EXHIBIT TKM-1T

**BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

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| **In the Matter of the Continued Costing and Pricing of Unbundled Network Elements, Transport, Termination, and Resale** | **Docket No. UT – 023003** |

**TESTIMONY**

**OF**

**TERESA K. MILLION**

**ON BEHALF OF**

**QWEST CORPORATION**

**JUNE 26, 2003**

## EXECUTIVE SUMMARY

My name is Teresa K. (Terri) Million and I present the cost studies associated with the various recurring issues under consideration in this Docket. My testimony discusses the TELRIC principles and Qwest's compliance with them in the context of the FCC rules. Qwest's cost models and cost studies produce forward-looking, least-cost long run incremental cost results based on replacement of the entire network, given existing wire center locations. My testimony provides support for the validity of Qwest Corporation's proposed rates for the following:

- ITPs (Interconnection Tie Pairs);
- UNE (Unbundled Network Element) Loops;
- High Capacity Loops;
- Subloops;
- Transport and Shared Transport;
- Multiplexing;
- Unbundled Dark Fiber;
- Switching; and
- Trunk Ports.

My testimony, as well as that of other Qwest witnesses, describes the Qwest Integrated Cost Model ("ICM") and discusses the changes/updates recently incorporated into certain of the ICM modules. The ICM is an integrated cost model that calculates the *recurring* Total Element Long Run Incremental Cost ("TELRIC") for the major unbundled network elements ("UNEs") and interconnection services. These elements include the unbundled loop, switching and transport. In addition, my testimony presents stand-alone TELRIC studies for dark fiber, interconnection tie pairs ("ITPs") and low side channel performance.

The ICM cost results, as well as the results of the additional TELRIC studies, as summarized in Exhibit TKM-2, should be used by the Commission to set recurring prices for Qwest's UNEs and interconnection services.

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## IDENTIFICATION OF WITNESS

**Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

A. My name is Teresa K. (Terri) Million. My business address is 1801 California Street, Room 2050, Denver, Colorado 80202.

**Q. PLEASE IDENTIFY YOUR EMPLOYER AND EXPLAIN YOUR POSITION AND RESPONSIBILITIES.**

A. I am employed by Qwest Services Corporation as a Director, Service Costs/Cost Witness in the Policy and Law department. In this position, I am responsible for preparing testimony and presenting Qwest Corporation's cost studies in a variety of regulatory proceedings.

**Q. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION?**

A. Yes. I submitted direct testimony regarding the recovery of OSS (Operational Support Systems) costs in Part A of Docket No. UT-003013, as well as direct and rebuttal testimony in Part B and Part D.

## PURPOSE OF TESTIMONY

**Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

A. The purpose of my testimony is to present Total Element Long Run Incremental Cost ("TELRIC") data in support of each of the recurring costs being addressed in this cost docket. This data forms the basis for the recurring pricing proposals outlined in the testimony of Mr. Bill Easton and Mr. Craig Morris. Exhibit TKM-2 summarizes the results

of the TELRIC studies that Qwest is filing. The actual cost studies, models, and documentation are provided in my cost study workpapers filed electronically on CD as Exhibit TKM-3.

**Q. ARE OTHER QWEST WITNESSES PRESENTING COST TESTIMONY IN THIS PROCEEDING?**

A. Yes. Mr. Dick Buckley presents a discussion of the cost methodology for the Loop Module in ICM, Mr. Dennis Pappas presents testimony in support of the network assumptions in the Loop Module, and Ms. Marti Gudi presents testimony regarding Qwest's cost factors, depreciation rates and cost of money.

## SUMMARY OF TELRIC PRINCIPLES

### TELRIC Principles

**Q. PLEASE SUMMARIZE THE OVERALL ECONOMIC PRINCIPLES THAT ARE APPLIED IN QWEST'S TELRIC STUDIES.**

A. TELRIC asks what it would cost to replace and operate the telephone network today using the most efficient technology that is currently available, taking as given both the basic geographical design of the network and the rest of the world outside the network. Qwest's TELRIC studies identify the forward-looking direct costs that are caused by the provision of an interconnection service or a network element in the long run, plus the forward-looking incremental cost of shared facilities and operations. The studies identify total element costs – the average incremental cost of providing the entire quantity of the element. The

assumptions, methods, and procedures used in the Qwest cost studies are designed to yield the forward-looking costs of replacing the telecommunications network.

**Q. HOW IS THE CONCEPT OF LONG RUN CONSIDERED IN THE QWEST TELRIC STUDIES?**

A. Qwest's TELRIC studies consider a time period over which all inputs are avoidable. In this context, long run does not relate to a specific period of time (e.g., five years, ten years, etc.) but refers to a time period long enough that all inputs, including investments, can be avoided. From a practical standpoint, this means that in a long run study, all direct investments related to the network element are considered to be avoidable, and the costs associated with these investments are included in the TELRIC study results.

**Q. PLEASE EXPLAIN HOW THE TELRIC STUDIES IDENTIFY REPLACEMENT COSTS FOR THE TOTAL ELEMENT.**

A. Qwest's TELRIC studies consider the costs of a network that is "built from scratch," assuming the existing location of network "nodes" or switches. These long run studies identify the total "replacement" costs of serving total demand, rather than the costs of adding equipment to an existing network to meet a small increment in demand. Thus, the studies consider the efficiencies associated with building a network to serve total demand, assuming a single carrier.

In Qwest's TELRIC studies, the increment studied is the total quantity of the network element. Therefore, the studies calculate the average cost for all units of output, rather than

the marginal cost of the next or last unit of output, consistent with the FCC's TELRIC methodology.

**Q. PLEASE EXPLAIN HOW THE FORWARD-LOOKING CONCEPT IS CONSIDERED IN THE QWEST TELRIC STUDIES.**

A. Qwest's TELRIC studies identify the forward-looking costs that would be likely to be incurred to replace and operate the network today. The studies consider the most efficient technology that is currently available today.

**Q. DO THE TELRIC STUDIES CONTAIN REALISTIC FORWARD-LOOKING ASSUMPTIONS?**

A. Yes. A TELRIC study must provide a realistic estimate of forward-looking costs. Therefore, Qwest's TELRIC studies focus on the latest technologies and methods of operations that are currently available. Only technologies that are commercially available (i.e., currently being used in the industry) and viable with respect to scale for a network the size of Qwest's are included in the studies. Theoretical future technologies are inconsistent with TELRIC and are not considered because it is impossible to know how much those technologies will cost, how they will be configured, and whether they will, in fact, ever be commercially available.

In Qwest's TELRIC studies, current market prices form a basis for determining the costs for equipment and materials. Consistent with TELRIC, these costs reflect what it would cost to replace the network today. Similarly, the placement costs in Qwest's studies are based on

the efficient costs the network organization currently incurs to place outside plant. The expense factors in Qwest's studies also are based on Qwest's recent costs, with adjustments to those costs to account for known or anticipated changes in productivity and inflation. Each assumption is designed to reflect the appropriate forward-looking cost of providing the network element.

**Q. YOU MENTIONED THAT QWEST'S TELRIC STUDIES IDENTIFY DIRECT COSTS AND THE COST OF SHARED FACILITIES AND OPERATIONS. PLEASE DISCUSS THIS FURTHER.**

A. Direct costs are the costs that would be avoided if the network element or service were not offered. Shared (directly attributable) costs are the costs that are generally caused by the provision of a group of elements. Both direct and shared (directly attributable) costs are included in Qwest's TELRIC studies, consistent with the TELRIC definition provided by the FCC in its First Interconnection Order.[1]

**Q. DO QWEST'S TELRIC STUDIES INCLUDE COMMON COSTS?**

[1] First Report and Order, *In the Matter of the Implementation of the Local Competition Provisions of the Telecommunications Act of 1996,* CC Docket Nos. 96-98 & 95-185, FCC 96-325 (rel. Aug. 6, 1996) ("*First Interconnection Order*"). The FCC stated: "We conclude that, under a TELRIC methodology, incumbent LECs' prices for interconnection and unbundled network elements shall recover the forward-looking costs directly attributable to the specified element, as well as a reasonable allocation of forward-looking common costs. . . . Directly attributable forward-looking costs include the incremental costs of facilities and operations that are dedicated to the element. Such costs typically include the investment costs and expenses related to primary plant used to provide that element. Directly attributable forward-looking costs also include the incremental costs of shared facilities and operations. Those costs shall be attributed to specific elements to the greatest extent possible. For example, the costs of conduits shared by both transport and local loops, and the costs of central office facilities shared by both local switching and tandem switching, shall be attributed to specific elements in reasonable proportions. More broadly, certain shared costs that have conventionally been treated as common costs (or overheads) shall be attributed directly to the individual elements to the greatest extent possible." *Id.* ¶ 682.

A. Yes. As discussed above, Qwest's studies identify the TELRIC for each element, which includes the direct and shared (directly attributable) costs. In addition, the studies separately identify an allocation of forward-looking common overhead costs, consistent with the FCC's definition of forward-looking economic cost.[2] These costs (e.g., legal, planning, executive, etc.) are not associated with a specific network element, but represent general costs of doing business. These are real costs that Qwest will continue to efficiently incur on a forward-looking basis.

**Q. HOW SHOULD THE QWEST TELRIC STUDIES BE UTILIZED IN THIS PROCEEDING?**

A. The TELRIC studies I am presenting should be utilized to set prices for UNEs and interconnection services. That is, the TELRIC data in the studies, including an allocation of common costs, should be used as the basis for the UNE and interconnection service prices that Qwest is proposing in my Exhibit TKM-2 for the elements presented by Messrs. Easton and Morris.

## The Telecommunications Act and FCC First Interconnection Order

**Q. WHAT DOES THE TELECOMMUNICATIONS ACT OF 1996 SAY ABOUT COSTS AND PRICES?**

[2] 47 CFR §51.505(a)(2) (The forward-looking economic cost of an element includes . . .[a] reasonable allocation of forward-looking common costs. . . .").

A. The Act states that prices for network elements shall be "nondiscriminatory," "based on costs" and "may include a reasonable profit."[3]

**Q. DOES QWEST'S TELRIC METHODOLOGY COMPLY WITH THE TELECOMMUNICATIONS ACT?**

A. Yes. Qwest's TELRIC studies are in complete compliance with the Telecommunications Act of 1996.

**Q. DID THE FCC ESTABLISH COSTING AND PRICING RULES IN ITS FIRST INTERCONNECTION ORDER?**

A. Yes. The FCC proposed costing and pricing rules in its First Interconnection Order, released on August 8, 1996. In those rules, the FCC established overall TELRIC principles and specified a TELRIC methodology.

**Q. DO QWEST'S TELRIC STUDIES FOLLOW A METHODOLOGY THAT IS CONSISTENT WITH THE FCC'S TELRIC RULES?**

A. Yes. As I discussed above, the cost studies I am presenting are consistent with the FCC's TELRIC principles, as defined in the FCC's First Interconnection Order. The following principles from the First Interconnection Order are essential to a TELRIC study and form the foundation for Qwest's studies:

- "Under a TELRIC methodology, incumbent LECs' prices for interconnection and unbundled network elements shall recover the forward-looking costs directly attributable

[3] 47 USC §252(d)(1).

to the specified element, as well as a reasonable allocation of forward-looking common costs." *First Interconnection Order* ¶ 682.

- "Per-unit costs shall be derived from total costs using reasonably accurate 'fill factors' (estimates of the proportion of a facility that will be 'filled' with network usage); that is, the per-unit costs associated with a particular element must be derived by dividing the total cost associated with the element by a reasonable projection of the **actual total usage** of the element." *Id*. (emphasis added).

- "Directly attributable . . . costs shall be attributed to specific elements to the greatest extent possible. . . . More broadly, certain shared costs that have conventionally been treated as common costs (or overheads) shall be attributed directly to the individual elements to the greatest extent possible." *Id*.

- "The forward-looking pricing methodology for interconnection and unbundled network elements should be based on costs that assume that wire centers will be placed at the incumbent LEC's current wire center locations, but that the reconstructed local network will employ the most efficient technology for reasonably foreseeable capacity requirements." *Id*. ¶ 685.

- "In a TELRIC methodology, the 'long run' used shall be a period long enough that all costs are treated as variable and avoidable." *Id*. ¶ 692.

- "An appropriate calculation of TELRIC will include a depreciation rate that reflects the true changes in economic value of an asset and a cost of capital that appropriately reflects the risks incurred by an investor." *Id*. ¶ 703.

## TELRIC COST DATA

### Studies Filed

**Q. WHAT TELRIC DATA IS QWEST FILING AT THIS TIME?**

A. Qwest is filing TELRIC studies for numerous UNEs and interconnection services. These studies provide cost data underlying the pricing of many of the SGAT UNE recurring rate elements. Specifically, I am sponsoring studies that provide the costs for elements such as loops, subloops, switching, transport and dark fiber. Exhibit TKM-2 contains a complete listing of these elements, along with a summary of the cost study results.

**Q. IS QWEST FILING COPIES OF EACH TELRIC STUDY, ALONG WITH DETAILED STUDY DOCUMENTATION?**

A. Yes. My cost study workpapers include electronic copies of each cost study and model. This electronic documentation (provided on compact disc) is being filed as Exhibit TKM-3. The exhibit includes all cost study calculations (e.g., Excel spreadsheets) and methodology descriptions. In addition, the workpapers include all of the supporting investment and expense cost models (along with user manuals) used to calculate investments and expenses in the studies. The cost studies provided on CD are also individually identified by exhibit number and cost study ID number, and will provide interested parties with the opportunity to analyze cost calculations and replicate or revise the Qwest sponsored TELRIC results.

**Q. WILL YOU DESCRIBE EACH TELRIC STUDY IN YOUR TESTIMONY?**

A. No. My testimony will address the overall costing approach employed by Qwest in developing costs and *highlight* certain elements related to specific studies. The study workpapers provide the specific study documentation and methodology descriptions for all of the TELRIC studies filed in this proceeding.

**Q. HOW SHOULD THE QWEST TELRIC DATA BE UTILIZED IN THIS PROCEEDING?**

A. The TELRIC data presented in my testimony should be used to set the recurring prices for UNEs and interconnection services addressed in this docket. That is, this data should be used as the basis for the UNE and interconnection service prices presented in the testimonies of Mr. Easton and Mr. Morris.

## Investment Models

**Q. YOU MENTIONED EARLIER THAT THE INVESTMENTS FOR MOST UNES ARE DEVELOPED USING INVESTMENT MODELS. PLEASE IDENTIFY THE MODELS USED TO CALCULATE INVESTMENT IN THE QWEST TELRIC STUDIES.**

A. Qwest uses several different investment models to calculate UNE investments. UNE investments represent the capital expenditures that would be necessary in order for Qwest to replace or reconstruct its network facilities. This includes the dollars that represent the individual pieces of equipment that make up the network (e.g., in the case of transport,

equipment includes fiber cable, conduit and electronic equipment) as well as the costs to install the equipment.

**Q. IS QWEST FILING THE INTEGRATED COST MODEL IN THIS PROCEEDING?**

A. Yes, Qwest is filing the Integrated Cost Model ("ICM") in this proceeding. The ICM produces *recurring* TELRIC estimates for the major UNEs and interconnection services, including the unbundled loop, transport and switching elements. I will describe the ICM later in my testimony. The ICM output is included in the results summary in Exhibit TKM-2 and the ICM cost study is included as Exhibit TKM-4 (Study #7699).

**Q. IS QWEST FILING SEPARATE RECURRING COST STUDIES FOR ADDITIONAL ELEMENTS THAT ARE NOT INCLUDED IN THE ICM?**

A. Yes. Qwest is filing separate recurring cost studies for several additional elements. For example, this filing includes stand-alone studies for dark fiber, interconnection tie pairs and low side channel performance. The results of the separate cost studies are included in Exhibit TKM-2, and the supporting cost models are included as Exhibits TKM-6, TKM-7 and TKM-8. In addition, these cost studies are provided electronically and individually identified on a CD by exhibit number and cost study ID number.

**Q. PLEASE SUMMARIZE HOW RECURRING COSTS ARE CALCULATED.**

A. The ICM and the separate Qwest recurring cost studies I am presenting employ the same basic procedures to arrive at a monthly recurring TELRIC cost estimate. The studies follow the basic steps listed below:

1. *Define the Network Element or Service.* The cost analyst works with Qwest product management and technical staff to define the element or service to be studied. This step includes identifying all the network components that are needed to provide the element or service, and estimating the demand for the element or service.

2. *Develop the Investment for the Network Element or Service.* After defining the network element or service, the cost analyst develops the investment that is required to provide the element or service. The investment is based on the actual, efficient vendor prices that Qwest is currently paying for material and equipment, plus the current cost Qwest incurs to place the types of equipment assumed in the studies, including capitalized labor costs.[4] Determining the correct amount of investment is a critical step in developing an accurate cost estimate for a UNE or service. Therefore, in addition to utilizing actual vendor material information and contractor or internal placement costs, Qwest relies on sound engineering practices to model the amount of investment needed to provide a given service at a particular level of usage or demand.

3. *Estimate Investment-related Capital Costs.* The cost analyst then calculates investment-related capital costs (e.g., depreciation, cost of money, income tax) based on the application of annual cost factors to the investment. Capital costs comprise a large portion of total service costs, and the level of capital costs is affected by the depreciation lives for the relevant plant accounts and the weighted cost of debt and equity capital.

4. *Estimate Operating Costs.* The cost analyst estimates operating expenses, in most cases by utilizing annual cost factors. Investment-related operating expenses (e.g., maintenance expense) are calculated based on annual cost factors that are applied to investment, while other operating expenses (e.g., marketing and product management expenses) are normally calculated based on factors that are applied to the investment-

[4] Qwest routinely updates its cost studies to include prices from the most current vendor contracts. Because there are practical limitations on how often cost studies can be updated, there are occasions on which the prices from a new vendor contract are not included in a study. This reflects the unavoidable reality that Qwest's network organization

related costs. These cost factors consider the relationships between expenses and investment that Qwest has experienced recently, adjusted for inflation/deflation and productivity increases. These operating expenses are added to the capital costs to provide the TELRIC for the network element. The cost analyst also allocates an appropriate share of common costs to the TELRIC costs to obtain the total cost (TELRIC plus Common).

5. *Validate Results*. After the analyst estimates the costs, the data are reviewed and cross-checked against other cost data to ensure reasonableness. The analyst and Qwest's cost group compare TELRIC estimates across states and services as part of this reasonableness check. The analyst also compares Qwest's TELRIC results with cost results produced by other cost models.

**The Integrated Cost Model ("ICM")**

**Q. PLEASE BRIEFLY DESCRIBE THE INTEGRATED COST MODEL (ICM).**

A. Qwest's ICM is a cost model that is designed to estimate the recurring TELRIC for UNEs and interconnection services. The ICM produces recurring costs for the major UNEs and interconnection services, including:

- Unbundled Loop – UNE-P
  - 2-Wire
  - 4-Wire
- Unbundled Loop – UNE-L
  - 2-Wire
  - 4-Wire
- Subloop

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may enter into a new contract with a vendor shortly after the cost group has updated a cost study. In that circumstance, the new contract cannot be reflected until the next update of the study.

- High Capacity Loops
- Extension Technology
- Line and Trunk Ports
- Local Usage
  - Local Switching – Unbundled Network Element (UNE)
  - Reciprocal Compensation
  - Tandem Switching
  - Shared Transport
- Unbundled Dedicated Interoffice Transport (UDIT)/Extended UDIT (E-UDIT)

**Q. HOW IS THE ICM DESIGNED?**

A. The ICM is comprised of five inter-related modules and an output workbook. Three of the modules—Loop, Switching and Transport—estimate the investment for the relevant network elements, using the appropriate TELRIC costing principles outlined above. The other two modules—Capital Costs and Expense Factors—develop factors that are used to translate investments into recurring monthly expenses. The Capital Cost and Expense Factors modules are integrated into the ICM Output Workbook for ease of use.

The ICM runs each of the modules and inserts the results from each module into the Output Workbook. The ICM Output Workbook, filed as Exhibit TKM-4 (Study #7699), uses the results of each module, along with special study inputs, to calculate the TELRIC for each UNE and interconnection service. First, investment-related factors are applied to investments to provide the investment-related monthly costs (e.g., depreciation, cost of money, income tax and maintenance) for each UNE and interconnection service. Second, the expense-related factors are applied to the investment-related costs to yield the monthly

cost for operating expenses, such as product management and network operations and support. Third, the output workbook sums all of the monthly costs to provide the monthly TELRIC for the UNE. Finally, the output workbook provides an allocation of common costs (e.g., executive and external relations expense) to each UNE and interconnection service.

**Q. DOES THE ICM ALLOW THE USER TO MODIFY INPUTS?**

A. Yes. The ICM provides input forms for each of the modules, which allow the user to change key input assumptions. The input forms display the default value for each input item and allow the user to override these values if desired. For example, the Transport Module provides input forms that allow the user to view the default equipment prices and to change these inputs if desired. After changes are made to all desired inputs, the user can easily rerun the ICM to produce UNE cost results based on the new user assumptions.

**Q. PLEASE HIGHLIGHT A FEW OF THE OTHER SIGNIFICANT FEATURES OF THE ICM.**

A. There are a number of important features within the ICM that make it a very useful and reliable tool for estimating the recurring TELRIC for UNEs and interconnection services:

- *It is simple and user friendly.* The ICM can be run on most windows-based personal computers.[5] It contains a "point and click" interface that is easily navigated by the user. The user can view results, study assumptions, study inputs, etc., and make changes when desired. A user can run a new TELRIC study, based on the user's specifications, in a relatively short period of time. In sum, the ICM is an easy-to-use

model that does not require users to be trained as model "experts." Any interested party can run the model by following the user guide instructions.

- *It is an open model.* The ICM makes it easy for the user to view the study inputs, calculation processes, and output results. All aspects of the model are open to investigation by the user. In addition, the model is nonproprietary.

- *It is integrated.* In the past, Qwest calculated costs for different UNEs in separate models. For example, switching costs were calculated via the Switching Cost Model ("SCM") and PC3 models, while loop costs were calculated using RLCAP and PC3. Transport costs were calculated in a separate transport model. With ICM, costs for the major UNEs, including the loop, switching and transport, are calculated in the same, easy-to-use integrated model. The integrated nature of the ICM assures that all annual cost factors are applied consistently.

**Q. IS QWEST PROVIDING A MANUAL THAT PROVIDES A DETAILED DESCRIPTION OF THE ICM AND ITS MODULES?**

A. Yes. Exhibit TKM-3 contains an electronic version of the ICM User Manual, which describes the model's overall methodology, and instructs the user on how to run the model and make changes to inputs, etc. The ICM documentation also includes separate user manuals for each ICM module (e.g., switching, transport, loop, expense factors). These documents are included in the "Documents" folder of the ICM provided in the "Cost Models" folder on the CD (Exhibit TKM-3).

**Q. DOES THE ICM PROVIDE UNE COST RESULTS THAT REFLECT THE PROPER APPLICATION OF TELRIC PRINCIPLES?**

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[5] *See* documentation for specific computer requirements.

A. Yes. The ICM contains recommended default inputs. If the model is run with these inputs, it produces results, as delineated in Exhibit TKM-2, that properly reflect the TELRIC principles described earlier in my testimony. The ICM model, using the default inputs, provides a reasonable estimate of the recurring TELRIC for UNEs in Washington. These results should be used by the Commission to set prices for UNEs and interconnection services.

**Q. DOES THE ICM INCLUDE RECURRING COST DATA FOR ALL UNES?**

A. No. The recurring costs for some UNEs have not yet been integrated into the ICM, and the costs for these elements are developed in separate studies. As a general rule, costs for new UNEs are first developed outside of the ICM in separate TELRIC studies. Over time, these elements are then integrated into the ICM. It is important to note that the separate TELRIC studies follow the same cost methodology that is used in the ICM.

## ICM Modules

### *Loop Module*

**Q. WILL YOU DESCRIBE THE LOOP MODULE OF THE ICM IN YOUR TESTIMONY?**

A. No. Please refer to the testimony of Mr. Buckley for a description of the Loop Module of the ICM.

***Switching Module***

*General Description*

**Q. PLEASE BRIEFLY DESCRIBE THE SWITCHING MODULE OF THE ICM.**

A. The Switching Module of the ICM calculates costs utilizing the Switching Cost Model ("SCM") program, which is incorporated into the ICM. The purpose of SCM is to calculate the unit investments for local and tandem switching usage and various types of switch ports. Once the SCM calculates the investments for these elements the ICM Output Workbook, Exhibit TKM-4 (Study #7699), then converts these investments into costs (e.g., a monthly cost per port and a per-minute cost for switching usage).

The SCM is contained entirely in a single Excel workbook, labeled "SCM Core," which is included in the "Switch" folder within the ICM. SCM, Version X1.02, represents a significant departure from the SCM that has been filed previously in Washington and other states. While the new version of the SCM follows the same methodological principles as previous versions of the SCM, the model is now much simpler and easier to audit since it is entirely contained in one Excel workbook without any complicated macros or visual basic programming.

While the overall SCM workbook is labeled as "SCM Core," it may be characterized as containing four modules: *SCM Core, SCM Calls, SCM Usage and SCM Ports.* I will briefly describe these modules below.

**Q. HOW IS THE DATA FROM THE SWITCHING MODULE USED IN THE ICM?**

A. The SCM calculates switching investments for local switching usage, tandem switching usage, line ports and trunk ports. These investments are converted to monthly or per minute of use costs in the ICM Output Workbook, Exhibit TKM-4 (Study #7699).

It is important to note that the SCM calculates investments based on an analysis of every switch location in Washington and considers the forward-looking digital switch technology that would be used in each location. The model also incorporates specific input data for each switch location (e.g., number of lines, usage per line). Thus, the SCM produces state-specific switching investment data based on a computation of the specific investments for every switch location in Washington.

*SCM Modules*

**Q. PLEASE BRIEFLY DESCRIBE SCM CORE.**

A. *SCM Core* calculates unit investments by switching functional category ("FCAT"). SCM Core uses discounted vendor prices and ratios which enable it to partition these vendor prices into functional categories. Both the prices and the partitioning ratios may be input by the user. The user-input demand is divided by user-input fill factors to determine the number of units that must be purchased to serve the user-input demand. Once the total units are computed, they are multiplied by the unit price to get the total investment required to satisfy the demand. The total investment is partitioned into the various functional categories. Then, the total investment for each functional category is divided by its

respective demand to provide a unit investment. For each switch in Washington, SCM Core produces unit investments for FCATs such as:

- Investment per analog line
- Investment per processor millisecond
- Investment per network CCS
- Investment per 3-port conference circuit

The SCM Core methodology is described in more detail in the SCM User Manual (i.e., Switching Module X1.02 Documentation FINAL June03) provided in the "Documents" folder in the "ICM" folder in the "Cost Models" folder on the CD, Exhibit TKM-3 (*see* pages 3 to 5).

**Q. PLEASE BRIEFLY DESCRIBE SCM CALLS.**

A. *SCM Calls* develops the busy hour ("BH") unit investments for various types of calls:

- Line to line
- Line to trunk
- Trunk to line
- Trunk to trunk

For each type of call, *SCM Calls* calculates the investment per BH call set up and the investment per conversation Centi-Call Second ("CCS"). These calculations utilize *SCM Core* FCAT outputs along with multiplier algorithms (e.g., how much of an FCAT is consumed to set up a specific type of call). These BH usage investments are then utilized by

the SCM Usage Module. The SCM Calls methodology is described in more detail in the SCM User Manual on the CD, Exhibit TKM-3 (*see* pages 5 to 7).

**Q. PLEASE BRIEFLY DESCRIBE SCM USAGE.**

A. *SCM Usage* utilizes the BH call set up and conversation CCS investments from *SCM Calls* to compute the annual per call and per conversation minute investments for switching. These investments are then input into the ICM Outputs Workbook, Exhibit TKM-4 (Study #7699), where they are converted into a switching cost per minute of use. The SCM Usage methodology is described in more detail in the SCM User Manual provided on the CD, Exhibit TKM-3 (*see* page 8).

**Q. PLEASE BRIEFLY DESCRIBE SCM PORTS.**

A. *SCM Ports* calculates the investment for various types of ports, using the FCAT data from *SCM Core*. For example, the "UNE Line Port" investment is developed based on the "MDF COE Investment,"[6] "Analog Line Investment," "Digital Line Investment," and "Processor per Working Line" FCATs. SCM Ports develops an investment per analog line ("MDF COE Investment" plus "Analog Line Investment" FCATs) and an investment per digital line ("Digital Line Investment" FCAT) and weights these investments based on the percentage of analog versus digital lines. The "Processor per Working Line" FCAT is added to this to derive the "UNE Line Port" investment, which is used as an input into the ICM Output Workbook, Exhibit TKM-4 (Study #7699).

**Q. DOES THE SCM CALCULATE THE COST OF FEATURE INVESTMENT?**

A. Yes. SCM Ports calculates the investment for vertical switching feature hardware. In the ICM Outputs Workbook, these features investments are added into the investment for ports, and converted to a monthly cost. For example, the Analog Line Side Port UNE includes the cost of standard feature hardware.

*Switch Partitioning*

**Q. DOES THE SCM CONSIDER THE LATEST SWITCH VENDOR CONTRACTS?**

A. Yes. If run with the Qwest default equipment price inputs, which I will discuss below, the SCM incorporates the latest contracts between Qwest and switch vendors.

**Q. HOW DOES QWEST PAY VENDORS FOR SWITCHING EQUIPMENT VIA THESE CONTRACTS?**

A. Today, Qwest pays for a large portion of switching equipment on a "per analog line," "per IDLC DS1 termination" for integrated digital lines, or "per trunk" basis. However, while vendors charge Qwest for equipment on a per line basis, the per line price is calculated on the basis of an assumed level of usage (e.g., CCS). Thus, it is important to understand that while Qwest pays for a large portion of switching equipment on a per line basis, in the long run the costs of the switch are caused by the usage of various switch components. In the long run, increases in switch usage lead to increases in switching costs, and decreases in usage will lead to decreases in costs.

**Q. WHY IS THIS THE CASE?**

[6] MDF COE Investment represents the investment for the main distribution frame central office equipment.

A. Regardless of how a switch vendor charges Qwest for switching equipment, the switch must be engineered, not only based on the number of lines, but also based on the anticipated usage of those lines. As busy hour usage (calls or CCS) increases or decreases, the traffic sensitive portions of the switch are engineered to handle the increase or decrease in traffic. More busy hour usage means more switch fabric, trunks, conference circuits, interactive announcements and processors, etc. Less busy hour usage means less switch fabric, trunks, conference circuits, interactive announcements and processors, etc. While line ports are dedicated to a customer and are thus not usage-sensitive, the trunk and switch fabric components of the switch are shared by all customers. If the average usage per port increases, the usage-sensitive portions of the switch must be engineered to accommodate this. The key point here is that some portions of the switch are, in fact, engineered based on usage, not lines.

In the long run, even if a vendor were to recover all of its costs via a per line charge, it would have to recover the additional costs it would incur to accommodate more usage. For example, assume that Vendor A is charging Qwest for all switching equipment on a per line basis. When Vendor A sets this price, the price per line is designed to compensate the vendor for all of the switching equipment it installs – both the costs that are engineered based on lines and the costs that are engineered based on usage. If the anticipated usage per line increases, the amount of usage sensitive equipment (i.e., trunks, talk paths through the switch fabric, etc.) provided by the vendor would increase. Therefore, if the vendor wants to be compensated for the additional traffic-sensitive equipment it provides, when the

current contract expires the vendor will increase the price per line. Any long run cost analysis like TELRIC would need to consider this fact in the development of costs.

Thus, even if all vendor charges to Qwest were entirely on a per line basis – which they are not – it would be wrong to assign all switching costs in a TELRIC study to lines. In the long run, usage impacts the costs of a large portion of the switch. It is for this reason that the Qwest SCM uses a partitioning methodology to assign costs to the functions that the switch provides.

**Q. PLEASE DESCRIBE THE SCM PARTITIONING METHODOLOGY.**

A. As described on page 4 of the SCM User Manual, included as part of the documentation provided on the CD (Exhibit TKM-3), the total price for each switch in Washington is determined based on current vendor switch contracts. The total price for each switch is then partitioned into the various functional categories (FCATs) using forward-looking, long run, cost-based ratios. These ratios reflect the percent of the total switch price that is driven, in the long run, by the basic switch functions (e.g., trunk terminations, line usage, conference circuit usage, etc.). That is, increases in the demand for each of these functions leads to increases in the amount of switching investment required. The costs of the switch must therefore be associated with these functions if the principle of cost-causation is to be properly reflected. Even with a per line contract, the costs of switching are related to these functions in the long run. Thus, in a TELRIC study, switch partitioning is required.

Please refer to the SCM User Manual for further discussion of the partitioning methodology. In particular, pages 13 to 14 of the Manual provide an example that demonstrates how partitioning ratios are applied in the SCM.

**Q. HOW ARE THE PARTITIONING RATIOS DEVELOPED?**

A. The ratios are developed based on a model switch. The list price of the equipment components of a model switch are determined based on current vendor list prices. Then, based on the function that each equipment component provides, the total list price of the model switch can be partitioned into the list price associated with the various switch functions. For each function, a partitioning ratio is then developed by dividing the list price associated with each function by the total list price.

*Switching Inputs*

**Q. WHAT ARE THE KEY INPUTS TO THE SWITCHING MODULE?**

A. The key inputs in the Switch Module of ICM include the unit prices for switching equipment (e.g., the price per Analog Line Port, the TR303 IDLC price per DS1 Port, and the End Office Trunk price per DS1 Port) and the line and trunk fills (e.g., Analog Line fill, TR303 IDLC fill).

**Q. PLEASE DESCRIBE THE SWITCH PRICE INPUTS.**

A. The basic switch price inputs for each switch vendor include:

- Analog line price per analog port
- TR303 IDLC DS1 price per DS1 port

- End office trunk price per DS0 port
- Tandem trunk price per DS0 port
- Non IDLC BRI price per BRI port – both for hardware and software
- PRI price per PRI port – both for hardware and software
- MDF COE price per OE pair
- MDF COE price per OSP pair

These are user changeable inputs. The ICM user may override the default values for these vendor price inputs. However, the default values represent Qwest's current vendor contract prices.

**Q. HOW ARE THE DEFAULT SWITCH PRICE INPUTS DERIVED?**

A. As noted above, the default inputs are based on current switch vendor contracts. I have included, as Confidential Exhibit TKM-5C, three Excel workbooks that show how the switch price inputs are developed. There is a workbook for Switch Vendor 1, Switch Vendor 2 and the Main Distribution Frame ("MDF"). These workbooks provide a mapping of the actual vendor prices included in the current contracts to the default values in the ICM. For example, the ICM default for the "Analog line price per analog line port" is $84.28. The derivation of this input value may be observed in the "Cont-AnLn" sheet of the "TKM-5.2C – Price Per Line 2003 Release SW1 P" workbook included in Confidential Exhibit TKM-5. This worksheet delineates the components of the $84.28 price per analog line, and provides specific contract references.

***Transport Module***

*General Description*

**Q. PLEASE DESCRIBE THE TRANSPORT MODULE.**

A. The Transport Module is used to estimate the investment in transmission and channel termination equipment needed to provide transport between two switching offices. The Transport Module calculates dedicated and switched transport investment for DS0, DS1, DS3, OC3, OC12 and OC48.

**Q. WHAT IS INCLUDED IN THE TRANSMISSION (MILEAGE SENSITIVE) INVESTMENT?**

A. The transmission investment includes the cost of fiber facilities and intermediate multiplexing equipment.

**Q. WHAT IS INCLUDED IN THE TERMINATION (FIXED) INVESTMENT?**

A. The "fixed" channel termination investment includes the electronic equipment located at the switch location (where the route originates and terminates) that converts electronic signals into optical signals, as well as the equipment used to multiplex or de-multiplex a signal.

**Q. WHAT DATA DOES THE TRANSPORT MODULE USE TO ESTIMATE TRANSPORT COSTS?**

A. The Transport Module calculates costs using the following files and data:

- Point pair files – These files include all combinations of routes between two wire centers in Washington. These data include originating and terminating wire centers and the number of circuits connecting them.
- SONET transport models for three configurations: point-to-point, back-to-back, and ring.
- Investments – Material costs for equipment used in the network.
- Investment Profiles – The distribution of transport configurations used in the model. These profiles vary by the size of the wire centers where the point pairs terminate.

These data are described in more detail in the Transport Module of the ICM User Manual.

**Q. PLEASE EXPLAIN THE GENERAL METHODOLOGY USED TO CALCULATE TRANSPORT MODULE INVESTMENTS.**

A. For every point pair in Washington, the Transport Module calculates investment per circuit for channel termination equipment, fiber optic facilities, and intermediate multiplexing equipment. The investments associated with each point pair are calculated as fixed (termination) and distance sensitive (transmission) investments in the model. These investments are converted into costs in the ICM Output Workbook, Exhibit TKM-4, (Study #7699).

*Transport Module Inputs*

**Q. WHAT ARE THE KEY INPUTS IN THE TRANSPORT MODULE?**

A. The key inputs in the Transport Module are the utilization factors and the vendor costs for various types of equipment (e.g., the cost per foot for fiber or a fiber distribution panel, etc.).

**Q. HOW ARE THE RECOMMENDED DEFAULT UTILIZATION FACTORS DEVELOPED?**

A. The utilization factors for various types of equipment (e.g., fiber distribution panels, SONET equipment) are developed by dividing total capacity of the equipment or fiber by the actual number of units being used on the equipment or fiber. The actual units in use for the equipment are based on the current demand for circuits. The Transport Module allows different utilization inputs depending on whether the traffic is switched or dedicated.

**Q. HOW ARE THE INVESTMENT DEFAULTS IN THE TRANSPORT MODULE DEVELOPED?**

A. All of the default material investments used in the Transport Module are taken from vendor contracts or price lists. This information is provided by Qwest engineers who develop the standard configurations currently used at Qwest. Thus, the material prices used as defaults in the ICM reflect the prices that Qwest pays vendors to purchase equipment used to provide transport for the foreseeable future.

**Q. DO YOU RECOMMEND THE USE OF THE DEFAULT INPUT VALUES FOR TRANSPORT?**

A. Yes. The default input values in the Transport Module are based on informed judgments of experienced network and engineering subject matter experts, along with information from actual vendor contracts and price lists. These are reliable sources that reflect the best information available.

***Capital Cost Module***

**Q. WHAT ARE THE KEY INPUTS IN THE CAPITAL COST MODULE?**

A. The key inputs to the Capital Cost Module are related to the cost of money and depreciation lives. The ICM allows the user to enter a specific cost of equity, cost of debt and debt to capital ratio. The ICM also allows the user to enter specific depreciation lives and net salvage for every plant account. The user can also choose to apply either Equal Life Group or straight line depreciation in the ICM Output Workbook. For a detailed description of the Capital Cost Module please refer to the direct testimony of Ms. Marti Gude. I also briefly discuss issues relating to depreciation and cost of money later in my testimony.

**Q. DO THE SEPARATE TELRIC STUDIES UTILIZE THE SAME CAPITAL COST FACTORS THAT ARE CALCULATED IN THE ICM CAPITAL COST MODULE?**

A. Yes. The ICM Capital Cost Module is used to develop the capital cost factors used in the ICM and in each of the separate cost studies filed in this proceeding. In the separate cost studies these factors are applied via the WINPC3 model, included on the CD (*see* Exhibits TKM-4, TKM-6, TKM-7 and TKM-8).

***Expense Factors Module***

*General Description*

**Q. PLEASE DESCRIBE THE PROCESS BY WHICH ANNUAL EXPENSE FACTORS ARE CALCULATED WITHIN THE ICM.**

A. The Factors Module of ICM includes several features that make it easy to understand the factor application process and to audit the results. In the Factors Module:

- Expenses and investments are pulled directly from Qwest's standard accounting reports.
- Trending of expenses and investments has been replaced with specific user-defined efficiency and inflation inputs.
- The factor calculation process starts with standard accounting report results (i.e., the books of the firm). Directly assigned costs (i.e., costs that are included elsewhere) and costs that are not applicable to TELRIC studies are removed, and these subtractions are explicitly displayed in the Factors Module. This provides the user with a clear understanding of which costs are included and which costs are not included in the factors.
- All calculations are contained in one set of worksheets.

For a detailed discussion of the development and application of Qwest's expense factors in the cost studies please refer to the testimony of Ms. Marti Gude.

**Q. DO THE SEPARATE COST STUDIES UTILIZE THE EXPENSE FACTORS THAT ARE CALCULATED IN THE ICM EXPENSE FACTORS MODULE?**

A. Yes. The same expense factors, based on the same inputs, are used in the ICM and applied in the separate cost studies via WINPC3.

*Expense Factor Module Inputs*

**Q. PLEASE DESCRIBE THE SPECIFIC FACTORS MODULE INPUTS.**

A. The key inputs to the Factors Module are the efficiency and inflation/deflation factors. In the Factors Module input screen, the user may input a "Cost Savings Value" and an "Inflation Rate." The cost savings value estimates the gains expected in productivity or efficiency, while the inflation rate estimates the amount of inflation (or deflation) anticipated. These values can be applied on an account-specific basis in the ICM Output Workbook, or applied uniformly to all accounts via the input forms included in the Factors Module.

**Q. DO YOU RECOMMEND USE OF THE DEFAULT INPUTS FOR EFFICIENCY AND INFLATION?**

A. Yes. As discussed by Ms. Gude in her direct testimony, these inputs reasonably reflect anticipated gains in efficiency and an inflation value appropriate for use in forward-looking cost models and studies that take into account the environment in which Qwest operates.

**Other Recurring Cost Models and Studies**

**Q. YOU HAVE DESCRIBED THE ICM AND ITS MODULES. DOES QWEST USE OTHER MODELS IN THE SEPARATE RECURRING COST STUDIES?**

A. Yes. For example, the ICM Loop Module is utilized to calculate recurring DS1, DS3 and OCn capable loop costs in addition to a separate "HiCap Equipment Development" study located in the "Backup" folder. However, often Qwest's separate recurring cost studies do not utilize a specific, defined cost "model" – the studies are performed using Excel, and the

"model" is an Excel workbook, containing all inputs, formulas and outputs. The cost factors are applied to the investments in these stand-alone studies using Qwest's WINPC3 model.

The UNE elements for Dark Fiber, ITP and Low Side Channel Performance are presented as stand-alone models and studies in my testimony below.

## OTHER COST METHODOLOGY ISSUES

### Cost of Money

**Q. WHAT COST OF MONEY DOES QWEST UTILIZE IN THE TELRIC STUDIES YOU ARE PROVIDING?**

A. The Qwest TELRIC studies that I am providing use the 9.63% cost of money adopted by the Commission in the Eighth Supplemental Order in Docket Nos. UT-960369, et al., and utilized by Qwest in Parts A, B and D of Docket No. UT-003013. Qwest is not proposing an adjustment to this cost of money for purposes of this cost docket.

### Depreciation Lives

**Q. WHAT DEPRECIATION LIVES DOES QWEST UTILIZE IN THE TELRIC STUDIES YOU ARE PROVIDING?**

A. The Qwest TELRIC studies that I am providing utilize economic depreciation lives as discussed in Ms. Gude's direct testimony. While the economic depreciation lives proposed by Qwest in this proceeding are not as aggressive as those suggested by the FCC in its press

release regarding the Triennial Review Order on February 20, 2003,[7] Qwest has chosen to use more conservative lives rather than make an issue of depreciation in this cost docket.

**Fill Factors**

**Q. PLEASE DESCRIBE THE TYPES OF FILL FACTORS THAT COULD BE USED TO MODEL COSTS.**

A. As I explained earlier in my testimony, "fill" is an industry term for the assumed utilization to be placed on a piece of investment (e.g., loop plant or a switch) when determining the unit cost. There are two types of fill that have been widely discussed in arbitration and cost proceedings: objective and actual fill.

"Objective" fill has historically been used to refer to the *maximum* utilization of a facility that can be achieved before reinforcement becomes necessary. The percentage for objective fill is usually something less than 100% because some capacity is set aside for maintenance and administrative purposes.

Forward-looking "actual fill" is the utilization that is actually projected to be experienced on average for the investment and is typically lower than the objective fill because of practical realities of network management and expected usage.

**Q. WHY IS THE PROPER USE OF FILL FACTORS AN IMPORTANT ISSUE?**

7 Attachment to FCC Press Release in FCC Triennial Review proceeding, at 4. "The order clarifies two key components of its TELRIC pricing rules to ensure that UNE prices send appropriate signals to incumbent LECs and competitive LECS. . . . Second, the Order declines to mandate the use of any particular set of asset lives for depreciation, but clarifies that the use of accelerated depreciation may present a more accurate method of calculating economic depreciation."

A. If fill factors are improperly applied in a TELRIC study, the results may be significantly over or understated. That is, the study results are highly sensitive to the fill factors that are used.

**Q. WHAT TYPE OF FILL FACTORS ARE UTILIZED IN QWEST'S TELRIC STUDIES?**

A. In general, loop feeder, switching, transport and other investments are calculated using ICM inputs that reflect projected actual fill factors.

**Q. COULD THE COMPANY EVER OPERATE AT AN OBJECTIVE FILL LEVEL?**

A. Not efficiently. It is important to remember that objective fill represents the fill level at relief – the point at which demand for access to the network requires the Company to reinforce facilities. If Qwest operated at objective fill, it would need to add facilities each time new demand for the facility arose – a scenario that is clearly impractical. For example, it would be extremely inefficient and expensive to add single or small units of switching capacity on demand. Instead, switching capacity is added in large "lumps," which represents the long run least cost method of provisioning. Thus, the efficient switching network will always function at a level below objective fill except when the network reaches the point in time when it becomes necessary to reinforce facilities. This concept applies to all network components, not just switches.

**Q. WHY DO THE QWEST TELRIC STUDIES UTILIZE PROJECTED ACTUAL FILL, RATHER THAN OBJECTIVE FILL, IN COST CALCULATIONS?**

A. When prices are based on cost, the use of objective fill would insure that all costs would not be recovered. For example, assume a Company places a 100 pair cable at a cost per pair of $100. The total cost of the cable would be $10,000. Let's further assume that the average projected actual usage of this facility is anticipated to be 65% or 65 of the 100 lines and that the objective fill for the facilities is 85%. The unit cost calculated using an 85% objective fill per customer and the unit cost calculated with the 65% projected actual fill per customer is illustrated in Table 1 below:

TABLE 1

| | TOTAL | PROJECTED USAGE | OBJECTIVE USAGE |
|---|---|---|---|
| 1. Fill levels | 100% | 65% | 85% |
| 2. Pairs | 100 | 65 | 85 |
| 3. Cost /Pair | $100 | $100 | $100 |
| 4. Total Cost | $10,000 | $10,000 | $10,000 |
| 5. Projected Cost/Unit (Line 3/Line 1) | $100 | $154 | $118 |

| | | Shortfall |
|---|---|---|
| Amount to Be Recovered | $10,000 | |
| Amount Recovered at $118 with 65 Pairs | $ 7,670 | $2,330 |
| Amount Recovered at $154 with 65 Pairs | $10,000 | $0 |

In this scenario, service is actually provided to 65 customers. Of course, in the real world, it would be unlikely that service would be provided to all 65 customers immediately. Therefore, until service is being provided to all 65 customers even a 65% fill results in a shortfall. Nevertheless, if service is ultimately provided to these customers, theoretically the entire $10,000 would be recovered only if the price were set at $154. If the price were set at $118, based on costs at objective fill, the firm would recover only $7670 – leaving a $2330 shortfall. This represents roughly 23% of the original $10,000 investment.

No business could survive if it continued to invest in equipment with no expectation that the costs of the investment would be recovered. That is, no firm could invest $10,000 with the

expectation it would only be able to recover $7670. Thus, it is critical that projected actual fill levels be utilized in TELRIC studies.

**Q. DOES THE FCC'S FIRST INTERCONNECTION ORDER REQUIRE THE USE OF PROJECTED ACTUAL FILL FACTORS?**

A. Yes. The FCC's First Interconnection Order stated that:

> Per-unit costs shall be derived from total costs using reasonably accurate "fill factors" (estimates of the proportion of a facility that will be "filled" with network usage); that is, the per-unit costs associated with a particular element must be derived by dividing the total cost associated with the element by a **reasonable projection of the actual total usage of the element**.[8]

The use of projected actual fill factors results in TELRIC-based prices that more nearly reflect the cost of actually providing a UNE or an interconnection service on a forward-looking basis in Qwest's operating environment. The Washington Commission has correctly adhered to this principle in prior dockets and nothing has changed on this issue to drive a different result.

**Total Investment Factors ("TIFs")**

**Q. PLEASE EXPLAIN THE USE OF TOTAL INVESTMENT FACTORS IN QWEST'S COST STUDIES.**

A. The Total Investment Factor ("TIF") combines all the proper investment loadings into one factor, calculated mathematically correctly, so that when multiplied against the material investments provides a total installed investment. For example, switching equipment

provided by the vendor at an EF&I (Engineered Furnished & Installed) price often includes installation and engineering. A TIF factor applied to a material price calculates not only installation and engineering, but also other costs such as power, warehousing, transportation and finance charges. Thus, the TIF will be higher than the investment loadings added to EF&I investment. However, the TIF does not calculate EF&I investment. The TIF does calculate fully loaded material investments that may include investment on an EF&I basis, but also reflects the additional loadings mentioned above that are not generally included in an EF&I price from a vendor.

The major component of the TIF is the labor to install and engineer the equipment. Since the material investment is for equipment only, as explained, the TIF factor also includes investments for testing and the power equipment required to properly operate the equipment represented by the material investment. Sales tax and Interest During Construction ("IDC") are added to the material investment to cover expenses Qwest incurs when it purchases equipment. Qwest also incurs expenses for warehousing and transporting the equipment from its warehouses to the equipment location.

Qwest relies on the General Ledger Journal files, as reflected in the company books, as well as other company reports (such as the MR2A) to calculate the underlying factors that make up the TIF factor. Qwest uses these reports to calculate the average expenditures required to perform the steps necessary to first warehouse the equipment, then transport it to the proper

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[8] CC Docket No. 96-98, No. 95-185, Released August 8, 1996, ¶ 682 (emphasis added).

location, install and power the equipment, and finally, reflect the necessary taxes and finance charges.

**Q. IS THE TIF NEW?**

A. No. Qwest has always presented its material investments on a fully loaded basis, often using a TIF to arrive at the amount. Qwest's previously filed cost studies and cost models have included the TIF in a variety of ways depending on what level of material investment the cost analyst started with, although, in the past this calculation may have been embedded, and not readily apparent in the study or model. Qwest currently applies the TIF to arrive at fully loaded material investment for the equipment used in its high-capacity loops (DS3 and above), transport, and low side channel performance cost studies.

**Q. WHY DOES QWEST USE FACTORS TO CALCULATE THE TIF INSTEAD OF USING ACTUAL ENGINEERING COSTS OR ENGINEERING COST ESTIMATES?**

A. Developing a factor to reflect actual average costs to be added to material investments is more accurate than engineering estimates, and is appropriate in forward-looking cost studies.

The equipment for which TIFs are developed come in many configurations and forms and include circuit equipment, radio systems and other terminal equipment. It is difficult to estimate the loadings required to produce a given total installed investment amount, since no two jobs are alike. The loadings required for one job may be very different from those

required for the next one. This causes many peaks and valleys in engineering estimates, making estimating very difficult, and not as accurate as using actual expenditures collected for the equipment being installed to develop an average loading factor. Since the TIF represents a relationship of material investment to related expenditures for the most current time period it provides a forward-looking cost estimate based on Qwest's actual experience installing equipment.

**Q. WHAT TIFS IS QWEST PROPOSING TO USE FOR THE CURRENT PROCEEDING?**

A. Qwest's TIF value, for example, for low side channel performance for the account represented by field reporting code ("FRC") 257C, Plug-ins without warehousing, is 1.3578. The TIFs used to develop the installed investments for high-capacity equipment range from 1.32 to 2.29 and are found in the "HiCap Equipment Development" study located in the "Backup" folder of ICM.

## Expense Factors and Common Costs

**Q. IS QWEST USING THE EXPENSE FACTORS ESTABLISHED BY THE WASHINGTON COMMISSION FOR EXPENSE RECOVERY IN PRIOR PROCEEDINGS?**

A. No. As discussed in Ms. Gude's direct testimony in this docket, the advent of a new proceeding provides the appropriate time for the Commission to re-examine the factors established in prior proceedings. Thus, as the Commission sets out to determine new

recurring and nonrecurring UNE and local interconnection rates the opportunity finally presents itself to update factors on the basis of Qwest's current expenses.

## ANALYSIS OF SELECTED COST DATA

### Unbundled Loop

**Q. IS QWEST PROVIDING RECURRING TELRIC DATA RELATED TO THE UNBUNDLED LOOP UNE?**

A. Yes. Qwest is providing recurring cost data for the 2 wire and 4 wire unbundled loop, with feeder and distribution subloop components. The costs for the total loop and distribution/feeder subloop elements are identified based on the five geographic zones previously determined by the Commission in Part A of Docket No. UT-003013. In addition, Qwest also offers an additional subloop element – building cable – that allows a CLEC to access Qwest facilities at building terminals that exist in many large buildings. Qwest is also providing costs for DS1 and DS3 capable loops, DS1 capable feeder loops, and OC-3, OC-12 and OC-48 capable loops.

**Q. WHAT COST MODEL IS USED TO CALCULATE THE COSTS FOR THE BASIC 2 AND 4 WIRE LOOPS AND THE BUILDING CABLE?**

A. The costs for the 2 and 4 wire loop are calculated in the ICM (Study #7699), and the cost for the building cable and 2 wire distribution are calculated in ICM as well. The investments for these loop elements are developed in the Loop Module of the ICM. Please refer to the

testimony of Mr. Buckley for a complete description of the ICM Loop Module, along with a discussion of the methodology issues involved in developing the costs for these elements.

**Q. WHAT IS THE BASIS FOR THE DEAVERAGED ZONES PROPOSED BY QWEST IN THIS PROCEEDING?**

A. Qwest's proposal for deaveraged zones is based on the same five zones determined by the Commission in the prior cost docket. Qwest is not proposing to change the assignment of individual wire centers to a particular zone. Thus, the wire center costs developed in the Loop Module of ICM, as described by Mr. Buckley in his direct testimony, have been grouped in accordance with the way they were grouped in the prior proceeding.

**Q. PLEASE DESCRIBE THE RECURRING COSTS FOR THE DS1, DS3, OC-3, OC-12 AND OC-48 LOOP ELEMENTS.**

A. The recurring DS1, DS3, OC-3, OC-12 and OC-48 Capable Loop costs, along with the DS1 Feeder loop costs are identified in the ICM (Study #7699). The DS1 Capable loop costs include the cost of a digital transmission path that transports bi-directional DS1 signals with a nominal transmission rate of 1.544 Mbps., and the DS3 capable loop includes the cost of a digital transmission path that transports bi-directional DS3 signals with a nominal transmission rate of 44.736 Mbps. An OCn capable loop is a digital transmission path that transports bi-directional high capacity SONET signals at OC-3 (155.52 Mbit/s), OC-12 (622.08 Mbit/s) and OC-48 (2.488 Gbit/s) transmission levels, using a 4-fiber digital interface. These loops connect a Qwest wire center with a customer location. The DS1 Feeder loop connects a wire center to the Field Connection Point ("FCP").

The investments for the DS1 and DS3, OC-3, OC-12 and OC-48 loop investments are developed in the ICM Loop Module as well as a separate "HiCap Equipment Development" study located in the "Backup" folder. The rates for these elements are included in the results summary in Exhibit TKM-2.

**Q. ARE THE DS1 AND DS3 CAPABLE LOOP COSTS DEVELOPED ON A GEOGRAPHICALLY DEAVERAGED BASIS?**

A. No. The majority of the costs used to develop rates for the high capacity loops are related to electronic facilities investments that do not vary geographically. Thus, Qwest has developed rates for these elements on a statewide average basis.

**Q. PLEASE DESCRIBE THE ICM LOOP MODULE FOR DS1 AND DS3.**

A. As noted above, the ICM Loop Module as well as a separate "HiCap Equipment Development" study located in the "Backup" folder is used to calculate DS1 and DS3 capable loop investments, which are included in ICM. The installed investment for termination and multiplexing equipment is then determined, and equipment capacities and utilization factors are applied to obtain a unit investment. In addition, fiber optic and copper cable investments are derived from the ICM Loop Module. The ICM Loop Module adds the fiber and copper investment to the terminating and multiplexing equipment to yield an investment for each DS1 and DS3. These investments are used as inputs in DS1 and DS3 Capable Loops in the ICM (Study #7699).

**Q. DOES THE OCN ICM LOOP MODULE FOLLOW A SIMILAR METHODOLOGY?**

A. Yes. The ICM Loop Module OC3, OC12 and OC48 investments are developed in a similar manner to the DS1 and DS3 investments. The investments calculated in the OCn ICM Loop Module are used as inputs for the OCn Capable Loops in the ICM Outputs Workbook, Exhibit TKM-4 (Study #7699).

For a more detailed description of the DS1, DS3 and OCn ICM Loop Module methodology, please see the documentation that is included in the ICM "Documents" folder in the "Cost Models" folder on the CD containing Exhibit TKM-3.

**Transport**

**Q. HAS QWEST PROVIDED A SINGLE RATE FOR BOTH UDIT AND EUDIT IN THIS DOCKET?**

A. Yes. Although the investment for interoffice transport and entrance facilities have been developed separately in ICM, Qwest presents a single combined rate for UDIT/EUDIT based on the UDIT rate structure in the ICM output. ICM begins with the separate facilities costs and combines them on the basis of assumed utilization of each component of the combined element to develop distance-sensitive fixed and per mile recurring rates. The study assumes that the interoffice transport component will be utilized 100% of the time, while the entrance facilities component will be utilized only 97% of the time. Thus, 97% of the costs of the entrance facilities are weighted in with the costs of interoffice transport. The costs for electronic circuit equipment are included in the fixed portion of the cost and the costs for conduit systems, cabling and poles are included in the variable (per mile) portion

of the costs. The rates for these combined elements are displayed in the results in Exhibit TKM-2 at section 9.6. ICM also calculates a separate recurring rate for the CLEC-end electronics for each level of transport.

**Q. YOU SAID ICM DEVELOPS SEPARATE COSTS FOR UDIT AND EUDIT. PLEASE EXPLAIN.**

A. ICM continues to develop the investments for UDIT and EUDIT on the basis of the two distinct network configurations (i.e., direct trunk transport and entrance facilities, respectively) involved in each of these elements. The reason for this is that currently Qwest's transport module in ICM contains location information for Qwest central offices, but similar location information is not resident in the transport module for CLEC offices. The central office locations are used to develop the A to Z information needed by the transport module to calculate the costs that result from the transport configurations. Without similar location information for each and every CLEC central office or point of presence ("POP") the transport module is incapable of producing similar costs for entrance facilities. Nor does Qwest believe that if the transport module could produce costs for entrance facilities based on the CLEC POPs that those cost characteristics would be the same as the cost characteristics for direct trunk transport.

**Q. WHY ARE THE COST CHARACTERISTICS OF DEDICATED TRANSPORT DIFFERENT FOR FACILITIES BETWEEN TWO QWEST OFFICES THAN THEY ARE FOR FACILITIES BETWEEN A QWEST OFFICE AND A CLEC OFFICE?**

A. Dedicated transport can be described as the "pipe" that provides connection between two offices. There are two independent reasons why one type of pipe (i.e., entrance facilities) has different cost characteristics, and in fact, is more costly than the other type of pipe (i.e., interoffice transport facilities). First, by definition, the sole purpose of the pipe called an "entrance facility" is to connect a Qwest office with a CLEC office. That connection is typically between the CLEC office and one Qwest office. Small CLECs require small pipes. Larger CLECs require larger pipes, although not usually as large as Qwest's interoffice pipes. In addition, the CLEC (not Qwest) determines the optimally efficient size and fill (degree of utilization) of its entrance facilities on the basis of its own traffic volumes.

In contrast, the pipes known as "interoffice transport" facilities must carry the much heavier call volumes of Qwest's own traffic, are routed in multiple directions through Qwest's network, connect to multiple Qwest offices, and carry the additional traffic of many CLECs and IXCs. For example, entrance facilities are provided only on a point-to-point basis, whereas interoffice transport may be provided on a point-to-point, rings, or back-to-back basis. As a result of these differences, the interoffice transport pipes are generally much larger than entrance facility pipes, achieve a greater degree of utilization, and therefore present significantly greater economies of scale and scope. All else being equal, any given DS1 capacity costs much less to provide when deployed over a large pipe, containing many other such circuits over which the cost of the pipe can be spread, than when deployed over a small pipes. The separate investments in ICM for UDIT and EUDIT reflect these cost

differences, and it would be incorrect to treat Qwest-to-CLEC transport links as though they had the same economies of scale as interoffice transport links within Qwest's network.

The second reason for the difference in cost characteristics between the two types of dedicated transport is that circuits involving entrance facilities (where the **facilities** are dedicated) are, on average, more costly than ordinary interoffice transport circuits (where the **circuits** are dedicated) of the same levels of capacity. This is because the former require special electronics more often than the latter do. Most entrance facilities are purchased in conjunction with interoffice transport because call volumes often make it efficient for CLECs to order dedicated, non-switched links – entrance facilities plus interoffice transport – between the CLEC office (of which there is usually only one), and particular Qwest offices within a given local calling area. Three sets of electronics are normally required to utilize entrance facilities in conjunction with interoffice transport facilities, including: (1) at the CLEC wire center where the signal originates; (2) at the initial Qwest office where the signal is integrated into the Qwest interoffice network; and (3) at the terminating wire center.

In contrast, once inside the Qwest interoffice network, it is possible for a circuit linking any two given offices within a local calling area to originate at one office and terminate at another without having to change the signaling level when passing through an intermediate office. This alleviates the need for intervening electronics and allows the transport pipe to remain at the same signaling level between offices. Qwest offices commonly have direct links to most other offices in the local calling area. However, CLEC offices rarely have

direct links to more than one or two offices in the area, and thus, in most cases dedicated circuits must pass through an intermediate point (the serving wire center) and must be accompanied by the special electronics described above to change the signaling level at these intervening points.

This means that in most cases in order for the CLEC's originating signal to traverse to the terminating wire center, it must be multiplexed up or down at the point where the signal is integrated into Qwest's interoffice network. For example, if the CLEC uses a DS3 level of entrance facility from its location to the initial Qwest office, but then wishes to terminate signals in multiple wire centers, the signal will often be multiplexed down to a DS1 level for interoffice transport to various terminating locations. This allows the CLEC to make efficient use of the network from its location into the Qwest network to serve its end-user customers. Once the signals enter the interoffice network they may travel from one Qwest wire center to another Qwest wire center over those facilities at the same level all the way without a need to be multiplexed until the signals reach the terminating wire center. Thus, these differences in cost characteristics between entrance facilities (EUDIT) and interoffice transport (UDIT) form the basis for Qwest's development of different rate structures for these two elements. Combining these two types of facilities into a single rate structure that prices the entire UDIT/EUDIT at one signal level (e.g., all DS1 or all DS3) will result in the CLECs being unable to choose to vary the levels of transport to utilize the network efficiently. Nevertheless, Qwest has combined the costs for these two elements, as

described above, to produce a single rate structure for UDIT/EUDIT as directed by the Washington Commission in Docket Nos. UT-003022/UT-003040.[9]

**Q. DOES THE COMBINED RATE STRUCTURE FOR UDIT AND EUDIT HAVE AN IMPACT ON ANY OTHER ELEMENTS ADDRESSED IN THIS DOCKET?**

A. Yes. Normally the rates for direct trunk transport and UDIT are the same. The rates used for the different levels of EEL transport (i.e., DS0, DS1, DS3, OC3, OC12 and OC48) are then drawn from these rates to form the transport portion of the EEL element. In this docket, Qwest has been ordered to address UDIT and EEL, but not direct trunk transport. Because the combined UDIT/EUDIT rates that include entrance facilities are not appropriate to use for EEL transport, and because there is no separate rate for direct trunk transport, Qwest has used the separate underlying cost for UDIT as the basis for the EEL rates presented in this proceeding.

**Q. IS QWEST FILING COST DATA FOR THE SHARED TRANSPORT ELEMENT?**

A. Yes. Shared Transport is defined as interoffice transmission facilities shared by more than one carrier, including Qwest, between Qwest end offices and tandem switches within a local calling area.

**Q. PLEASE BRIEFLY DESCRIBE THE QWEST SHARED TRANSPORT COSTS.**

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[9] *See In the Matter of the Investigation Into U S WEST Communications, Inc.'s Compliance with Section 271 of the Telecommunications Act of 1996/In the Matter of U S WEST Communications, Inc.'s Statement of Generally Available Terms Pursuant to Section 252(f) of the Telecommunications Act of 1996*, Thirteenth Supplemental Order, Initial Order (Workshop Threee): Checklist Item No. 2, 5 and 6, July 24, 2001, ¶ 151; and Twenty-Fourth Supplemental Order, Commission Order Addressing Workshop Three Issues: Checklist Item Nos. 2, 5 and 6, December 20, 2001, ¶ 59.

A. The Shared Transport costs are identified in the ICM, and include transport and tandem switching costs. The Shared Transport cost represents the weighted per minute of use cost for three types of interoffice calls that utilize the common switched network:

1. *Direct end office to end office* – These calls are directly routed between the originating and terminating local end offices and are not routed through a tandem switch.

2. *End office to end office via a local tandem* – These calls are routed from the originating end office to a tandem switch and from the tandem switch to the terminating local end office.

3. *End office to access tandem* – These calls are routed from the originating local end office to the access tandem.

The ICM separately calculates the per minute of use cost for each of these three types of calls. The per minute of use costs for each call type are weighted together based on Qwest trunk data to yield a single Shared Transport per minute of use cost.

**Interconnection Tie Pairs ("ITPs")**

**Q. IS QWEST FILING COST DATA FOR INTERCONNECTION TIE PAIRS?**

A. Yes. Cost data for Interconnection Tie Pairs (ITPs) is included in Study #7704 (Exhibit TKM-6).

**Q. PLEASE DESCRIBE THE COSTS INCLUDED FOR INTERCONNECTION TIE PAIRS.**

A. ITPs are the connection between the shared frame, where the terminations are tied, and the COSMIC frame. The cost of the ITP includes blocks on the shared frame, the shared frame and connections to the COSMIC frame and the cable and cable racking running between the shared frame and the COSMIC frame. The cost of placing all these facilities is also included in the overall costs. ITPs are part of the existing integrated Qwest network. Since these facilities will, in most instances, already exist and can be shared among various CLECs and Qwest, the costs will be recovered through a monthly recurring charge based on the number of connections being used by any one CLEC during the period.

**Low Side Channel Performance**

**Q. IS QWEST FILING COST DATA FOR THE LOW SIDE CHANNEL PERFORMANCE ELEMENT?**

A. Yes. Cost data for Low Side Channel Performance is included in Study #7693 (Exhibit TKM-7).

**Q. PLEASE DESCRIBE THE COSTS INCLUDED FOR THE LOW SIDE CHANNEL PERFOMANCE ELEMENT.**

A. Low Side Channel Performance provides the transmission facilities between the customer designated premises and the serving wire center, the wire center where the CLEC is collocated, or to multiplexing equipment. Voice Grade/DSO facilities are available for Channel Performance.

This cost study includes the costs for the channel performance rate category for the electronic equipment component, which is added to the Link to provide the desired level of transmission performance. It modifies the circuit with the basic performance necessary for the circuit function. This channel supports 300 to 3000 Hz. Four signaling options are available. They include Loop Start, Ground Start, Reverse Battery, and No Signaling.

Channel Performance investments are calculated using a Microsoft Excel® spreadsheet. The Channel Performance spreadsheet estimates the forward looking installed investment associated with DS0 circuits between a Serving Wire Center and the wire center where the CLEC is collocated.

**Dark Fiber**

**Q. PLEASE DESCRIBE THE TYPE OF DARK FIBER RATES THAT QWEST IS PROPOSING IN THIS PROCEEDING.**

A. Qwest is filing recurring Unbundled Dark Fiber ("UDF") cost data for unbundled loop and interoffice dark fiber elements, for both single strand and fiber pairs.

**Q. PLEASE LIST THE UNBUNDLED DARK FIBER LOOP ELEMENTS.**

A. The recurring UDF Loop cost elements are as follows:

- Unbundled Dark Fiber Loop - 1 Fiber (or "Single Strand")
- 1 Fiber Loop Termination, Per Termination per Office
- 1 Fiber Loop Termination, Per Termination per Premises
- 1 Fiber Cross Connection

- Unbundled Dark Fiber Loop - 2 Fiber (or "Pair")
- 2 Fiber Loop Termination, Per Termination per Office
- 2 Fiber Loop Termination, Per Termination per Premises
- 2 Fiber Cross Connection.

**Q. PLEASE LIST THE UNBUNDLED DARK FIBER INTEROFFICE FACILITY ("IOF") ELEMENTS.**

A. The recurring UDF IOF cost elements are as follows:

- Unbundled Dark Fiber IOF - 1 Fiber (or "Single Strand")
- 1 Fiber IOF Termination, Per Termination per Office
- 1 Fiber Cross Connection
- Unbundled Dark Fiber IOF - 2 Fiber (or "Pair")
- 2 Fiber IOF Termination, Per Termination per Office
- 2 Fiber Cross Connection.

**Q. PLEASE BRIEFLY DESCRIBE THE COSTS FOR THE UNBUNDLED DARK FIBER LOOP ELEMENT.**

A. The UDF Loop provides one or two optical fibers between a wire center and a customer location on which no electronic terminating equipment is provided by Qwest. The fiber(s) are connected to a fiber distribution panel ("FDP") or functional equivalent in the wire centers or customer locations. The average fiber investment per loop is derived from the ICM Loop Module, which is included with ICM electronically on the CD (Exhibit TKM-4).

**Q. PLEASE BRIEFLY DESCRIBE THE RECURRING COSTS FOR THE UNBUNDLED DARK FIBER INTEROFFICE ELEMENT.**

A. UDF IOF (per route mile) includes one or two interoffice optical fibers between two wire centers on which no electronic terminating equipment is provided by Qwest. The fibers are connected to an FDP or functional equivalent at each wire center. The recurring costs include the installed fiber and conduit investments as developed in the Qwest ICM Transport Module included with ICM in Exhibit TKM-3.

**Q. PLEASE BRIEFLY DESCRIBE THE RECURRING COSTS FOR UNBUNDLED DARK FIBER TERMINATION.**

A. The UDF termination element includes the cost to terminate the fiber(s) on an FDP. The cost of this element is the same for both interoffice and loop dark fiber.

**Q. PLEASE BRIEFLY DESCRIBE THE RECURRING COSTS FOR UNBUNDLED DARK FIBER CROSS-CONNECT ELEMENTS.**

A. The cross-connect element includes one or two fiber patch cords to connect an FDP to another FDP located at the serving wire center or customer location. The cost of this element is the same for both interoffice and loop dark fiber.

The recurring TELRIC costs are calculated in the "Dark Fiber" cost study (Study #7705), which is provided as Exhibit TKM-8. The UDF rates resulting from the study are included with the results summary in Exhibit TKM-2.

**Q. IS QWEST PROPOSING RATES FOR EXTENDED UDF?**

A. Yes. However, the recurring costs for Extended UDF ("E-UDF") are the same as the costs for UDF loop as described above.

**Switching**

**Q. PLEASE DESCRIBE THE SWITCHING ELEMENTS FOR WHICH YOU ARE FILING COSTS IN THIS PROCEEDING.**

A. Qwest is filing costs for several switching elements, including port and usage elements. The ports include analog line side port, analog trunk port, and digital trunk ports. The usage elements include local switching usage and the interconnection rate for end office call termination, per minute of use, which is used for reciprocal compensation, as well as local tandem switching and tandem transmission.

**Q. PLEASE DESCRIBE THE RATES INCLUDED FOR THE ANALOG LINE SIDE PORT.**

A. Qwest is presenting rates and costs for the analog line side port UNE with basic features and an additional charge for a premium port. The cost for the analog line side port, including features, is developed in the ICM Outputs Workbook in Exhibit TKM-4 (Study #7699). The results are included Exhibit TKM-2.

**Q. PLEASE DESCRIBE THE COMPONENTS OF A STANDARD ANALOG LINE SIDE PORT.**

A. The standard analog line side port includes the non-traffic sensitive ("NTS") portion of the switch, and the costs of providing standard features. The basic NTS portion of the analog line port provides access to the functionality of the switch, including signaling digit reception and translations, routing and rating, and call supervision, as well as access to

interoffice services. The cost of the port is calculated as a weighted average of the analog line port and Integrated Digital Loop Carrier (IDLC) line port. The analog end office port component is a termination of a POT-type two-wire copper on the line side of the switch. This component includes the non-traffic sensitive portion of the switch, including the line card and a portion of the main distribution frame. The IDLC end office line port is the termination of the DS1s between the IDLC remote terminal and the end office switch - expressed on a per line basis. The unit investments for these two types of line ports are weighted together based on the forward-looking percent of IDLC assumed in the ICM Loop Module. In addition to this weighted average unit investment for terminating the loop to the end office switch, there are two additional components; 1) the unit investments for standard vertical feature-related hardware; and 2) the application software.

**Q. PLEASE SUMMARIZE THE PROCESS USED TO CALCULATE THE STANDARD PORT COSTS.**

A. As I described above, the switching module of the ICM (also referred to as the SCM) develops the weighted average unit investment for the standard analog line side port or loop termination on the switch and the standard feature-related hardware investment per line. The application software investment per line is computed in a separate study. These components are entered into the ICM Output Workbook, where they are converted into a monthly cost per line via the application of factors. The unit costs for all of these components are added together to determine the total unit cost for the standard analog line side port.

**Q. PLEASE DESCRIBE THE COMPONENTS OF THE PREMIUM PORT.**

A. The premium port cost is calculated by adding the standard port costs plus the additional costs associated with the 6-port conferencing features, as developed in SCM, and the Centrex Management System ("CMS") feature, as developed in a separate study. Exhibit TKM-2 includes the incremental charge for premium ports at section 9.11.6.2.

**Q. WHY IS QWEST INCLUDING THE COST OF VERTICAL FEATURES IN THE LINE PORTS?**

A. In the past Qwest has, in many states, filed separate costs for vertical features. However, in cost proceedings across the Qwest region, several parties have advocated that the cost of features should be included in the switch port.[10] In order to meet the expressed needs of these CLECs, as well as previous rulings by this Commission, Qwest has included the recurring costs of features in the line port UNEs.

**Q. YOU HAVE DISCUSSED THE COSTS FOR POTS ANALOG AND PREMIUM LINE PORTS. HAS QWEST CALCULATED THE COSTS FOR OTHER TYPES OF SWITCH PORTS?**

A. Yes. As noted earlier, and as summarized in Exhibit TKM-2, Qwest has developed TELRIC for several types of ports, including the Digital Line Side Port (Supporting BRI ISDN), DS1 Digital Trunk Torts (Message, PRI, DID), and DS0 Analog Trunk Port. Definitions for

[10] For example, in the Arizona cost docket (Docket T00000A-00-194), witness Michael Hydock, testifying on behalf of AT&T, WorldCom and XO, stated on page 15 of his direct testimony (filed May 18, 2001) that "the cost of such features should be part and parcel of the switching port element."

these port elements are contained in the ICM Output Workbook, Exhibit TKM-4 (Study #7699).[11]

**Q. HOW ARE THE COSTS FOR THESE PORT ELEMENTS DEVELOPED?**

A. The port investments are calculated using SCM in the ICM, which is included electronically on CD. The ICM Outputs Workbook, Exhibit TKM-4 (Study #7699), converts the investments into a monthly cost per port utilizing annual cost factors. The ISDN BRI Port is available as a standard or a premium port similar to the standard and premium line ports for POTS applications discussed above. If a CLEC wants 6-port conferencing or CMS associated with a BRI, a Premium ISDN BRI Port is required.

**Q. PLEASE DESCRIBE THE SWITCHING USAGE ELEMENTS.**

A. The ICM provides costs for three switching usage elements - one for end office call termination, one for local switching usage and one for tandem switch usage. These costs are expressed on a per minute of use ("MOU") basis. First, Qwest has calculated the costs for End Office Call Termination, which is provided as a Local Interconnection Service ("LIS") element. This is a rate used to represent Qwest's Reciprocal Compensation as described in Mr. Easton's direct testimony. Second, Qwest has calculated the costs for the Local Switching Usage UNE. Both of these elements include the set up and duration costs associated with switching a call. However, the LIS call termination element does not include signaling, while the UNE switching usage element does include the costs for signaling (i.e., the SS7 network). When a CLEC purchases LIS call termination, signaling

[11] For example, see the ICM "summary of results" tab of the ICM output workbook. If the user clicks on the

elements are purchased separately. Finally, Qwest has calculated the costs for Local Tandem Switching which forms the basis for both the LIS and UNE rates for tandem switching. The results for these rate elements are included in Exhibit TKM-2.

**Q. HOW ARE THE COST FOR THE LOCAL SWITCHING USAGE ELEMENT DEVELOPED?**

A. For both local and tandem switching usage SCM computes a unit investment for a call set up and per minute of call duration. The SS7 signaling investments are included in SCM. These unit investments are expressed on an annual call or annual minute of use. In the ICM the setup unit investment is converted to a minute of use unit investment by dividing by the minutes per call. This is then added to the unit investment per minute for call duration and the sum is converted into a cost per minute of use via the application of annual cost factors. Costs for measuring and billing are added to these costs in the ICM.

**Q. HOW DOES THE COST PER MINUTE OF USE FOR LOCAL SWITCHING USAGE VARY FROM THE COST FOR END OFFICE CALL TERMINATION?**

A. As noted above, the costs for signaling are included in the unbundled switching UNE, but are not included in the LIS Call termination element. When a CLEC purchases LIS, it must purchase signaling separately. For this reason, Qwest has previously established separate rates for the TCAP and ISUP SS7 Signaling and STP Port elements.

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element name, a description of the element will be displayed.

## Enhanced Extended Link ("EEL")

**Q. WHAT IS THE ENHANCED EXTENDED LINK?**

A. The Enhanced Extended Link ("EEL") element represents a combination of loop facilities and dedicated interoffice transport, and may include multiplexing capabilities.

**Q. PLEASE DESCRIBE THE EEL RECURRING COST DATA.**

A. Qwest is filing recurring cost data for EEL Transport. These costs (for DS0, DS1, DS3, OC-3, OC-12 and OC-48) are calculated in the ICM, as delineated in Study #7699. However, as discussed above, these cost are not the same as the costs Qwest is filing for UDIT. Qwest is also filing cost data for 2 and 4 wire, as well as DS1 and DS3 EEL-Link that are exactly the same as the cost data Qwest is filing for the 2 and 4 wire UNE-L loops and DS1 and DS3 capable loops.

## Daily Usage Record File ("DUF")

**Q. QWEST WITHDREW ITS COST STUDY FOR THE DAILY USAGE FILE IN DOCKET NO. UT-003013. IS QWEST SUBMITTING A COST STUDY FOR DAILY USAGE FILE IN THE CURRENT PROCEEDING?**

A. No. While Qwest is currently providing CLECs with the data contained in the Daily Usage File ("DUF"), it currently has no mechanism in place to render a bill to them for this information. There is a process underway at Qwest to develop the necessary billing mechanism which is expected to be completed by the fourth quarter of 2003. In the interim Qwest has not yet completed an updated cost study for this element because the impact of

this billing project on the DUF and its attendant costs is unclear at this time. Qwest intends to submit costs for this element once the impacts of the billing project have been sorted out. If timing permits, Qwest will submit costs in a supplemental filing in this docket. Otherwise, the costs for this element will be submitted as soon as they become available.

## CONCLUSION

**Q. PLEASE SUMMARIZE YOUR TESTIMONY.**

A. Qwest has a right under the Act to seek recovery for the UNEs that it is required to provide to the CLECs. Qwest's TELRIC studies properly apply the FCC's TELRIC principles. For the UNEs and interconnection services included in this docket, I have submitted recurring TELRIC cost studies. The Commission should set prices for unbundled network elements based on the TELRIC data summarized in the TELRIC Summary of Results (Exhibit TKM-2) to my testimony.

**Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

A. Yes, it does.

**BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

| | |
|---|---|
| **In the Matter of the Continued Costing and Pricing of Unbundled Network Elements, Transport, Termination, and Resale** | **Docket No. UT – 023003** |

**EXHIBITS OF**

**TERESA K. MILLION**

**ON BEHALF OF**

**QWEST CORPORATION**

**JUNE 26, 2003**

## INDEX OF EXHIBITS

| EXHIBIT | DESCRIPTION | STUDY # |
|---|---|---|
| TKM-2 | Summary of Study Results | |
| TKM-3 | Compact Disc with Cost Models, Workpapers and Cost Studies | |
| TKM-4 | Integrated Cost Model (ICM) Output Workbook | 7699 |
| Confidential TKM-5C | Switching Price Inputs Development | |
| TKM-6 | Interconnection Tie Pairs (ITP) | 7704 |
| TKM-7 | Low Side Channel Performance | 7693 |
| TKM-8 | Dark Fiber | 7705 |