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VERIZON

COST METHODOLOGY AND COSTING PROCESS MANUAL FOR

ACCESS SERVICES

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

TABLE OF CONTENTS

| | Page |
|--|-------------|
| I. OVERVIEW OF COST STUDIES | 2 |
| A. Study Methodologies | 2 |
| B. Costing Tools..... | 3 |
| II. NETWORK DESCRIPTION | 3 |
| III. DEVELOPMENT OF FACTORS AND LOADINGS..... | 8 |
| A. Investment Loadings..... | 8 |
| 1. Engineer, Furnish & Install Loading Factors..... | 9 |
| 2. Power Loading Factor | 10 |
| B. Capital and Property Tax Factors..... | 11 |
| C. Annual Expense-Related Factors and Loadings..... | 12 |
| 1. Network Expense-to-Investment Factors..... | 12 |
| 2. RTU Expense-to-Investment Factor | 14 |
| 3. Marketing Loading..... | 15 |
| 4. Other Marketing Support Loading..... | 16 |
| 5. Common Overhead Loading..... | 17 |
| 6. Gross Revenue Loading..... | 17 |
| D. Adjustments to Expense-Related factors and Loadings..... | 18 |
| 1. Non-Recurring Expense Adjustments | 19 |

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

| | | |
|------------|---|-----------|
| 2. | Avoidance of Retail-Related Expenses | 19 |
| 3. | Normalization Adjustments | 20 |
| 4. | Product-Specific Expense Adjustments | 22 |
| 5. | Inflation/Productivity Considerations | 24 |
| 6. | Investment/Expense Forward-Looking Calibrations | 24 |
| 7. | Other Miscellaneous Adjustments | 25 |
| E. | Labor Rates | 26 |
| IV. | RECURRING COST STUDIES | 27 |
| A. | Switched Access | 27 |
| B. | Central Office and Tandem Switching | 29 |
| 1. | Definition and Assumptions | 29 |
| 2. | SCIS Model | 29 |
| 3. | Cost Modeling System (COSTMOD) | 31 |
| 4. | Development of Access Switching Costs | 32 |
| C. | Interoffice (IOF) Transport | 35 |
| 1. | Cost Methodology | 36 |
| 2. | Technology Assumptions | 37 |
| 3. | IOF Model | 38 |
| 4. | Development of Local Transport Costs for Switched Access | 40 |
| D. | Signaling Network | 41 |

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

| | | |
|----|---|-----------|
| 1. | Signaling Systems and Call-Related Databases | 41 |
| 2. | Signaling System 7 Model | 43 |
| E. | Loop Costs: Entrance Facilities..... | 45 |
| 1. | Basic Entrance Facilities | 45 |
| 2. | High Capacity Entrance Facilities..... | 53 |
| V. | NON-RECURRING COST STUDIES..... | 55 |
| A. | Definition and Assumptions..... | 55 |
| B. | NRC Study Methodology | 55 |
| C. | NRC Cost Model | 57 |

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

EXECUTIVE OVERVIEW

The purpose of this document is to provide the reader with a framework for understanding and evaluating the cost studies presented and sponsored by Verizon in regulatory proceedings seeking to establish the costs of Access Services provided to interexchange carriers (IXCs).¹ We briefly summarize here the methodology, the costing tools, and the network assumptions utilized in the preparation of Verizon's cost studies.

Verizon's studies are based on forward-looking assumptions about network technology. The specific plant characteristics assumed in Verizon's studies differ somewhat from jurisdiction to jurisdiction based on the location of the existing Verizon wire centers in those jurisdictions and the most efficient network design for serving customers in those jurisdictions. In all cases, however, the technology used reflects the most efficient technology being deployed in Verizon's network. This document provides background with respect to the relevant network technology in connection with Access Services.

¹ This manual is designed to provide a summary, high-level overview of Verizon's general costing methodology. It is not intended to be state-specific or to supplant any state-specific testimony. Any discrepancies between the manual and testimony filed in this or other proceedings should be resolved by referring to the state-specific testimony.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

I. OVERVIEW OF COST STUDIES

A. STUDY METHODOLOGIES

The costs of providing Access Services are divided into two general categories: recurring and non-recurring. Recurring costs are the ongoing costs associated with providing the service and are reflected in the monthly costs Verizon will charge the IXCs; non-recurring costs are one-time costs incurred by Verizon in connection with responding to an individual IXC's access order.

The methodology used to determine recurring access costs generally involves the following steps. Verizon first calculates the relevant material investments associated with each available unit of capacity in its forward-looking network design and then applies a utilization factor to those costs to develop the material investment per unit in service. Where appropriate, investment loading factors are then applied to account for the costs associated with the installation, engineering, and power for the relevant equipment or facilities. Verizon then applies annual cost factors and loadings to determine the forward-looking annual costs associated with the identified investment. These are divided by twelve to produce monthly recurring costs or divided by usage demand to calculate per minute costs.

In contrast, the non-recurring studies are designed to identify the specific activities involved in provisioning IXCs' access requests and estimate the labor costs involved in performing those activities, levelized over the planning period. Forward-

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

looking adjustments are made to take into account developments that should eliminate or reduce the need for (or time involved in) performing specific activities.

B. COSTING TOOLS

Verizon uses several different costing tools in its studies to analyze both the recurring and non-recurring forward-looking costs incurred in connection with each access service. While many of the studies use modeling tools that are specific to a service category (*e.g.*, Entrance Facilities or Switching), all access studies, both recurring and non-recurring, are developed completely or partially using VzCost, Verizon's new on-line costing system. VzCost is a modular, template-driven system that contains Investment, Expense and Cost Study modules. At the present time, the cost study flow generally works as follows: For recurring studies, unit material investment is developed using either VzCost or one of several self-contained modeling tools. For non-recurring studies, labor costs are developed using VzCost. At the same time, investment loading factors and several of the annual cost factors are developed outside of VzCost and imported into the system for use in cost studies, while most expense-related annual cost factors are developed within VzCost. Finally, using either system-generated or imported data, VzCost performs the investment loading (for recurring studies) and cost factor application (for recurring and non-recurring studies) portions of the cost studies.

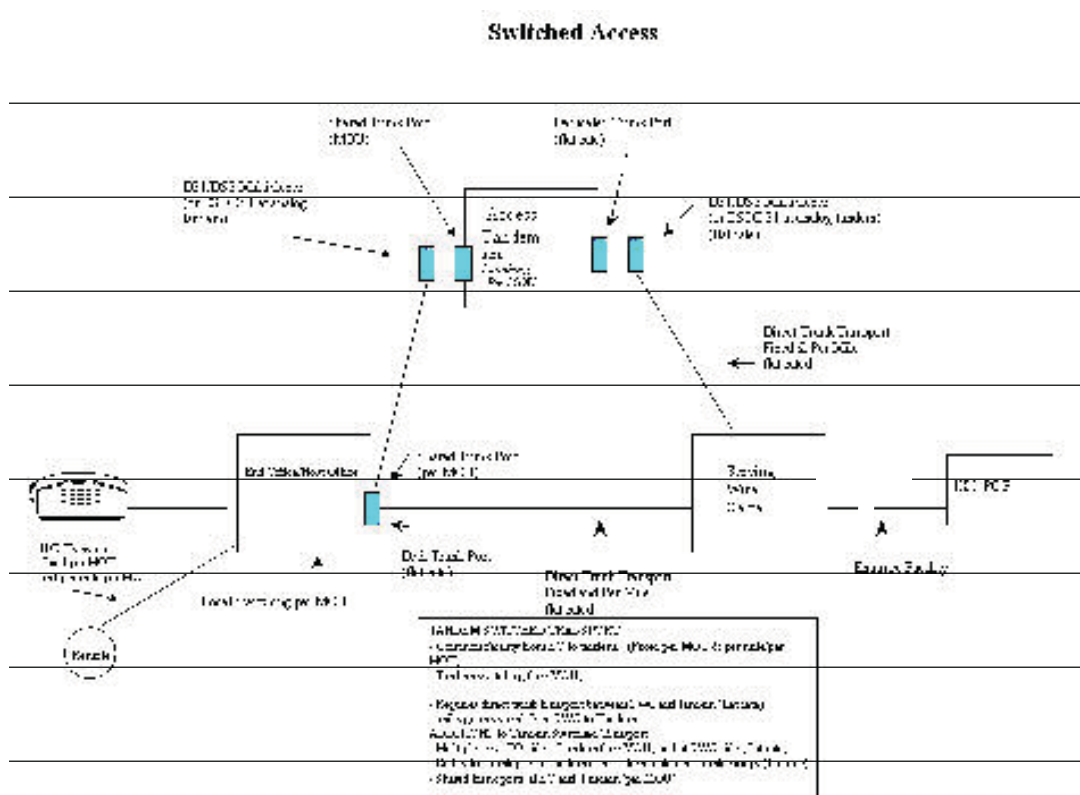
II. NETWORK DESCRIPTION

Verizon's network is composed of a complex array of technologies and systems that inter-operate to provide telecommunications services. The network is

**VERIZON
 COST METHODOLOGY AND COSTING PROCESS MANUAL
 FOR ACCESS SERVICES**

best understood when the plant is subdivided into its major functional components: local switching facilities, interconnection facilities that interconnect Verizon's wire centers with each other and with the networks of other carriers, and local loop facilities.

The diagram below depicts the overall architecture of the voice telephony network, in terms of Access Services.



While the specific technological assumptions that Verizon makes for its studies are addressed in detail in its testimony, the following discussion provides a general description of the network components and technology in Verizon's network

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

that are assumed for purposes of the studies. In all cases, Verizon assumes rational deployment of the most efficient technology existing in its network today, taking into account the location of existing wire centers. Accordingly, the cost studies assume that the forward-looking network would include the following:

Digital switching. Digital switching is the most efficient available technology for providing both local and tandem switching functions in a circuit-switched telephone network. Both incumbent LECs and competitive service providers employ these systems across the entire industry.

DS0 channelization in Interoffice Facility (IOF) transport systems.

Because digital switches operate on Digital Signal 0 (DS0) Level channels, digital transmission systems with inherent DS0 channelization are naturally the most efficient options for transport between these switches. High-capacity fiber optic systems employing the SONET digital channelizing and multiplexing hierarchy are standard throughout the industry. These systems provide cost-effective direct digital interfaces that deliver DS0 channels to digital trunk switch ports. All the transport elements considered in the studies are built with SONET technology.

DS0 is a unit of digital signal (64 Kbs) that provides an information-carrying channel within a digital facility. In general, a DS0 channel provides sufficient digital signal to carry one standard voice grade signal with a 3Khz bandwidth. Higher capacity digital signals such as “DS1s” and “DS3s” can be constructed by grouping together (multiplexing) lower-capacity signals (a DS1 channel can carry 24 DS0 channels, a DS3 channel can carry 28 DS1 channels). This is called the

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

“channelized” format of these signals. The same signal rates can be structured in an unchannelized format that provides access to the whole digital signal capacity for a single high-speed data pipe.

Loop Facilities. In general, local loops connect end user subscribers to a digital switch in a Verizon central office, to other equipment if it is a non-switched loop, or to a carrier’s facilities. Entrance facility loops connect interexchange carriers’ points of presence (POPs) to Verizon’s serving wire centers (SWCs). Entrance facilities are offered at signaling rates of DS0, DS1, DS3, STS-1, OC3 and OC12. A combination of copper and fiber facilities is used to provision lower speed entrance facilities while SONET over fiber plant is used for the higher speed systems.

Signaling System 7 (SS7). Digital switches in the circuit-switched network are controlled by software-driven processors. These processors interpret customer-dialing information and create the proper connections between lines and trunks in order to establish the desired call path. When more than one switch is involved in a call, those switches must exchange control information between them in a process called “signaling.” In modern telecommunications networks, a technology called SS7 is employed to provide these functions. All of the signaling and control elements for which Verizon has developed costs are built using SS7 technology and related Advanced Intelligent Network Database Systems.

Central office configuration. The service area of an incumbent LEC (ILEC) such as Verizon is divided into areas called “wire centers.” The physical geography

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

and the number of customers covered by wire centers can vary widely. In a dense urban area, a wire center may be a few square miles and serve 100,000 or more customer lines. Rural wire centers might cover tens of square miles and might serve only several thousand customers or fewer. Many factors have influenced the selection of the existing wire center boundaries, including political jurisdictions, topography, and engineering economy. The forward-looking network assumed in Verizon's studies is based on the existing wire center topography.

Outside plant construction types. Fiber and copper cables provide the loop access facilities from the central office (CO) to the customer, and similar fiber optic cables provide the interoffice transport facilities between COs. The studies assume the most efficient forward-looking mix of copper and fiber cables in the network.

Three major types of physical construction are used for these cables: underground, buried and aerial. A significant portion of the feeder and interoffice cable is typically routed underground through structures called conduit systems. In urban environments, distribution cable may be placed in conduit as well. Conduit systems typically consist of arrays of plastic tubes called ducts, usually four inches in inside diameter. Conduit arrays include underground chambers commonly called "manholes" that are used to house cable splices and some transmission equipment and to facilitate branching in the underground cable run. Conduit systems are most often constructed along or under major roadways.

Some cable is directly buried in trenches. Special armored cable must be used in buried applications, increasing the relative material cost of the system. The

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

cost of buried installation is highly dependent on the terrain, soil characteristics, and availability of rights-of-way for the trenching.

The third method is aerial installation, in which cable is deployed by Verizon on poles and along the walls of buildings. This method is used to support distribution cable as well as feeder and IOF cable. Several pole sizes are employed, depending on the location and size of cables that must be supported. Large street-side poles are often shared with the power company and/or cable television company.

III. DEVELOPMENT OF FACTORS AND LOADINGS

Factors and loadings are utilized by Verizon to estimate costs that are required to provide access services. They are based upon a relationship that is developed from forward-looking economic data. The discussion on factors and loadings has been divided into the following sections: (A) investment loadings; (B) capital-related annual cost factors; (C) expense-related factors and loadings; (D) adjustments to expense-related factors and loadings; and (E) labor rates.

A. INVESTMENT LOADINGS

All investments used in Verizon's cost studies reflect the cost of the material investment, the cost to install the investment, and the cost of necessary support power equipment. Together, these costs are sometimes called the total cost installed, or "TCI." Verizon uses investment loading factors to translate the material-only price of an asset ("material-only investment") into the TCI for that asset.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

Specifically, Verizon has developed the Engineer, Furnish & Install (EF&I) and the Power loading factors to calculate the TCI for assets in digital switching, digital circuit, operator systems and originating/terminating plant accounts.

1. Engineer, Furnish & Install Loading Factors

The EF&I Factors translate material-only investment into installed investment by accounting for items such as vendor engineering, Verizon engineering, transportation, warehousing, hoisting, vendor installation, Verizon installation (including acceptance testing or other plant labor), and interest during construction. The factors represent the relationship between these items and base year material-only investment.

EF&I Factors are developed for digital switching, digital circuit, operator systems and originating/terminating equipment. The factors are developed using data contained within the Company's Detailed Continuing Property Record (DCPR) and Central Office Equipment Property (COEP) databases. To calculate the factor for each plant account, the value of the total installed investment for equipment placed in calendar years 1999 and 2000 is divided by the value of the total material-only investment for the same equipment in the same years. Company-wide data covering a two-year period is used for each plant account in order to minimize anomalies that might be present in a specific market or in a specific year with respect to a particular piece of equipment.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

Although equipment costs from the years 1999 and 2000 are used in the EF&I calculations, the factors are appropriately used in forward-looking studies as the data from 1999 and 2000 are used as the basis for estimating the *relationship* of installed investment to material-only investment. Moreover, the technology used to engineer and install equipment has not undergone any significant changes since 1999 and 2000, nor are any significant changes anticipated in the foreseeable future.

2. Power Loading Factor

The Power Factor represents the relationship between the investment in power equipment necessary to run installed central office equipment and facilities and the installed investment in the equipment itself. One factor is used for central office digital switch, digital circuit, and operator systems investment. Data from the DCPR and COEP databases are used to calculate the factor. To calculate the factor, the value of installed central office power equipment placed in calendar years 1999 and 2000 is divided by the value of installed central office equipment placed in 1999 and 2000. Power investments associated with collocation are removed from the factor so that collocation-specific power costs are not included in the cost of other services. As with the EF&I Factors, the Power Factor is also developed using regional data covering a two-year period in order to minimize anomalies that might be present in a specific market or in a specific year with respect to a particular piece of equipment.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

B. CAPITAL AND PROPERTY TAX FACTORS

Verizon uses Capital and Property Tax Factors to calculate capital-related costs for investment used in cost studies. The Capital and Property Tax Factors are based on the following components: book depreciation; deferred taxes; return to debt; return to equity; income tax; and property tax.

Book depreciation is straight-line depreciation as defined by Generally Accepted Accounting Principles (GAAP). The initial investment minus the book depreciation and the deferred taxes becomes the investor supplied capital, or the amount that Verizon needs to obtain from debtors and/or from stockholders for that year. Based on the cost of money, the debtors and stockholders demand a return on their investment. The amount returned to stockholders (equity) is taxable as Corporate Federal and State Income Tax. The capital cost calculation is done for each year of the asset life and the results are summed and annualized to become the depreciation, return, and income tax costs that determine capital factors. The Corporate Tax Department provides Verizon with the applicable Property Tax, for each plant account, which is added to the above capital factors to become the Total Capital & Property Tax Factor for a particular plant account. This factor is multiplied against investment in a particular account to yield the capital cost for those investments on an annual basis.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

C. ANNUAL EXPENSE-RELATED FACTORS AND LOADINGS

Annual expense factors and loadings are used to translate TCI into recurring annual costs for access services; two of the loadings are also used to develop the final non-recurring costs for the identified labor expenses related to the provisioning of access services. Annual expense factors and loadings are developed as ratios that represent relationships between a subset of costs and (1) their associated plant account investments, (2) relevant expenses, or (3) associated revenues.

In the case of network-related expense-to-investment (E/I) factors, costs that are incurred for specific plant accounts are directly attributed only to investments in those accounts, while costs that are not specific to a plant account are spread proportionally across all affected revenue-producing plant accounts. In expense-to-expense (E/E) loadings -- the Marketing Loading, Other Marketing Support Loading, and the Common Overhead Loading -- expenses are spread proportionally over all relevant expenses. Similarly, the calculations for the expense-to-revenue (E/R) loading -- the Gross Revenue Loading -- spread revenue-driven expenses over revenues that are associated with those expenses. This approach ensures that forward-looking cost calculations for each service reflect cost-causative principles to the greatest extent possible and that non-account-specific costs are reflected in the costs of the various services in reasonable proportions.

1. Network Expense-to-Investment Factors

Network Expense-to-Investment Factors are used in recurring cost studies. They are developed in VzCost using a cost pool methodology. The cost pool

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

Methodology develops forward-looking expenses for each network equipment type and divides them by the corresponding forward-looking investments for the same network equipment type to calculate E/I factors. These Network E/I Factors include the costs of network repairs, maintenance, testing, moves and rearrangements, engineering, network administration, methods and support. The factors are applied to TCI to develop recurring annual network costs.

In developing the Network Expense Factors, Verizon begins with the General Ledger annual expense and investment data, by account, for the jurisdiction under study. In addition to the General Ledger expense data, capital carrying costs (*i.e.*, depreciation, return, income tax, and property tax) associated with general support facilities (*e.g.*, land, buildings, general purpose computers, and vehicles) are calculated and considered as expense in the development of the E/I ratios. Next, the expense, carrying cost, and investment data are adjusted to make them appropriate for use in forward-looking recurring cost studies. Adjustments to expense and investment are discussed in detail below in section D, Adjustments to Expense-Related Factors and Loadings.

The next step in the Network Factor development is to map the forward-looking expense and investment data to cost pools. Verizon has established network-related, line of business-related, and common cost pools to be used in the development of factors and loadings in order to assign costs to services in a cost-causative manner. Each network cost pool is based on a different type of network investment, such as aerial copper, buried fiber, switch, or transmission. Data that

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

have been assigned to network cost pools are used to calculate the Network E/I Factors. Data that have been assigned to line of business cost pools (*i.e.*, Consumer, Enterprise, and Carrier/CLEC) and to the common cost pool are used to calculate the E/E loadings (discussed below). The adjusted expense and investment account data are mapped to cost pools based on functionality. When a one-to-one mapping between account and cost pool does not exist, special studies are used to map the data to several cost pools.

Finally, the forward-looking operating and general support expenses assigned to each of the network equipment cost pools are totaled and then divided by the corresponding forward-looking investment to develop the Network Expense-to-Investment Factor.

2. RTU Expense-to-Investment Factor

RTU fees are the software costs that equipment manufacturers charge Verizon for the operation of and/or feature functionality associated with their equipment. In 1998 the American Institute of Certified Public Accountants (AICPA) issued Statement of Position (SOP) 98-1, which recommended changes in the requirements for capitalization of software. Prior to SOP 98-1, only RTU fees associated with the initial purchase of the switch and certain software that added new functionality to an existing switch or other network-related equipment were capitalized; all other RTU costs associated with adding software to an existing switch or network-related equipment were treated as expense. Based on SOP 98-1, since January 1999, Verizon capitalizes *all* switch and other network-related

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

software costs and books them to the Intangible Asset Account 2690, with the limited exception of software costs that are incurred specifically to fix a bug in previously installed software.

To reflect these accounting rule changes, Verizon has developed an RTU E/I Factor. This factor is developed outside of VzCost, and is loaded into a data table within the system for use in VzCost-generated recurring cost studies. This factor is based on the ratio of annual RTU software costs to total investment associated with either switching or digital circuit equipment. The software costs are calculated as an amortization over the life of such software, based on actual expenditures over a planning cycle. The RTU factor is applied to appropriate investments throughout the cost studies. Collocation investments are adjusted out of the factor's investment denominator, as the factor is not used in collocation studies.

3. Marketing Loading

The Marketing E/E Loading includes the cost of product management, sales, customer services, and product advertising. Like the Network E/I Factors, the Marketing E/E Loading is developed in VzCost using the cost pool methodology. As with the Network Factors, the expenses are adjusted to make them appropriate for use in forward-looking wholesale access studies before they are used in the calculation of the E/E loading. The Marketing Loading is calculated by taking the total forward-looking costs of wholesale product management, sales, customer services, and product advertising that have been assigned to the Carrier/CLEC cost pool and dividing them by total company expenses, less non-recurring (NRC),

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

marketing, other marketing support, and common expenses. NRC expenses are excluded from the denominator because the Marketing Loading is applied to recurring costs only – it is not used in NRC studies. Marketing, other marketing support and common costs are excluded because at the point in the cost studies where the Marketing Loading is applied, these costs have not yet been calculated.

4. Other Marketing Support Loading

The Other Marketing Support E/E Loading includes the costs of shared land and buildings, information management, furniture, office equipment and other support equipment costs associated with wholesale product management, sales, customer services, and product advertising. The loading is developed in VzCost using the cost pool methodology. Expenses are adjusted to make them appropriate for use in forward-looking wholesale access studies before they are used in the calculation of the E/E loading. The Other Marketing Support Loading is calculated by taking the costs of shared land and buildings, information management, furniture, office equipment and other support equipment costs associated with wholesale product management, sales, customer services, and product advertising, and dividing them by the total of all company expenses, less NRC, other marketing support, and common expenses. NRC expenses are excluded from the denominator because the Other Marketing Support Loading is applied to recurring costs only. Other marketing support and common costs are excluded because the recurring costs to which the Other Marketing Support Loading is applied do not yet include these costs. The Other Marketing Support Loading is applied to recurring costs, including

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

wholesale marketing costs that were developed through the application of the Marketing Loading.

5. Common Overhead Loading

The Common Overhead (COH) Loading includes expenses incurred in connection with General and Administration (G&A) functions, including executive, planning, general accounting and finance, external relations, human resources, legal, regulatory and any associated General Support Facility costs.

The COH Loading is calculated in VzCost, using adjusted, forward-looking expenses. The COH loading represents the ratio of common overhead expenses to total company expenses less common overhead expenses. The Common Overhead Loading is applied to recurring costs, including wholesale marketing, other marketing support costs, and to NRC costs. It is not applied to common costs, thus these costs are excluded from the denominator. In this manner, the common overhead expenses are appropriately assigned to all categories of services including non-recurring.

6. Gross Revenue Loading

The Gross Revenue Loading (GRL) is developed to account for revenue-driven expenses such as regulatory assessments, uncollectibles, and gross receipts tax. These expenses are associated with the level of revenue that Verizon actually receives. The GRL is developed outside of VzCost and loaded into a data table for use in VzCost-generated cost studies. The GRL is made up of three jurisdiction-specific components. The regulatory assessment component is calculated by

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

dividing regulatory commission assessments by total revenue. The uncollectibles component is calculated by dividing wholesale IXC uncollectibles by wholesale access revenue. Where applicable, a gross receipts tax component of the GRL is applied to individual services, based on a state's specific tax codes. The gross receipts tax component is based on the state's statutory tax rate. All of the applicable Gross Revenue Loading components are applied, via a gross-up formula, to total unit costs.

D. ADJUSTMENTS TO EXPENSE-RELATED FACTORS AND LOADINGS

Expense-related factors and loadings are created using annual expense, investment, and revenue data for the most recent year available. This data is called "base-year" financial data. To make the factors and loadings forward-looking and appropriate for use in cost studies, many adjustments are made to the base-year expense and investment data before they are used in the ratios. These adjustments are categorized as follows: (1) non-recurring expense adjustment; (2) avoidance of retail-related costs; (3) normalization and process improvement changes; (4) product-specific adjustments; (5) inflation/productivity adjustments; (6) denominator-specific forward-looking calibration adjustment; and (7) other miscellaneous adjustments. These adjustments, calculated using spreadsheets outside of VzCost, are developed as a percentage of the base-year expense or investment account affected. The percentage is then entered into a data table in VzCost, and applied against the base-

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

year expense or investment account during the VzCost expense factor run. Factors and loadings are then calculated using adjusted, forward-looking expense and investment data.

1. Non-Recurring Expense Adjustments

With the exception of the Common Overhead and the Gross Revenue Loading, the expense-related factors and loadings are developed for use in *recurring* product studies. Therefore, expense accounts used in the factors that capture the cost of both recurring and non-recurring work need to be adjusted to remove the portion of costs associated with non-recurring service order work. Different accounting systems exist currently for *fBA* and *fGTE*, therefore this adjustment is calculated a little differently for the two study areas. However, both adjustments attain the removal of costs associated with non-recurring work from the recurring expense factors.

2. Avoidance of Retail-Related Expenses

Direct retail costs (*i.e.*, customer-facing costs) are excluded from factors and loadings used in wholesale access studies. These costs are excluded via the application of a retail avoided cost percentage. This avoided cost percentage is determined on the basis of an examination of affected expense accounts using any study data available [*e.g.*, head-counts, accounting detail, functional data, work center data, Line of Business (LOB) data]. For each expense category, Verizon determines which, if any, particular expenses are avoided when providing service on a wholesale basis (the forward-looking network) rather than on a retail basis.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

3. Normalization Adjustments

Normalization adjustments are applied to make the base-year expenses used in the factors more representative of future expenses. For example, recovery costs associated with the 9/11 disaster are not an ongoing expense that Verizon will incur in future years. Therefore, base year 2001 or 2002 factors (factors that are calculated using 2001 or 2002 expense data as the starting point) are adjusted to remove any extraordinary expenses booked to any account for the 9/11 disaster recovery efforts. Expenses incurred due to natural disasters, like a hurricanes, ice storms, or tornados in a particular state or area, would similarly be deducted from base-year expense.

Other examples of normalization adjustments are:

- Merger Savings Adjustments: the forward-looking savings VZ expects due to the Bell Atlantic – GTE merger.
- Merger Cost Adjustments: any one-time costs paid and booked in the base year for the merger effort.
- Qualified Pension Fund credits: the extraordinary payments to/from the pension fund that should not be credited to expenses since these offsets are not guaranteed in future years.
- Inter-company carrying costs: Verizon Services (VS) Companies are regulated, wholly owned separate subsidiaries of the operating telephone companies (OTCs). Some support investments are retained on the VS Companies' books. These investments are used by the OTCs, hence, it is appropriate to calculate the forward-looking depreciation, return and

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

income/property tax associated with these investments as a cost of doing business. Investment in these retained accounts is assigned to the jurisdictions based on amounts of Inter-Company Depreciation/Tax Expense that is charged to the states in the VZ accounting process. When this investment allocation is made, a compatible expense adjustment is also implemented to remove the inter-company carrying costs that have been transferred from the VS Companies' books to the OTC's books in the accounting process. In this way, VZ is assured that carrying costs are not double-counted in factor development.

- VZ makes adjustments for the revenues received from other utilities for pole attachments and conduit rentals. The revenue offsets Verizon's cost for the portion of its pole and conduit that it rents out to other companies.
- Expenses related to time & material, customer-provided equipment and premises inside wire are normalized out of account 6362 (Other Terminal Expense). These expenses have no relationship to the investments in account 2362 (the factor denominator), which includes only company-owned equipment. Moreover, products associated with these activities have their own revenue streams (T&M Rates, Special Pricing Arrangements and Wire Maintenance Plans) that offset these expenses, therefore the costs of these products should not be recovered by other products or services.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

- Normalization adjustments are also made for "process improvements". If it is known that a major process improvement (such as a new system that will streamline work, or a new technology that will increase efficiency) will be implemented over the planning period, the affected expense accounts are adjusted.
- Finally, normalization considerations are also made for the investments (or denominators) used in developing factors. As with the expense accounts, each investment account is reviewed for any anomalies that may have occurred in a given year or in a given account. For example, many states use the two major data centers in VZ-East to bill customers, process payroll, run computer operations, etc. However, while the expenses associated with these two data centers are spread among all states that use them, the investments are located on the books of only the two states in which the data centers reside. When developing an expense-to-investment factor for the computer account, Verizon guarantees that these anomalies, jurisdiction to jurisdiction, are smoothed out by redistributing investment to all jurisdictions evenly based on the expenses incurred by each state.

4. Product-Specific Expense Adjustments

Many expense accounts, such as cable, switching, and other outside plant, are associated 100% with products. Other expense accounts are **not** 100% product driven – they play a part in product delivery *and* in providing support to all products,

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

services, and staff groups. These accounts include Computers (6124), Software Development (2690), Customer Services (6623) and Database Management (6724). In lieu of using expense factors and loadings, certain product cost studies use expense additives to cover the cost of activities booked to these dual-role expense accounts (revenue-producing and support). When this happens, the factors need to be adjusted to remove the value of the expense additives. The adjustment is implemented by surveying all product cost analysts for product-specific costs that they include in their product studies that are not developed by using expense factors or loadings. Sometimes these product studies use only product-specific capital costs (i.e., investments), sometimes they use investment costs *and* ongoing expenses (e.g., collocation), and at other times they only use expenses (e.g., customer care or advertising). An adjustment to the expenses used in the factors and loadings is implemented by applying a ratio of the appropriate product-specific costs to the affected expense accounts. This ensures that other product studies do not include these same expenses when using factors and loadings. In the simplest of terms, Verizon adjusts any costs in these support expense accounts before developing a factor to ensure there is no double-recovery of said expenses in product-specific rates. Collocation expense and investment adjustments for Land & Building accounts fall into the product-specific category, however, it should be noted that the Collocation adjustment is labeled separately in VzCost due to the scrutiny afforded to Collocation products in the past.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

5. Inflation/Productivity Considerations

Verizon's analysis of inflation and labor productivity is based on the trends that are observable for items such as negotiated unionized labor increases. Productivity and inflation are applied to the appropriate network, marketing, and other marketing support, and common expenses to account for anticipated changes in these costs over the study period.

6. Investment/Expense Forward-Looking Calibrations

Since factors and loadings are based on forward-looking (FL) expense numerators (after appropriate FL adjustments), the denominators – investments and total company expenses – must also be made forward-looking in order for the factors/loadings to represent true relationships. For expense to investment factors, a Forward Looking Calibration (FLC) factor is developed to calibrate the investment denominator to adjust for the imbalance caused when an expense factor is applied to a discounted forward-looking investment level. The FLC is developed as a ratio of total FL investments used in the cost studies to total booked investments. The FLC is then applied in VzCost to convert base-year investments to FL investments before using them in the denominators of the network expense factors.

In the case of expense loadings, VzCost calibrates the total company booked expenses "naturally" by summing the FL adjusted expenses calculated in the model. The total FL adjusted expenses are then used in the E/E denominators. That is, since all expenses are adjusted and made forward-looking in the model as a matter of

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

course, the denominator is the sum of the FL adjusted expenses and needs no further adjustment.

In the case of the revenue loading (or GRL), the relationship is not based on forward-looking projections. It is a "point in time" ratio; that is, it is developed as a representation of what actually happened over a given period, and is used as an estimate of what will likely happen. No adjustments are made. Since the expenses in the GRL are taxes, assessments and uncollectibles, there is no mathematical way to forecast how these costs will change. Therefore, Verizon assumes that what was evident during the base year will happen throughout the planning period.

7. Other Miscellaneous Adjustments

VzCost methodology allows for an Account Elimination (for Expenses) or Technology Adjustment (for investments). Verizon may eliminate a total expense or investment account because the technology is obsolete or non-applicable in a specific type of cost study. For example, deployment of analog switching is not an option in modeling a FL network, thus this account is eliminated from expense factor/loading development. It is eliminated in both the expense and investment assumptions.

An adjustment is also made for any expense or investment that is studied on an Activity-Based Costing (ABC) basis and included in cost studies outside the normal expense factors and loadings. For example, directory-listing costs are developed in fGTE jurisdictions for each dial-tone line and loop based on an ABC study; therefore, VZ ensures there is no double-count of directory expenses by eliminating the costs used in the directory study from the costs used in factor

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

development. Note that in *f*BA jurisdictions, this is a non-issue because *f*BA accounting separates Directory Services from the OTC books and includes them in non-regulated affiliate costs.

Finally, while modeling total company investment for factor/loading development there is a need to designate investment accounts as either support investment or revenue-producing investment. Support-like investments include (but are not limited to) furniture, office equipment, and motor vehicles; while revenue-producing investments are those directly recovered in product rates (e.g., switching, outside plant, and transmission investments). While this does not fall into the adjustment category, *per se*, the percent to Support and percent to Revenue-Producing per account can be found on the Investment Adjustment data table in VzCost.

The explanation and examples that have been set forth here should not be construed as the *only* adjustments made to expenses and investments; they are representative of the many kinds of adjustments that are made within the factor and loading development model.

E. LABOR RATES

Directly Assigned Labor Rates are used in non-recurring cost studies. They include the average wage and salary costs of the occupational workforce for the activities associated with the performance of their jobs and the administrative and support expenses associated with those jobs. Information is obtained using data

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

extracted from the financial records of the Company and from labor contracts. Major inputs consist of evaluated labor transactions defined by job function codes, labor groups, or job classes. Labor loadings include basic wage and salary costs for direct clerical and supervisory support personnel, and those additional cost causative loadings, such as overtime premium, paid absence, benefits, training, motor vehicles, tools, office supplies and other employee related expenses assigned to the direct wages of the basic rates being developed.

Labor rates are calculated from the most recent actual data available at the time of development and are trended forward using projected annual salary increases and negotiated changes in labor contracts. The rates are then levelized over the study planning period.

IV. RECURRING COST STUDIES

A. SWITCHED ACCESS

Switched Access Service, which is available to interexchange carriers for their use in furnishing their services to end users, provides a two-point electrical communications path between a carrier's premises or a collocated interconnection location, and an end user's premises. It provides for the use of common terminating, switching and trunking facilities, and common subscriber plant of the Local Exchange Carrier, as well as dedicated trunking and switch ports that may be purchased by the IXC. Switched Access Service provides for the ability to originate

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

calls from an end user's premises to a carrier's premises, or a collocated interconnection location, and to terminate calls from a carrier's premises or interconnection location to an end user's premises in the LATA where it is provided.

Switched Access Service is provided in four service categories of standard and optional features called Feature Groups, and also in shared and dedicated end office trunk ports, dedicated tandem trunk ports, tandem switching, local (shared) transport, dedicated transport, entrance facilities, and Automatic Number Identification (ANI). The provision of each Feature Group requires Local Switching and Transport facilities and the appropriate Local Switching functions. These Feature Groups are differentiated by their technical characteristics, e.g., line side vs. trunk side connection at the LEC entry switch, and the manner in which an end user accesses the Feature Groups in originating calling, e.g., with or without an access code. End office trunk ports allow the IXC to originate or terminate traffic at a given switch. They are available on a minute-of-use basis for smaller carriers, or a dedicated basis if the carrier feels the level of traffic will support it. The tandem switching option is available for those cases in which the carrier does not wish to purchase dedicated direct trunking, and no direct common trunks exist between a particular end office and the carrier's point of termination. The options for transport are either common transport, over Verizon routes, or dedicated direct transport over trunk groups installed for the carrier. Entrance facilities are put in place for entrance into the carrier's network at their point of termination from the Serving Wire Center. ANI causes seven or ten digits and information digits to be transmitted across the

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

network to identify the calling party's station. ANI is included as a part of Feature Group D Local Switching, and is also available as a standalone service.

B. CENTRAL OFFICE AND TANDEM SWITCHING

1. Definition and Assumptions

The Switching Cost Information System (SCIS) model, developed by Telcordia Technologies, estimates required investments in central office and tandem switching. These investments are used in developing the costs for the Feature Groups, trunk ports, ANI and tandem switching. The switching discounts that are used as an input to SCIS are based upon the discount that Verizon can actually receive when deploying switching equipment in the foreseeable future under its current vendor contracts. The discount is applied to the list price of the items in determining the appropriate investments.

The forward-looking end-office switch construct is based on digital switching with a strategic mix of technologies. The lines are assumed to be provisioned with equipment consistent with the forward-looking construct, including analog line units for copper or universal DLC loops and digital terminations for integrated DLC loops. The switching studies assume current wire center (and, therefore, switch host/remote) locations.

2. SCIS Model

The Switching Cost Information System (SCIS) model estimates the required investments for switching. The investment estimates are based upon (1) statistics concerning the number of access lines and trunks served by a switch and (2) traffic

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

characteristics, including average busy hour CCS (hundred call seconds) per line and trunk. The total investment calculated by SCIS is based upon investment tables that reflect national vendor price lists.

In addition to developing total investments, SCIS calculates a standard set of basic switching investment primitives for each office or remote (each called a NODE) needed to determine switching investments. These basic switching investment primitives are available for each NODE, for a group of NODES, for a geographic area, or for all switches in a specific jurisdiction. These investments may be weighted together to provide results consolidated by technology. When results are required for more than one switch in an area, a study is defined and offices are assigned to that study. Study calculations are then initiated to weight the previously determined results (NODE level results). Forward-looking discounts for each switch vendor and investment loadings are applied to the SCIS identified investments to develop total in-place switching investments.

SCIS is a PC-based system that contains two modules, SCIS/Model Office (SCIS/MO) and SCIS/Intelligent Network (SCIS/IN). SCIS/MO is the module that develops switching investments for model offices and SCIS/IN develops incremental investments associated with vertical switch features. SCIS output investments can be transmitted to other models and also into different studies where necessary. For example, the SCIS/MO results can be transferred into SCIS/IN electronically to determine feature-related incremental investments. Detailed results are readily available through a variety of output reports and formats.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

3. Cost Modeling System (COSTMOD)

The Cost Modeling System (COSTMOD) is a PC-based software program developed by Verizon that estimates material investments for GTD-5 EAX host switches and remote switching units. The investment estimates are based on inputs such as the number of access lines and trunks served as well as inputs on traffic characteristics such as busy hour CCS per line and trunk. The investment calculated by COSTMOD is based upon investment tables that reflect the vendor price list.

COSTMOD is composed of two cost modules: GTD-5 EAX Switching Cost Module and the Vertical Services Application or Features Cost Module. The GTD5 EAX Switching Cost Module enables the user to develop switch unit investments for major categories based upon individual switch inputs and defaults. The unit investment of the major GTD-5 switch hardware and software components is determined based upon the switch architecture and the network functional elements of the switch. Once this is completed, the investment of the switch is partitioned into fundamental categories.

Each individual part number that comprises a switch is assigned to one of the categories, based upon the function of that part number. Then these categories are sized to serve the input traffic load. A unit investment is calculated for the following categories for each switch: line terminations, trunk terminations, line and trunk path CCS, service circuit CCS, central office processor, and host/remote link CCS. The total investment of each base unit (*i.e.*, host switch) and remote unit is also calculated.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

Since the output results of COSTMOD are generated for each switch / remote, the output results are imported to an Excel spreadsheet to develop weighted averages for the termination categories for the jurisdiction and also to develop total jurisdiction investments for the other related categories. The traffic sensitive categories are summed to determine the total usage investment. Feature-specific hardware and software are developed in the Features Cost Module. In the Features Module, the unit costs are applied to the feature-specific traffic data to determine the investment cost of providing individual features.

4. Development of Access Switching Costs

The development of the central office switching costs for Switched Access services is based on the “bottoms-up” cost methodology employed in the SCIS and COSTMOD switching investment cost models. A bottoms-up methodology begins with the unit resource investments from the switching cost models as the starting point for the study. A unit resource investment is essentially a unit investment representing a certain component(s) of the vendor’s switching system. For example, the getting started investment per millisecond is a unit investment that represents the total switch processor and other switching initial investments divided by the total available processor capacity.

For Switched Access, the bottoms-up cost methodology determines the switch resources required to process a Feature Group, tandem switching, end office trunk port or ANI minute of use. Feature Group calls require the use of the switch processor (and other switch initial investments), line usage, trunk usage, service

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

circuits (where required), and signaling system 7 resources in the switch. Tandem switching uses these same components of the switch, with the exception of line usage. SCIS and COSTMOD produce the investments for trunk ports and tandem switching. The SCIS/IN cost model develops investments for each Feature Group call type by calculating the product of the unit resource investment consumed (e.g., getting started cost per millisecond of processing) and the amount of that resource consumed (processor milliseconds). The traffic sensitive line and trunk investments (developed on an investment per CCS basis) are converted to an investment per minute of use. SCIS/IN also calculates the ANI investment, in a similar fashion.

In the development of network calling investments, there are typically two major cost elements. First, there is the investment required to “setup” the call. This setup investment, which is incurred for each call attempt, captures the switch resources required to establish the call. The second cost element is the usage-related investment, which captures the line and trunk traffic sensitive investments required to process each minute of use. Since the common Switched Access rate elements are priced on a per minute of use basis, it is necessary to convert these setup investments (which are developed on a per call attempt basis) to a per minute of use basis by dividing the setup cost by the average Feature Group call holding time. The setup investments (expressed on a per minute of use basis) and the traffic sensitive per minute of use investments are added to develop a total investment per minute of use.

Trunk Port costs are developed for Shared End Office Trunk Ports and both Shared and Dedicated Tandem Trunk Ports. The investment for trunk ports includes

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

the traffic sensitive and non-traffic sensitive switch components of the ports and the DSX cross connection. The investments for the Dedicated Trunk Ports are multiplied by the annual cost factors and loadings to derive monthly costs for those switch components. The shared trunk port investments are divided by the average volume of usage to derive a cost per minute of use. The costs generated, after the application of the annual cost factors and loadings and the Busy Hour to Annual Ratio (BHAR), conform to the tariff rate structure which is expressed on a per minute-of-use basis.

Each of the investments described above are developed for the busy hour (i.e., the busiest hour of the switch busy season for which switch equipment capacities are designed by central office engineering). In order to convert these busy hour investments per minute of use to a minute of use for any minute of the day throughout the year, a Busy Hour to Annual Ratio (BHAR) is applied. The BHAR is comprised of two underlying factors. The first is the Busy Hour to Day Ratio (“BHDR”), which is the ratio of traffic in the busy hour to traffic in the whole day. This ratio represents the proportion of the busy day’s traffic that is accounted for by the busy hour. Because there are 24 hours in a day, and the starting point is a *busy* hour, the ratio must fall somewhere above 0.042, or 1/24. The second factor underlying the BHAR is the number of effective calendar days in a year that represents the relationship between traffic in the busy hour of one business day to total traffic in the year. That is, because the BHDR represents the relationship between traffic in the busy hour and traffic for the entire day *in a business day*, the

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

unit investment per busy hour minute cannot be divided by all 365 days in the year (because each day does not present the same traffic as a business day) but rather by the number of business days.

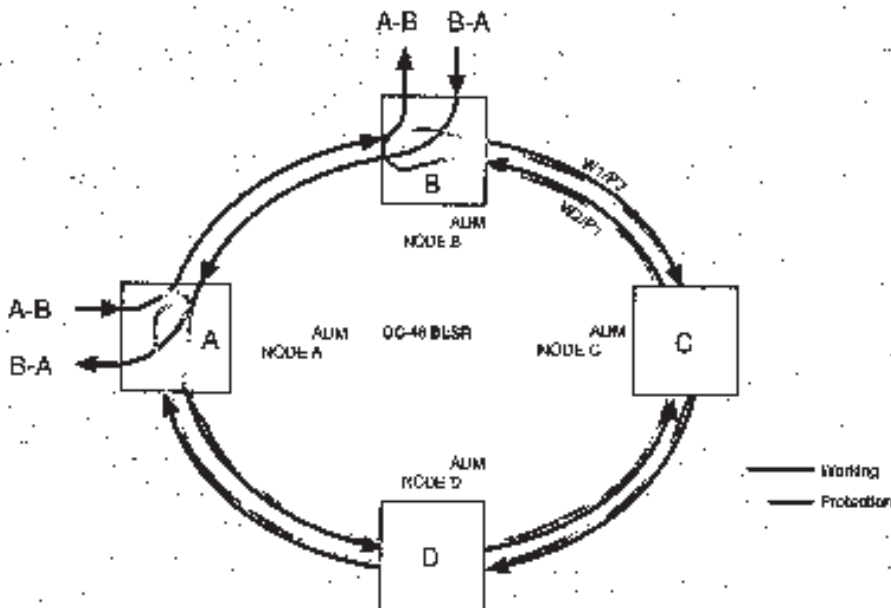
C. INTEROFFICE (IOF) TRANSPORT

Interoffice transport investments are used to calculate the cost of several Access Services, including dedicated transport, entrance facilities costs, local transport tandem and host to remote transport costs. Dedicated IOF is defined to include IOF transmission facilities dedicated to a particular customer. Dedicated IOF is offered between Verizon-owned wire centers at the following signaling levels: DS0, DS1, DS3, STS1, OC3, OC12, and, in some states, OC48. Monthly costs are identified on a “fixed” basis and a “per mile” basis for each signaling level facility.

For simplifying and illustrative purposes only, the diagram below represents a four node bi-directional line-switched ring.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

Four Node Bi-Directional Line Switching Ring



The fixed investments are those identified at the originating and terminating Verizon wire centers, including electronic equipment such as SONET add/drop multiplexers (ADM), digital cross-connect systems (DCS), D4 channel banks and fiber terminations. The per mile investments are those that vary with the length of the facility and include interoffice fiber cables, support structure, and any electronics at intermediate Verizon serving wire centers in those instances where a circuit transverses an additional SONET ring or the signal requires regeneration.

1. Cost Methodology

Current contract prices and information from Verizon vendors and/or its engineering organization are utilized to compile the material investments for the equipment components of the circuit designs for the different transmission speeds.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

Verizon then applies the material prices to typical equipment configurations (*e.g.*, a vendor-specific OC48 ADM equipped for 24 DS3 circuits).

Then, various circuit designs (supplied by the planning engineers) are populated with the network investments. The designs are weighted according to frequency of use to determine an average circuit investment per service at the DS0 level. This figure, in turn, is multiplied by the number of DS0s in the service to yield the appropriate investment level for that service. For example, DS0 level investments would be multiplied by 2016 to arrive at an OC-3 level investment for OC-3 level services. The DS0 level investment will vary by service since different equipment may be required to provision the different services. For example, providing a DS3 service using an OC48 ADM with DS3 plug ins would not require multiplexing while providing DS1 out of the same ADM configuration would necessitate the addition of a 3/1 multiplexer or digital cross connect system.

Verizon also applies a utilization factor to arrive at a total material investment for the transport rate. Investment loading factors are applied to the material investments to derive the total installed unit investment. Finally, annual expense factors and loadings are applied to each investment account in the typical circuit design to derive annual costs, which are then divided by 12 to derive monthly costs.

2. Technology Assumptions

Verizon uses SONET transport with 100% fiber facilities for all new growth applications in the interoffice network. Therefore the forward-looking assumption

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

for the IOF is SONET transport with 100% fiber facilities. IOF transport is based on facility models, which are schematics representing equipment routing using this construct. The facility models serve all signal levels (*i.e.*, DS0, DS1, DS3, STS-1, OC-3, OC-12, and OC-48, when applicable) throughout the Verizon IOF network.

3. IOF Model

IOF costs are developed for circuits that carry traffic between two different central offices, and include the cost of circuit equipment, the fiber facilities, and the outside plant supporting structure. The forward-looking IOF network is assumed to be 100% SONET, with the majority of services provided on OC48 SONET backbone rings. A minor amount of the services are provided on OC192 SONET backbone rings or Dense Wave Division Multiplexing (DWDM) systems. The IOF cost study produces fixed and per-mile costs for the following elements: DS0; DS1 (which is equivalent to 24 DS0s -- voice grade or data circuits); DS3 (as well as STS-1, which is the equivalent of 28 DS1s or 672 DS0s); OC3 (which is the equivalent of 3 DS3s or 2,016 DS0s); OC12 (which is the equivalent of 12 DS3s or 8,064 DS0s); and, in some jurisdictions, OC48 (which is the equivalent of 48 DS3s or 32,256 DS0s).

IOF costs are calculated as follows: First, the circuit designs are identified and equipment files are built to yield material investment required for IOF. Investment loading factors are then applied to material investment to yield total installed investment. Finally, cost factors are applied.

The study starts with contract prices and vendor information for the equipment components of the circuit designs for the different transmission speeds required. The

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

material prices are compiled into typical equipment configurations. The Engineering Department provides the circuit layouts that identify the equipment that is included in the cost of the particular service. The circuit layouts, which differ in complexity by density zone, are required to determine which equipment components must be included in the design for the various IOF service types. The vendor material prices that Verizon pays for the equipment used in the IOF circuits are calculated on the basis of the smallest unit of capacity. For example, in the DS3 service, the quantities of equipment are priced and then divided by 672 to derive the investment at the equivalent DS0 voice grade circuit level. This process is performed in a series of spreadsheets.

The next step is to import the information in the spreadsheets into the Investment Mapping program, which is also known as the “Container Module”. The Container Module allows the analyst to visually represent the circuit layout for the various IOF service types by density zone. The program develops the total investments for the various designs using the vendor material prices, the percentage weightings for the individual pieces of equipment, and the component utilization factors. These formulas are used to create the material investment elements.

The remaining steps are conducted within the VzCost system. Material investments are input into the “Loading Run” module of VzCost, where they are loaded for EF&I and power costs. Finally, Verizon applies the annual cost factors to each loaded investment account in the typical circuit design to derive the annual costs, which are then divided by twelve to derive monthly costs.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

**4. Development of Local Transport Costs for
Switched Access**

Local Transport costs are developed for two scenarios: local transport to a tandem, referred to as tandem transport, and transport between a remote and its host. These costs reflect the terminations on either end of a circuit (at the end office and at the tandem for tandem transport, and at the remote and the host for host/remote transport), and the actual facility between the two end points. Switched Access local transport is rated on a fixed and per mile basis, per minute of use. The fixed rate is for a single termination, and the per mile rate is for one mile of the common facility. The starting point for the costs of both tandem and host/remote transport are the Interoffice Facilities investments. The forward looking architecture reflects the following network construct for the interoffice facilities: the 5ESS switches hand off to STS-1 facilities, Nortel and Siemens switches hand off to DS1 facilities, and the GTD-5 switches hand off to DS3 facilities. These investments are converted to a minute of use basis by calculating annual minutes of use by taking the average busy hour CCS per trunks for each switch type (from SCIS) and dividing by the BHAR described above. The different investments are weighted together based on total trunk CCS by switch type and converted to a cost by applying the annual cost factors and loadings for each asset account.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

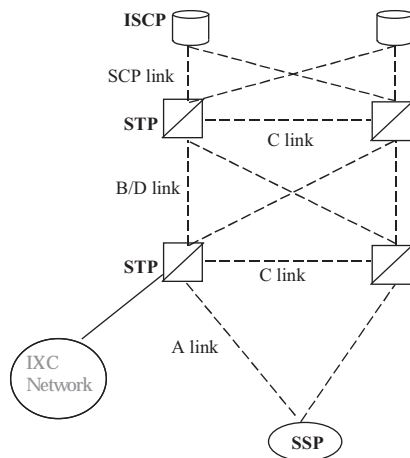
D. SIGNALING NETWORK

1. Signaling Systems and Call-Related Databases

The signaling network includes Signaling Transfer Points (STPs) Port, Signaling Links and access to SS7 databases. The costs for these components of the signaling network are included in the call setup costs for the Feature Group and tandem switching costs.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

SS7 Network Overview



SS7 Components

- ISCP** Intelligent Services Control Point
- STP** Signal Transfer Point
- SSP** Services Signaling Point (in SCIS)

SS7 Link Types

- A link** Access - connect SSP to STP
- B link** Bridge - connect pairs of STPs in same network
- C link** Crossover - connects STPs within a pair
- D link** Diagonal - connect pairs of STPs in different networks
- SCP link** Svc.Control Point link from STP to ISCP

Modern telecommunications networks transmit signaling information over communication paths separate from those used to transmit voice. Signaling information is switched at STPs, and is carried between STPs and local and tandem switches over signaling links. For more complex telecom services, the routing and other information used by the signaling network is stored in call-related databases known as Intelligent Service Control Points (ISCPs). The protocol used for signaling information is known as Signaling System 7 (SS7). A call-related database query is a switch query and database response through the signaling network, which provides access to Verizon's Line Information Database (LIDB), Toll Free Calling database

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

and the Advanced Intelligent Network (AIN) database by means of physical access at the STP to the ISCP.

Costing Methodology. The material unit investments for the STP are developed using the latest prices based on the jurisdictional STPs' configurations. Similarly, the material investments for the queries are developed using the latest vendor prices, based on the Next Generation Platform Intelligent Signaling Control Points (ISCPs) and negotiated vendor discounts.

Technology Assumptions. The construct used for the development of the cost of the STP port element reflects the actual configuration (STP port capacity) for each STP pair. This is determined by reviewing the actual STP network, the number of ports, and the forecasted future number of SS7 links. The unit costs are based on current link utilization levels and forecasted link demand. A representative model of the ISCP for each database is determined to develop the costs of the Toll Free Calling, LIDB and AIN databases.

2. Signaling System 7 Model

The Signaling System 7 (SS7) network is used to send control information to switches regarding setting up and releasing facilities that are used to originate and terminate interoffice calls. Verizon has developed an in-house SS7 investment tool to develop the element investments and the signaling costs for the signaling network (as distinct from the switched network). This signaling network provides control, address, and supervisory information for those messages that ride on the switch network. For example, consider a customer who picks up the phone and dials a

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

number to make a call. That call is sent to the local central office, where the call processing is halted. A message is sent over the SS7 network to determine whether the destination line for that call is busy and whether the destination line is in service. It then sends that information back to the originating central office so the call can be completed.

The SS7 investment model develops all of the SS7 network components except for the Switching Services Point (SSP). The SSP is really an end office that has SS7 software and hardware in order to send and receive messages. The investment for the SSP is developed in the SCIS model itself (and expressed as an investment per SS7 octet). The SS7 investment model is designed to calculate busy hour unit investments for the SS7 network components and AIN equipment. The SS7 investment model contains several component modules that are used to study individual SS7 network components. These components include Signal Transfer Points (STPs), Service Control Points (SCPs), and SS7 Links. Since the SS7 network is used by many services that use the equipment in different ways, the investment model calculates a primitive output, which represents one unit of use, *e.g.*, a busy hour query or a busy hour octet. The investments of the SS7 equipment components (STPs, SCPs and links) are apportioned to the primitives according to the cost causality, *i.e.*, the functions of the equipment, how the equipment is used, and the factors that cause additional equipment to be purchased. Different services use different combinations of the equipment, and those combinations of equipment are added together in the CCSCIS aggregation model. The investments per unit of

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

primitive use are then combined to a service-specific total investment and total cost in separate studies in VzCost.

E. LOOP COSTS: ENTRANCE FACILITIES

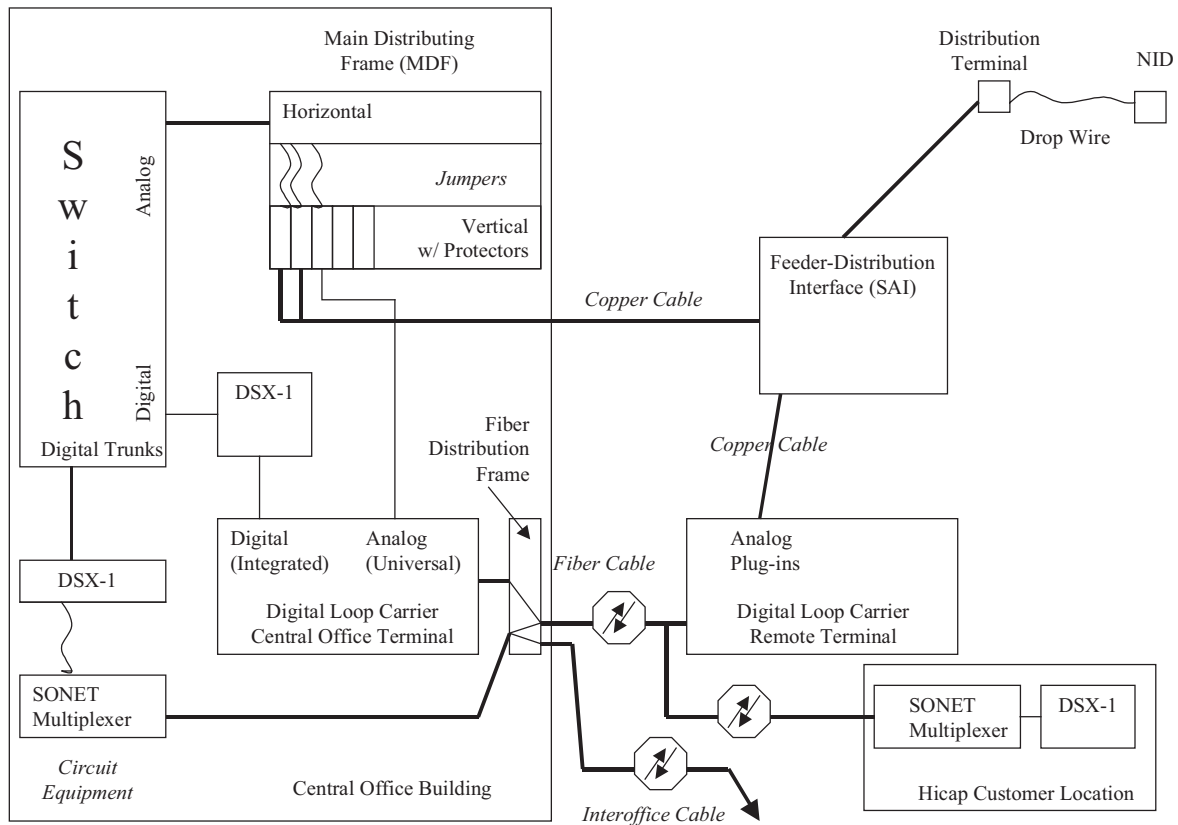
Verizon's loop cost studies address all loop types required by the FCC and offered by Verizon. These include various analog and digital loops as well as high capacity loops, subloops, and dark fiber. However only loops applicable to entrance facilities for switched access are addressed in this filing. Entrance facility loops connect interexchange carriers' points of presence (POPs) to Verizon's serving wire centers (SWCs). Entrance facilities are offered at signaling rates of DS0 (2-wire and 4-wire), DS1, DS3, STS-1, OC3 and OC12.

1. Basic Entrance Facilities

Costing Methodology: Verizon utilizes the VzCost Element Calculator: Loop Investment Calculator to develop the investments of the basic loop facilities that provide 2-wire, 4-wire and DS-1 entrance facility services.

Technical Construct: The diagram below represents the predominant components typically encountered in a loop currently in the network (not all of which are necessarily included in the forward-looking construct of a loop).

**VERIZON
 COST METHODOLOGY AND COSTING PROCESS MANUAL
 FOR ACCESS SERVICES**



In the forward-looking network, a combination of fiber-fed digital loop carrier (DLC) and copper cables is utilized to provide feeder facilities. In locations with a large service demand, Verizon uses fiber and dedicates a remote terminal to serve the building. The use of copper feeder is limited to those loops typically closer to the central office, while fiber-fed DLC is used beyond that point. This combined design strategy (using copper and fiber) eliminates costly network components required for longer loop copper designs (*e.g.*, heavier gauge cables, load coils, or repeaters).

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

When employing DLC, the infrastructure reflects the use of forward-looking digital loop carrier technology, in which the SONET-standard fiber transport is included with the digital carrier equipment. Modern DLC equipment can be designed and software-configured for a mix of Universal and Integrated DLC in the same system, and field concentration can be supported under the GR-303 standard if the switch interface is so configured.

The specific design of the loop infrastructure, or “outside plant,” depends on the demographic characteristics of the area.

Identification of Basic Entrance Facility Loop Investments: Basic

entrance facility loop investments include the following:

- Copper feeder and distribution cable;
- Fiber optic feeder cable;
- Digital Loop Carrier, including Remote Terminal and Central Office Terminal equipment;
- Cross-boxes (SAIs/FDIs) and distribution terminals;
- Digital Cross-Connect Panels (DSXs) and Main Distribution Frames (MDFs);
- Service wire (or “drop” wire) and Network Interface Devices (NIDs); and
- Support structures (*i.e.*, poles and conduits).

VzCost Element Calculator -- Loop Investment Calculator: The Loop Investment Calculator (VzLoop) is part of the VzCost system. It is designed to model the forward-looking outside plant network by computing and configuring the investments associated with the local loop. VzLoop begins with a list of existing

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

distribution terminals, cross-connects and digital loop carrier systems and the service addresses and demand associated with them. This data, from the Loop Engineering Information System (LEIS, for f BA), the Automated Assignment Information System, and the Integrated Computer Graphics System (AAIS and ICGS, for f GTE) is used as the basis for determining the coordinates of the service addresses, which then serve as a reference for designating the terminal locations in the modeled network. A minimum spanning tree algorithm is used to connect the terminals. First, the algorithm is applied to terminals on the distribution side of a cross-connect, to connect them to their crossboxes. The feeder-fed distribution terminals are then associated with their distribution area, and feeder segments are drawn to connect the distribution areas to the wire center.

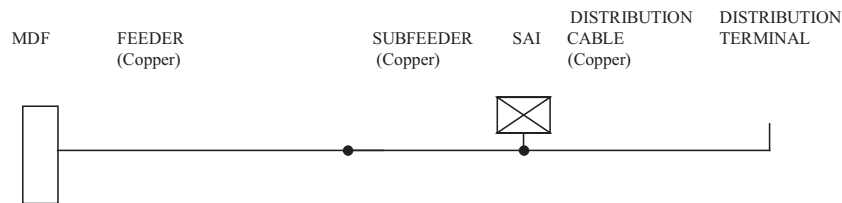
Once the network configuration has been determined, investment calculations may begin. There are three primary constructs for the physical characteristics of the outside plant in the engineering assumptions. The first construct uses an all-copper construction (copper feeder cable, copper sub-feeder cable, copper distribution cable, copper drop wire, no electronics) for loops where the feeder segment is shorter than the copper/fiber breakpoint and the customers are not located in large buildings. The diagram below illustrates this loop construct:

VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES

1. DISTRIBUTED PLANT -- UNDER THE BREAKPOINT

All Copper Loop

- Main Distributing Frame at CO
- Copper Feeder, Sub-feeder and Distribution Cable
- No Electronics



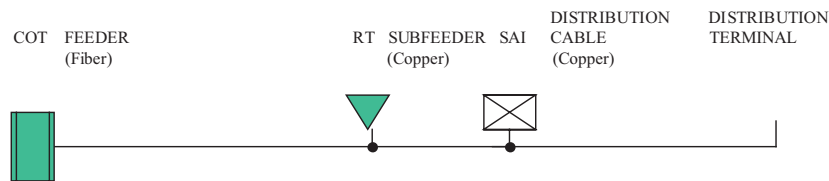
For those loops with feeder segments that are longer than the break point, Verizon assumes a DLC loop construct comprised of certain electronic equipment (a central office terminal (COT) and a remote terminal (RT)) connected by fiber cable). At the remote terminal, the fiber transport is converted back to copper and connected via a copper sub-feeder cable to a cross-connect interface (sometimes referred to as the serving area interface, or SAI). Copper distribution cable then connects to the customer via a distribution terminal, a drop wire and a NID. This construct is illustrated by the following diagram:

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COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

2. DISTRIBUTED PLANT -- OVER THE BREAKPOINT

Fiber-fed DLC

- Litespan COT and RT
- RT serves one UAA
- Fiber Feeder, Copper Sub-feeder and Distribution
- Loops with Feeder length over the breakpoint



The third major construct is fiber-to-the-building. This construct consists of fiber feeder connected to an RT located inside a building and is used to serve buildings regardless of loop length if the building houses more than a certain number of working lines. The diagram below illustrates the fiber-to-the-building construct:

3. FIBER TO THE BUILDING

- COT at CO
- Litespan RT inside building, connected to inside wiring
- Serves large buildings
- Irrespective of loop length



Loop costs are developed using forward-looking economic assumptions appropriate for the loop network. Consistent with forward-looking assumptions, the loops reflect copper or fiber optic feeder cable, copper or fiber distribution cable, and

**VERIZON
 COST METHODOLOGY AND COSTING PROCESS MANUAL
 FOR ACCESS SERVICES**

DLC and other electronic equipment. The following chart shows the appropriate loop network components for the two-wire loop for each construct.

| Investment and Cost Components 2 Wire | | | |
|--|---|------------------------------------|------------------------------|
| Cost Study Components: | Dist. Plant Under BP | Dist. Plant Over BP | Fiber to Building |
| • Copper Distribution | X | X | |
| • Fiber Distribution | | | X |
| • Copper Feeder | X | | |
| • Fiber Feeder | | X | X |
| • Electronics | | X | X |
| • Cross-connect | X | X | |
| • Distribution Terminal | X | X | X |
| • Service (drop) wire | X | X | |
| • NID | X | X | X |

“Secondary” elements are derived from the elements above:

- Poles based on fiber and metallic cable
- Conduit based on fiber and metallic cable
- Land and building based on electronics

The VzLoop process has two major design alternatives. In one case, the existing mix of copper and DLC-fed feeder is used to design the network. This means that a single cross-connect may be fed by a mix of copper and fiber/DLC pairs. In the second, an “economic breakpoint” is calculated in each route based on the material and labor cost of installing copper feeder or fiber-based DLC. Once the breakpoint is established, all feeder facilities beyond that distance will be 100% fiber/DLC. The new DLCs will be located at existing cross-connects or at the

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

entrances of distribution areas (DAs) that have no cross-connect today. Separate DLCs will be dedicated to serve large building terminals (Fiber to the Premise construct) based on the specific demand at the individual terminal, whether the rest of the DA is copper- or fiber-fed.

Multiple DAs and/or cross-connects may be combined into a Carrier Serving Area (CSA), to be fed by a single Remote Terminal (RT), if the maximum copper length from the RT to the last distribution terminal does not exceed an input Objective Maximum Distribution (OMD). However, an existing DA will not be reconfigured if the current longest distribution exceeds the OMD.

Demand is accumulated along the route to the wire center. When a cross-connect is encountered, the demand shifts from distribution to feeder. When an RT is encountered, the demand shifts from copper feeder to fiber feeder. Fiber to the Premise demand is always known as fiber distribution. From the cumulative demand of each type in each section and separate fill factors for feeder and distribution, the cable size(s) are calculated. Copper feeder and distribution in the same segment may share a sheath, as may fiber to an ordinary RT and fiber to the premise. If the demand exceeds the largest sheath size available, that size cable will be placed for all but the last sheath, which will contain the residual demand.

Investment for various sizes of poles, conduit, copper and fiber cable and cross-connects is developed from material contracts and appropriate labor tasks and input into the system. The task times and labor rates are those currently in use in the Construction Management Application (fBA South) and ECRIS (fBA North), or are

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

contract rates prevailing in the *f*GTE territory. Some tasks are applied to each unit, and some less frequently, based on input factors. Material investment for DLC is developed from vendor contracts, and installation cost is added in the VzCost Element Loading module. The material investment in items known as “exempt material”, *e.g.*, cable strand, distribution terminals, drop wire and NIDs, may be explicitly included in the study or may be excluded from the study and loaded onto the material or labor inputs.

Pole sharing with electric utilities is taken into account by reducing the forecasted pole quantity by the current proportion of electric-owned joint use poles. Pole and conduit sharing with other communications utilities is accounted for in the network expense factor, not in the investment.

2. High Capacity Entrance Facilities

Cost studies for high-capacity entrance facilities including DS3, STS-1, OC3 and OC12 signaling rates are premised on the use of Synchronous Optical Network (SONET) transport equipment when provisioned utilizing fiber facilities. This equipment is the most efficient technology currently available for provisioning high capacity local access service.

Technical Construct: Because of the unique nature of this service and the type of customer served, transport facilities are generally dedicated point-to-point facilities and are provided on a completely overlaid basis to the more general local access infrastructure. There is minimal opportunity for network resource sharing other than the fact that the fiber strands supporting this service and supporting the

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

local access services addressed in the loop construct are usually contained in the same large fiber feeder cable from the central office to the customer location.

Identification of High Capacity Entrance Facility Investments: The relevant investments include:

- Central office electronic equipment, such as an Add/Drop multiplexer (ADM), digital cross connect frames, and fiber termination frames;
- Equipment installed at the customer's premises, such as a protective cabinet housing the ADM, power equipment, cross connect panels, and fiber termination frames; and
- Fiber cable and associated "structure" investment, assuming 100% fiber cable between the central office and the customer's premises.

High Capacity Loop Model: The High Capacity Loop Model, or HiCAM, develops total material investment for circuits that carry traffic between an IXC location and the Serving Wire Center (SWC), including the circuit equipment, the fiber facilities, and the outside plant supporting structure. The forward-looking High Capacity Loop network is assumed to be 100% SONET, with the majority of services provided on OC3, OC12, and OC48 SONET backbone rings. The HiCAM cost study produces costs for the following elements: DS3 (as well as STS-1), OC3, and OC12. The process of calculating Entrance Facility costs is very similar to the methodology used in IOF studies. Similar to the IOF studies, circuit designs and total material investments are calculated using spreadsheets and the Container Module program, and VzCost is used to obtain total installed investments and final monthly unit costs.

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

V. NON-RECURRING COST STUDIES

A. DEFINITION AND ASSUMPTIONS

Non-recurring costs are the one-time expenses associated with the activities necessary to process and provision a carrier's request for the initiation, change or disconnection (termination) of service. Non-recurring costs are generally incurred at the time the ordering, provisioning and termination of service occurs. These costs fall into four primary categories: (1) service order; (2) central office wiring; (3) provisioning; and (4) field installation. The non-recurring cost studies analyze the costs of all activities identified as necessary to respond to IXC service requests.

The labor activities are performed in a number of functional organizations within Verizon. To develop non-recurring costs, Verizon utilizes a forward-looking estimate of the time required to perform each work activity involved in fulfilling an IXC request and multiplies that time estimate by the appropriate labor rate. Labor rates are levelized over a three-year planning period. Allocations of common overhead expense and revenue-related expense are factored in as well.

Jurisdiction-specific labor rates are used where appropriate; if the work is performed outside the jurisdiction covered by the specific study, then the jurisdiction or jurisdictions where the relevant work is performed are used.

B. NRC STUDY METHODOLOGY

The overall NRC study methodology starts by conducting field surveys to gather the current work times. From these surveys, average work times are

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

calculated to which adjustments are made to reflect work times in a forward-looking environment. Jurisdiction-specific labor rates are applied to the adjusted average work times to compute the costs. Common overhead and gross revenue loadings are then applied.

The process for determining the forward-looking work times consists of several steps. First, Verizon develops a list of basic access services. Basic access services are those that involve a set of provisioning activities that can be used to cost one or more similar service. For each basic service, the functional groups that are involved in provisioning that service are identified, and the activities that are performed in each functional group are itemized. Methods and procedures managers and field managers review these itemized activities to ensure that the activities are accurately described. Through surveys, work center personnel provide estimates of the time that is required for each of the identified activities under actual operating conditions. There are two exceptions to the survey process used in this model. For the Assignment Provisioning Center (APC), an existing organizational productivity management report is used, and for the National Markets Center (NMC), a recent series of workforce studies performed for Verizon by an outside consultant, Andersen Consulting (now Accenture), is used. In all cases, the cost analysts monitor the survey process to ensure that as many responses are completed as possible.

Concomitant with the identification of the work times, information regarding how often the exact duties need to be performed is required. For example, if there is

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

90% flow-through in a department, then the manual activity in that functional group only needs to be performed 10% of the time or on 10% of the orders. This is called the “Probability Factor.” The field managers and/or subject matter experts in the work centers provide the probability factors used in the non-recurring cost module.

To convert the current work times into forward-looking work times, a panel of subject matter experts familiar with OSS mechanization and with process improvement is asked to provide an estimate of what percent of today’s work will still be required in a forward-looking environment. This is called the “Forward-Looking Probability Factor.”

Work times, multiplied by the probability factors, serve as the baseline to which forward-looking probability factors are applied to reflect the benefits of future mechanization as well as productivity and other process improvements. To this result, Verizon applies the directly assigned labor rate and adds an allocation of common overhead and the revenue-related costs to determine the forward-looking non-recurring costs.

C. NRC COST MODEL

Verizon has developed a standardized non-recurring cost model within VzCost for the purpose of facilitating the identification of forward-looking service order, central office wiring, provisioning and field installation costs associated with each studied access service across all of the jurisdictions served by Verizon. The model is an activity-based cost model that is designed for ease of use in analyzing costs; users can quickly and easily perform "what if" scenarios and sensitivity

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

studies. The model is a Visual Basic application within VzCost, in which all of the components in the model are clearly displayed. Data common to the development of NRC costs for all access services (*e.g.*, the connect or disconnect work times, probability and forward-looking probability factors, the cost factors used in the model, labor trends, and labor rates) are easily modified, so that costs may simultaneously be recalculated for all services. This facilitates any sensitivity analyses that may be required.

The non-recurring cost for each basic access service is calculated in the model as follows. For each service, connect and disconnect times are shown separately. Since disconnect costs will not be incurred until some time in the future, they are discounted by the average service life of a service. All of the activities are totaled for a functional group, and then they are multiplied by a leveled labor rate. Both connect and disconnect costs for the functional groups are totaled into subtotals for Service Order, CO Wiring, Provisioning, and Field Installation. Finally, the Common Overhead and Gross Revenue Loading Factors are applied.

Labor rates are based on the job function code of the employees who are performing the activities. The labor rates are directly assigned and based on a given base year. They are then trended and leveled over a three-year period. The labor rates reflect the jurisdiction where the work is actually performed. For example, for the National Markets Center (NMC), there are eight NMCs for the Verizon East region, each of which process orders throughout the region. They are located in six states: Massachusetts, Virginia, New York, New Jersey, Pennsylvania, and

**VERIZON
COST METHODOLOGY AND COSTING PROCESS MANUAL
FOR ACCESS SERVICES**

Maryland. The labor rate for the East region (including the fGTE territories in Pennsylvania and Virginia) is thus a weighted average of the rates in those six jurisdictions. Central Office Frame technicians, on the other hand, are found in central offices in every jurisdiction. The labor rates used for Central Office Frame technicians are thus jurisdiction-specific.

A cost summary displays the costs of provisioning the service within a standard interval and on an expedited basis (*i.e.*, when services are requested to be provisioned in a shorter time interval than normal) for all of the access services in the model. These costs are subtotaled into the four categories of Service Order, CO Wiring, Provisioning, and Field Installation to match Verizon's rate structure. The manual service order surcharge (applicable when an IXC chooses not to submit an order electronically) is also displayed as part of the summary. The costs from the cost summary are used for mapping to a rate element sheet. This is done outside of the model. A service cost may be mapped one-for-one, or combined with other basic service costs to derive rate elements.