6. Switching Studies

Q. Please turn to the sixth part of your direct testimony, concerning SWBT's switching studies. How did the Company develop its estimates of local switching investments (Issue DA-0001)?

A. Material investments for switches were developed using Bellcore's Switching Cost Information System (SCIS), based on inputs such as line and trunk quantities and related usage requirements. SCIS outputs include basic switching investments and the processor related investments associated with features. Key steps in the usage cost estimation process included the following:

a. Total switching plant investment is calculated, assuming all digital switches.

b. The cost of "basic feature-related hardware and other construction costs" is added to the total switch investment.

c. SCIS is used to identify the "line driven" portion of the total switching investment. According to SWBT, this includes "equipment necessary to terminate access lines". [Description of Unbundled Network Element Cost Studies, SWBT, 1997].

d. "Usage driven" investment is calculated by subtracting line driven investment from total investment.

e. Usage investment per minute of use is calculated for each geographic zone by dividing usage investment for the zone by the "annual dial equipment minutes of use for digital switches in the zone."

f. ACES is used to calculate the cost per minute of use in each zone.

Key steps in the analog line-side port cost process included the following:

g. The study begins with line-driven investments from SCIS expressed on a per-line basis. Separate per-line investments are calculated for each switch type.

h. A weighted average per-line investment is calculated based upon the number of lines associated with each switch type.

i. Additional investment per line is added for the switch side of the main distributing frame.

j. The switch line and MDF investments are entered into the ACES model, where additional loadings are added, and monthly costs per port are computed.

High Investment Amounts

Q. Have you identified any problems with the Company's estimates of switching costs?

A. Yes. As shown on Schedule 9, the Company's estimate of total installed switching investment is roughly **Begin proprietary*** ***End proprietary.** Using the number of lines used in SWBT's Switching studies, SWBT's estimated per line investment is **Begin proprietary*** ***End proprietary.** While it is true that the price paid for new switches can vary widely, depending upon the manufacturer, model, and size of the switch, the Company's switching investment of **Begin proprietary*** ***End proprietary** per line is completely inconsistent with data I am familiar with indicating the cost of newly purchased switches. In my experience, when the total investment in a new switch is divided by the number of lines, the results (in recent years) are typically in the range of roughly $100 to $180 per line, although there are exceptions slightly above and below this range. Quantity purchasing discounts resulting from mergers could bring SWBT's figures down further.

Q. Would you please elaborate concerning the cost of new switches?

A. Yes. I have seen a wide range of cost data for switches, involving various carriers and manufacturers. In most cases the underlying data was labeled "proprietary," ruling out direct comparisons across jurisdictions. However, a report was recently published by NRRI which summarizes a wide array of public switch cost data: *Estimating the Cost of Switching and Cables Based on Publicly Available Data*, by David Gabel, Ph.D., Queens College, and Scott Kennedy (April 1998). In the NRRI study of large company switches, the per-line investment in 1997 dollars is estimated at $120.18 for host switches and $129.22 for remotes. [Table 3-12, p. 120.] These figures fall within the $100-$180 range I mentioned earlier, and they are far less than the per-line switch investment calculated in the Company's cost studies.

Switch Discounts

Q. Have you been able to determine why the Company's switch investment estimates are high?

A. I believe so. Varying discounts are applicable for purchases of line cards and other components used in accommodating growth on an existing switch compared to new switching equipment. A much deeper discount is available from switch manufacturers when a new switch is being purchased. The Gabel/Kennedy figures reflect the costs of new switches at the time of acquisition, and thus primarily, if not entirely, reflect the deeper discount applicable to such purchases. Although SWBT apparently concedes that some consideration should be given to this deeper discount, it apparently gave the deeper discount little or no weight in the studies submitted to the Commission, thereby creating the impression that switching is much more costly than is actually the case.

Q. How much consideration should be given to the initial purchase price in a forward-looking, long run study (Issue DA-0002)?

A. In a long run cost study, the initial cost of acquiring a new switch is highly relevant and should be given great weight. The assumptions of TELRIC are that the network is being built from scratch, though at the existing wire center locations. Consistent with the basic tenets of a long run planning horizon, a new switch can be acquired to optimally match the current volume of output. Furthermore, new switch transactions represent a substantial fraction of the total volume of sales by switch manufacturers, and thus any attempt to consider the equilibrium, or normal, level of switching costs must give great weight to the deep discounts available on new purchases. To under emphasize the discounts available on new equipment is to overestimate the relevant switching investment.

Q. Then should the switching investment in a long run cost study be based exclusively on the deep discounts available on new switches (Issues DA-0012, DA-0013)?

A. No. The lesser discounts (higher unit prices) associated with subsequent modifications and expansions of the switch should not be totally ignored in a long run cost study.

Among other reasons, this is appropriate in order to maintain consistency with the relatively high utilization rate or fill factor which should be used in a long run switching cost study. Modifications and growth can be quickly and easily accommodated by acquiring additional components, thereby making it possible to maintain a high "fill" rate. Consistent with the assumption of a high switching "fill" rate in a long run study, it is reasonable to assume that the carrier does not maintain a large inventory of spare parts, but instead will depend on the switch manufacturer for additional components as needed, in order to accommodate fluctuations in demand as well as growth. The manufacturer has higher transaction costs, and achieves a higher profit margin, on these smaller subsequent sales, and this is an expected part

of the overall profitability of any particular switch sale. In evaluating the long run cost of switching (reflecting a market equilibrium), it is necessary to give at least some consideration to the higher prices associated with these smaller subsequent transactions.

Q. What is SWBT's position concerning the relative weight to give to these different discount levels?

A. Based upon staff's review of SWBT's source documents, it appears that the switching studies filed in this proceeding assume 100 % weight to the much shallower "add on" discounts. However, in response to Issue DA-0012, SWBT states: "the model adopted used a weighted average of initial and growth lines". SWBT apparently concedes that a weighting process is appropriate, and it has provided some illustrative calculations showing its proposed method for determining the relative weights. However, this proposed method was not actually used in the cost studies submitted to the Commission in this proceeding.

Q. Could you explain SWBT's proposed method in greater detail?

A. The Company is essentially proposing to use a weighted average of the "new" and "replacement" discounts. However, rather than simply assigning weights to the new and replacement discounts and averaging the two, SWBT uses an indirect weighting method. At the back of my exhibit I have included a copy of a worksheet provided by SWBT, which shows a hypothetical example of how the Company proposes to estimate the switching discount. The process works as follows:

For each switch type, the Company identified the discount associated with the switching investment required for initial lines and growth lines. These discounts were then stated as some per-line investment amount less than $100. For example, an 80% discount would be stated as an investment amount of $20.00. SWBT then arbitrarily assumed a certain number of initial

lines for the specific switch type (given the process followed by SWBT, the assumed number of initial lines is irrelevant). Using an assumed growth rate, the Company then projected the number of lines added per year.

The total investment amount for the first year was calculated by multiplying the initial number of lines by the investment amount per line associated with initial lines. The investment amount for each subsequent year was calculated by multiplying the additional lines by the per-line investment amount associated with growth lines. SWBT then calculates the present value of each year's investment using an assumed cost of capital. The total number of lines is also discounted using the same cost of money. Total investment per line is calculated by dividing the present value of total investment by the present value of total lines. This results in a weighted average investment amount per line, stated in an amount less than $100. The weighted average discount is implicit in the per line investment. For example, an investment amount of $40.00 implies an average discount of 60 %. According to documents reviewed by Staff, the Company has assumed a relatively rapid growth rate and a relatively short projection life. These assumptions result in an implicit weighted discount of roughly **Begin proprietary*** ***End proprietary** % weight being given to the new discount, and approximately **Begin proprietary*** ***End proprietary** % being given to the growth or "add on" discount.

Q. Are there any problems with the Company's proposed approach (DA-0003; DA-004; DA-0008)?

A. In general, this is a plausible way of arriving at a reasonable set of weights. However, I do have a few minor concerns. First, a life cycle approach to estimating switching discounts is potentially inconsistent with other aspects of SWBT's switching study, and the Company's other TELRIC studies. For example, in its switching study, SWBT employs a static, point-in-time estimate of MOUs. Similarly, the Company's other studies, such as the loop study, estimate the cost of

UNEs based upon demand at a given point in time, rather than looking at volume as it grows over an assumed life cycle. If a life cycle approach were used in other parts of the studies for the sake of consistency, (e.g. deriving unit costs based upon the volume of minutes and loops that will be demanded over the next 5 or 10 years), it would likely reduce the calculated UNE costs.

Second, I question the validity of the Company's proposed growth rate for purposes of this weighting analysis. The magnitude of this assumption directly impacts the weight given to the new and growth discounts. Higher growth rates will result in more growth lines relative to initial lines. Consequently, a higher growth rate will result in less weight being given to the deeper initial discount.

The growth rate proposed by SWBT is supposed to represent the rate at which access lines will grow over the life of the study. Such a growth rate can appropriately be applied to the line-related portion of the switching investment. However, a somewhat higher growth rate would potentially apply to the usage-related investment. Typically, usage grows faster than lines, because usage per line is trending up.

Of equal importance, it is inappropriate to apply a line-related growth rate to the "getting started" or fixed portion of the total switching investment. By definition, this part of the switch does not grow much over the life cycle of the switch, and thus the initial deep discount is virtually all that is relevant to this part of the switch. On average, SWBT's start-up investment is approximately **Begin proprietary ***** *****End proprietary** % of total switching investment. [Local Switching Cost Study, 1996-1998 Workpapers]. This investment is purchased at the time of the initial acquisition of the switch. As such, it does not grow as additional lines are added, or as usage increases.

Q. For comparative purposes, have you reviewed any historical data concerning growth in access lines and access minutes?

A. Yes. Schedule 10, page 1 includes total switched access lines from 1992 to 1996 for all LECs, all RBOCs, and SWBT. These data were taken from the FCC's annual "Statistics of Common Carriers" report. As shown, over this time period, switched access lines grew by 3.8 % for all LECs, 3.6 % for all RBOCs, and by 4.0 % for SWBT. Page 2 of Schedule 10 shows billed access minutes from 1992 to 1996 for all LECs, all RBOCs, and SWBT. From 1992 to 1996, billed access minutes grew by 8.5 % for all LECs, by 7.9 % for all RBOCs, and by 8.2 % for SWBT.

We also reviewed some data SWBT provided to staff regarding growth in lines and total minutes of use for 1995 through 1997. Over this time period, SWBT's Kansas access lines grew by **Begin proprietary*** ***End proprietary** % per year. SWBT's total minutes grew by **Begin proprietary*** ***End proprietary** % annually over the same period.

Q. What about the Company's assumed projection life? Won't that input also affect the weights given to each of the two discounts?

A. Yes. Longer projection lives result in more growth lines in relation to initial lines, and more weight given to the growth discount. The projection life should be less than or equal to the assumed depreciation life for digital switching. As I mentioned earlier, SWBT is using a depreciation life of **Begin proprietary*** ***End proprietary** years for digital switches. SWBT has made a similar assumption in developing its proposed weights. If the Commission approves a longer depreciation life for digital switching, as I recommend, the weighting calculations should be modified accordingly.

Q. What are your recommendations with regard to the discount assumptions used in SWBT switching studies? (Issues DA-0002 & DA-0008)

A. I recommend that the new and replacement discounts be directly weighted, rather than indirectly weighted through the Company's life cycle methodology. Specifically, I recommend that 80-85 % weight be given to the new switch discount, and 10-15 % weight be given to the replacement discount. This provides a reasonable result, and avoids the complexities involved in the Company's proposed weighting approach.

However, if the Commission approves the Company's methodology, I recommend that a blended growth rate be used, which gives one-third weight to a line-based growth rate of 4%, one-third weight to a MOU-based growth rate of 12% and one-third weight to a growth rate of zero, which is the appropriate growth rate associated with the fixed and start-up portions of the switching investment.

Minutes of Use

Q. What is your recommendation concerning switching minutes of use (Issue DA-0009)?

A. First, for consistency with other aspects of the studies, the switching studies should be based upon the 1997 volume of traffic–not the traffic that was present during a much earlier time period. This issue will be discussed in greater detail by Staff witness Springe

Second, I recommend that the Commission accept SWBT's proposed method of allocating investment between the port and minute categories. Although there are some disadvantages from a CLEC's perspective, there are offsetting advantages from a public interest perspective. On balance, I think the Company's approach is acceptable.

SWBT first identifies the "minimum line investment" associated with each switch. This amount is assigned to the port cost category. [Local Switching Cost Study, 1996-1998

Workpapers]. All remaining switching investment is then assigned to the per MOU cost category. Presumably, SWBT wants to recover these residual costs through the MOU charge. This remaining investment amount is the majority of the switching investment, since it includes various miscellaneous investment amounts (not associated with lines or minutes), including the "getting started" investment.

AT&T has asserted that all such miscellaneous investment amounts should be recovered from the port charge. There are at least two disadvantages to SWBT's procedure from a CLEC's perspective. First, it will result in a larger flow of dollars from the CLECs to SWBT over time, because traffic tends to grow faster than the number of lines. Second, it will immediately result in higher rates to serve business customers and lower rates to serve residential customers. To the extent the CLECs concentrate on the business market, (e.g. because of its higher revenue levels per line), they will pay more for switching under SWBT's approach than if these miscellaneous costs were allocated to the per-line rate element.

On the other hand, there are some desirable consequences associated with recovering start-up and similar investments from MOU charges. Lower residential rates (for port and local usage) may encourage some CLECs to compete for residential customers. Moreover, recovering higher MOU charges will encourage CLECs to install their own switches once their traffic volumes become substantial. This is especially true of CLECs that are competing primarily in the business market, where usage is relatively high.