in an Ohio-only cost study is problematic. Due to the differences between the Ohio and Kentucky portions of the network, it is to be expected that a comparable Kentucky interoffice transport study would also include these circuits and would result in a different price being established for the same circuits. Further, there is a question whether any individual state commission has jurisdiction to establish rates for what are clearly interstate circuits. CBT suggests in the alternative that the Ohio to Kentucky circuits should be excluded altogether, or that they be treated separately and not averaged in with Ohio only circuits.

3. Optional Features and Functions

CBT's Optional Features and Functions study developed rates for various add/drop functions associated with its unbundled OC-n dedicated transport element. CBT also developed TELRIC rates for multiplexing equipment (DS1/DS3 and DS0/DS1). Mr. Mette described the methodology CBT used to develop the cost for the Optional Features and Functions rate elements. CBT developed the cost of the electronic equipment used to provide these features in the same manner as the electronics equipment used for Entrance Facilities, using the calculation template. Ms. Soliman agreed with CBT's study for optional features and functions, subject to Staff's recommended modifications for ACFs, fill factors, and other factors.

4. Non-Recurring Rates For Unbundled Dedicated Transport

CBT developed separate non-recurring costs for DS1, DS3, and OC-n unbundled interoffice transport and entrance facilities, as well as the various add/drop and multiplexing functions. Mr. Mette did a reasonableness check by comparing the results to nonrecurring cost studies CBT had done in 1992 for DS1 access channel terminations. The costs here were comparable to the costs in that study. (Mar. 5, p. 39).

Ms. Soliman expressed concerns that CBT did not consider the impact of access to CBT's OSS systems on the steps taken to process an order for dedicated transport. CBT assumed the same methods CBT uses to process access service requests today.

Ms. Soliman recommended that CBT establish rates for manual processing of orders, with separate per-order and per-element rate elements, and a different set of rates for processing orders via electronic access to CBT's OSS. She also suggests that CBT should submit a TELRIC study for non-recurring costs associated with DS0 interoffice circuits.

Mr. Starkey repeated his criticisms of CBT's nonrecurring cost studies as discussed above with respect to loops. However, CBT fully documented the basis for all of its interoffice transport nonrecurring charges. Even Mr. Gose commented on the "fantastic detail" of those studies. (Mar. 18, pp. 203, 205).

Ms. Soliman disagreed with MCI witness Starkey's recommendation that the Commission establish interim non-recurring rates equal to 50% of CBT's proposed rates pending a separate docket to establish permanent non-recurring rates. As Ms. Soliman noted, there is nothing in the record that demonstrates that cutting CBT's proposed rates by 50% is more representative of CBT's forward looking economic costs than the rates proposed in CBT's studies. All parties had the opportunity to investigate the proposed rates and there is no reason to put off the establishment of permanent rates.

5. **Dark Fiber**

CBT proposed to provide unbundled dark fiber only to the extent that CBT has facilities available in the specific route requested, and to price it on an individual case basis. (CBT Exh. 7, Exhibit 3). Staff witness Soliman agrees with CBT's proposal to provide dark fiber only to the extent that CBT has it installed in the requested route as being consistent with the CBT/MCI Arbitration Award. (Staff Exh. 3). However, Ms. Soliman disagreed with pricing dark fiber on an ICB basis and recommended that CBT develop a uniform rate for dark fiber, which may be deaveraged by rate band. CBT agrees to develop a price per foot for fiber and apply that price to the specific length of fiber that is requested by the NEC, assuming that the dark fiber exists.

Ms. Soliman disagreed with Dr. Ankum's recommendation that CBT should provide dark fiber free of charge if the Commission deviated from the fill factors advocated by Mr. Starkey. She recognized that Dr. Ankum was assuming that MCI pays for the spare facilities through the

application of fill factors, but could not obtain access to the spare facilities. To the contrary, the spare facility is equally available to all carriers at the same rate and all carriers proportionally share the benefit of the spare facility.

D. Physical Collocation

1. Collocation Cost Studies Methodology

Mr. Mette provided TELRIC cost studies for all Collocation rate elements. The collocation cost studies identify the forward-looking incremental costs of providing collocation. (CBT Exh. 7, p. 9). Collocation studies included Floor Space Occupied, Cable Splicing and Pulling, Space Reservation Charges, Conduit, Riser/Cable Space, Power Consumption, Power Delivery, Security Access - Entrance Door and Cage, Cage Construction and Materials, Core Drill Floor in Cages For Diverse Route, Central Office Build-Out Charges, and Cross-Connects. (CBT Exh. 7, pp. 9-10). Copies of the cost studies for Floor Space Occupied, Cable Splicing and Pulling, and Space Reservation Charges were attached as Exhibits 8, 9, and 10 to Mr. Mette's September 28, 1998 testimony. Mr. Mette's testimony described the services provided to a NEC with these rate elements and the methodologies used to develop the TELRIC cost for these elements. In general, the cost of the collocation elements were developed by determining the investment required to provide the particular element per unit of demand and then applying the appropriate annual charge factor to convert the investment to a monthly cost. Where labor rates are applicable, CBT's standard labor rates were used. (Mar. 4, p. 83). Further detail on each of the individual studies follows. The Commission should find the methodology CBT used to construct its physical collocation studies reasonable.

Mr. Gose proposed an across the board 75% reduction of CBT's collocation rates. (CoreComm Exh. 2, p. 59). Mr. Gose cannot explain any mathematical basis for this suggestion.

(Mar. 18, p. 190). His only explanation is based on rough variance percentages amongst rates in different central offices. (Mar. 18, pp. 190-91). However, he even proposes to reduce the lowest rates by 75%, even though there is no rational connection between a variance and an overall price reduction. (Mar. 18, p. 192). Ms. Soliman rightfully rejected CoreComm witness Gose's recommendation to reduce all of CBT's collocation rates by 75%. There was no evidence in the record to contradict CBT's cost studies.

While Ms. Soliman agreed that developing rates for collocation on a central office-by-central office basis is reasonable, she recommended that for new collocation sites, CBT charge on an interim basis the lowest approved rate for a collocation element. This interim rate would be in effect until CBT receives Commission approval for its TELRIC-based rates for collocation services in such central office.

2. Floor Space Occupied

Floor Space Occupied is the charge for space that collocators will occupy in CBT's central office. The results of the Floor Space Occupied study are shown on CBT Exhibit 7, Attachment 8, pp. 1-4.

CBT used the 1997 edition of the R.S. Means Building Construction Cost Data guide to develop its recurring floor space charge. CBT conservatively used the median cost figures. The R.S. Means' Building Construction Cost Data guide utilizes reported cost information to estimate the current square foot cost of constructing a telephone central office building. The R.S. Means Building Construction Cost Data guide relies on actual reported costs incurred by contractors constructing telephone central office buildings during the past ten years. MCI witness Ankum contended that the square foot investment figure contained in the R.S. Means publication provides the costs associated with a fully equipped central office and, therefore, already accounts for the

recovery of costs related to CBT's Central Office Buildout Charge ("COBO"). R.S. Means updates these figures annually utilizing current cost information, where applicable. However, R.S. Means contains little recent data for telephone central office buildings. R.S. Means has not received any recent data from telephone companies on central office buildings since, at best, the early '90s. (Mar. 4, p. 86). It is highly unlikely that any data in the R.S. Means guide pertains to multi-tenant telephone central offices, as they did not exist at that time.

CBT established its floor space charge based on the amount of square feet of central office floor space made available for collocation. CBT applied a "common area factor" to the floor space investment to calculate the investment associated with one square foot of collocation space. The common area factor was calculated based on the ratio of the total usable space for collocation divided by the total collocation area. As explained by CBT witness Mette, in order to provision a 100 square foot cage, one needs to account for common space, including building obstructions and access to the spaces. CBT's building engineers determined that there are only certain limited areas to construct collocation cages in the central offices and they arrange them in the best way they can. (Mar. 4, p. 90). The amount of available space varies from office to office, so CBT calculated a separate common area factor for each central office in which there is collocation. (Mar. 4, p. 89; CBT Exh. 7, Exhibit 8, p.2). Dr. Ankum and Mr. Gose acknowledged that each central office is different and will, in reality, have a different amount of common area. (Mar. 16, pp. 55-56; Mar. 18, pp. 176-77).

CBT developed the floor space charge based on the ratio of the space available for collocation to the square footage actually used by NECs to collocate their equipment. In order to provision 100 square feet of net usable space in a central office equipment room, depending upon the central office, CBT needs a total of [redacted] to [redacted] square feet of gross space in the collocation

room to account for common areas. This grossed up square foot factor reasonably permits CBT to recover its actual expenses involved in provisioning floor space to collocators to account for building obstructions and access areas. CBT applied its building ACF to this investment to calculate the monthly building cost associated with the collocation floor space for each CO. CBT also calculated the land investment associated with the collocation floor space for each CO by applying a land-to-building factor to the building investment. CBT proposes to recover costs through a monthly recurring rate per square foot.

MCI's Dr. Ankum agreed that collocation is limited to the space actually available, as incumbent LECs have no obligation to build onto their central offices to create new space. (Mar. 16, p. 54; FCC Order ¶ 585). However, MCI and CoreComm urge the Commission to reject CBT's common area factors. MCI proposes a common area factor of 1.3 (Mar. 16, p. 56), while CoreComm proposes a factor of 1.5 (Mar. 19, p. 176). MCI's proposal would only allow CBT to recover the expense involved in providing 100 actual square feet of central office space to collocators, plus minimal space for entry purposes. (Mar. 16, pp. 59-60). While Mr. Gose's proposal of 1.5 was slightly more generous, it was not based on any construction guide or architectural basis, but on a drawing Mr. Gose did himself. (Mar. 18, p. 176). The MCI and CoreComm proposals would, in effect, ignore the fact that collocation arrangements require substantial common areas in the collocation room due to various floor arrangements in CBT's central offices. While Dr. Ankum cited a building standard, it merely described a method for measuring common space. It did not provide any standard for a common area ratio and nothing suggests that it was intended to apply to telephone company central offices. (Mar. 16, pp. 62-63). Dr. Ankum is not an architect and has never designed a building.

Staff witness Soliman testified that Staff generally finds CBT's methodology for

calculating the floor space cost for collocation purposes to be reasonable. However, she recommended that CBT update the study using the 1999 edition of the RS Means Building Construction Costs Data and the 1998 Ohio-specific land and building investment to determine the land-to-building ratio. CBT agrees to make these updates. Ms. Soliman agreed that CBT's common area factors were reasonable. She noted that the Commission approved a common area factor of 2.0 for Ameritech. CBT's common area factors range from [redacted] to [redacted], depending upon the central office, with only office one exceeding a factor of 2.0. Rather than establish arbitrary common area factors, CBT has based its common area factors on the characteristics of each office in which a NEC may wish to collocate. For all of these reasons, the Commission should find CBT's common area factors reasonable.

3. Cable Splicing and Pulling

Cable splicing provides for the splicing of collocator provided outside plant fiber optic cable to riser cable in CBT's central offices. The cable pulling is the cable pull from the manhole to the cable vault, and the cable pull from the cable vault to the NEC's designated collocation space. Cable Splicing and Pulling charges were determined by applying CBT's labor rates to estimates, provided by CBT's Network Engineering & Construction group, of the amount of time it takes to complete these jobs. The results of the Cable Pulling and Splicing study are shown on CBT Exhibit, Attachment 9, page 1. Mr. Gose questioned this study, but had no evidence that the times in the study were inappropriate. (Mar. 18, p. 203).

4. Space Reservation Charges

Space reservation allows NECs to reserve additional collocation space in CBT's central offices. This was determined by applying CBT's labor rates to estimates of the amount of time required to perform this activity. The results of Space Reservation study are shown on CBT

Exhibit 7, Attachment 10, page 1.

CBT proposes a one-time charge for space reservation to cover the administrative expenses associated with checking, verifying, designing, documenting, and tracking all reservations. CBT has reasonably justified the labor estimates associated with the space reservation and ordering process. No intervenors have provided any evidence to contradict CBT's reservation charge proposal and it should be approved as proposed. Staff witness Soliman agreed with CBT's reservation charge, only recommending that the labor rate be updated to 1999 levels.

CBT also charges collocators an Application Fee but CBT did not provide cost study support for this rate. Staff witness Soliman agreed that it is not unreasonable for CBT to charge an application fee, but objected to the lack of a cost study to support the application fee. She recommended that CBT provide proposed rates and cost support to be reviewed and approved by the Commission. CBT will provide this support as part of the compliance filing process.

5. Conduit

Conduit costs were calculated on a per duct foot basis by developing two separate costs, one for the West Seventh Street central office and another for all other central offices. CBT's collocation conduit TELRIC study calculates the monthly cost to use conduit space between the designated manhole and CBT's cable vault on a per duct foot basis. CBT calculated the cost based on a sample of recent conduit installation jobs done by CBT. The costs represent the material costs, CBT labor costs, and contractor costs for conduit construction. The sample contained 16 conduit installation jobs associated with 11 different COs. Two jobs were associated with West 7th. The conduit costs associated with the 10 non-West 7th COs were averaged to determine the conduit cost per foot for Avondale, Evendale, and Rossmoyne,

although these offices had no conduit jobs included in the sample.

Mr. Gose accused CBT of "gerrymandering" conduit cost data, but had absolutely no basis for that charge. (Mar. 18, p. 198). He had no basis to contend that any of the data was inaccurate. (Mar. 18, pp. 196, 200). He even acknowledged that one of the best predictors of future cost is recent construction experience. (Mar. 18, p. 197). Ms. Soliman recommended approval of CBT's proposed collocation conduit rate for the West 7th CO. Ms. Soliman recommended that CBT update its study to include any recent conduit installation jobs or jobs associated with COs where collocation exists. If there are no such jobs, Ms. Soliman found it reasonable to adopt CBT's proposed rates.

6. Riser/Cable Space

The Riser/Cable Space study calculated two separate costs, one for the West 7th Street central office and another for all other central offices. The costs are calculated on an average cost per foot basis. Mr. Gose had no basis for disputing the study. (Mar. 18, p. 200). Ms. Soliman's only comment on the riser space study was to rerun the study using Staff's recommended ACFs and to apply TPI factors to bring investment to 1999 cost levels.

7. Power Consumption

CBT calculated the total cost of DC power, AC commercial power, and AC emergency power consumption per fuse AMP consumed. The total cost was determined by adding the cost of material and labor to the land and building costs associated with the power equipment in a given central office. Staff witness Soliman recommended approval of this rate element subject to recalculating land and building investments using 1999 RS Means Building Construction Cost Data, 1998 Ohio-specific land and building investments to determine the land-to-building ratio in the study, and the Staff-recommended ACFs.

8. Power Delivery

The Power Delivery study computed the cost on a per lead basis for the cables from the power distribution panel in CBT's cage in the collocation area to individual collocator cages. This includes the capital cost for the installed cable plus associated maintenance expenses. CBT proposes a one time non-recurring charge assessed on a per power lead basis. Staff witness Soliman recommended that CBT recover the power delivery cost using two separate rate elements: a non-recurring rate that recovers the capital cost of the power cable only; and a recurring rate element to recover the operating expenses associated with the power delivery service. CBT believes that its proposal is simpler and recommends that the Commission approve this rate structure.

9. Security Access - Entrance Door and Cage

Security Access Charge – Entrance Door & Cage is a charge per key. Ms. Soliman recommended that the Commission approve CBT's proposed rate for security access per key.

10. Cage Construction and Materials

Cage Construction and Materials is the average cost for a collocation cage. This rate element is a charge that includes the incremental costs of building the actual collocation enclosure. CBT determined its cage construction and material costs based on its cost of constructing a cage in the Rossmoyne central office. CBT proposes to recover its cage construction and material costs through a uniform one-time charge to the collocator on a per cage basis. There is no dispute on the record as to the cost of CBT's collocation cages or the method by which they were calculated.

Staff witness Soliman agreed that it is reasonable for the one-time cost for the cage construction to be recovered through a nonrecurring charge as proposed by CBT, but also

recommended an additional recurring charge, to allow CBT to recover recurring operating costs (income taxes, maintenance expenses, and administrative expenses) associated with the collocation cage. She also recommended that, if a collocator discontinues the use of the cage before the end of its economic life and another collocator re-uses that cage, CBT should make a pro-rata refund to the first collocator equal to the amount it charges the second collocator, which should be the unamortized value of the cage. CBT is amenable to Ms. Soliman's suggestions.

11. Core Drill Floor in Cages For Diverse Route

Core Drilling is the cost to drill additional holes in concrete floors to allow cables to pass between floors. CBT proposes a nonrecurring charge for core drilling for diverse routing on a per 4" core basis. The cost associated with this service represents the labor cost for drilling one hole. Staff witness Soliman recommended approval of this rate.

12. Central Office Build-Out Charges

The Central Office Buildout (COBO) charges are forward-looking incremental costs incurred entirely for purposes of making collocation available to CBT's competitors and which would not have been incurred to provision a single-tenant central office. The costs included in the COBO will not be recovered through the floor space charge, which, as discussed above, is based upon single-occupant central offices and does not include accommodations required for multi-tenant occupancy.

The nonrecurring charges for the COBO were determined on a central office by central office basis by calculating the COBO costs for each of its central offices that have collocators, West 7th Street, Avondale, Evendale and Rossmoyne. When CBT built out the collocation areas, it established project numbers for each of these central offices to track the cost of each project. As invoices for work came into the company, they were reviewed by the engineers and then

processed through CBT's accounting system for payment. To do the study, Mr. Mette obtained records of the costs charged to the project numbers and gathered the supporting documentation. (Mar. 4, pp. 105-06). For each central office, CBT calculated the total COBO costs by compiling the costs that it incurred for various functions provided by various contractors or performed by CBT personnel in that office. For each building, CBT determined the incremental costs to design, build, and deliver the physical collocation space.

The significant items that the COBO charge is designed to recover include regular and emergency ingress/egress for secondary tenants, proper environmental conditions including installation of ductwork directly to the collocated space, dedicated power receptacles, grounding equipment, additional alarm coverage, lighting, power distribution, and construction of a security separation between the collocation space and CBT's equipment. These are the types of items that are in the COBO as it contains the items that are needed to make the area ready for collocation. (Mar. 4, p. 96). Tab B of the COBO study categorizes the costs in the study. (Mar. 4, p. 97). The COBO cost study includes a summary description of the study, tabulations of invoices, and copies of most of the invoices that were submitted to CBT by outside vendors. (Mar. 4, p. 102).

MCI's witness, Dr. Ankum has no reason to doubt that it was necessary to spend this money to make the space ready for collocation, and has no basis to say that any of the costs were inappropriate. (Mar. 16, pp. 64-65).

CBT proposes to charge each collocator a pro rata portion of the COBO, based upon the relative proportion of available collocation space used by that collocator. Consistent with its interconnection agreements, CBT's proposes to charge the initial collocator the full COBO charge. Subsequent collocators are charged a pro rata share, which is refunded to predecessor

collocators. For example, the second collocator would pay one-half of the COBO charge and this money would be refunded to the first collocator that had paid 100% of the COBO charge. The third collocator would pay 1/3 of the COBO charge, half of which would be given back to each of the first two collocators, and so on.

MCI's witness, Dr. Ankum, challenges CBT's contention that the modifications proposed to be recovered in the COBO charge are warranted. Dr. Ankum claims that costs recovered by the COBO charge are already included in the per square foot investment costs identified in the R.S. Means' guides. The R.S. Means cost estimate does not include any of the costs that are necessary to make a central office a multi-tenant arrangement. Central offices were typically built in the past as single-tenant buildings. The COBO is the cost to make the building a multi-tenant arrangement so that collocation can exist in the building. (Mar. 4, p. 98). Dr. Ankum contends that the costs in the R.S. Means guide include recently constructed central offices, which should include offices designed for collocation. However, Dr. Ankum could not substantiate his claim with respect to the R.S. Means data and, to the contrary, CBT's evidence indicated that there was no recent R.S. Means data. (Mar. 16, p. 73). Therefore, it is extremely unlikely that the R.S. Means data included any buildings initially constructed to accommodate collocation. In addition, Mr. Mette provided evidence of CBT's most recent experience with constructing a new single tenant central office, the cost of which on a per square foot basis far exceeded the estimates in the R.S. Means guide. Dr. Ankum indicated that this would be useful information. (Mar. 16, p. 74). CBT's COBO charge, necessary in order to convert a single tenant building to multi-tenant usage is reasonable.

Staff witness Soliman generally agreed with CBT's proposed COBO charges. While she generally preferred that CBT recover the COBO costs on a monthly recurring basis, that would

require CBT to develop demand forecasts for collocation in each CO included in the collocation study during the study period. Ms. Soliman agreed that it is not unreasonable for CBT to recover its COBO costs as a non-recurring charge applicable to all collocators on a pro-rata basis. This approach is consistent with the FCC local competition rules, 47 C.F.R. §51.509(g) as well as the Commission's Guidelines, § V.B.2.b. She also found it reasonable for CBT to develop collocation rates on a per CO basis and recommended approval of CBT's proposed rate structure and cost recovery mechanism. However, Ms. Soliman recommended that CBT only charge the subsequent collocators their pro rata share of COBO costs less depreciation. She also recommended that the COBO charge be assessed on a per 100 square foot basis instead of a per collocator basis.

Ms. Soliman agreed that the COBO charges, which are necessary to convert CBT's existing central offices to multi-tenant buildings, were consistent with TELRIC methodology. In her opinion, no intervenor presented evidence of a reasonable estimate of the forward looking cost of building a multi-tenant central office. The only evidence in the record, CBT's incremental cost to construct a single-tenant CO building, plus the incremental cost to modify its buildings to accommodate collocators, provided the only reasonable estimate of the forward looking cost of providing collocation services.

In order to convert a single-occupant building to multi-tenant use, the company will incur some level of building preparation charges. It is an undisputed fact that, until passage of the 1996 Act, CBT had no new entrants physically collocated in its central offices in Ohio. It is undisputed that CBT had to undergo some level of construction in order to convert its existing central offices into multi-tenant facilities. It was undisputed on the record that the requested COBO charges were all necessary to make CBT's central offices available for collocation. It was undisputed that all of the expenses included in the COBO charge were actually incurred by CBT in the ordinary

course of business. No intervenor presented any evidence that there was any impropriety in any of the amounts CBT included in the COBO charge. Thus, even if it were so inclined, the Commission would have no basis to adjust the amount of the COBO charge CBT proposes to recover from intervenors. CBT should be able to recover its reasonable forward-looking construction costs, including labor, in order to accomplish this conversion of its central offices.

13. Cross-Connects

Cross-connects are provided through a combination of central office electronics and copper or fiber optic cables. The cost of the central office electronics was developed based on the capacity of the electronics equipment used to provide the cross-connect. The cost was developed using the template shown in CBT Exhibit 7, Attachment 11. Costs for copper or fiber optic cables were developed based on the length of cables required and the capacity of the cable that is utilized.

A cross-connect is the connection from the collocation cage back to CBT's portion of the central office, either at the mainframe or at a piece of transport equipment. (Mar. 4, p. 108). CBT proposes three types of cross-connect rate elements: DS0, DS1, and DS3. CBT developed one set of rates for each cross-connect element applicable to the West 7th Street central office and another set of rates applicable to any of the remaining COs. (CBT Exhibit 9-21). Cross-connects are provisioned differently in the West 7th Street office because the collocation area could not be placed near the CBT mainframe and CBT transport area. Since the distance between the collocation area and the transport area exceeds the distance parameters on how far a DS1 and DS3 signal can be transported, CBT had to install transmission equipment in order to transport the DS1s and DS3s from the collocation area back to the transport area. No intervenor provided any engineering basis to contest that this cross-connect was provisioned in the most cost-effective

manner. (Mar. 16, p. 75; Mar. 18, pp. 185-8). The cost of that equipment is reflected in the costs for the West 7th Street central office DS1 and DS3 cross-connects. (Mar. 4, pp. 111-12). In the other offices, the DS0 cross-connect is provided on copper facilities and the DS1 and DS3 are provided on coaxial facilities. (Mar. 4, p. 111).

Staff witness Soliman agreed that CBT's proposal for different cross-connect rates for different COs is reasonable and consistent with the Commission's guidelines and the FCC rules. CBT's method of providing cross-connects in West 7th is reasonable and uses the forward looking, most efficient technology to meet the expected demand. Ms. Soliman recommended its approval by the Commission.

Ms. Soliman expressed concerns regarding the fill factors. For cross-connects in West 7th Street CO, CBT estimated the DS0 cable fill factor of [redacted]% as the levelized fill factor over the economic life of the plant. Her first concern was that CBT determined the fill factor over the economic life of the plant and not the expected fill factor during the study period. Her second concern was that the calculation did not reflect the effect of reinforcement. She recommended that the DS0 cable fill factor be re-calculated to reflect growth in demand up to the mid-point of the study period including the impact of facility reinforcement, considering 1999 as the first year of the study period.

For cross-connects in all COs, CBT assumed the same fill factor for both DS1 and DS3 cross-connect equipment ([redacted]%). As discussed earlier, Ms. Soliman recommended that this fill factor be adjusted to the same fill factors she recommended for DS1 and DS3 equipment in the interoffice network. CBT disagrees with this recommendation. The fill factors for cross connects are driven by NEC demand for cross connects from their collocation cages. The interoffice network, however, is driven by the demand for all interoffice circuits. As such, the demand for

the interoffice network would show different characteristics than cross connect demand for collocation. (CBT Exh. 22, p. 15).

While Ms. Soliman agreed that developing rates for collocation on a central office-by-central office basis is reasonable, she recommended that for new collocation sites, CBT charge on an interim basis the lowest approved rate for a collocation element. This interim rate would be in effect until CBT receives Commission approval for its TELRIC-based rates for collocation services in such central office.

E. Directory Assistance Database

This study calculated the costs to provide directory listings to NECs for both the initial load and subsequent daily updates. (CBT Exh. 7, Attachment 2). When a NEC buys a copy of the CBT directory assistance listing database the NEC is provided the customer name, address, telephone information so that they can provide directory assistance. (Mar. 5, p. 58). Mr. Mette described how he conducted the directory assistance listing study. (CBT Exh. 7, p. 12). CBT projected costs for four years and used present value factors to calculate a levelized cost over that period. (Mar. 5, p. 70). The projected costs and demand data were developed by CBT's Operator and Directory Services group, the organization that maintains the database.

The group that maintains the database also has responsibility for functions associated with publishing the white pages. (Mar. 5, pp. 60-61). CBT removed Closing Costs, which are costs associated solely with its printed directories, based on records of the number of hours associated with that work. (Mar. 5, pp. 61-64). The remaining costs of database maintenance were evenly divided as joint costs between the directory assistance database and the database used to print directories. (Mar. 5, p. 75). CBT then added to the directory assistance database costs two computer tasks unique to the directory assistance database, one to convert the listings into an

industry standard F20 listing format, and the other to add zip code information. (Mar. 5, p. 76). CBT projected the number of listing updates that it expects to handle annually and the number of carriers it expects to purchase the database. This information was used to develop a rate per listing for both an initial load of the entire database and the subsequent daily updates for listings that change from day to day.

The [redacted] parties that CBT assumed would want access to the database were [redacted] and [redacted] that CBT had planned to use to provide a platform for the database so that other NECs could query it. (Mar. 5, p. 71). The Operator and Directory Services group developed their demand projections based on their familiarity with the market for directory assistance throughout the United States. (Mar. 5, p. 72-73).

The initial load creation cost was calculated by dividing CBT's total annual directory assistance database cost by the number of annual updates and multiplying that rate by the total number of listings in the initial load. The results of this study are shown on pages 3 and 4 of the Directory Listings cost study. These costs are before the addition of the 13% common cost allocator. (Mar. 5, p. 75). The initial load provides a copy of the entire database. The update charge would be assessed for every updated listing, provided on a daily basis as customer listings change. (Mar. 5, p. 76).

MCI witness Starkey arbitrarily allocated only 10% of the joint database maintenance costs to the directory assistance database. He merely reviewed outdated job descriptions, which provided no information on the times spent on various job functions. (Mar. 17, pp. 108-09, 113). Mr. Starkey acknowledges that CBT's own supervisors have a much better understanding of how CBT employees spend their time. (Mar. 17, p. 112). In addition, Mr. Starkey arbitrarily assumed that five carriers would be sharing the database. He presented no objective evidence that this

would occur.[11] Mr. Starkey has also contended that the cost of the initial load of listings should be provided essentially for only the cost of copying the database onto a tape. (Mar. 17, pp. 102-03). This proposal totally ignores the majority of the costs that CBT incurs to create the database and assure its accuracy. The listings contained in the initial load go through precisely the same process as the updated listings, yet Mr. Starkey attempts to avoid paying for any of those costs. (Mar. 17, pp. 95-100). Finally, Mr. Starkey attempts to compare the rates resulting from CBT's cost study with rates determined by the Texas Commission for SBC and by the New York Commission for Bell Atlantic/NYNEX. However, no real details about how those rates were calculated were introduced into evidence or even made available to CBT. (Mar. 17, pp. 104-08). The reasonableness of CBT's studies cannot be determined by a comparison of prices without knowing how the other prices were determined. There was no evidence of the process those other companies used to create and maintain their databases or how the significant size difference between CBT and those companies impacts the cost studies. Mr. Starkey's criticisms of CBT's cost study should be rejected as unfounded.

Staff witness McCarter found CBT's cost study to be reasonable, with the exception that she recommended that CBT's demand assumption of [redacted] carriers be increased to four. CBT disagrees that there is evidence this number of carriers will be purchasing the database. CBT would note that one of the [redacted] carriers it assumed in its demand forecast was the "dipping" platform and that no carrier is using that means of access to the DA database. Thus, to date, the only known demand for the database, besides CBT itself, is MCI.

F. Unbundled Network Element Combinations

CBT provided a TELRIC study for the loop/transport combinations it has included in its

[11] As demonstrated during cross-examination, Mr. Starkey's calculated results actually had the effect of assuming [redacted] carriers would share the database, as he divided the calculated cost by a factor of five without adjusting for the

existing interconnection agreements.[12] These combinations were the Loop/Transport combination #1 (VG interface), which combines an unbundled loop and dedicated unbundled DS0 interoffice transport, and Loop/Transport combination #2 (DS1 interface), which combines an unbundled loop and dedicated unbundled DS1 transport. Both loop transport combinations involve only voice grade loops. (Mar. 4, p. 171). The difference between the two combinations is whether the loops are handed to MCI at a DS0 or DS1 transport level. (Mar. 4, pp. 171-72).

For Combination #1 (VG interface), CBT proposes to charge the applicable recurring and non-recurring unbundled two-wire analog voice grade loop rates, the recurring and non-recurring rates for the unbundled dedicated DS0 interoffice transport,[13] and the recurring and non-recurring DS0 cross-connect rates. (Mar. 4, pp. 175-77). For Combination #2 (DS1 interface), CBT proposes to charge the applicable recurring and non-recurring unbundled two-wire analog voice grade loop rates, the recurring and non-recurring rates for the unbundled dedicated DS1 interoffice transport, the recurring and non-recurring DS1/DS0 multiplexing rates, and the recurring and non-recurring DS1 cross-connect rates. (Mar. 4, p. 178). The Loop/Transport combination #1 study is where CBT developed its rate for dedicated DS0 interoffice transport. This study was conducted in the same manner as CBT's DS1 and DS3 interoffice transport circuits, but was based upon the DS0 interoffice circuits in CBT's network.

No intervenor has contested the manner in which CBT developed its combination study. Whatever challenges have been made to the proposed rates are based solely on issues that have been addressed separately with respect to either loops or interoffice transport. Similarly, MCI's objections to the NRCs associated with the loop/transport combination costs are the same issues

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fact that CBT's cost study had already divided the cost by a factor of [redacted]. (Mar. 17, pp. 115-18).

[12] As CBT noted at the outset, depending upon the results of the FCC remand proceeding on the definition of UNEs and further proceedings in the Eighth Circuit, CBT may not continue to offer these combinations.

[13] During the hearing, Mr. Mette found a mistake in MCI Exh. 15, which compiled the loop/transport costs. On

that were raised separately with respect to loop and interoffice transport NRCs.

Staff witness Soliman found the structure of these cost studies to be reasonable, however, she expressed the same concerns regarding CBT's DS0 interoffice transport study as she raised with respect to the DS1 and DS3 interoffice transport studies. In addition, she recommended that CBT have separate NRCs for manual and electronic orders and that NRCs be broken into the same type of per-order and per-UNE structure, as discussed above with respect to NRCs.

G. Rate Bands

CBT has proposed to price its loops according to three geographically separate rate bands. These bands are identical to those contained in CBT's most recently approved alternative regulation plan. MCI objects to CBT's proposed rate band boundaries and recommends that the Commission require CBT to create a separate band containing only its West 7th Street Central Office. MCI suggests recombining all other current Rate Band 1 offices with offices currently included within Rate Band 2 to form a new Rate Band 2. CBT objects to this proposal. CoreComm agreed with the bands as CBT established them. (Mar. 18, p. 10).

Section V.B.2.a.6. of the Commission's Guidelines allows an ILEC the option to establish different rates for loops in at least three defined geographic areas that reflect geographic cost differences based on loop density. CBT's proposal reflects geographic cost differences based on loop density. Mr. Francis agrees that CBT's rate bands are reasonable and consistent with the TELRIC rules. (Staff Exh. 4). Mr. Francis also agreed that MCI's proposal would be reasonable, and he also described a third alternative, which would be to create four rate bands by separating the West 7th Street Central Office and leaving the remaining rate bands alone. Mr. Francis opined

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the per-mile rate, the data request included the DS0 transport rate instead of the appropriate DS1 transport rate. (Mar. 4, p. 184).

that from a cost perspective, any of the these three alternatives would be reasonable and consistent with § V.B.2.a.6. of the Commission's Guidelines.

CBT believes that it alone has the right to establish its rate bands. The Commission's Guidelines say "[a]n ILEC may establish different rates for elements in at least three defined geographic areas." So long as CBT's proposed rate bands are reasonable, as Mr. Francis says they are, they should be approved. The Guideline goes on to say that, to establish such rate zones, the ILEC may use "other cost-related zone plans established pursuant to state law, or another cost-related zone plan that creates a minimum of three cost-related zones approved by the Commission." In the alternative regulation phase of this proceeding, CBT presented the exact same rate bands as it is proposing for TELRIC purposes. CBT decided to have three bands for retail services so, therefore, believed it was appropriate to have the same structure in the unbundled elements when it did those studies. (Mar. 4, p. 35). All parties stipulated to those rate bands for retail purposes and the Commission has approved them. While the intervenors stated that their consent to the retail bands did not constitute agreement that these bands were appropriate for TELRIC, the proposed bands have been established under state law (R.C. § 4927.04). Therefore, they are a proper basis for establishing rate bands for TELRIC.

CBT believes that it would be inappropriate to impose a different set of rate bands on CBT for wholesale purposes than are used in CBT's alternative regulation plan. This point finds support in recent action by the FCC. On May 7, 1999, the FCC on its own initiative issued a stay of its rule 51.507(f), the federal version of the geographic deaveraging rule. In the Matter of Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, FCC 99-86. As part of its reasoning for the stay, the FCC noted that various deaveraging policies are being considered in different proceedings. The FCC stated: "Applying different standards for,

or degrees of, geographic deaveraging in different contexts might create arbitrage opportunities or distort entry incentives for new competitors." Id. at ¶ 6. To create different geographic bands for CBT for TELRIC purposes than were set in its alternative regulation case would invite such arbitrage opportunities for NECs and would be inappropriate.

H. Additional Studies To Be Filed and Compliance Runs of Existing Studies

The Staff Report listed a number of cost studies that CBT had not performed at that time. (Staff Exh. 10, p. 83).[14] The Staff Report recommended that additional studies be filed within three months after the Commission's decision is issued in this proceeding. Ms. Soliman's testimony continued to list a subset of this list as studies she believed CBT still needed to provide. (Staff Exh. 3, p. 5).[15] CBT acknowledges that it has not yet completed all TELRIC cost studies for all unbundled network elements. However, CBT has now completed some of the additional TELRIC studies listed in the Staff Report and Ms. Soliman's testimony and disputes whether it should be required to provide certain others.

CBT has provided cost studies for Physical Collocation, Dedicated Transport Services, Tandem Switching and Combinations. CBT has already addressed the fact that its tandem switching rate element is a part of its transport and termination study. With respect to Advanced Intelligence Network, or AIN, CBT had worked with MCI through an implementation team to identify the specific AIN elements that would be offered, but has had no recent contact from MCI (or any other carrier) on this topic. Insufficient information exists regarding the elements to be provided and the demand for those elements. Therefore, CBT cannot reasonably provide this study at this time. Staff witness Soliman recommended that, if CBT and MCI have not identified

[14] This list included Physical Collocation, Virtual Collocation, Dedicated Transport Services, Access to Signaling System 7 (SS7), Advanced Intelligent Network (AIN), Access to OSS Functions, Tandem Switching, 64Kb Loops, 1.54Mb Loops, Access to E911 Service, Pole Attachment and Conduit Occupancy, Access to Directory Assistance, Dark Fiber, Combinations Agreed to by CBT.

[15] Ms. Soliman's updated list included Unbundled Tandem Switching, Advanced Intelligent Network (AIN),

the required elements two months before the due date for submitting the cost study, then CBT and MCI should submit a letter to the Commission reporting on the status. CBT does not object to this proposal, but believes it is MCI's responsibility, if it still wishes to purchase AIN as a UNE, to begin this discussion with CBT.

CBT also questions the request that it provide a TELRIC study for Pole Attachment and Conduit Occupancy. The rates for these services were established in CBT's Commitment 2000 Stipulation and are calculated in accordance with an FCC formula established by a separate statute. The TELRIC methodology is not applicable.

Many of the rate elements that apply to Physical Collocation also apply to Virtual Collocation. For example, the cost of Floor Space will be identical. However, other elements for Virtual Collocation are dependent on the specific equipment that a NEC requests CBT to collocate in its central offices. Since CBT has not received any requests for Virtual Collocation to date, CBT cannot develop any additional Virtual Collocation rate elements besides those that apply to Physical Collocation. Therefore, CBT cannot address additional collocation rate elements until it receives a bona fide request.

With respect to Access to OSS Functions, CBT does not believe this would be a separate cost study. As described above with respect to new costs, a portion of these costs should remain in the ACFs, a portion should be assigned directly to certain UNEs, and the remainder should be included in the nonrecurring service order charge.

CBT acknowledges that it has not yet provided a cost study for Access to Signaling System 7 (SS7), 64Kb Loops, 1.54Mb Loops, Access to E911 Service, Access to Directory Assistance, and Dark Fiber. Those cost studies will be provided as part of the compliance portion of this once all the parameters are set. (Mar. 4, p. 170).

Virtual Collocation, Access to Unbundled SS7, Access to OSS Functions, and Unbundled Dark Fiber.

Based upon the Commission's determinations on the various input parameters addressed above, CBT expects to rerun its TELRIC studies in order to determine the final rates for the individual UNEs. Because of the volume of studies and work that will need to be done, and CBT's limited personnel resources, CBT requests that it be allowed 90 days from the date of the Commission's Order in this matter in which to complete the revised and new studies.

IV. CONCLUSION

CBT has presented a substantial case in support of its rates for interconnection and unbundled network elements. CBT has met every objection to its methods and procedures for performing cost studies, either by refuting the criticisms of intervenors and Staff and substantiating why its cost studies were done correctly, or where intervenors and Staff have raised legitimate issues, by accommodating or adapting to the suggestions. CBT urges the Commission to approve its proposed methods for developing its TELRIC rates, that the Commission enter an Order establishing the parameters to be used by CBT in performing compliance runs of its cost studies, and granting CBT 90 days in which to submit such revised studies.

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CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing was served upon the following parties this 28th day of May, 1999.

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