BEFORE THE
PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF DETERMINING PRICES FOR UNBUNDLED NETWORK ELEMENTS (UNEs) IN QWEST CORPORATION'S STATEMENT OF GENERALLY AVAILABLE TERMS (SGAT)	)))))	**DOCKET NO. TC01-098**

DIRECT TESTIMONY OF

SID MORRISON

On behalf of

THE STAFF OF THE PUBLIC UTILITIES COMMISSION OF SOUTH DAKOTA

June 16, 2003

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INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS FOR THE RECORD.

A. My name is Sidney L Morrison. My business address is 10176 Savannah Sparrow Way, Highlands Ranch, Colorado 80129.

Q. PLEASE SUMMARIZE YOUR PROFESSIONAL EXPERIENCE.

A. I began my telecommunications career in 1966 in Charlotte, North Carolina as a cable helper for Southern Bell Telephone and Telegraph. Southern Bell was an incumbent local exchange carrier managing numerous exchanges throughout North Carolina. My duties involved splicing underground, buried and aerial cable. I also worked as a switching technician and special services technician.

Beginning in August of 1970, I transferred to Mountain Bell in Denver, Colorado as a central office technician. In 1972, I was promoted to supervise main distributing frame operations. My duties included supervising the installation of POTS, Special Services, Central Office area cuts, main distribution frame replacements and many other projects. In 1980 and 1981, I performed time and motion studies for service provisioning on approximately 75 of Mountain Bell MDF operations. These time studies included components for jumper running and administrative activities on each of these frames. From 1983 until 1986, I was the switching control center and main distributing frame subject matter expert for US West. In this position, I was responsible for staff level support for service provisioning and maintenance including the development of enhancements for operational support systems (OSS) supporting these activities. From 1986 until 1993, I was responsible for the US West AMA teleprocessing organization for the fourteen state US West region.

In 1993, I retired from US West (Mountain Bell) and began contract engineering work and consulting. In 1995 I took an assignment in Kuala Lumpur, Malaysia as a contractor/consultant with a team of specialists to build a CLEC network consisting of a GSM services, fixed network services, cable television services and data services integrated into a common transport backbone.

I had a number of responsibilities in Malaysia the largest of which was organizing and implementing a field operations group (FOG), responsible for the installation and maintenance of all fixed network and cable television services. My responsibilities included the planning, organizing, staffing and implementation of the FOG including an installation and maintenance group, assignment center, dispatch center, test center and a repair center. I also had the responsibility of developing business processes and OSS system requirements for provisioning and maintenance supporting the FOG.

After launching the FOG, I managed the department and project managed the refinement of the organization into an ISO 9002[1] qualified organization. In January of 1997, the Binariang Maxis FOG became the first certified ISO 9002 service organization in Southeast Asia. I returned from Malaysia in June of 1997 and worked for approximately two years as a contract OSP/COE engineer, training new engineers for US West collocation efforts.

In May 1999, I accepted a contract in Switzerland building a new CLEC under the market name of diAx telecommunications. My responsibilities involved project management to establish operational support systems (OSSs) supporting all wireless, wireline, and data services offered by diAx. I also provided consulting services developing business processes supporting the establishment of the diAx Internet Provider Operations Center (IPOC) and diAx data services

[1] International Organization Standards, ISO 9002 is the standard set of requirements for an organization whose business processes range from production, installation and servicing.

offerings. I established system requirements based on IPOC business processes for fault management systems, provisioning systems, capacity inventory systems, customer service inventory systems and workflow engines controlling overall maintenance and provisioning processes.

In December 2000, I returned from Switzerland and began working for QSI as a Senior Consultant. I provide telecommunications companies with engineering advice and counsel for direct network planning, management and cost-of-service support. My specific areas of expertise include network engineering, facility planning, project management, business system applications, incremental cost research and issues related to the provision of unbundled network elements.

Years spent as a technician dealing with work stoppage activities, field riding exercises, business process engineering, auditing, and participating in the startup of two international CLECs has provided me with continuous hands-on experience with the work activities associated with the provisioning of data services, cable television services, wireless networks, switch based services, central office cross connection, field installation and maintenance and outside plant planning and engineering.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I completed two years of course work in electrical engineering at Central Piedmont Community College in Charlotte, North Carolina. I also completed four years of course work in business administration at Regis University in Denver, Colorado. I have attended numerous industry seminars and vendor training courses on telecommunications technology. In 1961, I attended the US Air Force Electronics training school and Nuclear Weapons Reentry Vehicle School at Lowry AFB, Denver, Colorado.

PURPOSE AND SUMMARY

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

A. The Staff of the Public Utilities Commission of South Dakota has asked me to evaluate Qwest's testimony and cost studies for Unbundled Network Elements (UNEs), which have been submitted to the South Dakota Public Utilities Commission (Commission) in DOCKET NO. TC01-098.

I have reviewed and considered all relevant testimony and documentation that Qwest provided in support of its South Dakota non-recurring charges (NRCs). I have made recommendations for changes to Qwest NRCs in the text of this testimony.

Q. WHICH NONRECURRING COST STUDIES DID YOU REVIEW?

A. The nonrecurring cost studies I reviewed include the following:

SD COST DOCKET NRC STUDY 6454 (NRC STUDY)

6465 South Dakota Collocation Model

6536 Line Sharing Per Line

6549 OSS Ongoing Maintenance

6505 Direct CLEC-to-CLEC Interconnection

6503 Collocation: Remote Terminal

6550 OSS Enhancement and Development

Q. PLEASE SUMMARIZE THE FINDINGS THAT YOU PRESENT IN YOUR TESTIMONY.

A. For Qwest's non-recurring cost (NRC) studies and proposed rates for unbundled elements, I have reached the following conclusions:

1. Qwest's NRC studies and calculations are not forward-looking and are inconsistent with the Total Element Long Run Incremental Cost (TELRIC) cost methodology, which requires that costs be measured based on the most efficient telecommunications technology currently available.
2. Many of the work item activities included in the NRC STUDY involve tasks that should not be considered as NRC work items in a forward-looking network.
3. The task times associated with the provisioning of many unbundled elements are overstated by approximately fifty percent or more.
4. Other activities that Qwest claims are required lack adequate documentation to support the suitability of the cost item presented by Qwest.

I recommend that, to remedy these problems associated with Qwest NRC cost studies, the Commission reject Qwest's NRC studies due to their substantive deficiencies and require Qwest to submit new cost studies following the guidelines discussed in my testimony.

Q. DURING THE PROCESS OF REVIEWING AND EVALUATING QWEST'S SOUTH DAKOTA NRC STUDY DOCUMENTATION AND TESTIMONY, CAN YOU EXPLAIN THE FRAMEWORK YOU UTILIZED?

A. I evaluated Qwest's testimony, cost studies with the understanding that the cost studies must be based on the utilization of the most efficient technology available, and that the nonrecurring costs generated by Qwest's model should be forward-looking in nature.

GENERAL EFFICIENCY ISSUES

Q. ARE THE INPUTS USED BY QWEST IN ITS NRC STUDY CONSISTENT WITH TELRIC PRICING STANDARDS?

A. No. My colleague, Mr. Mark Stacy addresses several methodological issues in his testimony that cast doubt on the validity of the inputs used by Qwest to calculate nonrecurring rates in this proceeding. In addition to Mr. Stacy's conclusions, I have found other technical criticisms of the NRC STUDY's inputs that are grounds for the Commission rejecting Qwest's proposed NRC rates.

Q. AFTER REVIEWING THE TESTIMONY AND NRC STUDY, WHAT HAVE YOU CONCLUDED WITH RESPECT TO THE EFFICIENCIES OF THE ASSUMPTIONS USED IN THE CALCULATION OF NONRECURRING RATES?

A. In general, I have found that Qwest has failed to incorporate assumptions regarding numerous efficiencies. This failure has resulted in overstated costs and rates for the nonrecurring elements. I have found that Qwest has included times for activities, which are not necessary in the provisioning of nonrecurring elements. I have further concluded that Qwest has not assumed that the most efficient currently available systems technology and processes are utilized in the provisioning of nonrecurring elements. As a result, Qwest's proposed nonrecurring rates are overstated.

Q. CAN YOU EXPLAIN WHAT YOU MEAN WHEN YOU SAY QWEST HAS INCLUDED TIMES FOR TASKS THAT ARE NOT NECESSARY?

A. Yes. Qwest's NRC Support Documents state that the estimates are based on an average that does not include:

- Problems encountered during the work activities to process the service order

- Systems down time
- Time spent resolving internal order flow procedures
- Supplements to the initial order
- Maintenance or repair time

With the above exclusions the work item times for many of the work tasks are very much inconsistent. The reason I say this is because many of the work task descriptions include time for processes that assume that problems, errors or inconsistencies exist in the provisioning process. The descriptions of work items include descriptive terms such as review, verify, validate, analyze, handle, screen and ensure, as well as other similar terms. By using these terms the subject matter expert (SME) is implying that the Qwest technician is searching for problems or irregularities in the service provisioning order. In this case, the technician is searching for problems that should not exist. The point is, the CLEC customer should not be charged for searching for problems that should not exist. If there are no charges for correcting the problems then there should not be charges for searching for errors. Any errors discovered during provisioning are errors caused by Qwest's business processes and are not caused by the CLEC service request.

Q. SHOULD WORK TASK INPUTS INCLUDE ANY WORK TIME ASSOCIATED WITH ORDERING OR PROVISIONING ERRORS?

A. No. First, as I indicated previously, Qwest's own nonrecurring cost study documents exclude time associated with problems in estimating time associated with order processing and provisioning. Moreover, in response to staff discovery request in New Mexico (Staff 05-004), Qwest indicated that "it is Qwest's expectation that the Local Service Request ("LSR") be error free when submitted into the system for provisioning. If an error is identified after submission of

the LSR there is no charge for a CLEC to supplement the "LSR" to correct the error." Clearly, Qwest does not contemplate time devoted to correcting errors during the provisioning process because Qwest expects the order for provisioning to be error free. In addition, the Qwest document entitled Exhibit Nonrecurring Elements New Mexico 4 states in TAB 52, COST ELEMENT, under NOTE line 5 that "[a]ll times are based on a perfect service order and not problems encountered at test & turnup." This being the case there is no need for further scrutiny of the LSR for errors until the LSR fails to process. At the time of failure, a true error can be addressed. However, at this time the error would be the result of Qwest systems, business processes or human error and should not be paid for by the CLEC as part of the NRC for the rate element.

Q. HAVING SAID THAT THE ORDERS ARE ERROR FREE WHEN PLACED INTO THE PROVISIONING PROCESS AND STATING THAT QWEST SHOULD NOT CHARGE FOR PROBLEM RESOLUTION, HAVE YOU FOUND ANY INDICATION THAT QWEST IS CHARGING THE CLEC CUSTOMER FOR PROBLEM RESOLUTION?

A. Yes, I found cases where the Qwest SME said, in documentation, that the process includes time to "fix a problem before proceeding." In Exhibit Nonrecurring Elements New Mexico, tab 5, it is stated:

> When on order can not complete automatically, investigation as to why, fix the problem, and complete the order.
> Dan anytime we are doing verification it can result in having took fix a problem before proceding. If you have any questions please give me a call" (Grammatical errors included.)

In the same document, tab 33, the author Jeanette S. Cain states in paragraph seven and eight:

> When all conditions for a customer service request cannot be met by the FACS components a Request for Manual Assistance (RMA) is generated. An RMA indicates service order processing has been stopped. The RMA identifies the reason the service order cannot be automatically processed, the FACS component that failed processing and provides an image of the customer service request.

> All RMAs are sent from SOAC to PAWS. PAWS places the RMAs into a 'next work package' queue. Assignment Consultants using an intelligent work station (IWS) terminal access PAWS to retrieve RMAs for resolution. Assignment Consultants are trained to resolve all RMA types for all service requests. Meaning they can resolve exception messages for POTS, non-designed specials, specials and Wholesale product/services(s) service order activity. The objective for RMA resolution per assignment Consultant is forty (40) per day.

This demonstrates that at least the work steps utilizing the term verification include time to fix a problem, as well as time searching for problems. It does not make sense, especially from an efficiency standpoint, to establish costs based on an assumption that technicians spend time verifying that problems do not exist – particularly when Qwest itself does not process orders with errors. Qwest's assumption, therefore, would not be consistent with TELRIC principles, and would tend to overstate costs.

EFFICIENT TECHNOLOGY

Q. PLEASE DESCRIBE THE MOST EFFICIENT TECHNOLOGY, AS THAT TERM APPLIES TO THE QWEST NRCS AT ISSUE IN THIS PROCEEDING.

A. In this case, the most efficient technology is that which is deployed to update and make existing processes more efficient. My experience has been that such technology is deployed in an effort to improve service and increase efficiencies by lowering costs associated with customer service provisioning.[2] The evolution of systems technology and the business processes used to provision services must be considered when taking into consideration the validity of the Qwest NRCs. Business processes and systems have gone through more than a century of development and refinement.

Q. PLEASE DESCRIBE THE HISTORY OF EFFICIENT TECHNOLOGY AS IT RELATES TO THE TELECOMMUNICATIONS INDUSTRY.

[2] The act of supplying telecommunications service to a user, including all associated transmission, wiring, and equipment. Harry Newton, Newton's Telecom Dictionary 17th Edition (New York: CMP Books, 2001)

A. The most relevant history starts in the 1960s when most provisioning processes were manual and highly labor intensive. The 1970s and 1980s brought the mechanization of business processes by using nonintegrated computer systems with singular databases, which improved accuracy and timeliness in service provisioning business processes. Provisioning processes became less labor intensive with more accurate records and faster access to records residing in data bases instead of paper records in filing bins and manual records in large, hard to manage books such as exchange cable records (ECCR). In the late 1980s and 1990s system interfaces developed, allowing for system to system exchanges of information, thus improving records accuracy by improving records synchronization and speeding up the businesses processes requiring access to multiple systems records. This technological enhancement lowered labor-intensive manual intervention and established the first efforts at flow-through provisioning. Flow-through provisioning in this circumstance means activities that occur within systems interacting directly with each other to produce a desired output.

With the advent of mediation devices[3] and work flow management systems[4] the 1990s produced the next logical progression in mechanization, the integration of the flow-through processes utilizing OSS and system databases, interfaced with intelligent network elements. In other words, all of the activity steps required to connect and disconnect services are mechanized and integrated with new computer systems eliminating or minimizing the need for business processes requiring costly manual intervention.

[3] Computer based systems used for mass or individual system communications with many subordinate network elements. In the case of telecommunications, mediations systems are utilized for provisioning and maintenance efforts. Mediation systems bring flow through provisioning a step closer to reality.

[4] The electronic management of work processes such as forms processing or project management using a computer network and electronic messaging as the foundation. Harry Newton, Newton's Telecom Dictionary 17th Edition (New York: CMP Books, 2001) 774.

Q. HOW DOES THIS TECHNOLOGICAL EVOLUTION RELATE TO QWEST IN THIS DOCKET?

A. Qwest's technology and process platforms allow services to be provisioned in this automated and integrated manner. Although detailed process flow diagrams illustrating points of manual and mechanized interface points were not provided for all of the services, a review of the work item expense descriptions and data sources provided by Qwest revealed the existence of Operation Support Systems (OSS) and technology platforms that have the potential of providing efficient service provisioning. Examples of these OSS platforms include but are not limited to:

- Work and Force Administration/Control (WFA/C), which manages and automates work assignments required to install facilities, trunks, special service circuits and business/residence lines.
- Work and Force Administration/Dispatch in (WFA/DI), which automates workload assignments for technicians who work inside the central office.
- Work and Force Administration/Dispatch out (WFA/DO), which automates workload assignments of technicians who work outside the central office.
- Memory Administration (MARCH), which provides mechanized updates to stored program control switches, translating line service order data into recent change messages and transmitting the messages to appropriate CO switches.
- Provisioning Analyst Work Station (PAWS), which supports integrated exception handling of work performed in the Circuit Provisioning Center, Loop Assignment Center and Network Administration Center.
- SWITCH, which supports the inventory and assignment of switch ports, providing administration capabilities for the switch resources and associated central office equipment.

- Trunks Integrated Records Keeping System (TIRKS), which supports design and provisioning of special service circuits, message trunks and carrier circuits, and management of facility and equipment inventories.

These legacy systems are examples of provisioning and maintenance OSS, currently deployed by Incumbent Local Exchange Carriers (ILECs) with the objective of increasing flow-through by utilizing mechanization to reduce costly manual intervention.

Q. YOU HAVE USED THE TERM FLOW-THROUGH IN YOUR TESTIMONY. WOULD YOU PLEASE DEFINE THAT TERM FURTHER IN THE CONTEXT OF THIS CASE?

A. Yes. When an automated system such as those I have mentioned functions properly, CLEC and end-user orders for service can be processed with little need for manual intervention. When orders do not "flow through" the automated system, but instead "fall out" of the system due to certain errors that I will discuss further, manual intervention is required. When such fallout occurs, and manual intervention is required, costs associated with the process increase dramatically (since the ILEC will be performing tasks manually, rather than automatically). When the ILEC processes are not designed to minimize fallout, (or if fallout is overstated in the NRC STUDY) even the most efficient technological process will produce needlessly high costs to CLECs and end-users by understating flow-through.

Q. HAS QWEST UTILIZED THE MOST EFFICIENT SYSTEMS TECHNOLOGY AND PROCESSES AVAILABLE IN CONDUCTING ITS STUDIES?

A. No. I will describe the specific errors and problems with Qwest's NRC studies during my discussion of the business process work items associated with unbundled network elements later in this testimony.

Q. WHY DO YOU INCLUDE THE TERM "PROCESS" WHEN DESCRIBING EFFICIENT TECHNOLOGY?

A. The term "efficient technology," as it applies to service provisioning, means that the "efficient technology" is fully utilized in the provisioning business process. If the supporting business processes ignore the efficiency potential of Operation Support Systems ("OSS"), the costs associated with the provisioning activities will be significantly higher due to excessive fallout. If Qwest has deployed the OSS platforms needed for services to be provisioned automatically as described above, but assumes that its cost study does not fully utilize these systems to perform that OSS task or fails to recognize the efficiencies of the OSS technology in its study, then the study will exaggerate provisioning costs, because it will assume more manual intervention than it should.

Q. DESCRIBE AN EFFICIENT FORWARD-LOOKING OSS BASED PROVISIONING PROCESS ENABLER.

A. One of the advantages of providing an efficient OSS platform is that efficient OSS virtually eliminate the requirement for manual intervention when connecting and disconnecting services (representing a full flow-through environment). This mechanized flow-through process utilizes systems to electronically link and control all systems and processes required for service provisioning.

This is demonstrated in a Plain Old Telephone Service (POTS) provisioning situation when a customer calls an ILEC service representative. When the customer calls, the service representative, through a new computer key system, accesses a business office system used to activate vertical features and provisions the services requested by the customer, including those

services that may require field visits. This information downloads to a service order distribution and control system to determine if line assignment activities or other records updates and tasks are necessary. If required, a request is generated and sent to a downstream provisioning system which will process and update records and forward information to the necessary OSS. The OSS in turn processes messages that are sent to mediation systems to provision the service by communicating with service providing network elements such as switching systems, cross-connect systems, transmission systems, transport systems and field electronics. The forward-looking assumption is that all network elements are processor controlled.

When the flow-through process receives a message confirming the completion of the requested system transactions and task, provisioning is successful without manual intervention. The service representative can inform the customer that service provisioning is completed and the service is available.

Q. WHAT IF THE CUSTOMER DOES NOT RECEIVE A MESSAGE CONFIRMING THAT PROVISIONING IS COMPLETE?

A. If confirmation is not received, it means that fallout has occurred. As noted, the term fallout is used to define an event as an error in mechanized flow-through processing. When such an error occurs, a fallout message is sent to the appropriate work group, notifying the group of the failure and any information necessary, and the error that resulted in the fallout must be addressed and handled manually before the order can be completed within the automated process. To illustrate, assume a number of OSS are electronically connected to create a flow-through electronic ordering process. If one of the OSS systems receives an invalid or incompatible information from another OSS system then, the order will fall out of the electronically interfaced process and will require manual intervention to rectify that particular problem and to complete the order.

Q. WHAT WOULD CAUSE AN OSS TO RECEIVE AN INVALID OR INCOMPATIBLE MESSAGE?

A. There are three types of OSS/network element system errors or failures that cause fallout.

- Database synchronization errors
- Network element/element manager failures
- System Communication failures

Q. WOULD YOU PLEASE EXPLAIN THESE FALLOUT ERRORS?

A. Yes. First, *Database synchronization errors* occur when databases in two or more systems of the OSS fail to match data, such as customer names or addresses or the status of system resources such as equipment and facility. This type of error is common and its root cause is found in the manual methods used to propagate information from system to system when automatic interfaces are not available. Technicians manually input repetitive data into multiple systems. This process exposes the data to a number of potential types of errors that are time consuming to correct between systems. The errors consist of typographical errors, transposition and misinterpretation of data from manual documents. These errors commonly occur as a result of mistakes made by Qwest personnel. Resolution of these errors is slow and labor intensive.

Second, *Network element failures* occur when a network element (for example, a Local Digital Switch) responds that it cannot complete a task requested by the OSS or EMS network. The most common reason for this type of failure is very similar to the database synchronization errors failure. That is, incorrect information or status in either the network element or the OSS/EMS responsible for initiating provisioning activity. These errors are commonly caused by a combination of data input processes. Processes where technicians manually input data from

manual records and at the same time an OSS is inputting data through automated processes. These errors also commonly occur as a result of mistakes made by Qwest personnel and are very much similar in nature and resolution as the previously mentioned *database synchronization errors.*

Finally, *System communication failures* are typically software failures at the application layers or interface layers responsible for the establishment of a communications path and managing interface protocols, resulting in a failure of the network to transmit data between OSS, EMS and network elements. The basic cause of these types of errors is two-fold, software and hardware maintenance. When these failures occur without fail-over protection systems then the business process typically breaks down to a totally manual process that perpetuates even *more database synchronization errors* and *Network element failures*. These failures are preventable by ILECs incorporating protective systems.

Q. HOW CAN ILECS IDENTIFY AND DEVELOP IMPROVEMENTS TO OSS FALL-OUT?

A. Effective ILEC users of forward-looking OSS technology utilize, as part of their business process, a root cause analysis (RCA) procedure to scrutinize the causes of OSS fallout. The resulting root cause analysis data are used to develop improvements to business processes and develop software features and enhancements to improve flow-through effectiveness. As Mr. Stacy notes in his testimony, Qwest does not have such a formalized process.

Another excellent example of the RCA process and its ability to improve flow-through is evident from the transcript of the Operations Support Systems Forum that was held on May 28 and 29, 1997 by the FCC Common Carrier Bureau. During the second day of the forum, Elizabeth Ham from Southwestern Bell described how her company improved the flow-through capability of their EASE (Easy Access Sales Environment) OSS to 99% flow-through. Commenting on how

this high flow-through rate was achieved, Ms. Ham stated: "Our consumer EASE product permits a 99 percent flow through of all service orders that are entered by our residential or consumer retail operations. We would expect the same flow through from a trained CLEC service rep." In an up-to-date electronic processing environment, fallout should be negligible. Fallout of the small array outlined by Ms. Ham, while ideal, is not always achievable. However, the Southwestern Bell example above demonstrates the level of flow through that was achieved via currently available telecommunications technology and processes more than half a decade ago. The example that Ms. Ham offers is for an ordering system. However, this demonstrates the feasibility of a high percentage flow through system.

Q. HOW COULD QWEST REDUCE COSTS TO ITS COMPETITORS AND ACHIEVE HIGH FLOW THROUGH, CONSIDERING THAT QWEST USES A LARGE NUMBER OF OSS?

A. Two issues must be addressed. First, the business process must be integrated with provisioning and maintenance OSS. This means that the OSS elements must be able to communicate and the business process must be the controller of the OSS communications. Second, new concepts in network elements that manage what today are manual tasks must be implemented. These forward-looking network elements must be able to perform what was in the past costly central office and field cross connect tasks.

Q. WHAT TECHNOLOGY ENABLES OSS COMMUNICATIONS AND ENABLES THE BUSINESS PROCESS AS THE CONTROLLER?

A. A workflow engine is the enabler of an integrated OSS infrastructure. A workflow engine can consist of a number of systems architectures, utilizing any number of software and hardware

technologies with the purpose being the same to make the process more efficient, automated, and less susceptible to fallout. The workflow engine manages the information flow from system to system, essentially checking off the work tasks associated with any business process as the process progresses.

Many OSS vendors package workflow engines with their OSS, to handle system specific processes. Other vendors specialize in workflow systems that are industry specific, such as the telecom industry. Many other vendors produce generic information technology systems that can operate in any business environment requiring system integration and business process control. The workflow engine's utility, again, is managing and coordinating interactions between integrated OSS and business processes (See ATTACHMENT SLM_001).

Q. WHAT NEW TELECOMMUNICATIONS NETWORK ELEMENTS ARE AVAILABLE TODAY TO PERFORM MANUAL CENTRAL OFFICE AND FIELD CROSS-CONNECTS TASKS?

A. New technologies making automated distributing frames (ADF) practical have emerged that dramatically reduce the cost and size of electromechanical cross-connects, supporting thousands of any-to-any connections in a single 23 inch wide shelf. While offering true metallic switching capabilities in an extremely high-density platform, these new devices finally make large copper switches economically feasible and available for actual deployment.

ADF cross-connect systems are typically equipped with intelligent routing software and a scalable switching architecture enables it to grow linearly with subscriber demands. Using standard interface technology, ADF control processors and software are designed to integrate into telecom OSS for flow-through support of provisioning and maintenance.

ADF technology can scale from a remote terminal (RT) application to the largest central office (CO) maintaining any-to-any connectivity regardless of the application, at a relatively constant price per connection point.

Q. WHAT DOES THIS INTRODUCTION OF NEW TECHNOLOGY TO THE TELECOM INDUSTRY MEAN IN THE CONTEXT OF THE QWEST SOUTH DAKOTA NRC STUDIES?

A. This currently available, forward-looking technology supports my conclusion that Qwest's NRC STUDY is based on non-forward-looking assumptions and is, therefore, entirely inconsistent with TELRIC principles. As I have noted, a framework for a new definition of forward-looking TELRIC efficient technologies for OSS and network elements supporting MDF and field cross connects is now identified and should be factored into the time studies that Qwest has submitted in this case.

Q. HOW SHOULD THE OSS FALLOUT IN QWEST NRC STUDIES BE TREATED?

A. In the framework of Qwest South Dakota NRC cost studies the historic fall-out rates must be adjusted to reflect forward-looking, least-cost, flow-through OSS technological efficiencies. OSS fallout must be viewed in the context of the total provisioning processes rather than viewing process steps individually. Viewing steps individually compounds the rate of failure for the business processes.

In demonstration of this point, I offer a hypothetical example of two parties who both consider a 10% fallout rate acceptable in provisioning a network element. Assume that the first party applies a 10% fallout rate to 100 provisioning orders, applying 10 work steps to each order. This approach would create 100 additional expense work item computations, significantly overstating

costs. In contrast, assume the second party applies a 10% fallout rate once to provisioning the network element. This approach would result in only 10 expense work item computations and provide, therefore, a much more reasonable and realistic cost estimation.

Q. IS MANUAL INTERVENTION EVER REQUIRED IN A FORWARD-LOOKING NETWORK?

A. Only if such intervention is planned as part of a process to address low volume or other unique situations. Therefore, it is critical to distinguish fallout resolution costs from the costs associated with planned manual intervention. Fallout resolution costs are not appropriately included as part of a TELRIC network, while planned manual intervention costs may be appropriate. Therefore, manual interventions for these fallouts should not be considered in a TELRIC cost study. Costs of manual intervention should be limited to work that results from a system or business process trigger that is implemented to address low volume or other unique situations as part of a business process design. The difference is the efficient utilization of forward-looking OSS technology. Provisioning orders that fall out of an OSS flow-through process have the potential to generate a significant amount of manual intervention time to resolve the associated trouble. Viewed over a period of two or three years, this amount of work to resolve service provisioning discrepancies generates the type of circumstance that should be eliminated (through the Root Cause Analysis process) by applying basic quality improvement procedures and a forward-looking OSS technology solution.

Unfortunately, it is virtually impossible to point toward any evidence of Qwest utilizing basic quality improvement procedures to improve the costs or poor quality issues associated with system fallout reflected in their NRC cost studies. Qwest's approach to fallout management is unacceptable. Instances of fallout should be incorporated into a common fallout factor that is

applied to the end-to-end process in recognition of the forward-looking flow-through potential of OSS.

Q. WHAT FALLOUT FACTOR SHOULD BE APPLIED TO THIS COST STUDY?

A I propose that an administrative fallout factor be incorporated into each network element NRC calculation to recognize the reality that fallout will occur. This factor should be applied once to the entire end-to-end provisioning process in recognition of the basic principle that processes should be viewed in this manner and to avoid the compounding cost effect associated with recognizing fallout at each process step. I propose utilizing a rate of 2% applied to the entire process to reflect forward-looking quality/cost efficiencies, which in my opinion are reasonable to expect from a company operating an efficient, forward-looking network.

Q. WHY IS IT IMPORTANT FOR FALLOUT FACTORS USED IN THE NRC STUDY TO REFLECT YOUR RECOMMENDATIONS?

A. It is important to reject Qwest's inefficient flow-through assumptions and incorporate a 2% fallout rate for several reasons: (1) there is no incentive for improvement because using Qwest's fallout assumptions would allow Qwest to recover the costs of its inefficient operations; (2) the Qwest overstated fallout accepts multiple quality failures as a standard portion of network element provisioning; (3) there is no way to determine the statistical validity of the data presented; and (4) it guarantees the ongoing acceptance of abnormally high NRCs associated with manual intervention.

Q. HAVE OTHER STATE REGULATORY BODIES REVIEWED AND EVALUATED THE PRINCIPLES AND FALL OUT FACTOR APPROACH YOU SUGGEST?

A. Yes. These principles and the fallout factor were presented, evaluated and accepted in three other jurisdictions:

- Massachusetts, D.P.U./D.T.E. 96-73/74, 96-75, 96-80/81, 96-83, 96-94-Phase 4-L consolidated arbitration, ruling dated October 1999;
- Connecticut, Docket 97-04-10, decision dated May 1998 and Docket 98-09-01, decision dated November 1999.
- Michigan, Case U-11280, order issued November 1999.

My recommendation that the Commission require the NRC STUDY to incorporate a 2% fallout is supported by the decisions of these regulatory bodies.

QWEST'S WORK TIME ASSUMPTIONS

Q. HAVE YOU REVIEWED THE WORK TIMES RELIED UPON BY QWEST AS INPUTS INTO ITS NONRECURRING COST STUDY IN SOUTH DAKOTA?

A. Yes, I reviewed all of the rate elements in the Qwest NRC STUDY. The elements for which I made specific work time adjustments are shown in ATTACHMENT SLM_002.

Q. WHAT DID YOUR REVIEW INVOLVE?

A. I reviewed the work items to determine their necessity and the time in minutes for each work item to determine if the times are reasonable. My analysis is from the perspective of appropriate business processes, systems and network architecture for the services being reviewed. I did not attempt to make any economic analysis of the business processes.

Q. WHAT IS A WORK ITEM?

A. Work items are tasks that are chained together to complete a process. These tasks are the primary functions, usually, of technicians. As such, these functions become repetitious for the technician and it is normal and expected for the technician to know the detail work items of her/his job well. It is also normal and expected for the technician to know how the task impacts individual customers. All of this is based on an experienced technician. In performing the day-to-day job, the technician does not need to verify repeatedly every piece of information relative to the job.

Q. CAN YOU COMMENT ON QWEST'S ASSUMPTIONS REGARDING WORK ITEMS IN ITS NONRECURRING COST STUDY?

A. Yes. Based on the assumptions used by Qwest in its nonrecurring cost study, NRCs have been grossly overstated. I say this because, for one thing, a review of the study reveals that many of the work items are unnecessary or redundant in nature. For example, provisioning the Loop Basic Install First Mechanized UNE (excluding disconnection) requires twenty-eight separate steps by five separate organizations. Of these twenty-eight work items, eleven work items involve the use of the following terminologies: verify, check, review, analyze, handle, screen, ensure, and validate. I am certain that these terms involve some amount of measured work time, resulting in the inflation of work item times in the NRC studies. For ease of reference I will refer to verify, check, review, analyze, handle, screen, ensure, and validate and similar work items as "*validation work items*" in the remainder of my testimony.

With the information provided by Qwest it is impossible to determine how much of the work item time involves the process of *validation work items*. The way the terms are used implies a constant search for errors or problems that in my opinion should not exist in the first place. Furthermore, should problems exist, the search for the problem should not be at the expense of

the CLEC. This is especially true since Qwest has already stated that the CLEC will not be charged for the resolution of the problem. It is, therefore, not appropriate to include the costs associated with these activities in the calculation of the NRCs.

Q. WHY DID YOU CHOOSE TO ANALYZE VALIDATION WORK ITEMS?

A. Using the definition I established earlier in this testimony, *validation work items* are those work items that verify, check, review, analyze, handle, screen, ensure, validate and similarly described activities. These activities, which entail the repetitive and redundant evaluation of data entered in the system are not appropriate to include in the calculation of forward-looking NRCs because they essentially assume a faulty system that breaks down constantly due to improper system synchronization. In other words, these activities would not be required if Qwest were using currently available forward-looking technologies as part of a TELRIC-compliant efficient network.

A forward-looking OSS platform assumes stable synchronized systems data. This being the case, there should be no reason to repetitively evaluate data and results after the data are initially established in the system. The time assumed by Qwest for validation is unnecessary and inconsistent with an efficient, forward-looking network as it is practiced. In a forward-looking OSS business process environment, these work items would generally not exist. If they existed at all, they would be performed as an incidental task by the technician doing the specific manual intervention activity associated with the UNE, or would be replaced by an OSS software feature -- the latter being the most desirable method.

Q. HAVE YOU MADE ADJUSTMENTS TO THE QWEST NRC MODEL TO RECTIFY THIS OVERSTATEMENT OF WORK TIMES AND ASSOCIATED COSTS?

A. Yes. I have taken measures, by adjusting the work times, to make the rates more in line with TELRIC principles by eliminating the times associated with validation work items. This adjustment resolves this particular issue, and would ensure that CLECs would not be charged for activities that do not exist in a forward-looking efficient network.

Q. DID YOU FIND OTHER PROBLEMS WITH WORK ITEMS AND WORK ITEM TIMES IN THE QWEST NONRECURRING COST STUDY?

A. Yes, work items are not well defined. As a result, it is impossible to determine the purpose of the activity with any precision (see ATTACHMENT SLM-003). For example, LOOP BASIC INSTALL FIRST Mechanized, the INTERCONNECT SERVICE CENTER (ISC) has fourteen work items. The majority of these work items are tasks that should be mechanized because they are simply the verification of existing data. Work item "Determine critical dates" is the process of applying standard critical dates as they are defined by Qwest. This item should be mechanized.

Additional items that should be mechanized are, by cell location, B-14, 15, 16, 17, 18, 19 and 20. As you can see from the description of these work items, Qwest is reviewing, verifying and analyzing the LSR for data that might be in error or that should exist in other systems and should be populated on the LSR by automated means. In addition, work item B-21 includes work items associated with directory advertising. Item B-21 provides specifically that "If directory advertising or retail contract or both, issue order to remove information from account." Clearly, the directory advertising activity should be paid for by the directory sales organization and not the CLEC. This is especially true now that the directory is no longer owned by Qwest.

The ISC has the following two activities in cell locations B-26 and 27: (i) "Handle calls from other departments working the order," and (ii) "Handle issues including conditioning facilities,

cable & pair." The first implies that a problem may exist on the LSR. However, Qwest has already stated that it does not charge the CLEC for the resolution of provisioning problems. The second item directly implies that a problem exists and when the item is further explored in the supporting documentation TAB 18, page 6, the description of the item indicates that problems are being cleared. Again, these activities in Qwest's cost calculations indicate that Qwest's NRCs include charges to CLECS that are inappropriate and inconsistent with Qwest's own description of what it excludes from its NRCs, i.e., "problems encountered during the work activities to process the service order." In its response to a staff discovery request in New Mexico (Staff 05-004), Qwest indicated its "expectation that the Local Service Request ("LSR") be error free when submitted into the system for provisioning." Qwest added that, "if an error is identified after submission of the "LSR" there is no charge for a CLEC to supplement the "LSR" to correct the error." As such, the two items in B-26 and 27 are nothing more than two steps added to cover unforeseen events. If this is the case, then these items and times should be eliminated because unforeseen events imply a problem with the processing of the service request, and the resolution of problems should not be at the expense of the CLEC.

Both the ISC and Design groups have work items to distribute the service order to "Ensure [the] order is successfully distributed to the systems and is ready for provisioning" and "Distribute WORD (Work Order Record Detail) document." Distribution of service orders is an automatic task in OSS and is typically initiated as an automatic function of the system or on command initiated by a technician. Under no circumstances should the order distribution activity take anything greater than seconds or less. Service request distribution activities should not be at the expense of the CLEC. Distribution of service orders is an automatic function of the OSS. If distribution of service request is a problem of a scale that requires constant attention in the provisioning process, Qwest, at its expense, should pursue system enhancements to alleviate the

problem and any time charged to the CLEC should be zero. These system enhancements would be essential to ensure an efficient, forward-looking network.

The LPC has one item, Clear RMA (Request for Manual Assistance). This item is understated, and the description does not give any indication as to what the task really involves. Moreover, it consumes a relatively large amount of time for a nondescript process stated simply as Clear RMA. This LPC item appears consistently throughout the NRC STUDY and most of its rate elements. ATTACHMENT SLM-003, for example, demonstrates that the work items span a wide variety of descriptions, few of which are adequate. The detail level varies from fourteen work items for the ISC (some rate elements have thirty-two such as Service Delivery Coordinator for DS3 Entrance Facility work items) to one work item for the LPC.

Q. WHAT OTHER ISSUES CONCERNING THE QWEST NRC COST STUDIES HAVE YOU DISCOVERED?

A. After analyzing the validation work items, I believe they are inappropriate for use in the Qwest NRC STUDY. As indicated previously in my testimony, Qwest's own documentation supports my position that Qwest is charging the CLEC wholesale customer for the items it claims to not charge for. These charges inappropriately include work activities related to processing the service order, resolving systems down time, resolving internal order flow procedures, supplementing the initial order, and maintenance or repair.

Q. ARE YOU OFFERING NEW COST STUDIES AS A PART OF YOUR TESTIMONY?

A. No. My intent is to demonstrate the technical shortcomings of the current Qwest NRC cost studies. However, I have adjusted the Qwest NRC STUDY to incorporate TELRIC principles to

the extent possible, and to make the resulting rates more consistent with an efficient forward-looking network.

Q. PLEASE SUMMARIZE THE ADJUSTMENTS YOU HAVE MADE TO QWEST COST STUDIES.

A. In Qwest's NRC STUDY, I have eliminated or adjusted all Qwest times associated with the following items:

Activities associated with terms such as verify, check, review, analyze, handle, screen, ensure, and validate and similar work items as *"validation work items"* I have changed to zero minutes. The exception to this is the first receipt of the LSR/ASR from the CLEC. This is usually the "SERVICE DELIVERY COORDINATOR" the first "Verify ASR" or "LSR". This Verify time should be reduced to 2.5 minutes.

Work Item, "INTRA-CO CALLS" this item is usually found under the "SERVICE DELIVERY COORDINATOR". This item has been adjusted to zero minutes. These calls mean that something is wrong on the order or the OSS is not effectively controlling the order and technicians need communications over and above what the system is providing. This means there is a problem with the order.

Order Distributed or Sent/Distribute. This type of terminology and corresponding time has been reduced to zero minutes. This is definitely a system function and happens typically when a technician hits the enter key at the end of a manual input process or the system automatically distributes the order after completion of its prescribed process. Systems typically distribute service orders and if any other process is utilized other than automatic distribution the CLEC should not be paying for it.

All references to Qwest directory advertising and listing have been reduced to zero. Qwest directory is no longer owned by Qwest and should pay its own way. Any time spent to determine directory status should be reduced to zero minutes charged to the CLEC.

Any time spent logging orders into a process is unneeded and has been reduced to zero minutes. This work item terminology is frequently combined with verify.

Any critical date determination has been reduced to zero as this is a function that systems perform. Critical dates are predetermined and should be fixed interval based on the critical date parameters for the order.

All DS0 cross connect should be 1 minute for COSMIC technology. High speed cross connects (DS1, DS3 and OCn) are reduced by 50%.

Reduce all travel time to 10 minutes per order. This is generous I believe. If a tech is loaded out with 10 orders, travel consumes 100 minutes of the day, this is a lot of travel time.

All test times are reduced to 10 minutes. Modern test equipment has features to make testing faster and efficient.

Login/Access are set to zero minutes. Typically, a technician logs on.to a system at the beginning of their shift and does not log off until the end of the shift. They certainly do not logon and logoff for every service request. Also, the technician performs service requests for multiple customers during the day and this charge can not completely be charged to any one customer as Qwest is doing in its cost studies.

Field visits to verify CO and OSP are reduced to zero minutes. The purpose of these field visits is to verify business records usually maintained in OSS. If the records were maintained accurately to the point that engineers could trust them there would be no need for field visits. I believe the CLEC should not pay for the verification of Qwest OSS databases.

Manual input to systems has been reduced to zero minutes. This is an interface issue for system to system input and forward-looking OSS.

I evaluated whether the cost studies comply with TELRIC – forward-looking, least-cost, most efficient technology when reducing or eliminating cost. I believe the standard is what is reasonable, based on TELRIC principles. I believe my analysis complies with this standard.

If the task listed in the NRC STUDY is duplicative or unnecessary, I deleted it and the time associated with it in the study. If I believed the time estimate was too high for a particular task, I reduced it in the study. If I believed that Qwest's documentation was insufficient, I deleted the task or reduced it in the study to what I believe is reasonable.

All other work items are reduced by 50%. The primary reasons are the unnecessary duplication of efforts reflected in the tasks described in Qwest's studies, Qwest's failure to use efficient technologies in its studies and the lack of documentary support for the estimates contained in Qwest's studies along with the myriad of methodological issues addressed by Mr. Stacy in his testimony.

Q. PLEASE SUMMARIZE THIS PORTION OF YOUR TESTIMONY.

A. This section of my testimony describes a multitude of issues linked with Qwest's studies. Many of the flaws discussed above can be attributed to four related issues that introduce major flaws into Qwest's basic calculations:

1. Qwest has failed to apply a forward-looking OSS technology overlay to existing business processes. The large number of work items, requiring manual intervention, associated with many of the cost study rate elements is a key indicator that forward-looking OSS technology is not appropriately deployed. Additionally there is no indication in any of the data that forward-looking OSS technology is in the near future. Qwest will most likely argue that SMEs tempered

their estimates with forward-looking adjustments, as this was part of their instructions.[5] However, I submit that it is highly unlikely that the SMEs, used to document the costs associated with Qwest's current business processes, are also subject matter experts in the areas of OSS evolution, technology advancements, industry forum resolutions and the associated cost/benefit points for each existing OSS that generates fall out.

2. In order to provision network elements a series of linked activities must be completed. Some of these activities require manual work while others are performed by systems. The combination of the required activity steps constitutes a complete process. Qwest makes no distinction between the manual resolutions of system fallout as compared to planned/designed manual process intervention. Applying this definition to each workgroup individually and calculating costs by individual process step regardless of whether the fallout was planned or created due to quality or system based errors, totally ignores the efficiency potential imbedded in existing OSS and compounds the costs associated with the end-to-end process. I have proposed applying a fallout rate once to an entire process as opposed to Qwest's cost compounding methodology. This standard quality approach is used in the industry and has been accepted by regulators.

3. To provide validation of SME work item time estimates and to develop confidence in the reported times, I recommend that Qwest utilize time and motion studies as an accuracy tool in reestablishing work item times in the NRC cost studies. This is a standard quality approach and has been accepted by regulators. Time and motion studies will result in more fully described work items and will help eliminate ambiguous work item descriptions.

4. Provide a review process for all business processes to ensure they are consistent with Qwest policies regarding work items that are billed to the CLEC wholesale customer, as well as work items that are not billed to the CLEC wholesale customer.

[5] The extent to which SMEs received appropriate instructions at all is an issue discussed by Mr. Stacy in his testimony in this case.

Q. WHAT IS THE PURPOSE OF THE REMAINDER OF YOUR TESTIMONY?

A. The remainder of my testimony addresses the rates of specific elements that are most critical to the advancement and sustainability of competition in South Dakota.

SPECIFIC ELEMENT REVIEW

LOOP CONDITIONING

Q. IS IT APPROPRIATE FOR QWEST TO CHARGE FOR LOOP CONDITIONING?

A. No. Using a forward-looking, least-cost network design, no basis exists for assessing loop conditioning charges to CLECs. This stems from the fact that in a forward-looking network design, there is little or no need to place bridged taps or load coils. In the absence of these devices, which inhibit DSL services, there is obviously no cost incurred to remove them. Therefore, in a forward-looking network configuration, loop conditioning would have associated costs of zero dollars, and with no loop conditioning costs to recover, the charges associated with loop conditioning should be eliminated. Qwest has developed non-recurring costs associated with loop conditioning that reflect an antiquated network that is neither forward-looking, nor least-cost and that are totally inconsistent with the TELRIC concept.

Q. DOES QWEST DEVELOP ITS RECURRING RATES FOR UNBUNDLED LOOPS IN THE SAME MANNER?

A. No. Qwest has developed recurring charges for UNEs based on forward-looking cost standards. Qwest's recurring loop rates are priced based on a network specifically designed so that items

such as load coils are not necessary.[6] Therefore, non-recurring costs for loop conditioning serve to double recover the costs associated with a forward-looking network. When a CLEC agrees to pay the monthly recurring rate approved by the Commission consistent with a forward-looking network methodology, the CLEC is paying for a loop that should already be fully capable of providing DSL service. Therefore, Qwest's additional charges associated with loop conditioning serve only to double recover costs that are already included in the monthly rate. Indeed, it would be inappropriate and inconsistent for the Commission to allow Qwest to base its loop rates on forward-looking principles, which may be greater than the costs of a non-TELRIC based network in that context, while it bases its loop conditioning rates on a non-TELRIC network which are greater than the costs of a TELRIC network in the context of loop conditioning. In other words, such a ruling would allow Qwest to go back and forth between network assumptions according to whether the particular network assumption produce higher rates for Qwest in that particular instance. The question is -- *If CLECs are already paying for a forward-looking network through monthly charges, why should they be subject to additional up-front charges in order to remedy the fact that the embedded Qwest network is not in fact up to those forward-looking standards?*

Q. HAVE OTHER STATE COMMISSIONS RULED THAT LOOP CONDITIONING CHARGES ARE NOT APPROPRIATE, AND THEREFORE, SHOULD BE ELIMINATED BASED ON SIMILAR ARGUMENTS?

A. Yes. In Minnesota, (OAH Docket No. 12-2500-12631-2, MPUC Docket No. P-999/CI-99-1665 dated May 18, 2000), it was determined that the prices set for loops cover the costs for

[6] In developing its loop rates, Qwest assumes that any loop greater than 12,000 feet in length will be served over fiber facilities. This assumption results in higher recurring loop rates than would occur if copper facilities were assumed. Moreover, because of this copper/fiber cutover assumption, load coils would never appear in Qwest's network.

conditioning loops, and that, through those loop prices, Qwest (U S WEST) is being compensated for the loop conditioning costs.

Even more recently, in an Order issued on September 29, 2000 (Docket No. 98-57 Phase III), in which the Massachusetts Department of Telecommunications and Energy ("Department") determined whether loop conditioning charges conform to TELRIC principles, the Department rejected Verizon's tariff charges for loop conditioning. In that Order, the Department quoted the FCC's *Local Competition First Report and Order* at ¶ 685, saying that the cornerstone of the TELRIC methodology is the use of "a reconstructed local network [that] will employ the most efficient technology for reasonable foreseeable capacity requirements". In making its determination that loop conditioning charges should be rejected the Department found such charges to be inconsistent with TELRIC methodologies. Given that inconsistency, the Department disallowed Verizon's proposal to recover costs for loop conditioning.

In addition, the findings of the Utah Commission support and summarize my position perfectly:

> A TELRIC model (or a forward-looking, efficient provider) would not design a network that required loops to be conditioned or groomed before services today's customers expect could be provided. It follows, and we so conclude, that the buyer of an unbundled loop should not have to pay for any such upgrading: the price of the loop presupposes sufficient quality, by which is meant a loop capable of meeting not just current demands but demands for advanced services as well. Accordingly, we disallow charges for line conditioning or grooming.[7]

Q. CAN YOU EXPLAIN IN MORE DETAIL YOUR CONTENTION THAT MANY OF THE COSTS THAT QWEST INTENDS TO RECOVER THROUGH ITS LOOP

[7] *In the Matter of Investigation into Collocation and Expanded Interconnection, Phase III Part C: USWC's Unbundled Network Element TELRIC Costs and Prices*, Public Service Commission of Utah, Docket No. 94-999-01, Phase III Part C Report and Order at p. 9 (June 2, 1999).

CONDITIONING CHARGES ARE ALREADY RECOVERED IN THE MONTHLY RECURRING RATE FOR AN UNBUNDLED LOOP?

A. Yes I can. First, recovering expenses associated with removing load coils or bridged tap is at its very premise, contradictory to setting rates based upon a least-cost, forward-looking methodology (i.e. TELRIC principles). What these expenses actually recover are costs associated with "retrofitting" the existing, embedded network. Indeed, (as described previously) a network design based upon the least-cost, most efficient technology available would result in loop facilities that would include few if any of these types of devices. For example, local exchange carriers rarely load loop plant (i.e. place load coils on copper pairs) unless those loops extend beyond 12,000 feet from the central office. Hence, loop rates set for a Qwest unbundled loop are based upon an implicit assumption that no load coils will be used (because Qwest assumes that under no circumstances will copper extend more than 12,000 feet). Yet even though Qwest charges the unbundled loop rates set in a TELRIC proceeding, (rates that should already recover costs associated with a loop absent load coils) Qwest insists that in some cases, additional conditioning charges must be assessed to "retrofit" the existing network by removing load coils.

Q. HOW DO RATES ASSOCIATED WITH RETROFITTING THE EXISTING NETWORK SERVE TO DOUBLE RECOVER COSTS?

A. By attempting to apply conditioning charges associated with retrofitting the embedded network, Qwest is in essence asking carriers to pay rates associated with the latest and greatest technology, yet, when they receive the loops for which they are paying forward-looking rates, they are then asked to pay additional charges to revise the existing network to meet that standard. This is akin to buying a Mercedes for $50,000, being provided a $20,000 Volkswagen, and then being asked to pay an additional $30,000 when you want the performance of the Mercedes for which you

originally paid. In total, you will have paid $80,000 to receive the $50,000 Mercedes to which you were entitled with your initial payment. More to the point of this case, under Qwest's approach, CLECs would be required to pay a monthly rate for a suburban loop that is up to forward-looking network standards. In addition, the CLEC are asked to pay $654.06 for the additional costs associated with removing load coils and bridge taps that were assumed not to exist in the first place. If Qwest is allowed to charge both the forward-looking monthly loop rate, as well as costs associated with retrofitting the existing network to a point where it complies with the assumptions included in its TELRIC studies, the Commission may as well have simply allowed Qwest to establish rates based upon its embedded costs in the first place. Indeed, that is exactly what the result will be. This result violates the FCC's TELRIC methodology and is detrimental to the growth of advanced services such as xDSL.

Q. WHAT DO YOU RECOMMEND REGARDING QWEST'S PROPOSED RATE FOR CABLE UNLOADING/BRIDGED TAP REMOVAL?

A. Based on the above, I have adjusted the rate down to $0. I recommend that the Commission adopt that rate.

COLLOCATION

Q. WHICH ELEMENTS OF THE QWEST COLLOCATION COST STUDIES YOU HAVE REVIEWED.

A. In this portion of my testimony I explore issues associated with IDFs and battery distribution fuse bays. Additionally I have studied and comment on Qwest's floor space charges, security charges, quotation preparation fees, and CLEC-to-CLEC connections. To do so I reviewed the testimony provided by Qwest witnesses. I also reviewed the cost support provided by Qwest on CD-ROM.

Q. WHAT IS AN IDF?

A. IDF is the acronym for Intermediate Distribution Frame. As the name "intermediate" implies, IDFs are usually located (in the electrical sense) between central office equipment and a MDF. To qualify as an IDF the IDF must have no direct outside-plant termination.

Q. HOW DOES QWEST APPLY THE IDF IN THEIR COLLOCATION ARCHITECTURE?

A. Refer to ATTACHMENT SLM-004[8], Qwest uses an IDF/shared frame between the CLEC space and the Qwest COSMIC or MDF. The IDF is not in the best interest of the CLEC. The IDF is costly, requiring floor space, terminal blocks, terminations, ironwork, cable rack and labor to construct. All of these items increase the cost of collocation and market entry for the CLEC.

Q. ARE THERE OTHER DISADVANTAGES ASSOCIATED WITH THE IDF OR SHARED FRAME?

A. Yes, the IDF impacts the cost of provisioning by adding additional cross-connects that would not be required if the IDF were not used. Additionally the added cross-connects represents an additional point for failure. The failures would take the form of shorts, crosses, grounds, missing wiring, or incorrectly wired circuits. These types of failures are additional opportunities for customer service failures.

The use of IDFs stem from embedded inefficiencies that have are inconsistent with a TELRIC study. First, there are no sound engineering reasons for using IDFs to terminate CLEC services. In fact, the IDF is technically no different from the MDF and is only introduced for Qwest's internal central office policies. Qwest engineers have been instructed to place IDFs to keep CLEC cables from terminating directly on the MDFs. As noted, introduction of IDFs results in

[8] Collocation Diagram from Qwest South Dakota Collocation Cost (7253), Tab A. Collocation Diagram

added costs to the CLEC when cables from the CLEC cage could terminate directly on the MDF more efficiently and in a less costly manner than on the IDF.

Q. WHAT IS YOUR RECOMMENDATION TO THE COMMISSION CONCERNING THE USE OF THE IDF OR SHARED FRAME?

A. The CLEC IDF has no redeeming engineering or operations value and its use in offering service to CLECs should be discontinued with plans to phase out existing IDFs and recover the floor space and at the same time eliminate a source of risk for customer service. This charge should, therefore, be eliminated.

Battery Distribution Fuse Bay Locations

Q. DOES QWEST PROPERLY LOCATE BATTERY DISTRIBUTION FUSE BAYS (BDFB) THAT ARE DESIGNATED FOR ILEC/CLEC POWER?

A. No. In ATTACHMENT SLM_005, I have placed examples of BDFB locations associated with switching, transmission and collocation. The Attachment demonstrates that for switching and transmission the BDFBs are located in a manner that minimizes the length of cabling needed to deliver power to the CLEC collocation cages and equipment. For collocation, the fuse runs are excessive because of an inefficient design that does not take into consideration the needs of the CLEC collocation area.

Q. IS THERE A MORE EFFICIENT DESIGN FOR BDFB'S WHEN COLLOCATIONS OCCUR?

A. Yes. In the example of the BDFB placed at the North side of the floor space for combination ILEC/CLEC use, the BDFB requires an unusually long cable run to provide power to the

collocation area cage loads from the BDFB fuses. This practice adds significantly to the cost of collocation. Unnecessarily long runs create the need for larger and larger cables as the distance from the BDFB to the load increases. BDFB cable cost can easily exceed $100 per foot without installation cost.

A more effective BDFB location is demonstrated in ATTACHMENT SLM_005. By placing the BDFB near the middle of the floor space in the collocation area, cable lengths are minimized and costs are minimized. Under normal circumstances, the power feed to the BDFB is run one time. The nature of the BDFB is that multiple fuses will be placed with separate runs from each fuse to many loads. Efficiency is met when the length of the multiple fused loads are minimized. In my experience, this is the most practical method to use for managing power to multiple users and loads thus better serving the needs of the CLEC collocation area. I have adjusted the study to reflect these efficiencies.

Floor Space Rent Charges

Q. CAN YOU DESCRIBE QWEST'S FLOOR SPACE RENT CHARGES AND ANY OBSERVATIONS YOU HAVE MADE WITH RESPECT TO THE QWEST FLOOR SPACE RENT CHARGES?

A. Yes I can. The Qwest floor lease space charge is a monthly recurring charge that is applied on a per square foot basis to recover the floor space investment as well as one 110 AC, 15 amp electrical outlet, and repair of climate controls, filters, fire and life systems and alarms, mechanical systems and HVAC, bi-weekly housekeeping service and general repair and maintenance[9]

[9] Direct Testimony of William R. Easton, Page 24.

I have traced Qwest's calculations for floor space from the rates proposed in cost study 6465 South Dakota Collocation Cost (filed in this proceeding) back to the original investment sources. In so doing I discovered the following:

1. Qwest has used data from the 1997 version of the RS Means construction guide to determine investment levels. It then uses a gross up factor of 2.5% to escalate costs to a 1998 level. Qwest uses this older data though more recent data is available.
2. Qwest uses a figure of $7.20 per square foot for land, yet provides no explanation of how this figure was calculated. Given that the FCC in its *Local Competition Order* has required that the existing wire center locations remain the same, the cost of the land is the only component that should be included at historical cost.[10]
3. Qwest includes mark ups in the RS Means figures for architectural fees and project management costs. The RS Means construction guide is vague on whether or not its construction cost data includes such fees and Qwest has taken the opportunity to include these fees. Qwest further includes landscaping and site work in its calculations.

Once Qwest has developed an amount for investment per square foot of floor space it applies charge factors to develop a monthly cost of $2.83. Qwest then loads $0.20 in common costs to develop its total monthly rate for a square foot of collocation floor space of $3.03 per month. I discuss these loadings in more detail later in my testimony.

[10] The FCC rules at section 51.505 (b)(1) implementing the Local Competition Order state: "The total element long-run incremental cost of an element should be measured based on the use of the most efficient telecommunications technology currently available and the lowest cost network configuration, *given the existing location of the incumbent LEC's wire centers*." Emphasis Supplied. Because the option of modeling a network where the wire centers could be moved to land that would be lower in cost that the existing land where most ILEC wire centers are located is not an option, the value of the land is the only component that should be valued at historical cost.

Q. HAVE YOU INVESTIGATED MORE RECENT CONSTRUCTION COST DATA FROM RS MEANS PUBLICATIONS?

A. Yes, I have. I reviewed the 2001 RS Means Square Foot Costs publication at the Denver Public Library. In the commercial and industrial section of that guide at page 209 the total building cost for a telephone exchange building is estimated to cost $107.45 per square foot. This amount includes contractor fees, overhead, profit, and architect fees. This figure is 18% lower than the 1997 figure used by Qwest as an input into the cost model.

Q. HAVE YOU CONSIDERED OTHER MEASURES OF REASONABLENESS RESPECTING THE RATE QWEST HAS PROPOSED FOR FLOOR SPACE LEASE CHARGES?

A. Yes, I have asked my colleagues at QSI about the rates for floor space other ILECs have proposed in similar proceedings across the country. While some initial ILEC proposals for floor space lease charges were in the range sought by Qwest in this proceeding, others were less than half of what Qwest seeks.

Q. PLEASE SUMMARIZE YOUR CONCERNS RESPECTING THE METHODS AND INFORMATION QWEST HAS USED TO CALCULATE ITS FLOOR SPACE LEASE CHARGES.

A. Given the vintage of the information used by Qwest, the alterations made to that data in attempts to bring it up to date, and the excessive loadings, I am concerned that the prices proposed by Qwest for floor space are indeed too high. I bring attention to this matter to highlight that additional and more current information is available and that Qwest's calculations may not be truly forward-looking with respect to floor space rental charges. Moreover, additional

information presented in the RS Means Square Foot Cost guide should be considered. That information pertains location factors.[11] The average of the location factors for South Dakota was 79.1% of the national average. Qwest should be required to use the $84.99 per square foot for building costs developed from the 2001 RS Means Square Foot Cost guide which includes location factors rather than the $170.44 per square foot building investment that Qwest calculates using older building cost data.

I believe that the Commission should require Qwest to recalculate its costs and prices for floor space lease charges in accordance with the TELRIC principles described by Mr. Gates and with current and appropriate investment information. The newly calculated rates should be subject to review by the parties to this case. ATTACHMENT SLM_006 demonstrates a recalculation of the floor space rent charge with more current RS Means cost data.

Security Charges

Q. CAN YOU DESCRIBE QWEST'S SECURITY CHARGES AND ANY OBSERVATIONS HAVE YOU MADE WITH RESPECT TO THE THOSE CHARGES?

A. Yes I can. Qwest has proposed a security charge of $0.85 per month per security access card. The investments for this charge are developed from equipment cost and employee count data that is 6-years old (1996 vintage) as well as a monthly expense per badge of 0.25 hours or 15 minutes of work each month. As a former US WEST employee I am unclear as to how the company would have conducted 15 minutes of work each month on my security badge as well as the badges of every other US WEST employee.

[11] The RS Means Square Foot Cost guide supplies costs shown on the basis of national averages for materials and installation. According to the guide, to adjust these costs to specific locations you would multiply the base cost by a factor for a particular location. The specific commercial factors for South Dakota locations are as follows: Sioux Falls 0.819; Watertown 0.785; Mitchell 0.778; Aberdeen 0.791; Pierre .0791; Rapid City 0.787. A simple average of these South Dakota locations is .791 of the national average.

Qwest also proposes a monthly recurring charge of $9.57 per person for card access to each office. This charge is nearly $114.84 per year per person for access to each individual central office. Once again, the investment data and employee count appear to be based on 1996 vintage data. Hence neither the access card charges nor the charges associated with card access to the Qwest offices should be considered forward-looking.

Q. PLEASE SUMMARIZE YOUR CONCERNS RESPECTING THE METHODS AND INFORMATION QWEST HAS USED TO CALCULATE ITS SECURITY CHARGES.

A. Given the vintage of the information used by Qwest and the excessive loadings, the prices proposed by Qwest for security charges are indeed too high. Again I bring attention to this matter to highlight that Qwest's calculations may not be truly forward-looking with respect to security charges.

The Commission should require Qwest to recalculate its costs and prices for security charges in accordance with the TELRIC principles described by Mr. Gates and the newly calculated rates should be subject to review by the parties to this case.

Quotation Preparation Fees

Q. WOULD YOU PLEASE DESCRIBE QWEST'S COLLOCATION QUOTATION PREPARATION FEES AND ANY OBSERVATIONS YOU HAVE MADE WITH RESPECT TO THOSE FEES?

A. Certainly. According to Qwest witness William R. Easton, the Quotation Preparation Fee is a nonrecurring charge for the work required to verify space, power, cable terminations, review design requests and develop a price quote for the total cost to the CLEC for its collocation

request. The CLEC will receive credit for the QPF charge when the collocation installation is completed and the CLEC submits the balance of the nonrecurring charge for that work.

I attempted to trace the costs developed by Qwest in its collocation model back to specific work steps required to perform this work. However, the Qwest collocation model includes hard inputs for the quotation preparation fees in a table that calculates nothing more than the average engineering cost for a number of jobs. I am concerned that I was unable to find support for any of the cost associated with the quotation fees (caged, cageless, or virtual) in the Qwest model.

Q. CAN YOU PROVIDE AN EXPLANATION AS TO WHY YOU HAVE CONCERNS WITH BEING UNABLE TO TRACE THE AMOUNTS OF THE QUOTATION FEES BACK TO THE ACTUAL LABOR ACTIVITIES AND WORK TIMES?

A. Absolutely. Let's consider the element specific costs presented by Qwest for a caged collocation quotation fee of $4469.55. If we divide this figure by a loaded hourly labor rate of $50.00, it would require over 89 hours of labor to complete the tasks associated with the quotation preparation. Said another way, it would take two week and nine hours, for one employee working 40 hours a week to accomplish this task. Having worked in numerous Qwest central offices I can state with a high degree of certainty that I could have accomplished the tasks of verify space, power, cable terminations, review design requests and develop a price quote for the total cost to the CLEC for its collocation request in much less time.

Q. CAN YOU DRAW ANY COMPARISON BETWEEN THE PROPOSED QWEST CHARGE FOR A QUOTATION PREPARATION AND THE ABILITY FOR OTHER LANDLORDS OF OFFICE OR RESIDENTIAL SPACE TO DEMAND NON-

REFUNDABLE APPLICATION FEES BEFORE ADVISING A PROSPECTIVE TENANT WHETHER THERE IS SPACE AVAILABLE FOR LEASE?

A. Yes I can. Advising a prospective tenant as to what space is available in a building is generally a function provided by management without any specific charge to that prospective tenant. Indeed, if a prospective tenant were told that there would be a substantial charge for just finding out whether space is available, that tenant would think the building owner has lost his mind and go elsewhere to look for space. In charging CLECs for the "service" of determining the availability of space, Qwest is introducing an element of financial risk for its potential competitors that may be perceived as a roadblock to competition in South Dakota. Such a charge is not only grossly overstated, it is in direct conflict with anti-competitive principles espoused by the FCC and within the context of the Telecommunications Act.

Q. PLEASE SUMMARIZE YOUR CONCERNS RESPECTING THE METHODS AND INFORMATION QWEST HAS USED TO CALCULATE ITS QUOTE PREPARATION FEE.

A. Given the absence of support, in the form of work activities and work times for those activities, from Qwest for the quote preparation fee, I feel the prices proposed by Qwest for quotation preparation fees are indeed too high. Even considering that the quote preparation fee is refundable in the form of a credit, I still believe the quote preparation fee is excessive considering that the engineering and associated cost cannot reasonably rise to the levels Qwest proposes. Quotation preparation fees should only be applicable if a CLEC requests space and subsequently rents the space in a Qwest central office. The Commission should require Qwest to recalculate its costs and prices for quotation preparation fees in accordance with the TELRIC principles

described by Mr. Gates and the newly calculated rates should be subject to review by the parties to this case.

Q. HAVE YOU ADJUSTED THE QWEST SOUTH DAKOTA COLLOCATION COST STUDY TO REFLECT YOUR CONCERNS ABOUT THE STUDY?

A. Yes, I recalculated the study by changing the values for power by reducing the cable lengths between the BDFB and the collocation space by 50%. Space rent values have been recalculated using RSMeans values from 2001 as indicated above in my testimony. I also provided a more realistic engineering fee by reducing the value by 50%. Qwest provides no support for the times it claims are required for engineers to perform the sample job in the Qwest collocation cost study. I can only speculate that those times could only be justified if the engineers are investigating and correcting a large number of systems and databases as I discussed previously in my testimony as being inappropriate. Those charges would certainly not reflect a forward-looking network, and CLECs should not bear the expense of bringing the Qwest network up to the forward-looking standards required by the FCC and Congress.

CLEC-to-CLEC Connections

Q. WHAT IS A CLEC-TO-CLEC CONNECTION?

A. This Qwest provided service is used to connect together multiple forms of CLEC collocations within the same Qwest Central Office, i.e., physical to physical, physical to virtual, virtual to virtual, or non-contiguous cageless bays. The CLEC-to-CLEC direct connections provide CLECs with the ability to connect with each other for the purpose of exchanging traffic (voice, data, video and etc.). A CLEC may also use these connections to connect multiple iterations of its own

collocations together within the same wire center. When a direct connection is requested between two collocations, a cable is placed between the collocations spaces.

Q. WHAT QWEST RATE ELEMENTS APPLY TO A DIRECT CONECTION?

A. Rate elements associated with direct CLEC-to-CLEC connections include:

A nonrecurring design engineering and installation charge.

Recurring charges for cable racking that is applied on a per foot per month basis.

A nonrecurring virtual connection charge for the labor to connect a virtual collocation.

Nonrecurring charges for opening and closing cable holes between floors or through inside walls.

If CLECs connect to other CLECs using Connecting Facility Assignments (CFA) cross connections, Qwest applies a nonrecurring charge for use of the connecting facility assignments.

Q. DO YOU HAVE ANY CONCERNS ABOUT THE RATE ELEMENTS APPLIED TO A CLEC-TO-CLEC DIRECT CONNECTION?

A. Yes, I have two primary concerns about the rate elements applied to the CLEC-to-CLEC direct connection. First, the provisioning rate elements suffer from the same problems as other Qwest nonrecurring rate elements. Mr. Stacy and I have previously addressed these issues in detail in our testimonies.

Second, the Direct CLEC-to-CLEC Interconnection cost study ID 6505 dated December, 2002, does not provide adequate information to determine if the labor hours charged for work item tasks are justified. For example, in the tab "Engineering", "Engineering Requirements", a total of 8 hours are listed for, what appears to be, departments or organizations within Qwest responsible for performing work task. Each organization or department has sub work task associated with the organization or department and time, in hours, charged. The **Collocation**

Project Management Center list three-sub tasks and 1 hour time charged. The **Common Systems Planning Engineering Center** list four-sub tasks and 5.0 hours charged. The **Planning & Engineering** indicates five sub tasks but no time charged while **Forms/Follow-up** list two sub tasks and 2.0 hours charged. There is no clear relationship between the hours charged and the associated task for each organization or department. Without additional supporting information there is no way of knowing if the times or work tasks are justified.

The Qwest cost study (Study ID 6505) for this element indicates that it would take 8 hours, or a full day to provision this element. The cost includes the planning, design, engineering, project management and other tasks and hours required for the job and does not include cable material or placement costs in the rate. My years of experience tell me otherwise. In my opinion this work could be accomplished in less than 4 hours. I have adjusted the study to reflect this more efficient time.

The SME provided data entry supporting work task, such as we see in study ID 6505, leaves an impression that Qwest has provided an overly complicated cost study. The study appears to have no other purpose than to lend credibility by association with complexity and camouflage, the lack of substance in the work task and times associated with the cost generated by the study task.

Q. PLEASE SUMMARIZE YOUR CONCERNS RESPECTING THE METHODS AND INFORMATION QWEST HAS USED TO CALCULATE ITS CHARGES FOR CLEC-TO-CLEC CONNECTIONS.

A. Given the absence of information required to appropriately review the CLEC-to-CLEC connection studies, the inflated work times associated with certain elements, and the excessive loadings I have previously discussed, the prices proposed by Qwest for CLEC-to-CLEC

connections are in some instances too high. I have made adjustments to the study that reflect these deficiencies.

REMOTE TERMINAL COLLOCATION

Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR TESTIMONY?

A. The purpose of this testimony is to discuss problems with remote terminal collocation (RT collocation) and show that the rates for RT collocation are improperly developed, excessive and risk excluding CLECs from the market place.

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AND STATE YOUR RECOMMENDATIONS.

A. Remote terminal (RT) collocation is an expensive and perhaps exclusionary method of collocation. High RT collocation costs will effectively restrict the choices of consumers shopping for the best values in advanced communications services. Qwest's proposal for RT collocation will reduce competitive alternatives. As such, alternative collocation methods for RTs must be implemented. My recommendation is to unbundle additional network elements, which will alleviate this problem. This is the most cost effective method of RT collocation and it provides equal collocation capability for competitors without prohibitively high investments. Unbundling network elements effectively places the CLEC on a level playing field with the ILEC. Unbundling these network elements also allows the CLECs to virtually collocate ADLU cards in ILEC RT located DSLAM equipment. This will allow for the maximum penetration of advanced services to all consumers in South Dakota.

Q. PLEASE DESCRIBE REMOTE TERMINAL COLLOCATION.

A. RT collocation offers space in remote cabinets thereby eliminating the central office to customer facility distance constraints on Digital Subscriber Line (DSL) providers.[12] Field electronics are located in the RTs for use by collocators to access DSL customers. The RT collocation requires access to AC/DC power, heat dissipation and terminations to the Feeder Distribution Interface (FDI).

Q. WHAT ARE THE ADVANTAGES OF REMOTE TERMINAL COLLOCATION?

A. Remote terminal collocation provides access to a layer of customers that is not accessible from the central office. These DSL customers are typically beyond the restrictive 18,000 foot. "boundary" of the central office.[13] By having access to customers at RT locations the CLEC has access to the same universe of customers available to the ILEC.

Q. WHAT ARE THE DISADVANTAGES OF REMOTE TERMINAL COLLOCATION?

A. Early indications are that collocating at a Qwest RT, or adjacent to a Qwest RT, will be nearly as expensive (if not more) per customer than collocating in a Qwest central office. The reason for this is that fewer customers are available from the RT as compared to the central office. In addition, high-density equipment is available for use in central office environments making this the most cost effective collocation method. Central office collocated equipment also has the added advantage of access to a greater universe of outside plant facilities and consequently customers, making central office equipment more efficient in delivering service. Additionally

[12] DSL technologies are transmission technologies used on circuits that run between the central office and a customer's premises. Historically xDSL technologies have been provided on loops that are exclusively copper. New DSL network technology can be deployed on hybrid loops that are fiber optic from the central office to a field location utilizing remote terminal technology and then copper cable pairs to the customer premise.

[13] As discussed later in this testimony, new technologies are addressing this technological limitation – distance from the central office -- on the availability of xDSL services.

support in the form of AC/DC power, HVAC and security for collocation are more efficiently available in the central office environment.

Q. ARE THERE ANY TECHNICAL SOLUTIONS THAT WOULD MAKE THE CLEC A VIABLE COMPETITOR IN CASES SUCH AS THE ONE YOU DESCRIBED ABOVE?

A. Yes, Qwest should be required to unbundle network transport elements.

Q. TO WHAT NETWORK TRANSPORT ELEMENTS ARE YOU REFERRING?

A. There are no technical limitations that prevent ILECs from allowing CLECs to provide advanced services over digital loop carrier (DLC) equipment.[14] Much of this equipment is designed to provide voice, data, and combined voice/data products over a single network platform for use by ILEC data affiliates and retail customers. This same platform should provide similar functionality for CLECs.

Q. HOW WOULD UNBUNDLING NETWORK TRANSPORT ELEMENTS SUCH AS THE DLC BE ACCOMPLISHED?

A. It is technically feasible for the ILEC to allow CLECs to virtually collocate line cards within Next Generation Digital Loop Carrier (NGDLC) remote terminals.[15] For example, it is possible to

[14] A digital loop carrier ("DLC") system allows a company to replace the end-to-end copper circuit that historically comprised a telephone access line (or a "loop") with a combination of high-capacity fiber optic feeder cable and copper distribution cable. The DLC system itself is generally comprised of some form of electronic equipment in the central office (generally referred to as a "central office terminal" or "COT") that connects the fiber optic feeder cable to an accompanying electronic device in the field wherein the fiber optic feeder cable and copper distribution cable meet (generally referred to as a "remote digital terminal" or an "RDT").

[15] The use of NGDLC devices allows Qwest to push fiber optic facilities closer to its customer's homes or businesses which should allow more customers to avail themselves of high-speed, packet switched digital services and enhance the speed and quality that customers can expect from those services.

collocate the Litespan 2000 ADLU[16] card, which can provide both voice and data services over a shared copper loop extending from the remote terminal to a customer's premises. The inherent DSL capabilities of the ADLU card in this respect negate the need for ILEC to collocate a bulky and expensive DSLAM within the RT enclosure (or in an adjacent structure). Further, the ADLU card (or similar types of cards with unique service features) is in many ways the intelligence focal point of the service being provided. By programming the card and the RT to accommodate new, innovative services, CLECs can differentiate their products from those produced by the ILEC. Further, the cost savings associated with using the inherent functionality of the ADLU card in this respect are substantial. Accessing such functionality is technically feasible as evidenced by the fact that both the Illinois and Texas commissions have required SBC to make such access available.[17]

Q. CAN YOU BE MORE SPECIFIC ON THE TECHNICAL FEASIBILITY OF COLLOCATING LINE CARDS IN QWEST'S RT?

A. Yes. It is technically feasible for Qwest to permit CLECs to specify, at each individual remote terminal, the line card(s) to be placed in the DLC equipment for use in providing service to the CLEC's customers. The following line card options are all technically feasible:

- CLEC specifies the type and quantity of the line card(s) that ILEC will obtain, own, and install in the DLC system located in an ILEC remote terminal;

[16] "ADLU" stands for "ADSL Digital Line Unit." These units can perform both the line splitting and DSLAM functionalities.

[17] See (1) *Arbitration Award*, Docket Nos. 22168 & 22469, *Petition of IP Communications Corporation to Establish Expedited Public Utility Commission of Texas Oversight Concerning Line Sharing Issues, Petition of Covad Communications Company and Rhythms Links, Inc. against Southwestern Bell Telephone Company for Post –Interconnection Dispute Resolution and Arbitartion under the Telecommunications Act of 1996 Regarding Rates, Terms, Conditions and Related Arrangements for Line Sharing* (hereafter "*Texas Line Sharing Order*"), (2) *Order*, Docket No. 00-0393, *Proposed Implementation of High Frequency Portion of Loop (HFPL)/Line Sharing Service (Tariffs filed April 21, 2000)*, released March 14, 2001.

- CLEC obtains the desired line card(s) and transfers ownership of the card(s) to the ILEC (for a nominal fee). ILEC then installs the card(s) in the DLC system located in a remote terminal. Upon request of CLEC, ILEC removes the card(s), return the card(s) to CLEC, and transfer ownership of the card(s) to CLEC for the nominal fee; or
- CLEC obtains, owns and installs the line card(s) in the DLC system located in an ILEC's remote terminal.

It is also technically feasible, and advisable, for Qwest to promptly provide to CLECs copies, both paper and electronic, of all technical specifications and network architecture data relevant to the development by any potential vendor of plug-in DLC line cards that will support the CLEC's high bandwidth services. In general, this Commission should encourage an open development platform wherein Qwest and CLECs alike are able to design, engineer and provision multiple services using the enormous capabilities of the NGDLC architecture. This type of open platform will speed advanced services competition to South Dakota customers and will provide a wide array of advanced services innovation.

Finally, it is technically feasible and advisable for Qwest to provide the CLECs with 6 months advance notification of software upgrades of, at a minimum, Qwest's: COTs, remote terminals, ATM switch/OCD, DLC equipment, and CPE. In addition, if Qwest chooses to upgrade any of the above software, then it is technically feasible and advisable, indeed practical, for Qwest to ensure with its vendor, backward compatibility for at least 12 months after the upgrade is installed. Again, these are all fundamental building blocks of an open NGDLC architecture capable of providing the large benefits possible to customers and the marketplace alike.

Q. HOW WILL UNBUNDLING NETWORK ELEMENTS, BY THE USE OF COLLOCATED LINE CARDS, BENEFIT THE CLECS?

A. Allowing CLECs to collocate their own line cards will not only favorably impact the economic viability of competition for advanced services by reducing the barriers to entry erected by enormous stand-alone collocation costs, it will also spark innovation in the provision of high-capacity services. Allowing carriers to collocate line cards with different capabilities than that perhaps chosen by Qwest will provide customers with real choices for new and different types of service.

Q. EARLIER IN YOUR TESTIMONY YOU STATED THAT THE QWEST RATES FOR RT COLLOCATION ARE IMPROPERLY DEVELOPED,AND EXCESSIVE. WOULD YOU PLEASE ELABORATE ON THIS STATEMENT?

A. Yes. In a review of the cost study for RT Collocation, Qwest makes the following statement on the space cost element:

- **Space** (per standard mounting unit; 1.75 vertical inches)
- This non-recurring rate is associated with the cabinet space and includes the cost of the cabinet and all of the work and materials associated with placement of the cabinet. The recurring rate associated with the Space recovers the maintenance of the materials and equipment associated with the cabinet along with a portion of the costs required for the power pedestal.

Essentially what Qwest is attempting to do is to recover its investment up front in a non-recurring charge rather than through reasonable monthly recurring charges. Moreover, what Qwest seeks to recover in its monthly recurring rate – maintenance -- should be recovered through the maintenance portion of an annual charge factor that is applied to the investment and then recovered on a monthly basis with the remainder of the investment.

Q. CAN YOU DRAW ANY COMPARISONS BETWEEN THE RATE STRUCTURE PROPOSAL FOR RT COLLOCATION AND ANY OTHER UNES?

A. Yes, I can. If Qwest were to apply the same methodology to switch ports, loops, or a square foot of central office collocation floor space, then competitors would be asked to pay up front for the entire loop, port or square foot. In other words, a competitor might have to pay several hundred dollars for each loop and then pay for maintenance as they go. This methodology, whether applied to RT collocation space, loops, or ports, has one stifling effect, that being an enormous up-front financial barrier for competitors that indeed may be insurmountable. Yet another drawback to the rate structure proposed by Qwest pertains to customer churn. Under Qwest's proposed structure, the competitor pays a very large up front non-recurring charge. If after paying this charge the competitor should somehow lose the customer, the competitor is stuck with RT collocation space that it may no longer need, yet that competitor has paid a huge up front charge that it cannot recoup.

Q. DO YOU HAVE ANY RECOMMENDATIONS FOR THE COMMISSION ON THIS ISSUE?

A. Yes. The Commission should require Qwest to offer RT collocation space on an unbundled basis, and the rate for that offering should be determined on a monthly recurring basis, rather than predominately on a non-recurring basis.

Q. ALTHOUGH YOU DISAGREE WITH THE APPLICATION OF THE RT COLLOCATION CHARGE, HAVE YOU HAD AN OPPORTUNITY TO SCRUTINIZE THE COST DEVELOPMENT OF THIS CHARGE IN THE QWEST COST STUDIES?

A. Yes, I have and from that review I have discovered three primary concerns. First, once Qwest develops its RT collocation investment, it applies factors to recover directly assigned, directly attributable, and common costs. Qwest directly assigns product management, sales, and business fees to the RT collocation investment. Mr. Tim Gates in his testimony explores in depth why these loadings are inappropriate

Second, in developing the RT collocation non-recurring cost, Qwest uses costs from two vendors and then weights them together. One vendor is substantially more expensive than the other (even after one considers that the SMU capacities are different). Section 51.505 (b) (1) of the FCC rules require that the TELRIC of an element should be measured based on the use of the most efficient telecommunications technology currently available and the lowest cost network configuration. This principle should be applied to the Qwest RT collocation cost study and the costs from the more efficient vendor should be used.

Third, once Qwest has developed its fully loaded and weighted investment for RT collocation equipment, it applies a very low utilization rate or fill factor to that investment. No support exists for this utilization rate in the cost study; rather it is simply a hard coded number. Qwest should be required to substantiate why such an extremely low utilization level is appropriate, or in the alternative a more appropriate utilization level should be applied.

Q. HAVE YOU RERUN THE QWEST RT COLLOCATION COST STUDY TO PROPOSE A NEW RATE?

A. No, I have not for two reasons. First, the rate structure whereby Qwest seeks to recover all of its investment up front from competitors complicates the study. Hence, additional changes beyond simple inputs will be necessary. Second, since many of the inputs have no corresponding support (e.g. the fill factors used) there is limited basis to rely upon input changes at this time. I believe

the appropriate path to follow is to first determine the appropriate rate structure with respect to how RT collocation costs should be recovered and then second to take that structure and appropriately construct and develop costs.

LINE SHARING

Q. WHAT IS LINE SHARING?

A. Loop conditioning line sharing DSL is a technology initially developed for purposes of increasing the digital transmission speeds that can be realized with the use of traditional copper-based loop facilities. ADSL, or *asynchronous digital subscriber line*, is a member of a larger family of technologies generally referred to as xDSL. The "x" in xDSL is generally used as a placeholder for purposes of identifying more specific derivations of the digital subscriber line technology (i.e. HDSL –high speed DSL, VDSL – very high speed DSL, UDSL universal DSL and RDSL – rate adaptive DSL). Generally, xDSL technologies use a system of digital modems placed on each end of a transmission medium (generally two or four copper wires) to transmit digital information at rates far exceeding those typically achieved by other types of copper loop transmission. xDSL technologies support a number of consumer data applications including wide area networking for purposes of telecommuting as well as high-speed Internet access that dwarfs the speed achieved by a standard 56Kbs modem.

Furthermore, the FCC has determined that the high-frequency spectrum of the loop is an unbundled network element to which ILECs must provide CLECs access.[18] Thus, line sharing refers to two carriers using the same loop to provide voice and high-speed service.

[18] *In the Matters of Deployment of Wireline Services Offering Advanced Telecommunications Capability and Implementation of the Local Competition Provisions of the Telecommunications Act of 1996,* CC Docket Nos. 98-

Q. ARE THERE SPECIAL CIRCUMSTANCES THAT MAKE ESTABLISHING A COST FOR THE HIGH-FREQUENCY PORTION OF THE UNBUNDLED LOOP DIFFERENT THAN SETTING A COST FOR OTHER UNES?

A. There are such circumstances. The high-frequency portion of the loop and the low-frequency portion of the loop are not discrete products. Rather, they are, as economists say, joint products. When one product is made available, so is the other, unavoidably. Assigning costs to joint products is different than for other products, because there is no cost-causation principle upon which to assign costs to joint products. The act of provisioning the loop means both services are available. Hence, the costs of provisioning are incurred without regard to the fact that two simultaneous uses of that loop are possible. A Qwest witness in Washington has said as much, noting there is no additional cost to Qwest associated with the loop when Qwest provides digital subscriber line (DSL) service on the high-frequency portion of the loop.[19]

Q. WHAT FCC GUIDANCE IS THERE FOR SETTING AN APPROPRIATE LINE SHARING COST?

A. The FCC has not established a definitive method for setting a TELRIC-compliant line-sharing cost. The FCC said in the Line Sharing Order that incumbent local exchange carriers (ILECs) can be required by state commissions to charge competitive local exchange carriers (CLECs) planning to use the high-frequency portion of the loop no more than the ILEC allocates, or

147 and 98-98, Third Report and Order in CC Docket No. 98-147, and Fourth Report and Order in CC Docket No. 98-98, FCC 99-355 (Rel. December 9, 1999), ¶136. ("Line Sharing Order").

[19] Before the Washington Utilities and Transportation Commission, In the Matter of the Continued Costing and Pricing of Unbundled Network Elements, Transport, and Termination. Docket No. UT-003013, Thirteenth Supplemental Order, Part A Order Determining Prices for Line Sharing, Operations Support Systems, and Collocation (January 2001), page 14. ("Washington Order")

imputes, as a cost to its own DSL product as offered under interstate tariffs.[20] Note that the FCC did not mandate that the line-sharing cost be equal to the imputed cost. Rather, it said that the cost should be no more than this amount. What the FCC was doing was setting a cap on the line-sharing rate that would prevent the possibility of a price squeeze by ILECs. In a price squeeze, an ILEC could erect an impenetrable barrier to entry into the DSL market by CLEC competitors by manipulating the wholesale cost charged to the CLECs for the high-frequency portion of the loop and the retail price charged end-user DSL customers by the ILEC.

Q. WHAT HAS QWEST PROPOSED AS A RECURRING CHARGE FOR THE HIGH-FREQUENCY PORTION OF THE UNBUNDLED LOOP?

A. Qwest proposes a charge for the high frequency portion of the unbundled loop of $5.00 per month.

Q. HOW DOES QWEST SUPPORT THIS COST?

A. Qwest asserts the price is consistent with its monthly retail price for DSL service after an imputation process is carried out.

Q. IS THERE ANOTHER BASIS FOR DEVELOPING A WHOLESALE COST FOR LINE SHARING?

A. Economic theory provides as an alternate cost-allocation principle for joint products. This theory states that firms in a competitive market will allocate joint product costs among the products according to the relative strength of demand for the each product. Following this principle means the greater the demand for one of the products relative to the demand for the other product, the

[20] Line Sharing Order, ¶139.

greater the share of the joint cost the firm will allocate to the product. Hence, in a competitive market setting, the costs allocated to the high-frequency portion of the loop could range from $0.00 to the entire cost of the loop. The first extreme of this continuum requires that there be no demand for the high-frequency portion of the loop and a positive demand for the low-frequency portion, while the other extreme requires that all demand for the loop be due to demand for the high-frequency portion. Of course, current evidence suggests there is demand for both the low-frequency and the high-frequency portions of the loop and that both services, voice and DSL, would therefore bear some of the costs of the loop.

Q. DOES THIS ECONOMIC CONCEPT PROVIDE AN UNAMBIGUOUS METHOD FOR DETERMINING A COST FOR LINE SHARING?

A. No. The market in which Qwest provides the high-frequency portion of its loop is not competitive. If it were, there would be another provider of loops to which CLECs providing DSL service could turn. The CLECs could negotiate with the two (or more) providers for access to the high-frequency portion of the loop and the prices produced by those negotiations would reflect the relative demand for the two frequency spectrums of the loop. The Commission also would not have to be engaged in this process of trying to establish an appropriate cost for line sharing as the market would have provided the solution. The relative-strength-of-demand concept is not, however, without value in this proceeding. It tells the Commission that as long as there is a positive demand for the high-frequency portion of the loop, the wholesale price also should be positive.

Q. WHAT HAVE OTHER STATES DONE AS THEY HAVE CALCULATED A COST FOR LINE SHARING?

A. As the Nebraska Public Service Commission notes, the FCC's failure to establish a methodology for setting a line sharing cost:

> . . . encourages states to use a surrogate, benchmark-type methodology, in which to price line-sharing elements. As a result, in states where line-sharing rates have been developed, methods used and resulting rates, have not been consistent.[21]

A survey of the decisions of several state commissions in territory served by Qwest confirms a wide range of line-sharing costs have been set. These rates range from $0.00[22] (Utah) to $4.89 per month (Colorado).[23] the Washington Utilities and Transportation Commission ($4.00)[24], Arizona Corporation Commission ($2.47)[25] and the Nebraska Public Service Commission ($1.56)[26] have set rates other than those extremes.

Q. WHAT RATE IS RECOMMENDED FOR SOUTH DAKOTA?

A. The demand for the high-frequency portion of the loop is positive, of that there is little disagreement. Precise information about the number of ADSL customers in South Dakota is unavailable, it is estimated that as of June 2002 about 6,575 customers had the service.[27] On the other hand, Qwest had some 312,000 access lines in South Dakota during that same time frame.[28] Demand for ADSL and other high-speed services has grown rapidly on a nationwide basis and

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[21] Before the Nebraska Public Service Commission, In the Matter of the Commission, on Its Own Motion, to Investigate Cost Studies to Establish Qwest Corporation's Rates for Interconnection, Unbundled Network Elements, Transport and Termination, and Resale. Application No. C-2516/PI-49, Findings and Conclusions (April 23, 2002), ¶ 230. ("Nebraska Order")

[22] Before the Public Service Commission of Utah, In the Matter of the Application of Qwest Corporation for Commission Determination of Prices for Wholesale Facilities and Services, Docket No. 00-049-10, Order (June 6, 2002), page 15. ("Utah Order")

[23] Before the Public Utilities Commission of the State of Colorado, In the Matter of U S West Communications, Inc.'s Statement of Generally Available Terms and Conditions, Docket 99A-577T, Ruling On Applications For Rehearing, Reargument, Or Reconsideration (April 17, 2002), Pages 84-85. ("Colorado Order")

[24] Washington Order, page 25.

[25] Before the Arizona Corporation Commission, In the Matter of the Investigation into Qwest Corporation's Compliance with Certain Wholesale Pricing Requirements for Unbundled Network Elements and Resale Discounts, Docket No. T-00000A-00-0194, Phase II Opinion and Order, page 52. ("Arizona Order")

[26] Nebraska Order, ¶ 232.

[27] FCC report on its *High-Speed Services for Internet Access: Status as of June 30, 2002.*

[28] *Local Telephone Competition, Status as of June 30, 2001,* FCC, February 2002.

South Dakota is no different.[29] However, even if the current growth trend is sustained, it will be a few years before even 10 percent of Qwest's loops provide both voice and high-speed service. Demand for the low-frequency portion of the loop, therefore, is and will be much stronger than demand for the high-frequency portion for some time. Thus, the Commission would be following sound reasoning by setting a rate that was in the range of the $1.56 established by the Nebraska Commission and the $2.47 set by the Arizona Commission. A rate in this range recognizes that demand for the high-frequency portion of the loop is positive but not strong relative to low-frequency demand. Hence, such a rate would be in keeping with the outcome predicted by economic theory if the market were competitive. Furthermore, a rate in that range would not be an impediment to proliferation of DSL service, and the high-frequency product would be making a contribution to the costs of the loop, both desirable goals for Commission policy. A rate in this range also would meet the imputation test (if $5.00 meets the test, so does anything less than that amount) and thus prevent Qwest from putting a price squeeze on the CLECs. The Commission could follow a formula, such as the Arizona Commission did when it set the high-frequency rate at 20 percent of the statewide loop rate, or it could set an amount that it believes reflects the current relative strength of demand, as Nebraska did, as it sets a rate for South Dakota.

Q. WHAT RECURRING MONTHLY RATE HAS QWEST REQUESTED PER LINE FOR ITS OPERATIONAL SUPPORT SYSTEMS (OSS) RELATED TO LINE SHARING?

A. Qwest has asked for a charge of $3.21 per line per month for changes to its OSS that it claims were necessary to comply with FCC regulations regarding the provisioning of line sharing.

Q. WHAT DOES THE FCC SAY ABOUT RECOVERING OSS CHARGES?

[29] According to the FCC report on its *High-Speed Services for Internet Access: Status as of June 30, 2002.*

A. Qwest witness Renee Albersheim in direct testimony page 24, lines 3-5 states:

> In its Line Sharing Order, the FCC recognized that the ILECs must modify their systems to support line sharing and that the ILECs will incur costs in doing so.[30] The FCC found that the ILECs should recover "reasonable incremental costs of OSS modification that are caused by the obligation to provide line sharing as an unbundled element."[31]

Q. HOW SHOULD THIS COMMISSION USE THIS FCC STATEMENT IN DETERMINING AN APPROPRIATE LINE SHARING OSS CHARGE?

A. This Commission should note the phrase "reasonable incremental costs of OSS modification" in the Line Sharing Order excerpt. The costs of OSS modification that Qwest seeks to recover through this charge include $11.2 million paid to Telcordia to carry out the modifications. Other states have disallowed this payment on the grounds that it does not meet the reasonableness standard. Qwest argues that by continuing to use Telcordia systems after selling its share of the company several years ago, Qwest put itself in the position of being dependent upon a monopoly supplier for key systems. When Qwest needed to upgrade its OSS to handle line sharing, it could not seek bids for the work. Instead, it prepared a statement of work that it sent to Telcordia because Telcordia owned most of the systems and was the only company authorized to modify them. Qwest, therefore, paid monopoly prices rather than cost-based prices for the modifications. The Arizona[32] and Washington[33] Commissions explicitly have stated Qwest should not be allowed to recover those costs, while the Nebraska Commission's[34] rate implicitly indicates they are not recoverable.

[30] *Line Sharing Order ¶ 142.*
[31] *Line Sharing Order ¶ 144.*
[32] Arizona Order, page 54.
[33] Washington Order, pages 48-53.
[34] Nebraska Order, ¶ 232.

Q. HOW CAN THIS COMMISSION USE THE DECISIONS OF OTHER QWEST STATE COMMISSIONS TO SET A LINE SHARING OSS RATE?

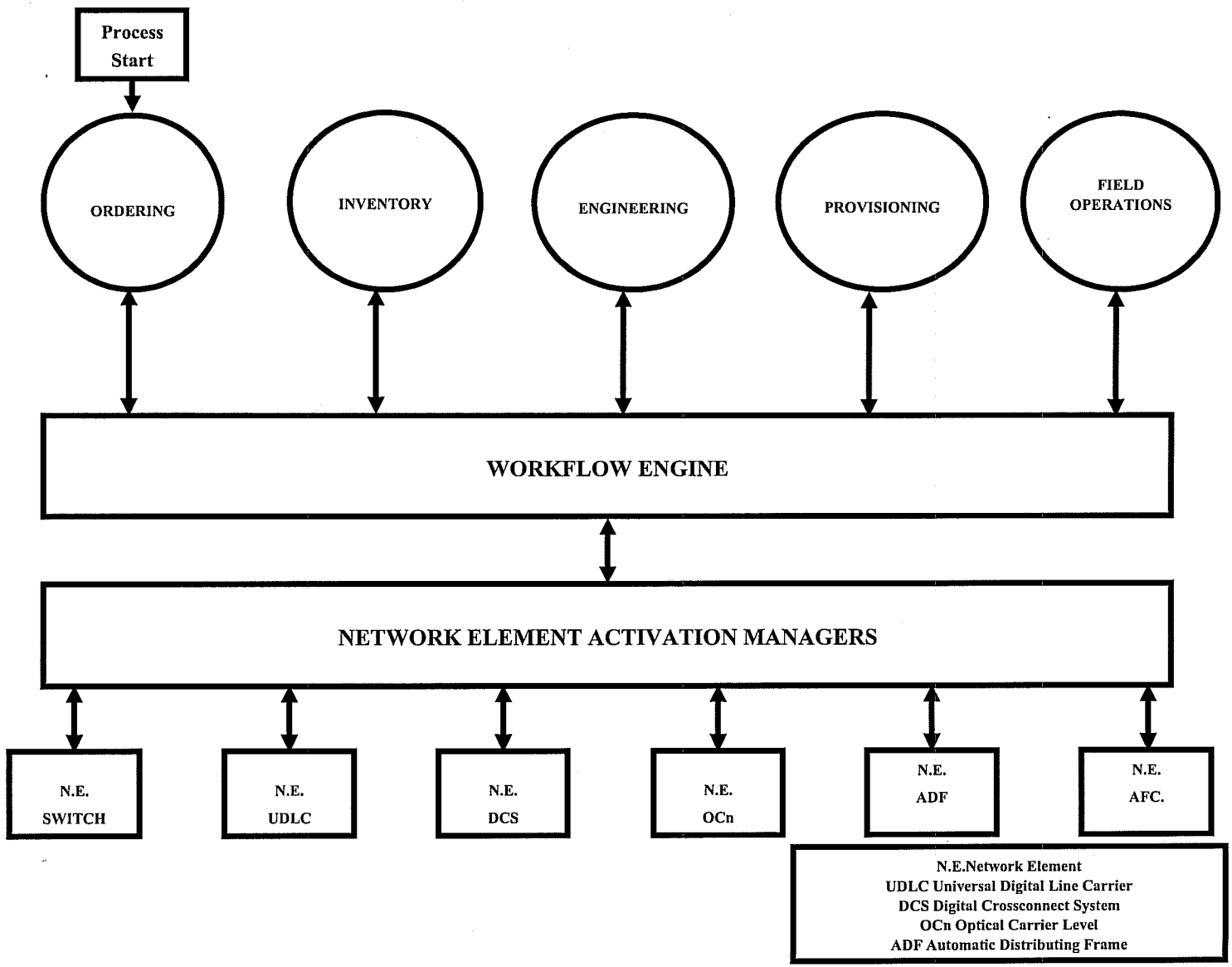
A. Washington has established a rate of $3.27, which at first blush appears to be approximately the same as the rate Qwest is asking for in this cost docket. The Commission should ensure that the rate is paid per local service request (LSR) rather than completed service order. As the Washington Order notes, an LSR may result in several service orders and the total cost can be several times higher than $3.27. Washington also caps the total amount that Qwest can recover, and the same should be true in South Dakota. Arizona has allowed Qwest a Line Sharing OSS charge of $0.10 per order,[35] while Nebraska does not have a separate OSS charge. If Qwest decides to seek an OSS charge in Nebraska, the $1.56 rate for line sharing must be reduced by an amount equal to the OSS charge.[36] This Commission should set a similar nominal OSS line-sharing rate. When the $11.2 million Telcordia expense is removed from the SD OSS Line Sharing study as amended by QSI (see ATTACHMENT SLM_007), it yields a per-order rate that when rounded is $0.23.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes

[35] Arizona Order, page 54.
[36] Nebraska Order, ¶ 232.

ATTACHMENT SLM_001



ATTACHMENT SLM_002

Jurisdiction	Cost Element	Direct	+	Marketing & Bus. Fees	=	Direct + Marketing	+	Other Direct Expenses	=	TELRIC	+	Common	=	TELRIC + Common	Original TELRIC + Common	% Reduction TELRIC + Common
South Dakota	DS1 ENTRANCE FACILITY	$67.19	+	$1.68	=	$68.88	+	$14.76	=	$83.64	+	$4.74	=	$88.38	$223.28	60.4%
South Dakota	LIS MULTIPLEX DS1 TO DSO (Subsequent Order Only)	$39.90	+	$1.00	=	$40.90	+	$8.77	=	$49.67	+	$2.81	=	$52.48	$208.90	74.9%
South Dakota	LIS MULTIPLEX DS3 TO DS1 (Subsequent Order Only)	$39.90	+	$1.00	=	$40.90	+	$8.77	=	$49.67	+	$2.81	=	$52.48	$208.90	74.9%
South Dakota	SWITCHED TRANSPORT DS1 TRUNK FIRST	$56.91	+	$1.43	=	$58.34	+	$12.50	=	$70.84	+	$4.01	=	$74.85	$248.59	69.9%
South Dakota	SWITCHED TRANSPORT DS1 TRUNK EA ADDL	$1.65	+	$0.04	=	$1.69	+	$0.36	=	$2.05	+	$0.12	=	$2.17	$6.02	64.0%
South Dakota	SWITCHED TRANSPORT DS3 TRUNK FIRST	$59.30	+	$1.49	=	$60.79	+	$13.03	=	$73.82	+	$4.18	=	$78.00	$255.51	69.5%
South Dakota	SWITCHED TRANSPORT DS3 TRUNK EA ADDL	$4.11	+	$0.10	=	$4.21	+	$0.90	=	$5.11	+	$0.29	=	$5.40	$12.95	58.3%
South Dakota	CLEC TO CLEC COLLOCATION CROSS-CONNECTION	$43.96	+	$1.10	=	$45.07	+	$9.66	=	$54.73	+	$3.10	=	$57.83	$223.74	74.2%
South Dakota	CABLE UNLOADING/BRIDGE TAP REMOVAL	$0.00	+	$0.00	=	$0.00	+	$0.00	=	$0.00	+	$0.00	=	$0.00	$663.17	100.0%
South Dakota	LOOP BASIC INSTALL FIRST Mechanized	$20.56	+	$0.52	=	$21.08	+	$4.52	=	$25.60	+	$1.45	=	$27.05	$94.47	71.4%
South Dakota	LOOP BASIC INSTALL EA ADDL Mechanized	$16.06	+	$0.40	=	$16.47	+	$3.53	=	$20.00	+	$1.13	=	$21.13	$78.73	73.2%
South Dakota	LOOP BASIC INSTALL WITH PERFORMANCE TESTING FIRST Mechanized	$53.47	+	$1.34	=	$54.81	+	$11.75	=	$66.56	+	$3.77	=	$70.33	$200.12	64.9%
South Dakota	LOOP BASIC INSTALL WITH PERFORMANCE TESTING EA ADDL Mechanized	$35.95	+	$0.90	=	$36.85	+	$7.90	=	$44.75	+	$2.53	=	$47.28	$141.60	66.6%
South Dakota	LOOP COORD INSTALL, COOP TESTING FIRST Mechanized	$68.42	+	$1.72	=	$70.13	+	$15.03	=	$85.17	+	$4.82	=	$89.99	$240.71	62.6%
South Dakota	LOOP COORD INSTALL, COOP TESTING EA ADDL Mechanized	$37.41	+	$0.94	=	$38.35	+	$8.22	=	$46.57	+	$2.64	=	$49.21	$141.60	65.2%
South Dakota	LOOP COORD INSTALL WITHOUT TESTING FIRST Mechanized	$21.56	+	$0.54	=	$22.10	+	$4.74	=	$26.83	+	$1.52	=	$28.35	$101.67	72.1%
South Dakota	LOOP COORD INSTALL WITHOUT TESTING EA ADDL Mechanized	$16.90	+	$0.42	=	$17.33	+	$3.71	=	$21.04	+	$1.19	=	$22.23	$85.92	74.1%
South Dakota	LOOP BASIC INSTALL COOP TESTING FIRST Mechanized	$54.93	+	$1.38	=	$56.30	+	$12.07	=	$68.37	+	$3.87	=	$72.24	$200.12	63.9%
South Dakota	LOOP BASIC INSTALL COOP TESTING EA ADDL Mechanized	$37.32	+	$0.94	=	$38.25	+	$8.20	=	$46.45	+	$2.63	=	$49.08	$141.60	65.3%
South Dakota	DS1,DS3,OCN 3,12,48 LOOP BASIC INSTALL FIRST	$66.95	+	$1.68	=	$68.63	+	$14.71	=	$83.34	+	$4.72	=	$88.05	$179.80	51.0%
South Dakota	DS1,DS3,OCN 3,12,48 LOOP BASIC INSTALL EACH ADDITIONAL	$32.00	+	$0.80	=	$32.80	+	$7.03	=	$39.83	+	$2.26	=	$42.09	$122.62	65.7%
South Dakota	DS1,DS3,OCN 3,12,48 LOOP BASIC INSTALL PERFORMANCE TEST FIRST	$82.43	+	$2.07	=	$84.49	+	$18.11	=	$102.60	+	$5.81	=	$108.41	$315.96	65.7%
South Dakota	DS1,DS3,OCN 3,12,48 LOOP BASIC INSTALL PERFORMANCE TEST EA ADDL	$60.93	+	$1.53	=	$62.45	+	$13.39	=	$75.84	+	$4.29	=	$80.14	$217.23	63.1%
South Dakota	DS1,DS3,OCN 3,12,48 LOOP COORD INSTALL WITH COOP TEST FIRST	$106.13	+	$2.66	=	$108.79	+	$23.32	=	$132.10	+	$7.48	=	$139.58	$356.55	60.9%
South Dakota	DS1,DS3,OCN 3,12,48 LOOP COORD INSTALL WITH COOP TEST EA ADDL	$61.05	+	$1.53	=	$62.58	+	$13.41	=	$75.99	+	$4.30	=	$80.29	$217.23	63.0%
South Dakota	DS1,DS3,OCN 3,12,48 LOOP COORD INSTALL WITHOUT TEST FIRST	$44.39	+	$1.11	=	$45.50	+	$9.75	=	$55.25	+	$3.13	=	$58.38	$189.06	69.1%
South Dakota	DS1,DS3,OCN 3,12,48 LOOP COORD INSTALL WITHOUT TEST EA ADDL	$33.91	+	$0.85	=	$34.76	+	$7.45	=	$42.21	+	$2.39	=	$44.60	$132.07	66.2%
South Dakota	DS1,DS3,OCN 3,12,48 LOOP BASIC INSTALL WITH COOP TEST FIRST	$89.32	+	$2.24	=	$91.56	+	$19.62	=	$111.18	+	$6.30	=	$117.48	$315.96	62.8%
South Dakota	DS1,DS3,OCN 3,12,48 LOOP BASIC INSTALL WITH COOP TEST EA ADDL	$61.59	+	$1.54	=	$63.14	+	$13.53	=	$76.67	+	$4.34	=	$81.01	$217.23	62.7%
South Dakota	SUBLOOP INTRABUILDING CABLE DISPATCH FIRST per order	$27.21	+	$0.68	=	$27.89	+	$5.98	=	$33.87	+	$1.92	=	$35.79	$103.10	65.3%
South Dakota	SUBLOOP FIELD CONNECTION POINT QUOTATION PREP FEE	$232.37	+	$5.82	=	$238.19	+	$51.05	=	$289.24	+	$16.38	=	$305.62	$1,343.90	77.3%
South Dakota	SHARED LOOP (per loop per order) Mechanized	$9.30	+	$0.23	=	$9.54	+	$2.04	=	$11.58	+	$0.66	=	$12.24	$37.27	67.2%
South Dakota	UDIT DSO	$67.03	+	$1.68	=	$68.71	+	$14.73	=	$83.44	+	$4.72	=	$88.16	$276.13	68.1%
South Dakota	UDIT DS1/DS3/OC3/OC12/OC48	$55.89	+	$1.40	=	$57.29	+	$12.28	=	$69.57	+	$3.94	=	$73.51	$321.82	77.2%
South Dakota	UDIT M1-0 MULTIPLEXING HIGH SIDE	$47.56	+	$1.19	=	$48.75	+	$10.45	=	$59.20	+	$3.35	=	$62.55	$241.32	74.1%
South Dakota	UDIT M1-3 MULTIPLEXING	$478.59	+	$12.00	=	$490.59	+	$105.15	=	$595.74	+	$33.74	=	$629.48	$3,011.44	79.1%
South Dakota	UDIT M1-0 MULTIPLEXING LOW SIDE	$37.80	+	$0.95	=	$38.75	+	$8.31	=	$47.06	+	$2.66	=	$49.72	$206.94	76.0%
South Dakota	EUDIT DS1/DS3/OC3/OC12/OC48	$92.92	+	$2.33	=	$95.25	+	$20.42	=	$115.67	+	$6.55	=	$122.22	$381.24	67.9%
South Dakota	DARK FIBER - INITIAL RECORDS INQUIRY SIMPLE	$91.00	+	$2.28	=	$93.28	+	$19.99	=	$113.28	+	$6.41	=	$119.69	$256.27	53.3%
South Dakota	DARK FIBER - INITIAL RECORDS INQUIRY COMPLEX	$106.83	+	$2.68	=	$109.51	+	$23.47	=	$132.98	+	$7.53	=	$140.51	$300.84	53.3%
South Dakota	DARK FIBER - FIELD VERIFICATION AND QUOTE PREPARATION	$231.14	+	$5.79	=	$236.93	+	$50.78	=	$287.72	+	$16.29	=	$304.01	$1,025.51	70.4%
South Dakota	DARK FIBER - ENGINEER VERIFICATION	$109.99	+	$2.76	=	$112.75	+	$24.17	=	$136.91	+	$7.75	=	$144.67	$352.26	58.9%
South Dakota	DARK FIBER NRC PER OCCURRENCE, PER ROUTE - FIRST FIBER STRAND OR PAIR	$136.13	+	$3.41	=	$139.55	+	$29.91	=	$169.46	+	$9.60	=	$179.05	$535.86	66.6%
South Dakota	DARK FIBER NRC PER OCCURRENCE, PER ROUTE - EACH ADDL FIBER STRAND OR PAIR	$68.88	+	$1.73	=	$70.61	+	$15.13	=	$85.74	+	$4.86	=	$90.60	$276.19	67.2%
South Dakota	OPTICAL CROSS CONN - PER FIBER STRAND OR PAIR PER CENTRAL OFFICE	$4.20	+	$0.11	=	$4.30	+	$0.92	=	$5.23	+	$0.30	=	$5.52	$21.90	74.8%
South Dakota	9.11.1 ANALOG LINESIDE PORT FIRST	$40.42	+	$1.01	=	$41.43	+	$8.88	=	$50.31	+	$2.85	=	$53.16	$164.13	67.6%

ATTACHMENT SLM_002

Jurisdiction	Cost Element	Direct	+	Marketing & Bus. Fees	=	Direct + Marketing	+	Other Direct Expenses	=	TELRIC	+	Common	=	TELRIC + Common	Original TELRIC + Common	% Reduction TELRIC + Common
South Dakota	9.11.1 ANALOG LINESIDE PORT EACH ADDITIONAL	$30.15	+	$0.76	=	$30.91	+	$6.62	=	$37.53	+	$2.13	=	$39.66	$102.04	61.1%
South Dakota	9.12.1.5 DIGITAL LINE SIDE PORT (SUPPORTING BRI ISDN)	$68.74	+	$1.72	=	$70.47	+	$15.10	=	$85.57	+	$4.85	=	$90.42	$237.67	62.0%
South Dakota	UNE-P POTS, CENTREX, PAL, ANALOG PBX FIRST MECHANIZED EXISTING SERVICE	$0.24	+	$0.01	=	$0.25	+	$0.05	=	$0.30	+	$0.02	=	$0.32	$0.69	53.3%
South Dakota	UNE-P POTS, CENTREX, PAL, ANALOG PBX EA ADDL MECHANIZED EXISTING SERVICE	$0.05	+	$0.00	=	$0.05	+	$0.01	=	$0.06	+	$0.00	=	$0.06	$0.14	53.3%
South Dakota	UNE-P POTS, CENTREX, PAL, ANALOG PBX FIRST MANUAL EXISTING SERVICE	$5.87	+	$0.15	=	$6.02	+	$1.29	=	$7.31	+	$0.41	=	$7.73	$16.54	53.3%
South Dakota	UNE-P POTS, CENTREX, PAL, ANALOG PBX EA ADDL MANUAL EXISTING SERVICE	$0.98	+	$0.02	=	$1.00	+	$0.22	=	$1.22	+	$0.07	=	$1.29	$2.76	53.3%
South Dakota	UNE-P ISDN BRI EXISTING SERVICE FIRST	$9.75	+	$0.24	=	$9.99	+	$2.14	=	$12.13	+	$0.69	=	$12.82	$31.97	59.9%
South Dakota	UNE-P ISDN BRI EXISTING SERVICE EACH ADDL	$1.67	+	$0.04	=	$1.71	+	$0.37	=	$2.08	+	$0.12	=	$2.19	$2.82	22.2%
South Dakota	UNE-P ISDN PRI, DSS Per DS1 Facility EXISTING SERVICE	$6.74	+	$0.17	=	$6.91	+	$1.48	=	$8.39	+	$0.48	=	$8.87	$29.15	69.6%
South Dakota	UNE-P ISDN PRI, DSS Per First Trunk EXISTING SERVICE	$6.74	+	$0.17	=	$6.91	+	$1.48	=	$8.39	+	$0.48	=	$8.87	$30.09	70.5%
South Dakota	UNE-P ISDN PRI, DSS Per Each Addl Trunk EXISTING SERVICE	$1.67	+	$0.04	=	$1.71	+	$0.37	=	$2.08	+	$0.12	=	$2.19	$2.82	22.2%
South Dakota	UNE-P POTS FIRST LINE MECHANIZED NEW SERVICE	$19.42	+	$0.49	=	$19.90	+	$4.27	=	$24.17	+	$1.37	=	$25.54	$56.44	54.7%
South Dakota	UNE-P POTS EA ADDL LINE MECHANIZED NEW SERVICE	$5.44	+	$0.14	=	$5.57	+	$1.19	=	$6.77	+	$0.38	=	$7.15	$16.19	55.8%
South Dakota	UNE-P POTS FIRST LINE MANUAL NEW SERVICE	$26.52	+	$0.66	=	$27.18	+	$5.83	=	$33.01	+	$1.87	=	$34.87	$83.78	58.4%
South Dakota	UNE-P POTS EA ADDL LINE MANUAL NEW SERVICE	$6.32	+	$0.16	=	$6.48	+	$1.39	=	$7.87	+	$0.45	=	$8.31	$18.81	55.8%
South Dakota	UNE-COMBINATION LMC-LOOP DS0 FIRST	$64.66	+	$1.62	=	$66.28	+	$14.21	=	$80.49	+	$4.56	=	$85.05	$239.60	64.5%
South Dakota	UNE-COMBINATION LMC-LOOP DS0 EACH ADDITIONAL	$44.07	+	$1.10	=	$45.17	+	$9.68	=	$54.85	+	$3.11	=	$57.96	$156.36	62.9%
South Dakota	UNE-COMBINATION LMC-LOOP DS1 FIRST	$80.19	+	$2.01	=	$82.20	+	$17.62	=	$99.82	+	$5.65	=	$105.48	$303.07	65.2%
South Dakota	UNE-COMBINATION LMC-LOOP DS1 EACH ADDITIONAL	$61.16	+	$1.53	=	$62.69	+	$13.44	=	$76.13	+	$4.31	=	$80.44	$221.90	63.8%
South Dakota	UNE-COMBINATION LMC MULTIPLEXER DS1 TO DS0	$48.88	+	$1.23	=	$50.10	+	$10.74	=	$60.84	+	$3.45	=	$64.29	$201.69	68.1%
South Dakota	DS0 ENHANCED EXTENDED LOOP FIRST	$72.48	+	$1.82	=	$74.29	+	$15.92	=	$90.22	+	$5.11	=	$95.32	$260.73	63.4%
South Dakota	DS0 ENHANCED EXTENDED LOOP EACH ADDITIONAL	$59.62	+	$1.49	=	$61.12	+	$13.10	=	$74.22	+	$4.20	=	$78.42	$194.28	59.6%
South Dakota	DS1 ENHANCED EXTENDED LOOP FIRST	$85.22	+	$2.14	=	$87.36	+	$18.72	=	$106.08	+	$6.01	=	$112.09	$319.65	64.9%
South Dakota	DS1 ENHANCED EXTENDED LOOP EACH ADDIDTIONAL	$69.66	+	$1.75	=	$71.40	+	$15.30	=	$86.71	+	$4.91	=	$91.62	$238.47	61.6%
South Dakota	DS3/OC3/OC12/OC48 ENHANCED EXTENDED LOOP FIRST	$119.14	+	$2.99	=	$122.13	+	$26.18	=	$148.31	+	$8.40	=	$156.71	$344.51	54.5%
South Dakota	DS3/OC3/OC12/OC48 ENHANCED EXTENDED LOOP EACH ADDIDTIONAL	$89.88	+	$2.25	=	$92.13	+	$19.75	=	$111.88	+	$6.34	=	$118.22	$263.33	55.1%
South Dakota	PRIVATE LINE TO EEL CONVERSION	$15.88	+	$0.40	=	$16.28	+	$3.49	=	$19.77	+	$1.12	=	$20.88	$37.36	44.1%
South Dakota	DS1 ENHANCED EXTENDED LOOP TRANSPORT MUX	$63.37	+	$1.59	=	$64.96	+	$13.92	=	$78.88	+	$4.47	=	$83.35	$268.83	69.0%
South Dakota	DS3 ENHANCED EXTENDED LOOP TRANSPORT MUX	$67.02	+	$1.68	=	$68.70	+	$14.73	=	$83.43	+	$4.72	=	$88.15	$268.83	67.2%

Direct - Direct Costs
Marketing & Bus. Fees - Marketing & Business Fees
Direct + Marketing - Direct Costs + Marketing & Business Fees
Other Direct Expenses - Other Direct Expenses
TELRIC - Total Element Long Run Incremental Costs
Common - Common Costs
TELRIC + Common - Total Element Long Run Incremental Costs + Common Costs

ATTACHMENT SLM_003

State: South Dakota

Work Item	Time Minutes	Prob #1	Prob #2	Prob #3	Prob #4	Applied Time (Minutes)	Labor /Hour	Cost
A	B	C	D	E	F	G	H	I
						B * (C Thru F)		H * (G/60)
LOOP BASIC INSTALL FIRST Mechanized								
ADD								
-INTERCONNECT SERVICE CENTER (ISC)								
.05, .5, .6, .08 probabilities is percent of time this activity will occur.								
Prob (.15) is percent orders that will fall out of IMA for manual handling.								
Review LSR for completeness and accuracy, contractual entries	2.5	1.000	0.150			0.00	$40.03	$0.00
Verify Connecting Facility Assignment (CFA) for facility/circuit availability	0	0.050	0.150			0.00	$40.03	$0.00
Exchange info, obtain CO, name, address, office type. Access Telephone Address Guide to obtain CO address and validate end user address.	0	1.000	0.150			0.00	$40.03	$0.00
CPPD look-up billing USOC's for co-provider	1	1.000	0.150			0.00	$40.03	$0.00
Summary Bill List-Look up Billing Telephone Number, tax code, and bill date	1	1.000	0.150			0.00	$40.03	$0.00
Analyze request to determine co-provider, type of order, and installation option	0	1.000	0.150			0.00	$40.03	$0.00
Determine critical dates	0	1.000	0.150			0.00	$40.03	$0.00
If directory advertising or retail contract or both, issue order to remove information from account	0	0.500	0.150			0.00	$40.03	$0.00
Populate required fields	1.5	1.000	0.150			0.00	$40.03	$0.00
Type, review and submit to customer the Firm Order Confirmation (FOC)	0	1.000	0.150			0.00	$40.03	$0.00
Input order into service order processor. Type and format order for billing and provisioning	5	1.000	0.150			0.00	$40.03	$0.00
Ensure order is successfully distributed to the systems and is ready for provisioning	0	1.000	0.150			0.00	$40.03	$0.00
Handle calls from other departments working the order	0	0.600	0.150			0.00	$40.03	$0.00
Handle issues including conditioning, facility, cable&pair	0	0.080	0.150			0.00	$40.03	$0.00
Subtotal - INTERCONNECT SERVICE CENTER (ISC)						**1.65**		**$1.10**
-LOOP PROVISIONING CENTER (LPC)								
Probability is % manual work required.								
Clear RMA (Request for manual assistance)	5.6	0.400				0.00	$37.78	$0.00
Subtotal - LOOP PROVISIONING CENTER (LPC)						**2.24**		**$1.41**
-DESIGN								
Probabilities are % manual work required.								
Order handling/screening	0	0.200				0.00	$44.31	$0.00
GOC (Generic Order Control) order log	3	0.200				0.00	$44.31	$0.00
Enter WA (Work Authorization) mask	3	0.100				0.00	$44.31	$0.00
Prepare loop input/DRI (Design Related Information)	5	0.200				0.00	$44.31	$0.00
Circuit design	10	0.100				0.00	$44.31	$0.00
Distribute WORD (Work Order Record Detail) document	0	0.050				0.00	$44.31	$0.00
Subtotal - DESIGN						**2.90**		**$2.14**
-CENTRAL OFFICE FRAMES								
2 probability is for cross-connects placed at Main Distributing Frame and Interconnect Distribution Frame.								
Analyze order	0	1.000				0.00	$43.81	$0.00
LOOP BASIC INSTALL FIRST Mechanized (con't)								
Complete cross-connect	1	2.000				0.00	$43.81	$0.00
Post DVA work complete is WFA-DI (Work Force Administration - Dispatch In Module)	1	1.000				0.00	$43.81	$0.00
Subtotal - CENTRAL OFFICE FRAMES						**3.00**		**$2.19**
-SERVICE DELIVERY IMPLEMENTOR								
Screen WFA (Work Force Administration) for circuit	0	1.000				0.00	$43.81	$0.00
Verify LNO (Local Network Operation) completion	0	1.000				0.00	$43.81	$0.00
Notify customer/co-provider of work completion	2.5	1.000				0.00	$43.81	$0.00
Post order complete in WFA/C (Work Force Administration - Control Module)	5	1.000				0.00	$43.81	$0.00
Subtotal - SERVICE DELIVERY IMPLEMENTOR						**7.50**		**$5.48**

Work for mechanization and problem resolution

Cost should be covered by directory advertising

Work Items associated with Problems

Incomplete description of work task

Work for mechanization and problem resolution

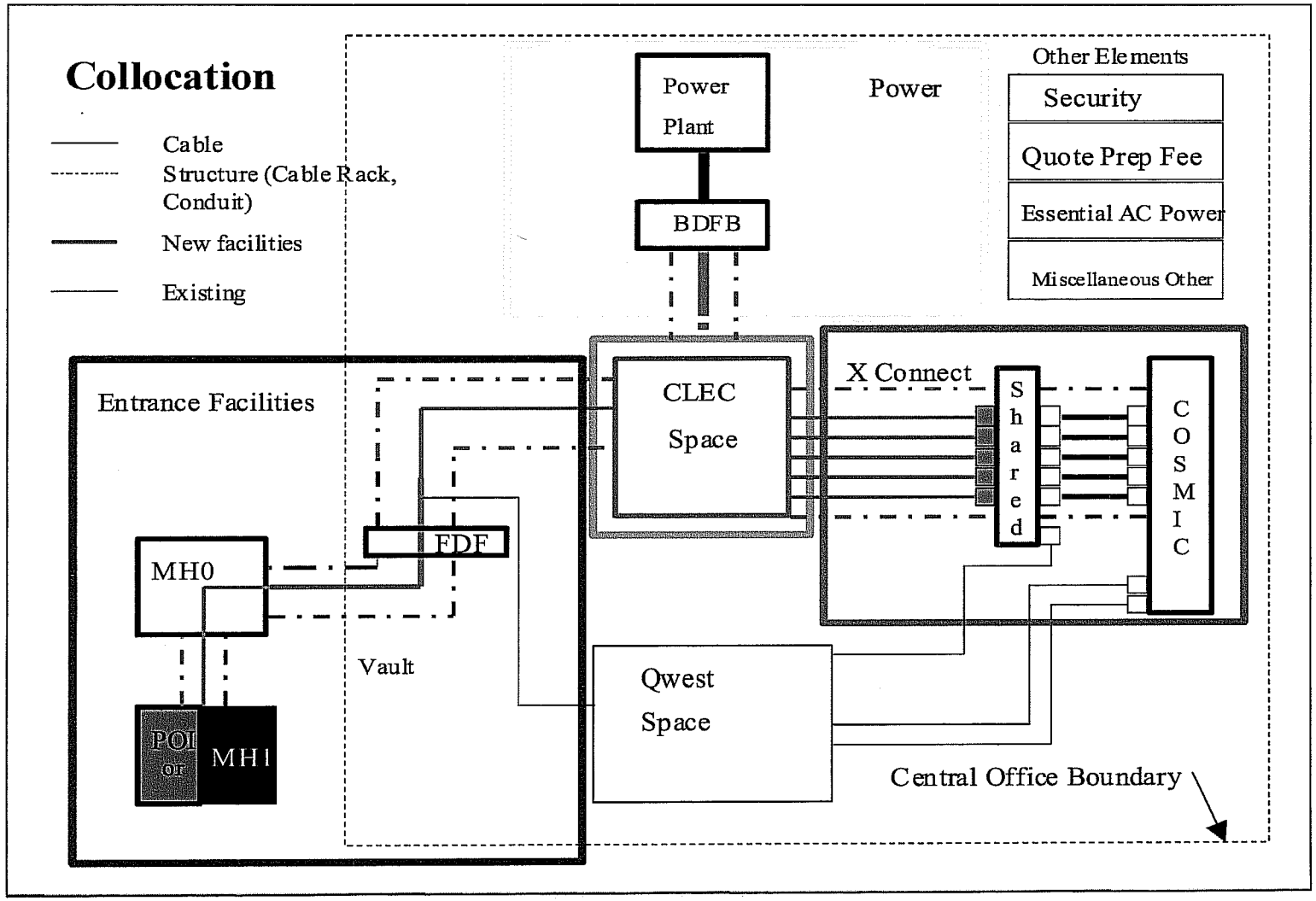
Work for mechanization

Work for mechanization

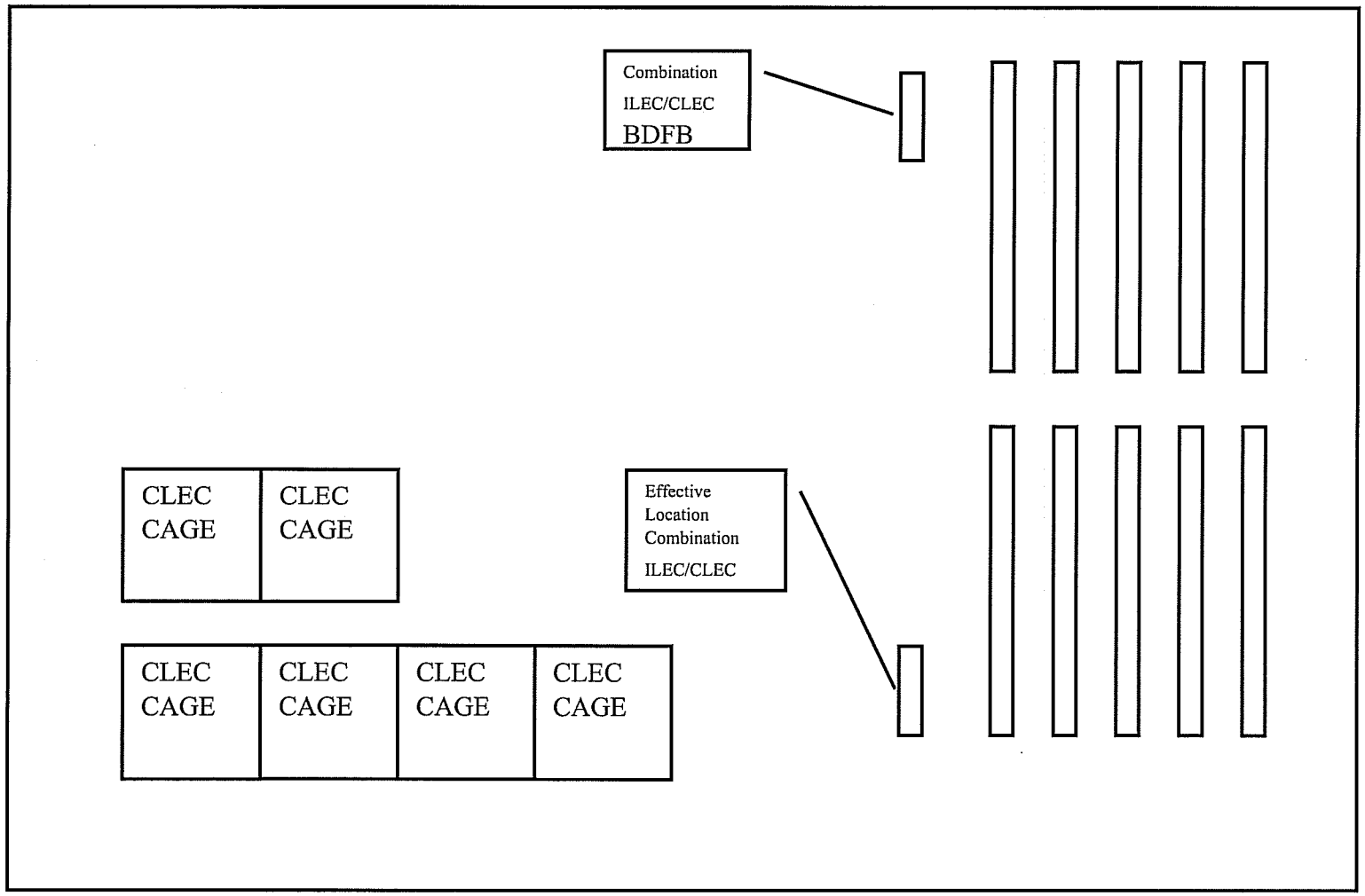
Work for mechanization and problem resolution

Work for mechanization and problem resolution

ATTACHMENT SLM_004



ATTACHMENT SLM_005



ATTACHMENT SLM_006

Space Rent
Investment

Version 1.0 Created 12/12/02, 9:53:02 AM
South Dakota

Land Investment	**$7.20**
Building Investment	**$85.89**

SUMMARY OF NUMBERS

Capital $ for RRCN			
Typical Central Office Model	=	8000	RSF
RS Means Median Unit Cost 4500 GSF	=	$135.00	GSF
Building Construction RRCN	=	$84.99	RSF
Site Work & Landscape	=	$18.86	RSF
97 Construction Cost Subtotal	=	$103.85	RSF
RS Means 97 to 98 Cost Escalation	=	0.00%	
98 Construction Cost Subtotal	=	$103.85	RSF
Land Purchase 1 Acre	=	$7.20	RSF
Architectural Fee 15%	=	$0.00	RSF
USWC Project Management 5%	=	$5.55	RSF
Typical CO Project RRCN	=	$116.60	RSF
Mechanical & Electrical Delivery Cost	=	($23.51)	RSF
Typical CO Project ARRCN	=	$93.09	RSF

**RSF = Rentable Square Foot
**RRCN = Rentable Reconstruction Cost New
**ARRCN = Adjusted Rentable Reconstruction Cost New

ATTACHMENT SLM_007

Parameter File: I:\SLHILL-Team\OSS\SD OSS Studies\2002\SD OSS LINE SHARING.xls, Sheet "WINPC3 Parameters"
State(s): SD
Database Vintage: 02SD01E
Factors For: Interconnection
Report Type: ICM Format
Decimal Places: 6
Costs Format: Monthly
Group Totals: Yes
ACF Input: I:\SLHILL-Team\OSS\SD OSS Studies\2002\SD OSS LINE SHARING.xls, Sheet "WINPC3 ACF Inputs"
ACF Output: I:\SLHILL-Team\OSS\SD OSS Studies\2002\SD OSS LINE SHARING.xls, Sheet "WINPC3 ACF Outputs"
Investment: I:\SLHILL-Team\OSS\SD OSS Studies\2002\SD OSS LINE SHARING.xls, Sheet "WINPC3 Investments"
Output: I:\SLHILL-Team\OSS\SD OSS Studies\2002\SD OSS LINE SHARING.xls, Sheet "WINPC3 Output"

State: South Dakota

Description	Loaded Investment	Direct Expense	Invst. Based & Mktg.	NTWKST TDC $		HREXP TDC $		Common	TELRIC + Common
LINE SHARING OSS PER LINE									
LINE SHARING OSS EXPENSES	$0.000000	$0.166204	$0.169772	$0.002496		$0.001408		$0.015393	$0.231332
LINE SHARING OSS PER LINE	$0.000000	$0.166204	$0.169772	$0.002496	0	$0.001408	0	$0.015393	$0.231332