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OUTAGE REPORTING AND CUSTOMER NOTIFICATION TEAM

TECHNICAL PAPER

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1.0 Executive Summary

Over the past several years a number of major network outages have increased public awareness and concern over telecommunications reliability. On April 6, 1992, the Federal Communications Commission (FCC) began requiring telecommunications service providers [1] to report outages of 30 minutes or more that potentially affected more than 50,000 customers [1]. This threshold was later lowered to 30,000 customers and requirements were added to report outages affecting airports, 911 Service, nuclear power plants, major military installations, and key government facilities [2].

To ensure a continued high level of reliability, the FCC's Network Reliability Council (NRC) [2] recommended the formation of a Network Reliability Steering Committee (NRSC) [3] to monitor network reliability based on major outages reported to the FCC. The NRSC issues weekly, quarterly, and annual reports that provide detailed analyses of the outage data over time. Probably the most beneficial service provided by the NRSC is a near real-time sharing of outage reports filed by the affected carrier. These reports include a root cause analysis of the event including equipment affected, software issue, etc., which allows other service providers to learn from each event to help prevent or at least mitigate the effects of a similar occurrence in their networks.

The FCC re-chartered the NRC to address a number of issues that many consider more forward looking. The first NRC could have been viewed as reactive, while this NRC is more proactive. The Outage Reporting and Customer Notification Team (referred to from this point forward as "Outage Team") was asked to address two questions:

1. Assess whether other service providers (i.e., cable, satellite, and wireless) should report outage data similar to that reported by telecommunications service providers [4]
2. Determine whether and how customers of carriers should be informed of service outages.

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[1] The FCC amended Part 63 of its rules (Section 63.100) to require that local exchange and interexchange common carriers that operate either transmission or switching facilities promptly notify the Commission of service outages whenever telephone services provided by their networks are significantly disrupted.

[2] The NRC is a Federal Committee organized by the FCC that provided recommendations for prevention of public telecommunications network outages and minimization of the impact of such outages. The recommendations are referred to as "Best Practices."

[3] The NRSC is sponsored by the Alliance for Telecommunications Industry Solutions (ATIS).

[4] It was assumed that as new telecommunications service providers' networks become large, all reporting requirements then in force should be applied.

The Outage Team set out to determine if the industry had processes in place within each industry segment to monitor network reliability and share outage information. Second, the Outage Team needed to find out what notification processes were in place in the various industry segments and/or companies. Information was solicited from industry through a formal data request followed by several interviews. The Outage Team found the following:

- All industry segments monitor their networks (major nodes, transmission and distribution plant) for trouble conditions.
- The minimum thresholds to which Local Exchange Carriers (LECs) and IntereXchange Carriers (IXCs) monitor and react are generally short in duration and having little or no impact on the customer.
- The LEC/IXC community generally considers a major outage to be one that fits the FCC definition of major outages (30 minutes/30,000 customers). Cellular and Satellite consider a major outage to be the loss of a network node.
- All service providers perform root cause analysis on major events. LEC/IXC and Cellular providers perform root cause analysis on each outage and multiple root cause analysis across all major events, analyze trends over multiple events, and track performance.
- Only the LEC/IXC community currently shares information with industry on outages and their causes. These segments cited several examples of effective forums for such sharing and analysis, including the NRSC and the Network Operations Forum (NOF).
- Most LECs/IXCs notify the public about disasters, major outages, and 911 Service outages (LECs only). Additionally, LECs/IXCs and Satellite provide some notification to customers (e.g., major customers) on outages other than those listed above.
- The majority of service providers have mutual aid agreements (both formal and informal).
- Nearly all service providers have plans in place in the event of a disaster.

In addition, the Outage Team found that better sharing of outage information among other industry segments could help to prevent outages in the future, as learned from the experiences of NRC - 1 and the NRSC. Additionally, notification of emergency service outages is taking place. As a result, the Outage Team's major findings and recommendations are:

- Individual service providers monitor their networks for trouble, take action when there is an outage, and have steps in place to improve the reliability of their networks. Two industry segments (LECs and IXCs) noted that forums exist that provide for open sharing of information on outages as well as recommending steps to prevent or mitigate the effects of outages. The Alliance for Telecommunications Industry Solutions' (ATIS) NRSC and the NOF are two examples provided that directly address the causes of outages and, through their processes, share information on the causes of outages and steps to prevent recurrence. Other industry segments are encouraged to establish similar processes and forums or consider using the existing forums.
- Existing mechanisms for outage notification (e.g., utilizing operators and media for 91l/major events, etc.) are sufficient for notifying customers of service disruptions. Additionally, customer notification should be included as part of a service provider's service affecting incident planning.

2.0 Background

The FCC, in Docket 91-273 Second Report and Order, referred several issues to the re-chartered NRC [3]. Two were given to the Outage Team, specifically to assess whether other service providers (i.e., cable, satellite, and wireless) should report major outages to the FCC (similar to that reported by LECs/IXCs) and to determine whether and how customers of carriers should be informed of service outages.

2.1 Outage Reporting

On April 6, 1992, the FCC required service providers to begin reporting outages of 30 minutes or more that potentially affected 50,000 customers [1]. The Threshold Reporting Group, under the direction of the NRC, recommended that the 50,000 - customer threshold be lowered to 30,000, and that outages affecting airports, 911 Service, nuclear power plants, major military installations, and key government facilities also be reported. The Council adopted the recommendation. Carriers began voluntarily reporting at this level on June 1, 1992. Due to the sensitive nature of some of the reports, the National Communications System (NCS) assumed responsibility, effective May 12, 1993, for submitting outage reports to the FCC covering nuclear power plants, major military installations, and key government facilities.

On August 1, 1994, the FCC released the Second Report and Order in Docket 91-273 which revises its rules for reporting major outages [3]. Most of the changes in this Order had been implemented in June 1992, when the FCC adopted the NRC recommendations on a trial basis. Items of major interest include the additional reporting of fire-related incidents potentially affecting 1,000 or more lines and reporting of 911 special facility outages when more than 25 percent of the lines to any PSAP are affected (where automatic rerouting to an alternative PSAP does not exist). Also, final reports must include root cause analysis and review how Best Practices may have prevented or mitigated the effects of the outage.

2.2 Customer Notification

In the current environment, traditional telecommunication carriers provide some notification to the public during outages (depending on the severity) via radio, television, etc.   Some IXCs provide alternative dialing instructions (e.g., 10XXX, recorded announcements, etc.).

The NRC's E911 Focus Group identified education of the public in their Technical Paper to avoid overloading the network during emergencies. For example, during Hurricane Andrew, a large number of 911 calls were made by citizens testing the E911 Service to be sure that it was working properly. The focus group also found that during the civil unrest in Los Angeles in 1992 40 percent of the call volume was due to non-emergency and abandoned calls. In the aftermath of the civil unrest the City of Los Angeles recommended that the public should be educated to limit 911 calling during disasters.

2.3 Organization of Technical Paper

3.0 Team Membership

The Outage Reporting and Customer Notification Team's chairman is Raymond Albers (Bell Atlantic) and the NRC Steering Committee champion is Frank Ianna (AT&T). Mr. Albers and Mr. Ianna jointly developed the team's issue statement (see Appendix 1) which provided the Committee with an excellent starting point. The team revisited the issue statement on several occasions to assess progress. This proved to be a valuable tool that provided the group with a common understanding of the issues and allowed the committee to begin working quickly.

The Outage Team met about once a month beginning January 25, 1995. The team members were:

- Michael Angi (Colony Communications)
- Daryl Brumley (IBM)
- Harold Daugherty (Bell Atlantic)
- Gerry Depo (Administrator, Town of Bloomsburg, PA)
- Ken Grace (Bellcore)
- Jim Lankford (SBC)
- Archie McCain (BellSouth)
- Arthur Prest (CTIA)
- Thad Regulinski (University of Arizona)
- Jerry Usry (Sprint).

4.0 Data Collection and Analysis Methodology

The Outage Team determined that it required an industry-wide view of current outage reporting and customer notification practices to fulfill its mission. Such a view would necessarily recognize the diverse nature of the various industry segments (e.g., traditional wireline local exchange and interexchange carriers, wireless providers, cable TV companies, and satellite service providers.) Accordingly, the team developed a questionnaire to survey representatives of these industry segments on their practices for network monitoring, outage analysis and reporting, outage information sharing, and public and/or customer notification, and disaster recovery and mutual aid.

The remainder of this section describes the questionnaire and the process used to administer it and summarizes the response rates from the industry.

4.1 Questionnaire Description

The body of the questionnaire consisted of twelve numbered questions, several of which contained multiple sub-questions. The first two questions asked for identification of the parts of the respondent's network that are monitored (with alarms or other automatic capabilities) for service degradation and/or an outage. The respondents were asked to include monitoring of power, site environment, fire, physical access, etc. Sub-questions provided space to identify monitoring of major nodes in the network, transmission between nodes, and distribution to and from customers.

Question 3 asked for the company's criteria for defining a service outage and a "major" outage. Spaces were provided to indicate minimum duration and minimum numbers affected, as well as other criteria.

Question 4 addressed the processes in place to act on outage events, e.g., to prevent or mitigate future occurrences. Sub-questions listed analysis of root causes for individual events and across events, analysis of trends over events, preparation of tracking and analysis reports, and maintenance of a historical file of reports. For each sub-question, the respondent could answer either All events, Major events, Other, or None.

Questions 5 through 7 asked whether any of this information was shared with others in the industry, with whom, and by what mechanisms.

Question 8 asked whether the company notified customers or the public about service degradation or service outage events. Check-off responses were provided for Customers, Public, Both, and Neither. Questions 9 and 10 asked for identification of the events or services for which notification is provided, and mechanisms for providing notification. Choices for the mechanism of notification for each identified service or outage type included Direct Contact (e.g., physical dispatch), Television, Radio, Recorded Announcement, Notify Operator, Newspaper Ad, Bill Insert, and Other.

Questions 11 and 12 asked, respectively, whether the company has a disaster recovery plan and if it is a participant in mutual aid with others in the industry.

A copy of the questionnaire is provided in Appendix 2.

4.2 Data Collection and Analysis Process

The NRC designated Bellcore as the central point for requesting, collecting, compiling, and aggregating data for all task groups. All data provided to Bellcore was protected under a non-disclosure agreement. The data were treated as proprietary information, and specific references to individual respondents were removed during the aggregation process.

The NRC was directed to obtain a view of all segments of the industry. The NRC asked all the largest companies in the industry to participate; these companies represented over 90 percent of the subscribers in each industry segment. Each company was asked to identify a Single Point of Contact (SPOC). In total, 6 IXCs, 12 LECs, 18 Wireless companies (including the 10 largest), 9 CATV companies, 9 Satellite (or Mobile Satellite) companies, 1 Competitive Access Provider (CAP), and 14 Manufacturers identified SPOCs. Only three companies who were asked to provide a SPOC refused. Bellcore sent all data requests to the SPOC in each company (The Outage Reporting and Customer Notification data request was not sent to manufacturers).

The questionnaires were sent to the SPOCs on April 12, 1995. (The companies that were late in identifying their SPOCs received their questionnaires immediately after they identified their SPOCs.) The original cutoff date for responses was April 30, 1995. However this date was extended to August 31, 1995, to include as many responses as possible. Two companies returned the questionnaires not completed, one because its satellite network is not yet in place and the other because its network monitoring practices are not uniform across all its cellular network operating areas.

The final total of completed questionnaires is listed in Table 1 below:

Table 1 Data Questionnaire Responses

Industry Segment	Number of Responses
LEC and CAP	13
IXC	5
Satellite	7
Cable	2
Wireless	12
Total	**39**

The responses were aggregated and summarized by industry segment. The nature of the data did not lend itself to elaborate statistical analyses. The results forwarded to the Outage Team included numerical summaries by industry of answers to check-off and Yes or No questions (questions 1, 4, 8, 11 and 12) and summaries and ranges of answers by industry for the remaining questions. These results were then analyzed by the Outage Team. The team's conclusions appear in the following sections.

5.0 Study Results

The data received from the Outage Team's questionnaire for LEC and IXC were very similar. As a result, LECs and IXCs were combined into one category. The data was aggregated into the following four industry segments for further analysis:

1. LEC/IXC
2. Cellular
3. Satellite
4. Cable

The following sections describe the findings based on the industry data request and for one industry segment (cable), additional information was gathered though interviews.

5.1 Local Exchange/Interexchange Carriers

Table 2 below provides a high - level characterization of the data received from LEC/IXC industry segment.

Table 2 LEC/IXC Data Summary

Question	Response
Monitor Outages	Yes
Minimum Threshold	50 msec - 5 min
Major Outage	30,000 cust./30 min
Root Cause Analysis	Yes
Share Outage Information	Yes
Notify Customers of Outages	Yes
Mutual Aid Agreements	Yes
Disaster Recovery Plan	Yes

5.1.1 LEC/IXC Outage Monitoring

LECs and IXCs have automatic monitoring systems that provide notification of service degradation and/or service outages. Nodes (e.g., switches, tandems, Signal Transfer Points, etc.) and transmission between nodes and distribution facilities are monitored. The minimum criteria used by carriers to define an outage range in duration from 50 milliseconds to 5 minutes and in extent from those affecting 1 blocked call to those affecting 1,000 customers.

Historical files of outage reports are maintained and most carriers perform individual root cause analysis and trend analysis of all outages, in addition to performing analysis of root causes across major events. Tracking and analysis reports are generally prepared for major outages. Larger LECs/IXCs share outage information with equipment vendors and share selected information with other LECs/IXCs via National ESAC, NOF, and/or the NRSC. Some of these processes have been in place for many years and are very robust.

5.1.2 LEC/IXC Customer Outage Notification

The majority of LECs responded that they notify major customers and the public about disasters, major outages, and 911 Service outages using a combination of direct contact, notifying operators, radio, television and recorded announcements. IXCs report major switching and transmission outages directly to large customers and most report all outages to customers/public via recorded announcements, operators, and radio or television. Additional methods of customer notification, which vary depending on the type of service disruption, were:
  - Flashing Signs
  - One-to-One Contact
  - Specialized Machine Announcements
  - Newspaper Announcements
  - Press Releases

5.2 Cellular Carriers

A high-level characterization of the responses received from the Cellular Industry is provided in Table 3 below.

Table 3 Cellular Data Summary

Question	Response
Monitor Outages	Yes
Minimum Threshold	50 msec - 30 min
Major Outage	Loss of cell site, trunk group, etc.
Root Cause Analysis	Yes
Share Outage Information	No
Notify Customers of Outages	No - majority
Mutual Aid Agreements	Yes - majority
Disaster Recovery Plan	Yes

5.2.1 Cellular Outage Monitoring

Cellular carriers also have automatic monitoring systems that provide notification of service degradation and/or service outages. This monitoring includes nodes (e.g., switches, Signal Transfer Points, etc.) and transmission facilities between nodes. The minimum criteria for an outage range in duration from 50 milliseconds to 30 minutes.

Most Cellular carriers maintain historical files of outage reports and analyze at least major events for individual root cause and root cause across multiple events. Trends are analyzed over multiple events. Information is generally not shared beyond the corporate parent. However, a few cellular providers do share information with suppliers and/or suppliers' user groups.

5.2.2 Cellular Outage Customer Notification

The majority of Cellular providers do not notify customers or the public about outages. However, this is in part due to the architecture of cellular networks. For example, if a cell is out of service the adjacent cell can handle all or a portion of the calls, although the signal may not be as strong. Additionally, cellular technology provides the capability such that when the "A" Carrier is unavailable then the "B" Carrier handles the calls. Of the Cellular providers that do provide outage notification, the following methods are used:
- Television
- Radio
- Media Relations Group
- Customer Service Department

5.3 Satellite Carriers

The Satellite Carriers' responses at a high level are characterized in Table 4 below.

Table 4 Satellite Data Summary

Question	Response

Monitor Outages
   Minimum Threshold
   Major Outage
	Yes
	No minimum
	Loss of payload, earth station, or isolation of large community

Root Cause Analysis	Yes - major outages
Share Outage Information	No
Notify Customers of Outages	Yes
Mutual Aid Agreements	Yes - informal
Disaster Recovery Plan	Yes

5.3.1 Satellite Outage Monitoring

Satellite carriers have automatic monitoring systems that provide notification of service degradation and/or service outages. This monitoring includes nodes (e.g., satellite, earth stations, etc.) and transmissions between nodes.   Any interruption or degradation of service is acted upon promptly. Definitions of major outage range from the isolation of a large community to any outage that lasts 1 - 15 minutes.

Major events are analyzed for root cause individually and across events and for trends over events. Reports are prepared and files maintained. Outage information sharing is limited to affected customers.

5.3.2 Satellite Outage Customer Notification

As stated in the previous section, outage information is shared with affected customers. Additionally, customers are notified directly about outages. Some Satellite providers notify the public about significant outages. The methods used to notify customers of outages described in the survey results are:
- Television
- Radio
- Recorded Announcements
- Operators
- One to One Contacts
- Facsimile

5.4 Cable Providers

Table 5 provides a high - level characterization of two sources of data. One was from a very limited number of responses received from the industry data request. To supplement this data, representatives of the National Cable Television Association were interviewed and input was obtained from the Outage Team members.

Table 5 Cable Data Summary

Question	Response
Monitor Outages	Not currently automatic - moving towards status monitoring
Minimum Threshold	Varies from 2 channels to a loss of all channels
Major Outage	5 minutes to 2 hours, 1 - 100 customers
Root Cause Analysis	Yes - major
Share Outage Information	No
Notify Customers of Outages	Yes
Mutual Aid Agreements	No
Disaster Recovery Plan	No

5.4.1 Cable Outage Monitoring

The Cable industry is currently migrating towards automatic monitoring. It is implementing software that maps multiple trouble reports to a common failure point and dispatches crews based on this information. In the future, the Cable industry is moving toward Operations Centers to monitor and administer installation and maintenance activities.

There does not appear to be a consistent definition of either a minor or major outage. Root cause analyses are performed on major events, as defined by the individual Cable Service provider, and files are maintained on these events. Outage information sharing is largely limited to the corporate parent.

5.4.2 Cable Outage Customer Notification

Cable operators provide notification to customers regarding system outages in addition to maintenance or construction activities through direct mailings, recorded announcements, and television.

6.0 Summary of Conclusions and Best Practice Findings

The Outage Team was asked to respond to the following two specific questions:

1. Assess whether other service providers (i.e., cable, satellite, and wireless) should report outage data similar to that reported by telecommunications service providers.
2. Determine whether and how customers of carriers should be informed of service outages.

The following two sections summarize the Outage Team's findings, conclusions, and recommendations.

6.1 Outage Reporting Recommendation

The Outage Team believed that if processes were in place to monitor and share information within each industry, as currently exist in the LEC/IXC community, then the recommendation would be not to require formal reporting of outage data (i.e., 30,000 lines/30 minutes). Unfortunately, the data received does not support this belief. However, a model exists that has been proven to foster open sharing of outage information and working cooperatively to resolve network reliability problems. It is assumed that as new entrants' become large, all network reporting requirements then in force should be applied. The Outage Team concludes the following:

Individual service providers monitor their networks for trouble, take action when there is an outage, and have steps in place to improve the reliability of their networks. Two industry segments (Local Exchange Carriers and Interexchange Carriers) noted that forums exist that provide for open sharing of information on outages as well as recommending steps to prevent or mitigate the effects of outages. The Alliance for Telecommunications Industry Solutions' (ATIS) Network Reliability Steering Committee (NRSC) and the Network Operations Forum (NOF) are two examples provided that directly address the causes of outages and through their process share information on the causes of outages and steps to prevent recurrence. Other industry segments are strongly encouraged to establish similar processes and forums or consider using the existing forums.

6.2 Customer Notification of Outages Recommendation

The Outage Team believed that market pressures would drive not only continuous improvement in network performance but also notification of outages to customers. The team suspected that service providers would as a general rule provide public notification of emergency service outages. The Outage Team found that a very high percentage of LECs provide public notification of 911 Service outages, and that most service providers have appropriate mechanisms for notifying customers of major outages (e.g., most cellular handsets can be configured to automatically switch to the alternate carrier if preferred carrier's control channel is not detected, IXCs provide alternate carrier codes - 10XXX, etc.).

As a result the Outage Team concludes the following:

Existing mechanisms for outage notification (e.g., utilizing operators and media for 91l/major events, etc.) are sufficient for notifying customers of service disruptions[5]

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[5] The results are based on the service providers' perception of outage notification to the customer and/or public; however, the Essential Services Team found that Public Safety Access Point (PSAP) operators felt that communications could be improved between themselves and local exchange carriers regarding outages before, during, and after they occur (See Essential Services Technical Paper).

7.0 Metric

A number of tools are utilized by the telecommunications industry to measure network reliability. Initially, the NRSC utilized outage frequency tracked over time as an indicator of network performance. However, simple outage counts can provide an incomplete measure of network performance because outages are counted equally, although a very large outage affects the public more than an outage that just barely meets the reporting threshold criteria. The T1A1.2 Working Group developed a metric[6], called an Outage Index, that provides a measure of the relative importance of outages for different services with respect to their publicly perceived impact.

The Outage Team recommends that Committee T1, specifically T1A1.2 Working Group, consider enhancing the outage index to include services provided by cellular, satellite, and cable industries. Once developed, individual companies can apply this measure internally to their outage data to assess network reliability performance.

8.0 Path Forward

Measurements, such as outage frequency and T1A1.2's Outage Index, applied internally can direct service providers in assessing their network performance as well as focusing their efforts on trouble areas. The Outage Team believes that market pressures will ultimately drive network reliability improvements.

9.0 Acknowledgments

The Outage Team would like to extend its sincerest appreciation to the Industry Single Points of Contact and the individuals behind them who gathered the data. To make meaningful recommendations data must be collected from industry, and the results in this paper are based largely on the invaluable data supplied by many of the NRC participating companies. Finally, this report would not be possible without the outstanding efforts of Ken Grace and John Healy in aggregating and analyzing data.

10.0 References

[1] FCC Report and Order 92-58, CC Docket No. 91-273 (7 FCC Record 2010), Federal Communications Commission, Washington, D.C., adopted February 13, 1992, released February 27, 1992.
[2] FCC Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, 93-491, CC Docket No. 91-273 (8 FCC Record 8517), Federal Communications Commission, Washington, D.C., adopted November 5, 1993, released December 1, 1993.
[3] FCC Second Report and Order 94-189, CC Docket No. 91-273 (9 FCC Record 3911), Federal Communications Commission, Washington, D.C., adopted July 14, 1994, released August 1, 1994.

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[6] Committee T1 Report No. 42 "A Technical Report on Enhanced Analysis of FCC-Reportable Service Outage Data," August 1995.

11.0 Appendices

Appendix 1 - Issue Statement
Appendix 2 - Industry Information Request

Appendix 1

Issue Statement

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Network Reliability Council
Issue Statement

Issue Title: **Network Reliability Performance**
Working Group: Outage Reporting & Customer Notification Team

Problem Statement/Issues to be Addressed

The FCC referred, in Docket 91-273 Second Report and Order, several issues to the newly chartered NRC. Two were given to this team, specifically to assess if other service providers (e.g., cable, satellite, wireless, etc.) should report outage data similar to that reported by telcos and to determine whether and how customers of carriers should be informed of service outages

Outage Reporting (Background): On April 6, 1992, the FCC required service providers to begin reporting outages of 30 minutes or more which potentially affected 50,000 customers. The Threshold Reporting Group, under the direction of the NRC, recommended that the 50,000 customer threshold be lowered to 30,000 and added airports, 911, nuclear power plants, major military installations and key government facilities - which the Council endorsed. Carriers began reporting at this level on June 1, 1992. Due to the sensitive nature of some of the reports, the National Communications System (NCS) assumed responsibility for submitting outage reports to the FCC covering nuclear power plants, major military installations and key government facilities effective May 12, 1993.

On August 1, 1994, the FCC released the Second Report and Order in Docket 91-273 which revises its Rules for reporting major outages. Most of the changes in this Order were implemented in June 1992, when the FCC adopted the NRC recommendations on a trial basis. Of major interest is the additional reporting of fire-related incidents potentially affecting 1,000 or more lines. Also, final reports must now include root-cause analysis and review how "Best Practices" may have prevented or mitigated the effects of the outage.

Customer Notification (Background): Some carriers currently provide notification to the public during outages via radio, television, etc. Others provide alternative dialing instructions (e.g., 10XXX). Additionally, education was an area that the E911 Focus Group identified in their Technical Paper. For example, during hurricane Andrew a large number of 9-1-1 calls were made by citizens testing the E911 service to ensure it was working properly. They also found that during the civil unrest in Los Angeles in 1992 40% of secondary and abandoned calls were made. The City of Los Angeles recommended in the aftermath of the Civil unrest that the public should be educated to limit 9-1-1 use during disasters.

Areas of Concern & Problem Quantification

1. Assess whether other service providers (e.g., cable, satellite, wireless, etc.) should report outage data similar to that reported by telcos.
2. Determine whether and how customers of carriers should be informed of service outages.

Description of Proposed Work

1) Should outage data be reported by other service providers:
   a) Assess how other service providers (e.g., cable, satellite, wireless, etc.) currently monitor outage data.
   b) Evaluate the usefulness of this data for investigating the causes of service loss, avoidability of outages and effect of outages.
   c) If the previous item reveals any gaps, propose how other service providers could enhance outage monitoring.
2) Determine whether and how customers should be informed of service outages:
   a) Canvas industry for current methods used to notify public of outages (e.g., alternative dialing instructions, use cellular service, 911 out of service - call local police/fire departments, etc.).
   b) Based on findings of the pervious item, determine if there are other services that customers should be notified of that they are not currently receiving notification.
   c) Develop a guide to how customers are/could be notified of service outages.

Existing Work Efforts

1. The NRSC has established a Network Reliability Performance Committee which will also be exploring the impact of outages on a local and regional/demographic and geographic basis. They will be exploring outage data currently being reported by industry. This should serve as a good starting point once they have identified all available data.
2. A "Technical Report on Analysis of FCC-Reportable Service Outage Data" (Report Number 38), has been approved by Committee T1. The report proposes an index which incorporates the affected service types, outage duration, and outage extent measures into a single metric, using the current data for FCC-Reportable outages, for an outage event. The indices for individual outages can be added together to establish a cumulative index providing a method for comparisons of service outages over time and events. The current index is only applicable to outages reported per 91-273.
3. Cable Television Laboratories Inc. (CableLabs) staff and several of its member companies formed the CableLabs Outage Reduction Task Force because of the importance of outages to the industry and its customers. An Outage Reduction Study was issued in 1992 by the Task Force which they considered a "living document." The study identified:
   - Outage Definition, Detection/Tracking and Customer Acceptability
   - System Reliability Modeling
   - Plant Powering
   - Outside Plant and Headend Protection

Appendix 2

Industry Information Request

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NRC Outage Reporting & Customer Notification Team
Industry Information Request

Company Name: _____
Contact Name:_____   Telephone: _____
Your Industry Segment: ð Local Exchange Services   ð Interexchange Services
                            ð Satellite Services   ð Cable Services
                            ð Cellular Services   ð Other: _____

1. Do you currently monitor your network (with alarms or other automatic monitoring capabilities) for service degradation and/or service outage?
                 ð Yes   ð No (if you answered No, please skip to question 3)

2. What parts of your network do you monitor? Please identify equipment types in all applicable categories below. Include monitoring of power, site environment, fire, physical access, etc., as appropriate):

- Major Nodes (e.g., switches, STPs, SCPs, cable head-ends, earth stations, MTSOs, or other major functional equipment)

- Transmission between nodes (e.g., cross-connect systems, channel banks, multiplexers, fiber optic cables, microwave equipment, other transmission equipment and/or paths)

- Distribution to/from customers (e.g., cross-connect systems, multiplexers, carrier systems, physical transmission paths, amplifiers, remote nodes such as cell sites, huts, cabinets, and underground vaults, other outside plant)

- Other (specific to your industry)

3. What criteria do you use to define a service outage in your network:
            Minimum duration: _____
            Minimum numbers affected: _____ customers
                                     _____ channels of type: _____
            Other:

       How would you define a "Major" outage?
            Minimum duration: _____
            Minimum numbers affected: _____ customers
                                     _____ channels of type: _____
            Other:

4. What processes do you have in place to act on these events, e.g., to prevent or mitigate future occurrences? "All" refers to all events affecting the equipment listed in question 2. "Major" refers to major outage events as defined in question 3. Please define "Other" if you use that category:

Analyze underlying root cause for an individual event   ð All ð Major ð Other ð None
Analyze root causes across events   ð All ð Major ð Other ð None
Analyze trends over multiple events   ð All ð Major ð Other ð None
Prepare tracking and analysis reports   ð All ð Major ð Other ð None
Maintain a historical file of reports   ð All ð Major ð Other ð None
Other (please specify)   ð All ð Major ð Other ð None

5. Do you share this information with other segments of you industry?

      ð All ð Major ð Other ð None

   (if you answered None, please skip to question 8)

6. With whom is it shared (e.g., other under the same corporate parent, other companies, an industry forum)? (If an industry forum is involved, please identify the forum.)

7. How is the information shared (e.g., E-Mail or fax for individual events, periodic summary reports, etc.)? Also describe the timing or frequency of the information sharing.

8. Do you currently notify your customers or the public about service degradation or service outage events?
       ð Customers   ð Public   ð Both   ð Neither
   (If you answered Neither, please skip to question 11)

9. For which services or events do you provider customer or public notification? (Add additional pages if needed):
   1.
   2.
   3.
   4.
   5.

10. How do you provide notification for each service or event listed in question 9? (Check all that apply.)

	Service 1	Service 2	Service 3	Service 4	Service 5
Direct contact (e.g., physical dispatch)					
Television					
Radio					
Recorded announcement					
Notify operator					
Newspaper ad					
Bill insert					
Other:					

11. Does you company have a disaster recovery plan?

12. Is your company a participant in mutual-aid with others in your industry (e.g., during disasters)?