

1 **F. VERIZON MISIDENTIFIED COST CAUSATION AND THEREFORE**
2 **HAS MISASSIGNED COSTS TO ITS VARIOUS SWITCH RATE**
3 **ELEMENTS**

4 **Q. WHAT ARE THE CAPACITY RESTRAINTS ON MODERN DIGITAL**
5 **SWITCHES?**

6 A. As Ms. Pitts stated in her Direct Testimony, digital switches are port-limited, and
7 are not constrained by peak period usage.⁷⁷ Indeed, Verizon studies show that the
8 average processor utilizations are infinitesimally small compared to the available
9 call processing capacities (not total capacity – only the vendor-stated call
10 processing capacity).⁷⁸ This level of small utilization is typical of the current
11 generation of digital switches – they are designed to take advantage of the huge
12 economies in computer chip technologies to ensure that a switch will not exhaust
13 on processing or memory power. Verizon studies show that its switches will
14 never exhaust its call processing capacities in their lifetimes.⁷⁹

15 Verizon implicitly acknowledges this fact when it asserts that usage for
16 reciprocal compensation does not affect the processing capacities of a switch.⁸⁰

⁷⁷ See the following. VZ-MA: J. Gansert's testimony, New York Case 95-C-0657, 94-C-0095, 91-C-1174, page 24. SWBT: Transcript (pg 3556) of Costing Pricing Issues SWBT Arbitration PUC Docket 16226, 11/3/96 cross of Raley. Ameritech: Direct Testimony of William Palmer, ICC Docket 96-0486, Ameritech-Illinois Exhibit 3.3. Pacific Bell: R. Scholl February, 1997, deposition in case R.93-04-993 and I.93-04-002.

⁷⁸ See Attachment 4, filed herewith, which displays the average switch processor utilizations contained in the SCIS model as run by Verizon.

⁷⁹ Id. (showing Verizon's SCIS inputs for [1] years to processor exhaust and [2] years to replacement).

⁸⁰ Panel Testimony at footnote 7.

1 The appropriate cost driver for today's digital switches is ports, not peak period
2 usage.

3 **Q. HOW DOES THE FACT THAT PROCESSING CAPABILITY OF**
4 **MODERN DIGITAL SWITCHES IS NOT A CONSTRAINT AFFECT**
5 **VERIZON'S COST STUDY?**

6 A. Verizon has improperly allocated the substantial processor, memory and other
7 "getting started" costs to the minute-of-use element of its switch rates. These
8 "getting started" costs do not vary with respect to lines or trunks. The line and
9 traffic inputs to SCIS can be modified by an order of magnitude, but the "getting
10 started" cost will not change even one penny.⁸¹

11 The only time the "getting started" cost will be replicated is when a second
12 switch must be installed because the port capacity was reached. Therefore, the
13 cost driver is ports. The "getting started" costs should be assigned to the ports,
14 not the minute-of-use.

15 Just as it is imperative to ensure that non-recurring costs be recovered via
16 non-recurring cost elements, it is critical that non-traffic sensitive costs not be
17 recovered via traffic sensitive elements.

⁸¹ This can be seen by viewing the office-by-office results in Verizon's SCIS database. The "getting started" cost of a switch does not change, except when remote switches are added to a host switch, because the remote's "getting started" costs are added to the host's "getting started" cost.

1 **Q. HOW DO YOU PROPOSE TO ASSIGN COSTS TO THE TRAFFIC**
2 **SENSITIVE AND NON-TRAFFIC SENSITIVE COST CATEGORIES?**

3 A. Verizon has included the SCIS outputs by detailed cost category on Page 2 in
4 Subsection 5.9 in the Switching MOU cost study. These cost categories must be
5 assigned to the appropriate element. In making these determinations, an
6 engineering analysis helps understand the functions and capacities of the
7 equipment whose costs are being assigned, and an economic analysis helps ensure
8 conformance to long-run, forward-looking cost methodology that assigns costs
9 based on economic cost causation.

10 Some categories are obvious: Line Termination costs (analog and IDLC),
11 BRI and PRI costs (for ISDN line and trunks, respectively), and other ISDN-
12 related port costs are unequivocally assigned to ports.

13 **Q. WHAT ARE THE “EPHC” CATEGORIES AND WHERE DO THEY**
14 **BELONG?**

15 A. There are four EPHC categories in the 5ESS switch SCIS/MO outputs (two in the
16 non-ISDN investments and two in the ISDN investments) that also should be
17 assigned to ports and non-traffic sensitive costs. EPHC is an output category that
18 captures the common equipment in the switch module, which is the primary
19 building block component of the 5ESS switch’s distributed architecture. This
20 common equipment’s maximum port capacity is always reached before its call

1 processing capacity.⁸² Therefore, the cost driver is ports, and the EPHC costs
2 should be assigned to the ports.⁸³

3 **Q. WHAT SCIS COST OUTPUT CATEGORIES SHOULD BE ASSIGNED**
4 **TO THE PEAK PERIOD USAGE CATEGORIES?**

5 A. The Line CCS categories (ISDN and non-ISDN), the D Channel Access PPS, PPB
6 Channel Access PPS, and Inter-Switch PPS⁸⁴ and SS7 link costs should all be
7 assigned to the traffic sensitive category, because this equipment is engineered
8 and purchased based on peak period usage.⁸⁵

9 The trunk costs are separated and assigned to the common trunk MOU,
10 which is also peak period usage sensitive.⁸⁶

⁸² This can be seen in the Line Termination output reports from SCIS that will always show "Excess SM EPHC Capacity Inv." (subcategory of the "Part C" costs in the Line Termination Investment) assigned to every port because the port capacity of the switch module was reached before the usage capacities could be completely utilized. These excess capacity categories are labeled 'Part C' of the Line termination costs.

⁸³ AT&T/WorldCom's restated switch cost study has computed a port additive factor to assign the getting started and EPHC costs to the ports. The factor development can be seen in the Restated Workpapers, Section #5.9 EO Material Investment. The factor is then entered into V-Cost, using Verizon's port utilization inputs. This was done to avoid having to make algorithm changes to V-Cost.

⁸⁴ These categories reflect equipment engineered based on either voice busy hour minutes of use or ISDN data busy second packet usage.

⁸⁵ Please refer to Ms. Murray's Direct Testimony regarding the difficulties of developing pricing structures for peak period costs.

⁸⁶ Note that Verizon's analysis initially and temporarily assigns trunk ports to the non-usage costs in the cost study (see Subsection #5.9, page 2) to isolate the local switch usage costs to develop the switch MOU rate element. The trunk costs are subsequently isolated from the non-usage category and assigned appropriately in the Digital Trunk Port development that is then used to calculate the common trunk MOU cost.

1 **Q. HOW MUCH OF THE TOTAL SWITCH INVESTMENT IS TRAFFIC-**
2 **SENSITIVE?**

3 A. A very small percentage of the overall investment in current digital switch
4 technology is engineered based on peak period usage. The allocation of the SCIS
5 outputs to the traffic sensitive and non-traffic sensitive categories can be seen in
6 Attachment 5.⁸⁷

7 **Q. HOW DOES THIS RELATE TO THE MODIFIED SYNTHESIS MODEL**
8 **INPUT USED TO ALLOCATE SWITCH COSTS TO PORT AND MOU**
9 **RATE ELEMENTS WHEN THE FLAT-RATED PORT OPTION IS NOT**
10 **USED?**

11 A. The information in Attachment 5 described above can be used in the Modified
12 Synthesis Model to allocate switch costs to port and MOU rate elements.⁸⁸

13 **G. RIGHT-TO-USE FEES ARE UNSUBSTANTIATED AND SHOULD BE**
14 **REJECTED, AND THE RIGHT-TO-USE FEES ARE MISASSIGNED**
15 **TO THE USAGE SENSITIVE RATE ELEMENTS.**

16 **Q. HOW DID VERIZON DETERMINE THE COSTS OF RIGHT-TO-USE**
17 **(RTU) SOFTWARE?**

18 A. Verizon's right-to-use software cost is an allocation of an annualized software
19 expense for Verizon-East based on historical data for 1999 and 2000, plus
20 forecasts for 2001 and 2002.

⁸⁷ The percentage of Verizon's total switch investment that is peak period usage related, including trunks, is also identified in the Restated Workpapers Subsection 5.9 EO Material Inv. (electronic workpapers AT&T VA_Part C-8-1 Switch MOU Supp(1).xls.

⁸⁸ The 40% traffic sensitive input to the Synthesis Model referenced in Ms. Pitts' Direct Testimony was not implemented, and the FCC's default inputs were used. These estimates are superseded by the actual Verizon percentage data set forth in Attachment 5.

1 **Q. IS THE TOTAL FORECASTED RTU AMOUNT APPROPRIATE?**

2 A. It is difficult to determine if the RTU amount is appropriate, because Verizon did
3 not provide any supporting documentation for the high level estimates it used.

4 **Q. WHY DO YOU QUESTION THE VERIZON-EAST RTU FEE AMOUNTS?**

5 A. RTU fees can vary dramatically, as is illustrated by Verizon's own cost study
6 workpapers in this proceeding.⁸⁹ Verizon included 1999 data that appear to be
7 inconsistent with data from other years and much higher than its more recent
8 software expenditures and forecasts. The inclusion of this 1999 data seriously
9 inflated the annual estimate of costs. In the absence of Verizon's full explanation
10 of the significant spike in 1999 costs, those 1999 costs should be excluded from
11 the calculations.

12 **Q. SHOULD VERIZON'S CURRENT RTU EXPENDITURES BE USED TO**
13 **DETERMINE FORWARD-LOOKING RTU FEES IN A TELRIC STUDY?**

14 A. No. Verizon's embedded RTU expenditures can include software purchases
15 necessary to update older switches. As discussed previously, a TELRIC study
16 requires a completely new network to be built that would eliminate the need to
17 upgrade older generation switches that should not be reflected in a forward-
18 looking environment. A large spike in expenditures, such as Verizon's 1999
19 costs, could also be the result of a one-time only RTU purchase that provides

⁸⁹ See Verizon RTU Factor Study Part G-9, Sheet labeled "Workpaper 1_Pg1" showing expenditures for 1999 and 2000 and estimated expenditures for 2001 and 2002 in columns D-F. The 1999 expenditure is more than twice as high as any other year.

1 switch software functionality for the rest of the life of the switches, requiring a
2 longer time period to amortize than Verizon's assumption of four years.

3 **Q. WHAT CORRECTIONS DO YOU SUGGEST?**

4 A. The minimal amount of information provided by Verizon does not allow us to
5 make any in-depth review or recommendations.⁹⁰ If further information is
6 provided regarding these fees, AT&T/WorldCom may file Supplemental
7 Testimony. However, at a minimum, the RTU factor should be recalculated,
8 excluding the unusually high RTU fees in 1999. AT&T/WorldCom's restated
9 rates excluded the 1999 data and recomputed the RTU factor based on the three
10 other years of data provided by Verizon.⁹¹

11 **Q. HAS VERIZON ASSIGNED THE UNSUBSTANTIATED RTU COSTS TO**
12 **UNE RATES IN AN APPROPRIATE MANNER?**

13 A. No. Verizon has inappropriately assigned the RTU costs to the minute-of-use
14 UNE rate element when these costs should be assigned to the ports.

15 **Q. HOW DOES VERIZON INCUR RIGHT-TO-USE COSTS?**

16 A. Verizon typically pays RTU fees either on a per-switch or per port-basis, or as part
17 of a larger buy-out contract that could cover all of Verizon's switches.⁹² Buy-out

⁹⁰ See Verizon's response to AT&T's Data Request Number 9, Requests 7(c),(h),(i),(j).

⁹¹ Using three years of data is consistent with other areas of Verizon's study, such as the line growth data provided in response to AT&T Data Request 9-12. See Attachment 6 for the RTU factor recalculation.

⁹² Verizon confirmed that it negotiates fees for right-to-use licenses on a buyout basis in its response to AT&T Request Number 9, Request 44.

1 contracts allow an ILEC to purchase software for all (or sometimes a subset) of its
2 switches, rather than purchasing the software on a per-switch or per-line basis.
3 The implicit cost driver would be the total number of switches that the buy-out
4 covers.

5 **Q. ARE RTU FEES EVER PAID BASED ON MINUTES-OF-USE OR**
6 **CALLS?**

7 A. RTU fees are the same without regard to the number of calls or minutes of use of
8 a switch, and we have never seen RTU fees charged by the switch manufacturer
9 on a minute of use or call basis. Thus, even if Verizon could substantiate its
10 software costs, they should be allocated to the non-traffic sensitive switch port
11 rates, and not to the traffic sensitive minute-of-use rates.

12 **Q. WHY RECOVER RTU COSTS VIA THE PORTS?**

13 A. RTU costs are incurred primarily on a per-switch basis (or directly on a per-port
14 basis). Exhaustion of ports is the cost driver for the purchase of an additional
15 switch and the incurrence of additional RTU fees. Cost causation principles are
16 best served by allocating RTU fees to the ports in the same manner as the “getting
17 started” costs, and in the same manner that Verizon incurs its costs.

18 AT&T/WorldCom’s restated minute-of-use costs exclude the RTU fee and
19 assign a recomputed RTU fee to the port elements.⁹³

⁹³ The corrected Verizon RTU factor described above must be further recomputed because it is being applied to a different amount of switch investment (AT&T’s proposed non-traffic sensitive investment) than the amount in Verizon’s study. See Attachment 5 for this recomputation.

1 **H. SWITCH ENGINEERING AND INSTALLATION**
2 **FACTORS ARE OVERSTATED**

3 **Q. WHAT IS THE SWITCH EF&I FACTOR?**

4 A. The engineering, furnished and installed ("EF&I") factor is the loading factor used
5 to add items such as vendor engineering, Verizon engineering, vendor installation
6 and Verizon installation, and sales tax in order to convert the material-only cost of
7 a switch to a fully installed cost.

8 **Q. HOW DID VERIZON COMPUTE ITS EF&I FACTOR?**

9 A. Verizon used Verizon-East region-wide embedded data from its Detailed
10 Continuing Property Records (DCPR) to calculate its EF&I factor. The Verizon
11 EF&I factor was derived by comparing the material cost of the equipment to the
12 total installed cost of the equipment.

13 **Q. DOES VERIZON'S CALCULATION PRODUCE A REASONABLE EF&I**
14 **FACTOR?**

15 A. No. Verizon's EF&I factor is unreasonably high.

16 **Q. DOES VERIZON PROVIDE ANY JUSTIFICATION FOR ITS HIGH EF&I**
17 **COSTS?**

18 A. No. Verizon response to AT&T Data Request Number 9, Request 31 seeking
19 detailed DCPR data supporting Verizon's claimed EF&I factor provided only a
20 column called "installed investment" without any data that underlie the
21 installation costs. The integrity of the DCPR data is in question given the FCC's
22 December 1998, audit findings of Verizon's Continuing Property Records.

1 In the Massachusetts UNE proceeding, VZ-MA admitted that it always
2 performs its own engineering and installation and does not put such work out to
3 competitive bid.⁹⁴ As a result, marketplace competitive pressures that encourage
4 efficiencies are absent, and reliance on this data to calculate a forward-looking
5 TELRIC EF&I factor to be applied throughout the VZ-East region is inappropriate
6 unless Verizon demonstrates that the Verizon costs are competitive with the
7 marketplace. Verizon has not made this showing.⁹⁵

8 **Q. WHAT DO YOU PROPOSE IS THE REASONABLE FORWARD-**
9 **LOOKING VENDOR PORTION OF THE EF&I FACTOR?**

10 A. SCIS can compute the vendor engineering and installation portion of the
11 engineering and installation factor as it calculates both [1] material-only or [2]
12 vendor EF&I costs. AT&T/WorldCom used the EF&I data from the SCIS/MO
13 outputs to develop an appropriate vendor EF&I factor.⁹⁶

14 **Q. WHAT DOES AT&T/WORLDCOM PROPOSE AS A REASONABLE**
15 **FORWARD-LOOKING EF&I FACTOR TO BE USED AS THE INPUT TO**
16 **VCOST?**

17 A. Given the questions raised by Verizon's incomplete documentation and by the
18 FCC's audit of the underlying data that Verizon relies on to develop the EF&I

⁹⁴ See Verizon's response to AT&T's Request Number 3, Request 4 in the Massachusetts UNE proceeding DTE-01-20.

⁹⁵ EF&I Factors were provided by many companies in the FCC's 1992 Open Network Architecture filings. The average EF&I factor was 10%. In addition, an 8% EF&I factor was decided upon in the FCC's USF proceeding, *see* In the Matter of Federal-State Joint Board on Universal Service, CC Docket Nos. 96-45, 97-160, FCC 99-304 (rel. Nov. 2, 1999), at ¶307.

⁹⁶ See Attachment 2.

1 factor, use of an earlier Verizon factor is appropriate to determine the local
2 telephone company portion of the EF&I factor. Verizon used a .1080 factor in its
3 February 13, 1992 filing of additional cost information and workpapers in
4 response to the FCC's MOO DA 92-128 released January 31, 1992 (ONA Tariff
5 Order). AT&T/WorldCom used the EF&I data from the SCIS/MO outputs for the
6 vendor portion of the factor in conjunction with the Virginia sales tax and the
7 11% Verizon portion of the factor to develop a reasonable EF&I factor that is
8 approximately 60% of Verizon's claimed factor.

9 **I. RECIPROCAL COMPENSATION RATES SHOULD BE**
10 **CALCULATED USING UNE SWITCH RATES**

11 **Q. DOES VERIZON INCLUDE THE SAME SWITCHING COSTS IN THE**
12 **DEVELOPMENT OF RECIPROCAL COMPENSATION AND UNE**
13 **SWITCH RATES?**

14 **A.** In its response to data requests, Verizon admitted that the switch processing of
15 UNE traffic and reciprocal compensation traffic is the same.⁹⁷ Notwithstanding
16 this admission, Verizon has arbitrarily chosen not to include the substantial
17 "getting started" costs and RTU fees in the reciprocal compensation rates, even
18 though it included these same costs in its UNE usage rates.⁹⁸

⁹⁷ See Verizon's response to AT&T Data Request Number 9, Request 22: "On a strictly technical basis, the switch does not treat either type of terminating call differently. However, Verizon VA has allocated the costs differently."

⁹⁸ See Verizon's response to AT&T Data Request Number 9, Request 23.

1 **Q. HOW DOES VERIZON JUSTIFY ITS DECISION TO INCLUDE THESE**
2 **COSTS IN UNE SWITCH USAGE COSTS AND NOT IN RECIPROCAL**
3 **COMPENSATION COSTS?**

4 A. Verizon claims it is including only incremental costs of the *additional* traffic
5 associated with terminating other carriers' traffic. Verizon claims that reciprocal
6 compensation traffic does not cause a burden to processing capacity (or apparently
7 cause any increase to RTU fees), and as a result, Verizon excluded both "getting
8 started" costs and RTU fees from reciprocal compensation.⁹⁹

9 **Q. IS VERIZON'S EXPLANATION REASONABLE?**

10 A. No. The same argument that Verizon makes about reciprocal compensation also
11 applies to UNE traffic. Verizon is seeking to maximize its UNE revenues and
12 minimize the costs of reciprocal compensation that Verizon pays.

13 **Q. ARE THERE MODIFICATIONS YOU ARE RECOMMENDING TO**
14 **VERIZON'S STUDY THAT WILL VIRTUALLY ELIMINATE THIS**
15 **PROBLEM?**

16 A. Yes. As discussed above, the "getting started" cost of a switch and its RTU fee
17 should not be included in the traffic sensitive UNE elements but properly belong
18 in the non-traffic sensitive port elements. When this correction is made, the
19 argument about assignment of "getting started" costs and RTU fees to UNEs or
20 reciprocal compensation is moot because the costs are fully (and properly)
21 assigned to the ports.

⁹⁹ See Panel testimony at 204.

1 If, however, the Commission does not accept AT&T/WorldCom's
2 proposal to assign the "getting started" cost and the RTU fees to the ports, then
3 these costs must be fairly apportioned to all traffic, including reciprocal
4 compensation, and not just to UNE switch usage rates.¹⁰⁰

5 **J. SUMMARY AND CONCLUSION**

6 **Q. PLEASE SUMMARIZE THIS PORTION OF YOUR TESTIMONY**

7 A. Although severely limited by untimely responses and lack of data requested in
8 discovery, we have identified fundamental flaws in Verizon's switch cost study
9 that create severe overstatements in switch UNE elements. The flaws include use
10 of an incorrect short-run growth-only switch price for a long-run study, a flawed
11 methodology for developing discount inputs, understatement of port utilization
12 inputs, RTU fees and feature port additives based on questionable inputs (for
13 which Verizon has failed to provide appropriate supporting information), an EF&I
14 factor that is too high, misallocation of non-traffic sensitive port-related costs to
15 the local switch usage rate element, and use of inconsistent assumptions for UNE
16 and reciprocal compensation cost development.

17 **Q. PLEASE STATE YOUR CONCLUSIONS.**

18 A. Verizon's cost study is fatally flawed and should be rejected. If the Commission
19 does not accept the modified Synthesis Model sponsored by Mr. Pitkin and its
20 results as a foundation for switch UNE costs, then Verizon's study must be

¹⁰⁰ This correction needs to be made in both the end office switch and the tandem switch
(footnote continued)

1 corrected as described herein. AT&T/WorldCom's restated switch rates include
2 the corrections recommended in this testimony.

3 **V. TRANSPORT**

4 **A. INTRODUCTION AND PURPOSE OF TESTIMONY**

5 **Q. PLEASE DESCRIBE THE PURPOSE OF THIS PORTION OF THE**
6 **PANEL TESTIMONY AND PROVIDE A SUMMARY OF ITS**
7 **CONCLUSIONS.**

8 A. This testimony reviews Verizon's claimed interoffice transport and common (also
9 known as shared) transport costs as presented in Verizon's Direct Panel
10 Testimony. This testimony identifies and explains the errors that Verizon VA
11 made with regard to both and recalculates the interoffice transport and common
12 transport costs to correct these errors.

13 Verizon VA has significantly overstated its forward-looking economic
14 costs for dedicated interoffice transport and common transport. In particular,
15 Verizon VA made the following errors:

- 16 • For dedicated interoffice transport, Verizon VA made fundamental
17 methodological errors in its study. The most significant error is Verizon
18 VA's understatement of the capacity of the SONET rings used to provide
19 dedicated interoffice transport in its study, thereby significantly overstating
20 the costs for the circuits riding those SONET rings.

investments.

- 1 • Verizon VA’s cost study also improperly includes Digital Cross-connect
2 System (“DCS”) on most dedicated transport circuits even though the
3 competitive local exchange carrier (“CLEC”) may not want this element.
4 Consistent with the FCC’s Advanced Services Order and with the terms of
5 the Verizon VA/AT&T and Verizon VA/MCImetro interconnection
6 agreements, DCS should be treated as a separate unbundled element,
7 which a CLEC has the option to purchase based on cost and network
8 considerations.
- 9 • Verizon VA’s installation factor for transport equipment is significantly
10 higher than even Verizon’s own data demonstrates to be reasonable.
- 11 • Verizon VA has failed to provide rates for DS1 to DS0 and DS3 to DS1
12 multiplexing even though this network element is essential for dedicated
13 transport and is normally included in Verizon’s cost studies for interoffice
14 dedicated transport.
- 15 • Verizon VA has also significantly overstated the costs for common
16 transport. Verizon VA has based the cost for common transport on its
17 dedicated transport cost study. Thus, errors described in our testimony
18 relating to dedicated transport must also be corrected with regard to
19 common transport costs.