- BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH -

In the Matter of an Investigation)	DOCKET NO. 94-999-01
Into Collocation and Expanded)	PHASE III PART C
Interconnection)	REPORT AND ORDER

ISSUED: June 2, 1999

SHORT TITLE

Phase III Part C: USWC's Unbundled Network Element TELRIC Costs and Prices

SYNOPSIS

Prices are set for unbundled Network elements, including the Two- and Four-Wire loop; the sub-loop unbundling elements Network Interface Device, Loop Distribution, Loop Feeder, and Loop Concentrator/Digital Loop Carrier; the local switching, non-traffic sensitive elements End Office Analog Line Port and Local Switching per Minute of Use; and the Tandem Switching Minute-of-Use. Policy decisions are made with respect to loop conditioning (grooming), extension charges, and Feature Groups One and Two. For this Docket only, we adopt the definition of urban, suburban and rural exchanges recommended by US West Communications, Inc. (USWC) and the Division of Public Utilities (Division). Choice of a Total Element Long-Run Incremental Cost (TELRIC) cost-estimation model and related input assumptions is deferred to a later Docket.

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I. PROCEDURAL HISTORY

We have previously provided procedural histories for these proceedings in our Order issued October 24, 1997, in Phase I of this Docket dealing with wholesale discount rates based on avoided retail costs, and in our Order issued April 8, 1998 (April Order) in Phase II dealing with the unbundled network element loop cost and price. In Phase III, Part C, of this Docket, dealing with the costs and prices of USWC's unbundled network elements (UNE), parties filed written testimony beginning August 1998. Hearings were held in December 1998.

II. SCOPE

In Phase III of this Docket we establish costs and prices for a number of unbundled network elements. As in Phase II (the April Order), our decisions are guided by public policy objectives, criteria by which contending cost-estimation models are evaluated, and parallel proceedings underway at the Federal Communications Commission (FCC). Proprietary cost-estimation models were then and are now a subject of dispute. Parties do not agree on an approach to cost modeling.

We conclude that cost models have not reached an acceptable level of development and therefore we do not select one in this proceeding. The Division's analysis of the models reveals that USWC's estimates tend to be high, and AT&T's, low. We accept this Division conclusion. Because we believe prices for unbundled elements must be established now, we blend model results to obtain the necessary cost estimates. This blended approach will offset, we believe, the conflicting cost-estimation tendencies identified by the Division. Before discussing this subject further, we briefly review the role of forward-looking economic costs in reaching public policy objectives, the relationship between costs and prices, and the criteria an acceptable cost-estimation model must meet.

A. PUBLIC POLICY OBJECTIVES

As we explain in the April Order:

Section 251 (d) (1) of the 1996 Federal Act requires a price, or rate, determined "without reference to a rate-of-return or other rate-base proceeding," which must be nondiscriminatory and based on cost. "Cost" includes a "reasonable profit." The 1995 State Act requires us to consider total service long-run incremental cost (TSLRIC) when establishing rates for service, but leaves room for other factors, like universal service, to influence our decisions. (54-8b-3.3) Both Acts call for just and reasonable rates (prices).

In its rulemaking [1] to implement the 1996 Federal Act, the FCC defines "cost" as forward-looking economic cost.[2] The FCC accepts the economist's rationale that prices based on forward-looking economic cost will promote competition in the industry the appropriate way, through economically efficient entry of new firms. The 1995 State Act had already directed us to consider a variant of forward-looking economic cost, TSLRIC, as a basis for pricing retail services. With attention now on unbundled network elements, not retail services, the FCC Rules call for a different version of forward-looking economic cost, TELRIC, to be used for pricing them.

[1] Local Competition Order, CC Docket No. 96-98, First Report and Order, August 8, 1996.

[2] Forward-looking economic costs means "the cost of producing services using the least cost, most efficient, and reasonable technology currently available for purchase with all inputs valued at current prices." CC Docket No. 96-45, Universal Service Order, May 8, 1997, paragraph 224, ff 573.

Id., p. 5. (Footnotes in original.)

FCC rules prescribing how to cost and price unbundled network elements were vacated by a July 18, 1997 ruling of the United States Court of Appeals for the Eighth Circuit. The U. S. Supreme Court, however, reinstated almost all of these rules on January 25, 1999, but directed reconsideration of the FCC's "necessary and impair" standard.(1) Our intended approach to costing and pricing UNEs is consistent with the FCC rules in that it is based on TELRIC, or forward-looking economic costing principles.

Parties differ with respect to marginal-cost versus average-cost pricing, the allocation of joint and common costs, and the relationship of unbundled element costs to total service costs. In theory, marginal-cost pricing of a product or service, in the production of which a large component of fixed costs is required, may result in incomplete recovery of

fixed costs. Optimal prices require recovery of fixed costs in a manner that minimizes market distortions. Pricing telecommunications services is a "second best"[(2)] proposition because of several characteristics of a telecommunications network. First, fixed costs are a large proportion of total costs. Second, many joint and common costs are shared in the provision of multiple services. Third, marginal or incremental costs, which vary with the provision of different services, may only be a small proportion of total cost. If the prices of network elements were to equal marginal cost, the failure to recover fixed and shared costs would threaten the financial viability of the enterprise. Thus, prices, though based on forward-looking economic costs, must permit recovery of a reasonable proportion of fixed and shared costs, which necessarily must be allocated to the several elements and services. Accordingly, we set prices to recover the costs of network elements that an efficient, forward-looking provider would incur to provide telecommunications services.

B. THE RELATIONSHIP BETWEEN COSTS AND PRICES

The April Order outlined the relationship we found acceptable:

No party disputes and we conclude that under the 1995 State Act and the 1996 Federal Act, we have the authority to decide what costs are relevant, how cost estimates should be calculated, what methods and models are appropriate, and the weight to be accorded to evidence and the factors advocated by the parties. Moreover, since neither statute requires a price that is equal to the estimated unbundled loop cost, we have latitude to establish the proper relationship between cost estimates and price. That is to say, we may consider all factors relevant to pricing unbundled network elements rather than simply equating the price to a cost estimate from a particular cost model.

Setting the prices or rates for unbundled network elements does not require us to depart from the long-standing regulatory practice which identifies the public interest in just and reasonable rates with a set of ratemaking objectives. Our ratemaking decisions have rested, and should continue to rest, upon a record-based, balanced approach to attaining them. Economic efficiency is an important objective. We believe our pricing decisions should encourage efficient entry.

Prices based on forward-looking economic costs should encourage competition through efficient entry. Such prices should place the incumbent and competitors on equal footing. The record in this Docket contains no evidence on the proper empirical relationship between costs and prices, however. Though we continue to believe that we must establish a proper relationship between cost and price, the prices we herein determine will equal the cost estimates we find acceptable as there is no record basis to do otherwise.

C. CRITERIA FOR MODEL SELECTION

Our April Order adopted the following cost-modeling recommendations:

1. The least-cost, most efficient, reasonable technology currently being deployed to provide service will be modeled. The incumbent local exchange carrier's existing wire centers will be the center of the loop network, to which outside plant will terminate. Wire center line counts will equal actual counts. Loop design will not impede the provision of advanced services.

2. A network function or element necessary to produce a service will have an associated cost.

3. Only long-run, optimal forward-looking costs will be modeled.

4. The rate of return will be that authorized by the FCC on interstate services or by the state on intrastate services. Economic lives and future net salvage values will be used to calculate depreciation rates, which will be within the FCC-authorized range.

5. The cost of providing service to all businesses and households within a geographic region will be estimated so economies of scale are properly reflected.

6. A reasonable allocation of joint and common costs will be assigned to a service.[4]

7. Calculations will be deaveraged to the wire center serving area level, or if feasible to smaller areas such as a Census Block Group, Census Block, or grid cell.

[4] The term "service" is used by the FCC because these recommendations were developed in the Universal Service Docket there. Phase III considers the cost of unbundled network elements, not services. We will consider whether this necessitates differences in cost modeling at the appropriate point.

Id., pp. 9-10. (Footnote in original.)

With the exception of differing positions on the cost of capital, depreciation rates, and the method of deaveraging, the records of both Phase II and Phase III of this Docket support these guidelines for forward-looking economic cost modeling. We again conclude that any model proposed for use in this State should meet them.

Based on the Phase III record, however, we clarify two of these points. Point number one states that loop design may not impede the provision of advanced services. This has implications for the level of quality and transmission capacity that is to be expected of an unbundled loop. Number seven requires geographic deaveraging of costs. We conclude that models must be capable of accepting Commission-specified geographic boundaries, such as the urban, suburban, and rural areas suggested by USWC and the Division, and that changes in area designations should not affect the total cost of the statewide system.

The April Order also adopted openness and flexibility as primary modeling criteria, and stated: "Openness means the model, and all underlying data, formulae, computations, and software, should be available to the parties for evaluation." Further: "Underlying data should be verifiable, engineering assumptions reasonable, and model outputs plausible. Flexibility means a party should be able to examine and modify critical assumptions, engineering principles, and input values." Nothing in this Docket alters the relevance of these criteria, and we believe they must be met.

The Order continued:

USWC states that a cost model should be consistent, flexible, stable, reliable, and realistic; that is, assumptions should be consistent, parties should be able to conduct sensitivity tests, results should be stable when the model is updated, the model should be reliable so correction of mistakes has an insignificant effect on results, and only realistic assumptions about the design, planning, and construction of facilities should be used. In agreeing that a cost model should be open and verifiable, the Division testifies that if full documentation is not provided the model will be a "black box" and independent evaluation will not be possible. In AT&T's and MCI's view, a model should be completely documented so an independent analyst can understand how it operates and can test the adequacy of its algorithms; a model should be flexible enough to allow adjustment and testing of inputs by users; a model should be stable as to the sensitivity of results to changes in inputs and assumptions; and, finally, a model should employ non-proprietary data available to the public.

USWC suggested that embedded costs should be used as a reality check. But Section 251 (d) (1) of the 1996 Federal Act requires a price, or rate, determined "without reference to a rate-of-return or other rate-base proceeding. . . " It is clear prices may not be based on embedded cost in any direct manner.

We reaffirm openness and flexibility as the primary criteria for model evaluation, supplemented by the above discussion. We expect complete documentation of models. As we said in the April Order:

The practical requirement suggested by "complete documentation" is not explicit on this record, though its common sense meaning is clear enough. Our standard is simply that models must be documented well enough to allow independent evaluation. . . .

Parties may come to us if this requirement is not being met. Our existing procedures will be used to protect information determined to be proprietary. Because the record shows that analysts and users must be able to vary a model's assumptions and data inputs, in order to test the sensitivity of results to such changes and to evaluate the model itself, we adopt the recommended flexibility criterion as well.

III. ISSUES FOR DECISION

A. COST ESTIMATION

Because of inadequate model development and documentation, the Division, an independent analyst, cannot determine whether the HAI model's algorithms reflect a network based on best engineering practices and economic principles of network design. Further, we find, based on Division testimony, that USWC's Integrated Cost Model (ICM) does not produce a forward-looking, economically efficient network. Expert testimony leaves no doubt that the models on the record cannot pass the tests imposed by the openness and flexibility criteria. Both models also have other flaws.

A shortcoming of the ICM, employed by both USWC and the Division, is its failure to produce a comprehensive, efficient, forward-looking result. Instead, the ICM prorates a sample of recent historical costs based on characteristics of various exchanges. It does not design a network, but mimics the embedded costs and practices of recent network experience. This is an accounting, or statistical, rather than an engineering approach. Division testimony highlights this shortcoming of the ICM model, though in the context of explaining its upward bias:

ICM does not hypothetically build a scorched node network completely from scratch. Rather, using its original RLCAP base it uses statistical prototypes for the various density groups, and because it does not hypothetically build the network completely from scratch, any new lines must be attributed to existing density groups, affecting weighting and creating the upward bias from smaller to greater density groups.

L. Jeppson, December 11, 1998, p. 3.

The record shows that the HAI model employs a forward-looking, economically efficient approach. Nevertheless, we find significant problems with the algorithms that locate and design distribution plant. The HAI model does not locate a large percentage of the customers that are known to exist (particularly in rural exchanges), but establishes proxy locations for them. When illogical or implausible customer locations are assigned, plant design is inaccurate. For this reason, we are skeptical of the reasonableness and accuracy of the final design, though we are not convinced by USWC testimony that the HAI model necessarily builds a deficient amount of outside plant.

These modeling problems lead us to conclude that the models on the record could not be used individually and should not be adopted in Phase III, Part C. They also fail to meet the criteria explained above. A future docket to examine the FCC's Hybrid Cost Proxy Model (HCPM) and later versions of the current models may offer us an opportunity to choose a model that both designs a reliable forward-looking economically efficient network and provides plausible TELRIC costs. We encourage USWC and AT&T either to join the Division's examination of the HCPM or to upgrade their own models to meet the criteria. In the case of the ICM, this would require incorporation of algorithms to develop a forward-looking, economically efficient network.

Differences in the cost estimates the models, as applied by the parties, produce are significant. The HAI, using AT&T's input values and assumptions, yields an $11.40 statewide weighted average monthly cost estimate for the two-wire loop. The ICM, with USWC's assumptions, input values, and prescribed cost of capital and depreciation rates, yields $21.51. But when the Division's input values are used, the ICM yields $16.45.[(3)] Because of the problems we have identified with these models, we determine cost of the two-wire loop to be the average of the estimates produced by USWC's version of the ICM and AT&T's HAI. We will use the Division's estimate as a cross check. The average of the two models is $16.46; the Division's estimate is $16.45.

Where possible, we follow the same procedure for the remaining unbundled elements. If the record contains an estimate

from but one of the two models, we accept the Division's adjusted ICM estimate, or no price is set. If the USWC estimate is the only estimate and it is lower than the Division's, we accept the USWC estimate. If both HAI and ICM estimates are higher than the Division's, an average of the two is calculated and this number is averaged with the Division's estimate to arrive at a result we accept.

B. POLICY ISSUES

1. Geographic Deaveraging

The Division, AT&T, Nextlink, and MCI favor deaveraging TELRIC costs now to provide the proper cost basis for prices and to allow reasonable comparability of costs for competitors. In Phases II and III, USWC testifies that deaveraging should only occur when retail rates are rebalanced and deaveraged. During the last general rate case, Docket No. 97-049-08, significant adjustments to service prices were made to bring them closer to cost. Pursuant to Section 54-8b-2.4-(2)-(i), further adjustments could have been proposed by USWC or other parties. This did not occur, and we are precluded from making further retail rate adjustments. We conclude, however, that we may deaverage UNE prices at this time.

The Joint Exhibit filed by the parties in this Docket classifies wire centers as urban, suburban, and rural. Based on the record, the primary criterion for the categories is the grouping of wire centers by USWC according to the applicable host - remote exchange (switch) relationship. USWC classifies the host as urban, suburban, or rural, and this determines the category of the remote switch. It gives rise to certain anomalies, however, in that, to all appearance, some switches classified rural are not (for example, Logan, Park City, St. George), and some classified urban are not (for example, Alta, Mt. Green). See Appendix I for a list of exchanges. Despite these anomalies, we believe it is important to deaverage costs geographically to promote competition in furtherance of state and federal policy objectives. In addition, the FCC will ultimately require deaveraged costs. We therefore accept the categories, even with these imperfections, and will deaverage costs where appropriate.

We direct the parties to develop the modeling capability to deaverage costs in the following manner. Models must first calculate an optimal statewide network, on a TELRIC or forward-looking, economic cost basis, without regard to exchange classification, and in a second step report each wire center's or, if appropriate, smaller serving area's average UNE costs as calculated in step one. We believe the information this requires is already available because the models now compute costs on a weighted basis. We believe it necessary for costs to be reported for given geographic areas without requiring the entire model to be rerun.

2. Line Conditioning (Grooming) and Extension Charges

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.[(4)] Accordingly, we disallow charges for line conditioning or grooming. A similar rationale and conclusion applies to line extension charges.

3. Feature Groups

Proponents of the HAI and ICM models define the equipment or features that should be included with an unbundled loop differently. AT&T, using the HAI model, includes Feature Groups One and Two in the cost of the unbundled loop. USWC and the Division, using ICM, do not. AT&T states that the equipment to provide these features is an integral part of the hardware for a loop, and therefore includes the cost and functionality of them in all loops. USWC separately allocates Feature Group costs and therefore maintains that they should be priced separately. We rely on the technical fact that CLECs with their own switches are able to provide Feature Groups in order to conclude that Feature Groups should be priced, not as part of a two-wire loop, but separately.

C. PRICING UNBUNDLED NETWORK ELEMENTS

A record basis upon which to estimate, as we would for sound reasons of public policy, the relationship prices should bear to costs, does not exist at this phase of the Docket. We have no choice but to set prices for unbundled network elements equal to the costs we have determined appropriate. These prices are in Table A, following which we give such explanation as we believe is required.

Table A. Unbundled Network Element Prices

Element	Price		
	Urban	Suburban	Rural
Two-Wire Loop	$14.41	$17.47	$24.14
Sub-Loop Unbundled Elements (Two-Wire Loop)			
Network Interface Device	$0.43	$0.48	$.052
Loop Distribution	$10.66	$14.86	$19.51
Loop Feeder	$1.91	$2.36	$3.95
Loop Concentrator/Digital Loop Carrier	$1.96	$2.07	$2.14
Feature Group One	$0.72	$0.88	$1.00
Feature Group Two	$3.20	$5.67	$4.50
Four-Wire Loop	$23.57	$28.57	$39.47
Local Switching Non-Traffic Sensitive			
End Office Analog Line Port	$0.89	$0.90	$1.02
Local Switching per minute of use	$0.002299	$0.002664	$0.002896
Tandem Switching per minute of use	$0.001058	$0.001025	$0.001059

1. Unbundled two-wire loop and feature group pricing.

The statewide weighted average cost of the unbundled two-wire local loop is on this record to be found in the range bounded by $11.40 and $21.51. The Division's estimate is $16.45, plus $4.48 for two feature groups. Because we have decided to exclude feature groups from the loop, and using the averaging approach discussed above, we set the statewide average price for an unbundled two-wire loop at $16.46. The statewide average price for Feature Group One will be $0.77, and for Feature Group Two, $3.71.

2. Four Wire Loop Pricing.

We set the price of a four-wire loop at 163.5 percent of a two-wire loop. Though USWC and the Division each suggest that doubling the two-wire price is appropriate, neither submitted such a price in the Joint Exhibit. Rather than basing their recommendations on cost, the record instead reveals an arbitrage concern on the part of the Division and USWC. It is obvious that some savings, at minimum for placement, must exist. A doubling of the two-wire loop price is therefore unreasonable. The record does reference a study suggesting 127 percent of the two-wire price on a cost basis, though USWC argues the study is weak because it assumes that all loops are converted to four-wire. USWC, however, failed to produce a study of its own. The record also shows that the FCC uses a national average cost of 160 percent of the two-

wire cost. The average of the record estimates, 127 percent and 200 percent, is 163.5 percent, close to the FCC figure. This is the price we select, noting that it does not include feature groups.

3. Other Unbundled Network Elements

Shared Transport and Operational Support Systems are the subject of separate proceedings in this Docket and therefore prices for them are not set here. Further, many signaling and transport unbundled network elements found in the Joint Exhibit cannot be priced here because parties differ as to the definitions of these elements. This difficulty can be overcome when common definitions are submitted.

IV. ORDER

Wherefore, based upon the evidence received, the Commission sets prices for unbundled network elements as shown in Table A above.

These prices are final, and effective on the date of this Report and Order. The Commission intends to revisit the cost basis for these prices in the future.

DATED at Salt Lake City, Utah, this 2nd day of June, 1999.

/s/ Stephen F. Mecham, Chairman

/s/ Constance B. White, Commissioner

/s/ Clark D. Jones, Commissioner

Attest:

/s/ Julie Orchard
Commission Secretary

APPENDIX 1. EXCHANGE CLASSIFICATION

City or Exchange		
Urban	**Suburban**	**Rural**
ALTA	AMERICAN FORK	BEAVER
BOUNTIFUL	LEHI	BRIANHEAD
CLEARFIELD	OREM	BRIGHAM CITY
COTTONWOOD	PAYSON	CEDAR CITY
DRAPER	PLEASANT GROVE	COALVILLE
FARMINGTON	PROVO	CORINNE
HOLLADAY	SALEM	DUCHESNE
HUNTSVILLE	SANTA QUINN	DUGWAY
KAYSVILLE	SPANISH FORK	EAST CARBON
KEARNS	SPRINGVILLE	EPHRIAM
LAYTON EAST		GRANTSVILLE
MAGNA		HANKSVILLE
MIDVALE		HEBER CITY

MOUNTAIN GREEN		HELPER
MURRAY		HURRICANE
OGDEN MAIN		HYRUM
OGDEN NORTH		LEADS
OGDEN SOUTH		LOGAN
OGDEN WEST		MONROE
RIVERTON		MORGAN
SALT LAKE EAST		MOUNT PLEASANT
SALT LAKE MAIN		NEPHI
SALT LAKE SOUTH		PARK CITY
SALT LAKE WEST		PAROWAN
WEST JORDAN		PRICE
		RICHFIELD
		RICHMOND
		ROOSEVELT
		SALINA
		SMITHFIELD
		SPRINGDALE
		ST. GEORGE
		TOOELE
		VERNAL
		VEYO
		WENDOVER

1. The 1996 Federal Act makes available, at cost-based prices, all UNEs that are necessary for a CLEC to do business; those which, if not available would harm ("impair") the CLEC. The FCC rule, which the Supreme Court found too broad, would require that all UNEs which could be made available must be.

2. The "second best" concept urges policy makers to consider that in the presence of practical constraints, standard economic answers like pricing at marginal cost will not yield optimal results. See "The MIT Dictionary of Modern Economics," Third Edition. Editor David W. Pearce. The MIT Press: Boston, Massachusetts 1989.

3. All cost estimates are contained in the Joint Exhibit submitted by the Division, USWC and AT&T.

4. Industry standards suggest that voice grade lines should be capable of transmitting from 300 to 3400 Hz with minimal distortion; e.g., modems designed to function in the spectrum below 3400 Hz will function at their designed capacity. In general, 4000 Hz, including guard zones, is set aside for voice grade service. Though such technical specifications are beyond the scope of this Docket, parties should address unbundled loop transmission capability in future dockets.