NARUC SERVICE QUALITY WHITE PAPER
March 5, 2004

NARUC Service Quality Subgroup "Service Quality White Paper"

I. INTRODUCTION

The Telecommunications Act of 1996 ("1996 Act") called for sweeping changes in the way telephone services are delivered. The 1996 Act focused primarily on ensuring Universal Service and opening markets to competition. Furthermore, the 1996 Act, specifically noted that one of the intended effects of the primary focus was to promote higher quality service to American telecommunications consumers.[1]

In 1998, the NARUC Technology Policy Subgroup introduced a "Service Quality White Paper", which was adopted in Convention, November 11, 1998. Since that time there have been many advances in technology that have helped to improve service quality.

This paper suggests that it may be appropriate to revisit the service quality metrics proposed in the 1998 White Paper, to better reflect the level of performance that telephone providers have been able to achieve due in part to these technological advances.[2] Periodic and consistent reporting of these metrics will insure that consumers are receiving appropriate quality of service and it will at least identify areas of concern. Publicizing service quality performance results will both draw attention to potential problem areas before consumers are substantially impacted and provide a strong incentive for carriers to improve quality year after year.

The Service Quality Subgroup suggests in this White Paper that telecommunications carriers should continue to provide Service Quality measurements to the FCC and their respective State Commissions, and that a report of these performance measures be made available to the public.[3] This will allow interested parties to assess current service quality levels among the States, and identify increasing or decreasing trends over time. It is this Subgroup's belief that the improvement in the carriers' service quality performance is not due solely to

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[1] As stated in the preamble, the purpose of the 1996 Act is "to promote competition and reduce regulation in order to secure lower prices and *higher quality services* for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies."

[2] Since 1987, the FCC has collected operational data for the largest incumbent local exchange carriers in its Automated Reporting Management Information System (ARMIS) database. The ARMIS Report on Quality of Service collects data for residential and business lines in categories such as average installation intervals in days, percentage of local installation commitments met, initial trouble reports per 100 access lines, repeat out-of-service (OOS) trouble reports as a percentage of initial OOS trouble reports, and OOS repair intervals in hours. The 1993-2002 ARMIS quality of service data for residential lines served by major ILECs indicated that, in general, there has been an improvement in the performance of the RBOCs in 2001and 2002 in those categories of service, especially when compared to their performance during the mid to late 90s. For further detail, see L. Pérez-Chavolla, "Summary and Analysis of FCC's ARMIS Quality of Service Data for Major ILECs: 1993 to 2002" (Columbus, OH: NRRI, December 2003).

[3] The term "State Commission" is used as a general expression to refer to all Commissions, Utility Boards, Departments, and Regulatory Authorities in the United States, including its Territories, which regulate telecommunications services.

advances in technology. Improvements have come as a result of the diligence by the States in monitoring the carriers' service quality results.

The measures being suggested for inclusion are generally consistent, in both use and definition, among the States. However, the Service Quality Subgroup believes that greater effort is needed to make measurement practices more comparable between the States and individual carriers. Because carriers often have different interpretations of how they should measure service quality data, it is difficult to make meaningful comparisons of reported data among carriers. An effort to promote greater uniformity and consistency among carriers in how the data are measured is anticipated as a second white paper.

II. SERVICE QUALITY REPORTING IN GENERAL

In March 1998, NARUC urged the collection of service quality data from incumbent local exchange carriers ("ILECs") and competitive local exchange carriers ("CLECs").[4] Because of the importance of monitoring the service quality trends in a timely manner, the Technology Policy Sub-Committee recommended that ILECs and CLECs collect service quality data on a monthly basis and, report the monthly service quality data to federal and State regulatory commissions on a quarterly basis.[5] The Service Quality Subgroup recommends that reporting be more stringent as opposed to being relaxed and done on a monthly basis. However, many CLECs provide service via UNE-P or resale, so, for such CLECs, measuring their service quality data is really the service quality of the ILEC and would be redundant for some measures, such as Installations, Maintenance and Repair, and Network Performance. The Service Quality Subgroup would take the position that most of the following metrics would be used for measuring service quality results for ILECs as well as for CLECs that use their own facilities. However, there are other measures that are relevant to all service providers. These universally applicable measures of service quality relate to front office functions such as answering business and repair calls. Therefore, Answer Time measures for business and repair calls should apply to all providers.

III. PERFORMANCE DATA

The Subgroup identified five major categories of performance data useful for measuring the quality of telecommunications service, including: 1. Installation, 2. Maintenance and repair, 3. Network performance, 4. Answer time performance, and 5. Customer perception. A brief description accompanies each recommended category. Key definitions are provided in Section IV of this White Paper.

1. INSTALLATION

Reporting data about the installation of basic service allows a State Commission to evaluate the adequacy of the carrier's telephone plant facilities and workforce and the carrier's success at meeting customer expectations.

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[4] *See* "Resolution Regarding a Federal Service Quality Reporting Program" (adopted by the NARUC Executive Committee on March 4, 1998).

[5] Resellers should indicate the incumbent LEC that provides the underlying telecommunications service.

a) Installation orders for basic service

The number of all installation orders for basic service occurring where facilities are available during the reporting period should be reported. Installation orders should include new orders and transfer orders only. Reporting should be disaggregated into business and residential classifications and, where feasible, rural and urban wire centers.

b) Installation orders for basic service completed within '3' working days

The number of installation orders for basic service completed within three (3) working days from when the order was placed by the customer should be reported.[6] The Service Quality Subgroup recognizes that other time periods may be required in some States, based on specific State regulations.[7] The NARUC 1992 Handbook proposed an objective level for this measure of ninety percent (90%) of installation orders completed within three (3) working days.[8] Based on actual ARMIS data being filed by the ILECs, the Service Quality Subgroup recommends a performance measure of ninety-five percent (95%) of installation orders completed within three (3) working days. This measurement should exclude orders where the customer has requested or agreed to an installation beyond the three (3) working days.

c) Held Orders over 30 days

The number and percentage of orders for basic service that are delayed for more than thirty (30) calendar days from the receipt of the application for service should be reported. This measurement should exclude orders where the customer has requested an installation date beyond thirty (30) calendar days from receipt of the application for service. In some States, monitoring requests or orders with longer delays such as over sixty (60) or ninety (90) calendar days may be required, based on specific State regulations.

d) Installation Commitments Met

The number of installation commitments met and the total installation orders during the reporting period should be reported. Reporting should be at the wire center level, where feasible,

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[6] The NRRI report "Metrics Most Commonly Adopted by the States to Measure the Performance of Quality of Service Categories" indicates that the average objective level for installation of basic telecommunication service set by states currently monitoring this subcategory is ninety percent (90%) of primary installation orders completed within five (5) working days (L. Pérez-Chavolla, Columbus, OH: NRRI, September 2003, internal document). FCC's data on RBOCs' performance on average installation intervals in days shows that the average installation intervals for residential customers ranged, on average, from one to two days for the 1994-2002 period, based on aggregate data for each RBOC (NRRI, December 2003 Report, based on ARMIS Report 43-05).

[7] For a complete set of state-specific service quality measures, see L. Perez-Chavolla, "Survey of State Retail Telephone Quality of Service Standards: Organized by State" (Columbus, OH: NRRI, April 2003, Report 03-16s).

[8] In March of 1992 NARUC published its "Telephone Service Quality Handbook", which proposed model standards for evaluating the performance of telephone utilities in five categories of service: Installation of service, operator handled calls, network call completion, noise and transmission, and customer trouble reports. NARUC proposed both objective and surveillance levels for the different subcategories of service included under each of the five categories mentioned above.

and disaggregated into business and residential classifications and, where feasible, rural and urban wire centers. The NARUC 1992 Handbook proposed an objective level of ninety percent (90%) of commitments met. The Service Quality Subgroup recommends a performance measure of at least ninety-five (95%) of installation commitments met.[9]

2. MAINTENANCE & REPAIR

Reporting data about the maintenance and repair of basic service allows a State Commission to evaluate the adequacy of the carrier's telephone plant facilities and workforce and the carrier's success at providing continual service for its customers.

a) Trouble Reports

The number of initial and repeat trouble reports occurring within the reporting period should be reported. Reporting should be at the wire center level, where feasible, and disaggregated into business and residential classifications and, where feasible, rural and urban wire centers.

Most telecommunications carriers have company procedures that dictate certain calls to the repair center not be counted as true "troubles." State Commissions have encountered significant discrepancies in the exceptions found in audits of telecommunications carriers. One carrier may have a list of twenty or more reasons for excluding a trouble ticket from the report, while another utility may have only two or three specified exceptions. In order to facilitate benchmarking carrier performance and analysis of service quality data consistently among different carriers, the Service Quality Subgroup suggests that telecommunications carriers simply pass along all trouble report data. By excluding the use of such exceptions, the Subgroup anticipates that the accuracy of the reported service quality data will increase, while the reporting burden on the carrier will decrease.

1. Initial Trouble Reports

1.01 Report the total number of initial trouble reports during the reporting period.

2. Repeat Trouble Report

2.01 Report the total number of repeat trouble reports during the reporting period.

3. Access Lines

[9] The average objective level for installation commitments met set by the states is ninety-two percent (92%), based on the September 2003 NRRI report "Metrics Most Commonly Adopted by the States to Measure the Performance of Quality of Service Categories". The 1993-2002 ARMIS data for this category indicates that, on average, the aggregate performance of the major ILECs ranged from ninety-eight (98%) to ninety-nine percent (99%) (L. Pérez-Chavolla, "Summary and Analysis of FCC's ARMIS Quality of Service Data for Major ILECs: 1993 to 2002", p.1).

3.01 Total Number of Access Lines Served by the Reporting Carrier

4. Service standards for trouble reports

4.01 The NARUC 1992 Handbook proposed an objective level of six (6) reports per 100 access lines. Based on actual ARMIS data being filed by the ILECs, the Service Quality Subgroup recommends that States establish a standard trouble report rate of two (2) initial trouble reports per 100 access lines per month.[10]

4.02 The number of repeat trouble reports each month should not exceed ten (10%) percent of the total number of trouble reports received in the month.[11]

b) Repair intervals

The carrier's repair interval provides a measure of the adequacy of the carrier's operating procedures and workforce levels. Expected performance levels may vary according to the State and the size of the reporting carrier. Reporting should be at the wire center level, where feasible, and disaggregated into business and residential classifications and, where feasible, by rural and urban wire centers.

1. Number of Out-of-Service Troubles

1.01 Report the total number of out-of-service troubles in the reporting period.

2. Percentage of Out-of-Service troubles cleared in 24/48 hours

2.01 The report should state the percentage of troubles cleared within 24/48 hours. The 1992 NARUC Handbook proposed an objective level of

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[10] On average, the objective levels of the states monitoring this subcategory of service are set at five (5) initial reports per 100 access lines. As part of its ARMIS database, the FCC collects information on initial, subsequent and repeat trouble reports, as well as on OOS initial trouble reports and all other initial trouble reports. FCC's "ARMIS Preset Report 43-05" only provides data for total trouble reports, including both initial and repeat trouble reports. Based on this report, the annual performance of the RBOC's from 1993 to 2002 ranged from 1.36 to 3.49 reports per 100 access lines (ARMIS Report 43-05, Table II, Column (af), Rows 140, 141, 142). The number of initial trouble reports for each of the RBOCs is available in the FCC's "Paper Report 43-05". Based on data provided in the Paper Report, the RBOC's performance in 2002 ranged from 1.1 to 2.5 initial trouble reports per 100 residential access lines per month for MSAs and from 1.1 to 3.8 for Non-MSAs (L. Pérez-Chavolla, "Summary and Analysis of FCC's ARMIS Quality of Service Data for Major ILECs: 1993 to 2002", p. 2).

[11] FCC defines Repeat Trouble Reports as reports on service quality received within thirty days after the resolution of an initial trouble report on the same line. Initial trouble reports refer to quality of service complaints made by customers or end users to ILECs that have not been reported to the telephone provider within the previous thirty day period. In its preset reports, the FCC provides data on repeat trouble reports only as a percentage of initial out-of-service trouble reports. Based on data for the 1994-2002 period, the ILECs' average aggregate data for repeat trouble reports as a percentage of initial OOS reports ranged from 15.5 percent to 27.3 percent. In 2002, the companies' performance improved, with repeat trouble reports ranging from 16.4 percent to 20.1 percent of initial OOS reports (L. Pérez-Chavolla, "Summary and Analysis of FCC's ARMIS Quality of Service Data for Major ILECs: 1993 to 2002", p. 2).

ninety percent (90%) of out-of-service reports cleared within 24 hours. The Service Quality Subgroup recommends that ninety (90%) percent of all troubles should be cleared within 24 hours and ninety–eight (98%) percent of all troubles should be cleared within 48 hours.[12]

c) Repair Commitments Met

The number of repair commitments met measures the adequacy of the carrier's workforce and the efficiency of its maintenance and repair operations. The number of repair commitments met and the total number of repair orders during the reporting period should be reported. Reporting should be at the wire center level, where feasible, and disaggregated into business and residential classifications and, by rural and urban wire centers. The 1992 NARUC Handbook proposed an objective level of ninety percent (90%) repair commitments met. The Service Quality Subgroup recommends a performance measure of at least ninety-five percent (≥95%) of repair commitments met.[13]

3. NETWORK PERFORMANCE

The number and duration of switch outages and interoffice transmission facility outages indicate the level of the carrier's success at providing continual access to the full capabilities and benefits of the network. In addition, other indicators of network performance, such as trunk blockage, provide valuable information about the end-to-end performance of the public network. Reporting should be at the wire center level, where feasible, and disaggregated into business and residential classifications and, by rural and urban.

In any instance of a major outage there is a "customer service" obligation. It is imperative that State Commissions be aware of service outages. Therefore it is appropriate to include a recommendation requiring notification of a major outage. Language such as the following could be used, "Every utility shall inform the Commission, as soon as possible, of any specific outage occurrence or development, such as those caused by cable cuts, fire, flood, wind, or other Acts of God, that may result in a prolonged interruption of service for a substantial number of its customers in a wire center."[14]

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[12] The average objective level of the states monitoring this subcategory is eighty-seven percent (87%) of out-of-service reports cleared within 24 hours, based on the September 2003 NRRI report "Metrics Most Commonly Adopted by the States to Measure the Performance of Quality of Service Categories". The FCC collects information on OOS based on the intervals in hours it takes an ILEC to resolve an OOS report. The ARMIS data aggregated per ILEC for the 1994-2002 period illustrates that on average, the ILECs resolve OOS reports within 15.1 to 26.8 hours. As of 2002, the companies, as an aggregate, took from 13.9 hours to 22.5 hours to resolve an OOS report (L. Pérez-Chavolla, "Summary and Analysis of FCC's ARMIS Quality of Service Data for Major ILECs: 1993 to 2002", pp. 2-3).

[13] On average, the states monitoring this subcategory have set an objective level of ninety-two percent (92%) of repair commitments met, based on the report "Metrics Most Commonly Adopted by the States to Measure the Performance of Quality of Service Categories" (L. Pérez-Chavolla, NRRI, September 2003). The FCC does not collect information on this measure as part of its ARMIS database.

[14] State rules for network performance usually provide a timeframe within which an outage is considered to be "prolonged". A "prolonged outage" is typically defined as one with a duration exceeding one (1) to three (3) hours. "Substantial" is generally expressed in state rules as the percentage of access lines being affected and/or the

4. ANSWER TIME PERFORMANCE

Companies use both automated systems and live attendants to answer customers' calls. To capture the performance of all types of systems, the Subgroup recommends the following performance measures as a way to monitor answer time performance.[15]

Report the following measures for the business (including billing) and repair offices:

a) Total calls attempted
b) Total calls answered by Voice Recognition Units (VRU) or Automatic Call Directors (ACD)
c) Total calls live-answered by attendants
d) Total calls answered within twenty (20) seconds
e) Total calls abandoned or dropped
f) Average waiting time until calls are answered.
g) Number of calls transferred to a live attendant more than twenty (20) seconds after the caller selects an option to do so and, when the caller does not select an option, the number of calls transferred to a live attendant more than twenty (20) seconds after the last option has been provided.
h) Number of total calls attempted where the caller received a busy signal

The 1992 NARUC Handbook proposed an objective level for business and repair office answer time of eighty-five percent (85%) of calls answered within twenty (20) seconds. The Service Quality Subgroup recommends that the objective levels for these measures be as follows:

(1) Ninety percent (90%) or more of all calls attempted shall be answered within twenty (20) seconds, as measured on a monthly basis.[16]
(2) Once a caller has selected the option to speak with a live representative, ninety percent (90%) or more of all calls shall be transferred to a live representative within twenty (20) seconds after the caller selects the option. If a caller does not select a menu option, ninety percent (90%) of

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percentage of customers affected, whichever is less. The percentages currently used in state rules to define "substantial number of customers" range from ten percent (10%) to twenty-five (25%) percent of access lines affected per exchange and/or up to twenty-five percent (25%) or a hundred (100) customers being affected (L. Pérez-Chavolla, "Survey of State Retail Telephone Quality of Service Standards: Organized by State", April 2003). The Service Quality Subgroup recognizes that other definitions of prolonged and substantial may be required in some states, based on specific state regulations and policies.

[15] During its discussions, the Subgroup found wide variation in the manner in which Answer Time Performance is measured.

[16] The average answer time set by the states to monitor answer time performance is eighty-six percent (86%) within thirty (30) seconds for business office answer time and eighty-seven percent (87%) within twenty-six (26) seconds for repair office. The most commonly adopted objective levels among the states monitoring these measures were ninety percent (90%) of calls to a business office answered within twenty (20) seconds, and eighty-five percent (85%) of calls to a repair office answered within twenty (20) seconds (L. Pérez-Chavolla, "Metrics Most Commonly Adopted by the States to Measure the Performance of Quality of Service Categories", September 2003). The FCC does not collect information on this measure as part of its ARMIS database.

all such calls shall be transferred to a live representative within twenty (20) seconds after the last menu option has been provided.

(3) The number of callers who reach a busy signal shall not exceed three (3) percent.

Further, States should require that an automated call processing system provide the caller with the option to speak with a live representative within the first twenty (20) seconds of answering. A company should provide the live representative option by clearly directing the caller to take an affirmative action (i.e., select an entry on the telephone) or explaining that the caller will reach a live representative by default within twenty (20) seconds (i.e., be transferred when the caller does not select an option on the telephone).

5. CUSTOMER PERCEPTION

Performance data on installation, maintenance, and networks may not completely capture the consumers' experience with a telecommunications carrier. Consumer complaints and commission sponsored consumer surveys are two additional data sources for assessing consumer perceptions of the quality of service provided by telecommunications carriers.

a) Consumer Complaints

The Service Quality Subgroup recommends that State Commissions collect and monitor the total number of consumer contacts received and, when feasible, disaggregate those contacts that were referred to the carrier for action and/or investigated by the State Commission. The Subgroup also recommends disaggregating the complaints by category of service (installation, maintenance and repair, access to repair and business offices, billing) and by type of customer (residential, business and, where feasible, rural and urban exchanges) to facilitate monitoring.

b) Consumer Surveys

Telephone surveys conducted by State Commissions can provide a greater amount of information for use in assessing customers' perceptions of telecommunication service quality. Such a survey should examine aspects of installation, repair, complaints and billing. The following are various components useful in determining a customer's level of satisfaction.

1. Installation

   a. Performance of the company in meeting the time frames the customer required for providing the service.
   b. Service requirement met by the agreed date.
   c. Information provided about the features of the service, either when the customer ordered it or when it was provided.
   d. Reliability of this service after it was first provided.
   e. How easy/difficult was it to contact the correct person or automated attendant that actually dealt with the customer's request.
   f. Overall service provided in this instance.

2. Repair

a. How easy/difficult was it to contact the correct person or automated attendant to report this fault?
b. Speed with which the fault was resolved.
c. Reliability of the service after it was restored.
d. On completion of the service repair, did the company or its contractors confirm with the customer that service was restored?
e. Overall service provided in this instance.

3. Complaints

a. How easy/difficult was it to contact the correct person or automated attendant to report the complaint?
b. Manner in which the customer was dealt with by the first person he or she spoke with.
c. Speed with which the customer's complaint was dealt.
d. Customer satisfaction with the resolution to the complaint.
e. Overall service provided in this instance.

4. Billing

a. Timeliness of the arrival of the customer's bill after the billing date.
b. Accuracy of the information contained in the bill.
c. Information contained in the bill.
d. Presentation of the bill, including ease of understanding.
e. Overall service provided in this instance.

The customer's level of satisfaction should be measured using response categories ranking from very satisfied to very dissatisfied.[17] Survey results should include disaggregated information for residential and business customers and by exchange. The report should disclose information on sample size, confidence levels and margin of error.

If the survey results are going to be shared with customers, it would be useful to provide them with information on some factors that need to be taken into account when comparing the performance of telecommunication carriers, such as company size, type of customers they serve, as well as special quality of service requirements a company may have as part of its alternative regulation plan.

IV. DEFINITIONS

For the purposes of this white paper, the following definitions shall apply.

Access Line: A transmission path between end user terminal equipment and a switching center. Access lines to be counted include: residential, business, Centrex, ISDN, Payphone, and voice-grade PBX trunks.

[17] A response scale commonly used in surveys is called the *Likert scale*, which proposes a 1 to 5 scale, including the following categories: Strongly disagree, disagree, undecided, agree and strongly agree.

Answer or Answered: A call is answered when the caller has reached the operator, service representative, or automated system that will assist the caller or accept the information necessary to process the call. An acknowledgement that the caller is waiting on the line, or a dropped call, does not constitute an answer.

Basic Service: The provision of access to the public switched network. Depending on the State, basic local exchange service may include the provision of one party line service, local/toll calling, local usage, tone dialing, emergency services, assistance services, telecommunications relay services, directory listings, privacy protections and non-published service.

Customer: Business and residential end users; does not include telecommunications service providers purchasing wholesale services or network elements.

Held Order: Requests or orders for basic local exchange service delayed over 30 calendar days because of telephone utility plant or workforce problems.

Initial Trouble Report: The first trouble report associated with a specific trouble on a subscriber line for which there is no pending trouble report.

Installation Commitment Met: The provision of access to basic local exchange service to a customer on or before the commitment date and time offered to the customer by the carrier.

Metropolitan Statistical Areas: "[A] Core Based Statistical Area associated with at least one urbanized area that has a population of at least 50,000. The Metropolitan Statistical Area comprises the central county or counties containing the core, plus adjacent outlying counties having a high degree of social and economic integration with the central county as measured through commuting." (Standards for Defining Metropolitan and Micropolitan Statistical Areas, 65 Fed. Reg. 82238 (Dec. 27, 2000)).

Objective level: The level of performance considered acceptable or satisfactory by a regulator that a telephone service operator is expected to provide to its customers.

Out-of-Service: A classification of a trouble report where the customer indicates either: (1) an inability to complete incoming or outgoing calls or (2) the presence of interference which causes connected calls to be incomprehensible.

Repair Commitment Met: A customer trouble report resolved by the carrier on or before the commitment date and time offered to the customer by the carrier.

Repeat Trouble Report: A customer reported trouble received on or before the 30th day following the resolution of an initial trouble on the same network access line.

Rural Area Wire Centers: All wire centers wholly outside a Metropolitan Statistical Area or other State designated urban area.

Subsequent Trouble Report: A trouble report received after an initial or repeat trouble report, but before the carrier has resolved the initial or repeat trouble report, notifying the carrier of the same specific trouble reported in the initial or repeat trouble report

Trouble: Any indication that the network or any portion thereof is not functioning as designed.

Trouble Report: A record created by the carrier indicating the date and time a customer reports a trouble to the carrier.

Urban Wire Centers: All wire centers that include any portion of a Metropolitan Statistical Area or other State designated urban area.