Mutual Aid and Restoration Agreements

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1. Executive Summary

The Network Reliability Council (NRC) was established by the Federal Communications Commission to explore how carrier cooperation and shared expertise can overcome network reliability issues. Among the issues selected for study by the NRC were mutual aid arrangements which serve as examples of outage mitigation techniques. A Focus Team was assembled to:

- Develop a compendium of formal mutual aid and restoration agreements, including resource-lending and network-sharing agreements.
- Identify key issues encountered during the development and implementation of such agreements and document "lessons learned",
- Document how informal mutual aid arrangements work within the industry.

The Focus Team utilized a survey and telephone polling to gather its data. The findings of the Focus Team can be summarized as follows:

- While few formal agreements exist, there are multiple informal arrangements throughout the industry demonstrating extensive inter-carrier and carrier-vendor communication and cooperation during emergencies.
- The parties to the informal arrangements know who to contact in emergency situations, maintain up-to-date contact lists and have procedures in place for contacting one another.
- There are four major, documented, formal agreements. Three deal with resource-lending (Bellcore Client Companies National Security Emergency Preparedness, California, BellSouth - Alabama and Tennessee), and one with network-sharing (New York City Metropolitan Region Consortium.)

The existing agreements share two basic traits -a specific need motivated their establishment, and a common set of concerns was addressed. For example, in the State of California, the frequency of natural disasters motivated the development of the agreement. The concentration of financial institutions in Manhattan, an island with limited access and egress, provided strong motivation for the development of an agreement among a consortium of interexchange carriers in the New York City metropolitan region. Common concerns addressed during the development of the agreements resolve, among others, some of the following questions:

- What constitutes an emergency?
- What are the potential liabilities (of cooperative response)?
- What are the roles and responsibilities of the signatories once the agreement is invoked?

Three of the four agreements focus on resource lending (i.e., supplies, portable equipment, motor vehicles, personnel.) In contrast, the New York City Metropolitan Region agreement facilitates network sharing, that is, temporary alternative routing of traffic and services over another carrier's spare high capacity facilities. In addition, the Federal Government, through the National Communications System, has put in place plans and agreements that enable the use of shared telecommunications resources, established a national telecommunications management structure, and developed a means to prioritize the provisioning and restoral of critical communications resources.

The existing formal agreements are, by design, limited in scope and applicability. Therefore, this compendium also describes complementary voluntary response and restoration efforts based upon industry cooperation that essentially amount to informal mutual aid arrangements. The vast majority of telecommunications disruption incidents which require a multi-carrier/vendor response effort are addressed through industry cooperation. Instead of precisely defining the scope of network sharing or resource lending arrangements, the telecommunications industry approaches each incident with a "can do" approach that has a long history of success. Use of such arrangements is

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predicated on a common dedication to the public good on the part of carriers and suppliers that transcends competitive pressures. In addition, such informal arrangements can offer additional flexibility in dealing with emergencies since each situation that results in a telecommunications outage is unique. These informal arrangements leverage relationships already established with the industry through day-to-day operations. Recent successes, including coordinated telecommunications industry response efforts in the aftermath of Hurricanes Andrew, Iniki and Hugo, the Loma Prieta earthquake, water damage at a critical interexchange carrier facility in Fairfax, South Carolina, and Signaling System 7 network failures on the east coast, illustrate both the geographic and causal diversity of telecommunications outages/incidents.

Effective industry cooperation and the orderly and prompt response to emergency conditions are critically dependent on good communications plans and procedures to facilitate notification and restoration. At a minimum, carriers should have a communications structure in place to be used for timely notification of affected parties in the event of disasters or emergencies. The minimum requirements for such an emergency communications structure are:

- Carriers' Network Management/Operations Centers should know who and how to contact one another and have procedures for doing so.

- Contact lists must be updated and published regularly.

Further, a carrier experiencing a significant telephone service outage should be prepared to contact all relevant Network Management Centers as soon as possible to facilitate the evaluation of restoration alternatives. Where particular circumstances dictate, this essential communications structure may be augmented by voluntary participation in formal mutual aid and restoration agreements. In drafting any formal agreement, care must be taken that it in no way hinders response and restoration efforts by requiring unnecessary contacts and communications.

Regulators have expressed concern over whether competition will lessen industry cooperation; however, recent activities of the Network Operations Forum (NOF) of the Exchange Carriers Standards Association mitigate this concern. Recognizing the need for coordinated, informed response, the NOF has developed emergency traffic management guidelines for network management personnel at local and interexchange carriers. The guidelines provide alternatives for dealing with network emergencies, including network congestion, IC switch or network failures, and SS7 failures, and also describe procedures for inter-company communications. In addition, the NOF has developed and maintains four contact directories for use in emergencies. These directories are targeted toward incident type and include contact and reporting numbers for network management centers, catastrophic SS7 failures, media stimulated mass calling events, and LIDB 800 and 900 service troubles. In support of the communications structure described herein for mutual aid, the NOF is compiling and will maintain a Mutual Aid Contact Directory as part of its *Network Management Guidelines and Contact Directory*.

This compendium, by providing the text of the existing mutual aid and restoration agreements and highlighting key learnings that make those agreements effective, provides a reference source about formal mutual aid arrangements. And, in describing how routine cooperation in the telecommunications industry serves to coordinate response and recovery efforts, it can also be of help in weighing whether normal telecommunications industry response efforts, either as routine as coordinating network traffic management techniques to mitigate the effects of network congestion, or as sophisticated as responding to the aftermaths of a hurricane or earthquake, are sufficient to cope with any special needs.

2. Background

The Network Reliability Council (NRC) was established by the Federal Communications Commission in December of 1991 to explore how carrier cooperation and shared expertise can overcome network reliability issues. To establish a framework for issue identification and study, the NRC established a Steering Committee (NO REST) that was chartered to identify and explore specific focus areas of study. The initial set of seven focus areas (signaling, fiber cable cuts, digital cross-connect systems, powering, switching, fire and E911 reliability) reflected the analysis of recent outages and their root causes. Mutual aid arrangements, which serve as examples of outage mitigation techniques, were not identified for study in the initial set of focus areas. However, because the FCC wanted to better understand how formal and informal mutual aid and restoration arrangements operate today, the NO REST Steering Committee expanded its study to include mutual aid and

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restoration agreements. This study was recommended to:

- Develop a compendium of formal mutual aid agreements, including resource-lending and network-sharing agreements,
- Identify key issues encountered during the development of such agreements and document "lessons learned",
- Document how informal mutual aid arrangements among carriers and suppliers work within the industry today,
- Serve as a reference source for users, carriers and regulators for information about formal and informal mutual aid arrangements.

3. Data Collection and Analysis Methodology

A multi-discipline industry Focus Team, under the guidance of the NO REST Steering Committee, was established to carry out the study. (A list of the Focus Team members is given at the end of this paper.) The Focus Team undertook two major tasks:

- Formulate a definition of mutual aid and restoration,
- Collect examples of mutual aid agreements from the industry.

3.1 Definition of Mutual Aid and Restoration

The following definition of mutual aid and restoration encompasses the various ways the term is currently used in the industry.

Telecommunications utilities and common carriers have entered into at least two types of formal mutual aid agreements: resource lending agreements and network sharing agreements. In addition, a variety of informal arrangements exist.

3.1.1 Resource-Lending Agreements

In an emergency that damages a portion of the telecommunications network beyond the response or restoration capability of an affected company, resource-lending agreements help a participating company acquire critical resources it needs to restore its network. These agreements govern the loan of resources, such as supplies, portable equipment, motor vehicles and personnel, from one telecommunications utility to another.

Examples of formal resource-lending agreements include the Bellcore Client Companies National Security Emergency Preparedness (NS/EP) and California Mutual Aid Agreements for Emergency Resource Allocation. They contain:

- a commitment to provide available resources when requested,
- procedures for declaring an emergency situation,
- coordination directly between the companies involved or through governmental agencies,
- terms and conditions governing the loan of the resources.

Informal resource lending arrangements may be general in scope or may cover specific items such as circuit packs, HF radios, portable generators, portable microwave equipment, portable satellite terminals, portable switches and fiber optic transmission equipment in trailers.

3.1.2 Network-Sharing Agreements

Network-sharing arrangements allow a carrier experiencing a failure of critical high capacity transmission facilities to restore service by temporarily rerouting traffic over another carrier's spare transmission facilities. The most comprehensive known formal example of this type is the Mutual Aid and Restoration Agreement signed by interexchange carriers, alternative service/access providers and local exchange carriers in the New York City Metropolitan Region. The agreement specifies:

- procedures for the declaration of a Mutual Aid and Restoration ALERT and/or EMERGENCY by the New York City Department of Telecommunications and Energy,
- procedures for contacting participating common carriers to identify spare or protection facilities available for restoration,
- agreement to develop transmission plans that define the manner by which carrier facilities will be interconnected and restored,
- terms and conditions for the failed carrier's temporary use of the loaned facilities for a period of up to seven days.

Formal agreements and informal arrangements may also exist for lending capacity on microwave or HF radio networks or fiber optic protection spares to another carrier for emergency communications. An example is an arrangement between Unitel of Canada and Sprint for Unitel to use specific Sprint fiber optic protection systems between three cities in case of an outage on Unitel's facilities. The systems are provided subject to availability, with Sprint's requirements having priority, and Sprint is compensated when they are used. The agreement has been invoked several times.

3.2 Data Questionnaire

The existence of formal and/or informal mutual aid and restoration agreements and processes throughout the industry was investigated by a questionnaire designed to identify any existing agreements, their nature, and company contacts for further information. The questionnaire is shown in Appendix 1.

Three channels were used to distribute the questionnaire throughout the industry:

- The Network Reliability Council Single Point of Contact List. This list includes approximately 45 telecommunications industry organizations including local exchange carriers, interexchange carriers, other network providers, equipment vendors, industry groups and network users.
- The membership list of the Cellular Telephone Industry Association (CTIA).
- The membership list of the Association of Local Telecommunications Service Providers (ALTS).

Altogether, 58 questionnaires were returned, including a single joint response from the ALTS membership. The Focus Team's overall findings are based on the information provided by the survey, coupled with subsequent telephone polling of carriers' Network Management Centers and the Network Operations Forum. These findings include the following:

- While few formal agreements exist, there are multiple informal arrangements throughout the industry demonstrating extensive inter-carrier and carrier-vendor communication and cooperation during emergencies.
- The parties to the informal arrangements know who to contact in emergency situations, maintain up-to-date contact lists and have procedures in place for contacting one another.
- There are four major, documented, formal agreements. Three are of the resource lending type (Bellcore Client Companies NS/EP, California, BellSouth - Alabama and Tennessee), and one of the network sharing type (New York City.)

4. Examples of Mutual Aid and Restoration Agreements

4.1 Formal Agreements

The four major formal agreements in place today are:

- Agreement Between Bellcore Client Companies (BCC) for National Security Emergency Preparedness (NS/EP) Resource Allocation,
- Mutual Aid Agreement Among Telecommunication Interexchange Carriers and Local Exchange Companies in California for Emergency Resource Allocation,
- BellSouth Communications and Interexchange Carrier Emergency Preparedness and Restoration Agreements of Understanding (for Alabama and Tennessee),
- Agreement of the New York City Metropolitan Region Mutual Aid and Restoration Consortium.

In addition to the the industry agreements, two Federal Government-motivated formal agreements are summarized in this section. These are included to depict how the government uses formal agreements to ensure joint industry/government response (NTMS agreement) and shared use of Federal communications resources (SHARES agreement).

Following is a summary of each agreement, including a brief description of the agreement and its intent, and a point of contact for additional information.

4.1.1 Agreement Between Bellcore Client Companies for National Security Emergency Preparedness (NS/EP) Resource Allocation

This resource-lending agreement provides terms governing the emergency provision of transportable resources from any Bellcore Client Company (BCC) to another BCC requesting assistance during an

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NS/EP emergency. The resources covered by the agreement are: supplies - including cable, wire, circuit packs, etc.; portable equipment - including HF radio transceivers, radio towers, portable switches, portable generators, etc.; motor vehicles - including company automobiles, vans, construction trucks, trenchers, airplanes, etc.; and personnel.

Topics covered in the agreement include:

- definition of an NS/EP emergency,
- definitions of resources,
- compensation and payment,
- transportation and travel arrangements,
- return of equipment,
- treatment of employees,
- support documentation,
- confidentiality of proprietary information,
- indemnification,
- general terms.

Participants: Bellcore Client Companies (Ameritech, Bell Atlantic, BellSouth, Cincinnati Bell, NYNEX, Pacific Bell, Southern New England Telephone, Southwestern Bell, US West)

See Appendix 2.1 for a copy of this agreement. For further information contact the Manager-NCC, 2101 L Street, Suite 700, Washington, DC 20037

4.1.2 Mutual Aid Agreement Among Telecommunication Interexchange Carriers and Local Exchange Companies in California for Emergency Resource Allocation

The California Emergency Resource Allocation agreement closely parallels the Bellcore Client Companies NS/EP Emergency Resource Allocation agreement. It applies when one participating California telecommunications utility provides another with transportable resources for emergency restoration. The agreement constitutes a commitment by each signatory to provide assistance in the form of supplies, portable equipment, motor vehicles and/or personnel to the requesting party when such a request is deemed by the provider to be within his capacity. Coordination is provided by the State of California Office of Emergency Services - Chief of Utilities. An emergency may be declared by the State, or a City or County Government or by the requesting telecommunications utility. The terms and provisions of the agreement closely follow those of the Bellcore Client Companies NS/EP Agreement described above.

Participants: Contel of California, GTE California, Pacific Bell, Sprint. AT&T & MCI are not signatories but fully support mutual aid and restoration in emergencies.

See Appendix 2.2 for a copy of this agreement. For further information contact the Executive Director-Emergency Preparedness, Environmental Management & Safety, Pacific Bell, 2600 Camino Ramon, Room 2E157, San Ramon, CA 94583.

4.1.3 Bell South Telecommunications and Interexchange Carrier Emergency Preparedness and Restoration Agreements of Understanding for Alabama and Tennessee

Because of concern about the consequences of an earthquake in Tennessee, representatives of BellSouth Telecommunications, interexchange carriers and other telecommunications carriers formed a committee in August, 1990, to facilitate cooperative interaction among companies and ensure the survivability and restoration of critical communications services in the event of a major network catastrophe. The committee developed an "Agreement of Understanding" for interaction among IECs and among IECs and BellSouth in emergency situations. The primary purposes of the agreement are to establish a spirit of cooperation and provide for the orderly restoration of telecommunications services should a major network failure occur by delineating "minimum requirements" for cooperative interaction.

All restoration activities covered in the agreement are voluntary; there are no contractual obligations or duties. The agreement was adopted in Tennessee, in November, 1991, and is nearing final approval in Alabama.

Topics covered in the agreement include:

- carrier emergency restoration contact lists,
- emergency contact procedures,
- restoration priorities,
- voluntary emergency restoration activities including:
  - import of mobile switching units,
  - public service announcements and provision o 10XXX information to customers,
  - redirection of switched access trunks,
- loan of available emergency equipment,

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- expediting of IEC service requests for restoration.

Participants:
Tennessee Agreement: AT&T, BellSouth Telecom., LDDS, MCI, Sprint.
Alabama Agreement: BellSouth Telecom., DeltaCom/Southern Interexchange, LDDS, MCI, Sprint. (AT&T is not a signatory but fully supports mutual aid and restoration in emergencies.)

See Appendices 2.3 and 2.4 for copies of these agreements. For further information contact: Manager - NS/EP, BellSouth Telecommunications, So. E5C1, 3535 Colonnade Parkway, Birmingham, AL 35243.

4.1.4 Agreement of the New York City Metropolitan Region Mutual Aid and Restoration Consortium

Because of the critical importance of telecommunications to the New York Metropolitan Region's economic health, New York City Mayor David Dinkins set up a public/private task force in August, 1990, to explore ways of enhancing the reliability of the Region's telecommunications network. The Task Force's Mutual Aid and Restoration Subcommittee developed a network-sharing mutual aid and restoration agreement to meet this need. The agreement establishes formal procedures for coordinating the responses of the region's common carriers during network disruptions and establishes terms and conditions for the restoration of high capacity transmission facilities. It went into effect in February, 1992.

Topics covered in the agreement include:

- definitions of a telecommunications "Alert" and "Emergency",
- roles and responsibilities of parties,
- procedures for emergency contacts and joint restoration planning,
- identification of restoration facilities,
- development of restoration transmission plan,
- charges for emergency restoration service,
- priority/precedence in the case of multiple failures,
- confidentiality of proprietary information,
- liabilities and limitations,
- general terms.

Parties to the Agreement: AT&T, Cable & Wireless, EMI Communications, LOCATE, MCI, Metromedia Communications, MFS, New Jersey Bell, New York Telephone, RCI, Sprint, Teleport Communications, Western Union Advanced Transmission Services, Wiltel

See Appendix 2.5 for a copy of this agreement. For further information contact the Deputy Commissioner, New York City Department of Telecommunications and Energy, 75 Park Place, 6th Floor, New York City, NY 10007.

4.1.5 National Telecommunications Management Structure (NTMS) - National Coordinating Center (NCC)

When it reaches full operating capability early in 1993, the National Telecommunications Management Structure (NTMS) will provide a comprehensive, survivable and enduring management capability for initiating, coordinating, restoring, and reconstituting the Nation's telecommunications resources in the event of a national disaster or emergency, including war. The requirement to develop NTMS originated with Executive Order 12472 which directed the Manager, National Communications System (NCS) to develop a national telecommunications management infrastructure responsive to national needs, and to establish a joint government/industry National Coordinating Center (NCC) capable of assisting in the management of NS/EP telecommunications under all conditions of emergency or crisis.

Established in 1984, the NCC consists of resident telecommunications industry representatives, Department and Agency detailees, and staff members of the Office of the Manager, National Communications System (OMNCS), located together to facilitate resolution of telecommunications problems in emergencies. The following industry members are represented in the NCC: AT&T, Bellcore, COMSAT, GTE, Martin Marietta, McCaw Cellular Communications, ITT Communications Corporation, MCI, Pacific Telecommunications Incorporated (PTI), Sprint, and United States Telephone Association (USTA). The NCC is located at the OMNCS in Arlington, VA, and provides modest facilities for emergency/crisis reaction. The NCC also supports the Joint Telecommunications Resources Board, which formulates and recommends policy and procedures to the President for dealing with non-wartime emergencies.

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The NTMS will provide for an extension of the NCC functional capability into the various regions of the nation. A joint effort of government and industry, including the President's National Security Telecommunications Advisory Committee (NSTAC) and the NCS Committee of Principals, developed the concept, which was approved by the White House for implementation in 1988. The plan provides for the establishment of six regional management teams consisting of government and industry telecommunications managers who normally reside in the region, referred to as the Communications Functional Group (CFG). Each team is supported by 7 to 10 government and industry Operating Centers, staffed by resident government and industry personnel, where the actual work of reestablishing and reconstituting telecommunications is accomplished. These regional teams, supported by their Operating Centers, will be capable of responding to a broad spectrum of emergencies, if required. The NTMS plan calls for the selection, training and validation of six regional CFGs by the end of 1993. To date, four teams have been validated, and training and validation of the remaining two CFGs will be completed in early 1993.

The NTMS Program has been highly successful and is an excellent example of what can be accomplished when government and industry work together on a mutually developed plan of action. A Memorandum of Agreement outlining support for the NTMS has been consummated with each of the major carriers. NCS member organizations are fully committed to the NTMS Program. The success of NTMS has generated interest by other government and industry entities. Using the NTMS as a model, members of the energy community are exploring concepts for the management of energy resources in crisis situations. For further information please contact the NTMS Program Manager, c/o NCS, 701 So. Court House Road, Arlington, VA 22204-2198.

4.1.6 Shared Resources (SHARES) High Frequency Radio Program

The SHARES High Frequency (HF) Radio Program is a National Communications System initiative to establish and maintain a single, interagency emergency HF radio network by bringing together HF radio resources of 36 participating federal and federally affiliated organizations. The SHARES network operates on a voluntary basis in that agencies "share" resources when normal communications are destroyed or unavailable to transmit national security and emergency preparedness (NS/EP) messages. SHARES uses existing government-owned radio resources. For additional information contact the Manager-National Coordinating Center, c/o NCS, 701 South Court House Road, Arlington, VA 22204-2198.

4.2 Industry Cooperation and Informal Arrangements

A variety of inter-company contacts and working relationships exist in the industry today that can be and are utilized in emergencies. In general, these arrangements work without any written guidelines. They serve, among other things, to:

- Enable carriers to share information regarding network outages and congestion effects,
- Coordinate network management techniques, such as transferring traffic to mitigate the effects of congestion or network outages,
- Ensure that suppliers can rapidly provide hardware and software support.

In normal operations there are daily contacts between the carriers' network management centers regarding traffic management, network modification and trouble isolation. There are a host of frequent contacts between local exchange carriers (e.g. Bell Operating Companies, GTE, Alltel, local co-ops, etc.) There are also daily contacts between the network management centers of the local exchange carriers and the interexchange carriers, since the LECs provide the exchange access facilities to the IECs for the purpose of originating and terminating IEC telecommunications. These relationships have evolved over the years for the provisioning and maintenance of joint services. Managers in the field know each other, meet at cut overs and multi-company projects, and work jointly on problems. There are numerous instances of the loaning of plug-in or test equipment to turn up jointly provided circuits. When required, conference calls are held to alert appropriate work centers about mass calling events and to plan and coordinate response with between local and interexchange carriers.

Somewhat more formal cross-industry contacts exist through inter-company organizations which meet periodically, including the NS/EP program, the Network Operations Forum and state telephone association meetings. Procedures and work steps for network operations and maintenance are usually done under guidelines developed by the Network Operations Forum.

Local and interexchange carriers rely upon informal arrangements using all of these contacts to facilitate mutual aid and restoration efforts in emergencies. Informal industry cooperation arrangements may parallel the resource-lending and network-sharing components of the formal agreements but can also include other arrangements (e.g. with local suppliers for priority resupply of electricity, fuel and water, or with vendors for rapid delivery of hardware/software to replace out of service facilities.) Because each situation that results in a telecommunications outage is unique, the set of necessary and desirable "formal" mutual aid agreements may not be predictable. Instead, informal arrangements leverage relationships already established within the industry through day-to-day operations.

Of particular note are the extensive informal commitments that manufacturers of switching, transmission and power equipment have made to the carriers. These commitments include having disaster restoration organizations and plans, giving highest priority to the manufacturing and delivery of equipment needed for restoration, and the continuous maintenance of preconfigured mobile equipment installed in trailers and located at strategic spots for overnight delivery. In some cases, suppliers have formalized these commitments with signed documents. Examples of manufacturers' disaster restoration programs and preconfigured mobile equipment are given in Appendix 3.

Informal arrangements have a significant history of success since they have served to coordinate restoration in the aftermath of almost all of the recent telecommunications outages. Use of such arrangements is predicated on a common dedication to the public good on the part of carriers and suppliers that transcends competitive pressures.

4.2.1 Local Exchange Carriers

A strong legacy of inter-company cooperation and support during emergencies remains among local exchange carriers, despite the break-up of the Bell System. The Bellcore Client Companies have agreed to voluntarily use the NS/EP structure and contacts to facilitate restoration activities in the event of an emergency in which inter-company assistance is required but in which the NS/EP Agreement is not invoked.

This informal arrangement was utilized in the aftermath of Hurricane Andrew. Because no critical services at any government locations were affected by the hurricane, the NS/EP agreement was not invoked (although some TSP services were affected). BellSouth requested that the Bellcore NS/EP group coordinate a request for mutual aid assistance. A request was made for 160 outside plant construction technicians, along with all appropriate tools, equipment and vehicles, for approximately three months, to repair copper and fiber plant. Four BOCs responded. Three provided the requested assistance and the fourth was used as a backup in case additional forces were needed. The forces were moved within a week of the request and arrived on site with all necessary equipment. In addition, two non-Bell local exchange carriers loaned generators to BellSouth. Other industry members also made voluntarily offers of assistance and resources.

The spirit of cooperation exists among all local exchange carriers, not just the members of the former Bell System. In another recent example of voluntary assistance, a Bell Operating Company in the Northeast made an unsolicited offer of repair trucks to a non-Bell local exchange carrier, to assist with the restoration effort after an ice storm, and the assistance was accepted.

In addition to arrangements among carriers, the site operations personnel of local exchange carriers have numerous agreements at a local level with various vendors for priority restoration of electricity, water, and fuel.

4.2.2 Interexchange Carriers

In a major disaster impacting the public, the interexchange carriers are committed to working with government agencies and other telecommunications carriers to restore service. Their policy is to help the end customer in an emergency situation.

The IECs participate in numerous informal mutual aid and restoration arrangements in both their local and long distance divisions. These arrangements can be broadly grouped into three categories: Inter-carrier, Vendor and Organizational.

Inter-Carrier The IECs' network control centers maintain current contact lists and procedures for parallel organizations in the LECs and other IECs. This information is obtained through special direct requests, periodic joint meetings and regular contacts. The carriers typically work with other companies several times a month to normalize traffic during mass calling or other events. In addition, they participate in the rerouting of traffic to or from other carriers, as emergency situations warrant. Communication among the IECs' operating field

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managers in a time of crisis is strong and facilitates mutual aid when appropriate.

Normal IEC emergency preparedness measures include pre-planned sources for generators, back-hoes, and portable units such as switches, digital cross-connect systems, transmission equipment, etc. In addition, generic plans for restoration after predictable events may be available. These resources are available to assist other carriers in emergencies. Resource sharing is common among the managers when dealing with service issues. In a recent example, arrangements were made to share protect channels at four sites.

The interexchange carriers have demonstrated their commitment to voluntary cooperation and assistance on several recent occasions, including the extensive efforts of the IECs to assure the best possible communications into and out of the stricken area after the San Francisco earthquake and the assistance provided by the IECs to BellSouth after Hurricane Andrew, including equipment, supplies and technical support. Informal inter-company arrangements were also demonstrated during an interexchange carrier outage in Fairfax, South Carolina, on October 9, 1992. When water caused extensive facility damage, Sprint coordinated with AT&T to divert 1+ traffic to the AT&T network. At Sprint's request, BellSouth redirected Sprint traffic at the local exchange and rerouted the traffic to the AT&T network.

The IECs also play an active role in inter-company disaster preparedness drills, based on informal requests to and from the industry. These drills and any actual events are followed by joint review sessions.

Vendor The IECs' engineering organizations have arranged both formal and informal commitments from hardware and software vendors for priority aid. As evidenced recently during the Fairfax, SC, outage, vendors such as Northern Telecom, AT&T Network Systems, DSC, Alcatel, Hekimian, and Tellabs provide quality emergency site personnel and equipment within a few hours or days.

Organizational Through participation in organizations such as the National Security Telecommunications Advisory Committee (NSTAC), the National Coordination Center (NCC), and the Network Operations Forum (NOF) the IECs (as well as other industry members) have built many multilevel, working relationships within the industry. As with the development of the individual contacts referenced above, these relationships ensure the carriers' ability to meet the needs of an increasingly interconnected telecommunications infrastructure.

4.3 Network Operations Forum - Network Management Guidelines & Contact Lists

The Exchange Carriers Standards Association (ECSA) was formed to promote the timely resolution of national and international issues involving telecommunications standards and the development of operational guidelines. While membership in the ECSA is currently limited to wireline exchange carriers, unrestricted participation from the entire telecommunications industry is encouraged in its sponsored committees and forums. Over 300 companies, including LECs, IECs, enhanced service providers, manufacturers, vendors and end users, currently participate in ECSA sponsored committees.

To further its goal of promoting industry harmony and cooperation, the ECSA sponsors open industry forums to address technical and operational issues affecting the nation's telecommunications facilities. One of these is the Network Operations Forum (NOF), a subcommittee of the Carrier Liaison Committee. The NOF provides a working forum for telecommunications industry participants, including both access providers and access customers, to identify operations issues which are national in scope involving the installation, testing and maintenance of access services. The NOF provides a means for the exchange of operations related information and for developing resolutions to issues by consensus agreement for voluntary implementation by the industry.

In July, 1991, the NOF began focusing its attention on the area of network reliability. To ensure the availability of telecommunications service for all customers, the NOF Network Management Subcommittee has developed traffic management guidelines to provide the Network Management personnel of exchange and inter-exchange carriers with alternatives when network emergencies arise. The guidelines were jointly developed by personnel representing both exchange and interexchange carriers and are intended to facilitate efficient IEC-LEC operational interfacing. The guidelines are given in Appendix 4.

The types of emergency conditions covered by the guidelines include:

- network congestion due to facility failures or abnormal calling periods.

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- IEC switch or network failures or extended outages.
- Signaling System 7 network failures.
- termination of Access Service Customer service.

Emergency resolution options include traffic rerouting alternatives, network management controls and various types of announcements. The guidelines also cover procedures for exchange carriers to notify interexchange carriers of SS7 network failures affecting the interexchange carriers' traffic.

The NOF has also developed and maintains four contact directories for use in emergency conditions:

1) Network Management Contact Directory (Company and geographical listings),
2) Catastrophic SS7 Network Failure/Restoration Contact Directory,
3) Media Stimulated Mass Calling Event Contact Directory,
4) LIDB 800 & 900 Service Trouble Reporting Numbers.

In response to a request from the NO REST Steering Team, the NOF has developed a fifth contact list, for Mutual Aid and Assistance. It will be published in the Network Management Contact Directory section of the Network Operations Forum Reference Document.

To promote effective inter-company communications during an emergency situation, the traffic management guidelines recommend that network providers and equipment manufacturers participate in an Emergency Communications System. This system currently provides voice communications in the event of a failure of the public switched telephone network. The NOF is considering additional recommendations to further enhance inter-company emergency communications capabilities.

For additional information about the Network Operations Forum, the Network Management Guidelines, or the NOF contact lists, contact the Information Director, Exchange Carrier Standards Association, 1200 G Street, Washington, DC, (202) 434-8822.

5. Path Forward - Key Considerations in Developing Mutual Aid and Restoration Agreements

Key issues encountered during the development of the existing mutual aid agreements and "lessons learned" in developing them are documented in this section. Managers and staff responsible for the agreements have provided significant insights regarding the challenges in their development and use. The key issues covered in this section include:

- Definition of a telecommunications "Emergency,"
- Communications /contact methods,
- Liabilities /compensation,
- Confidential and proprietary information,
- Telecommunications Service Priority,
- Origins of formal agreements
- Roles and responsibilities,
- Outages affecting multiple carriers,
- Customer education,
- Exercises & mock drills.

5.1 Definition of Emergency

The definition of what constitutes a telecommunications "Emergency" is relevant to mutual aid agreements because it determines when an outage is severe enough to warrant invoking a mutual aid agreement. The definition of Emergency can encompass a number of different variables including:

- the type of telecommunications traffic that is disabled (i.e. Wall Street operations and the consequent impact on the economic well being of the country),
- the type of network element involved (i.e. STP mated pair failure),
- the number of users affected by the outage,
- loss of emergency services such as E911, interrupting emergency response capabilities in an area,
- the potential for an outage of long duration.

5.1.1 Definitions Used In Existing Formal Agreements

The definitions for "Emergency" used in the four formal mutual aid agreements are given below.

• Bellcore Client Companies NS/EP Agreement

"As declared by the Government of the United States, any event or crisis (local, national, or international) which causes or could cause injury to the population, damage to or loss of property, or degrades the NS/EP posture of the United States."

• The State of California Mutual Aid Agreement defines an "Emergency" as follows:

"An event as declared by the Governor of California, any City or County or any California Telecommunications Utility (TU) responding thereto which seriously damages a portion of the telecommunications network beyond the response/restoral capability of the responsible TU."

• The New York City Mutual Aid and Restoration Agreement defines "Emergency" as follows:

"A loss of critical wideband high capacity intrastate and/or interstate telecommunications within New York City or into and out of New York City that cannot be restored by the Failed Common Carrier(s) within two (2) hours by utilizing its (their) own spare/protect channels. An Emergency may be called by the Commissioner (of the New York City Department of Telecommunications and Energy) or by the Failed Common Carrier(s) with the concurrence of the Commissioner."

• The BellSouth Mutual Aid Agreements do not provide a precise definition of Emergency. However, both agreements discuss the need "for cooperative interaction to ensure the survivability and/or restoration of critical communications services in the event of a major network catastrophe." Further, the Tennessee Agreement describes emergencies as follows:

"While earthquakes are the primary concern in Tennessee, other emergency situations include fires, floods and other catastrophic occurrences which can cause pervasive network failures."

The common thread running through these definitions/descriptions is that mutual aid agreements should be invoked only when events are catastrophic and result in a serious disruption of service that exceeds the capability of the failed carrier to restore critical services in a timely fashion.

Another means of invoking mutual aid and restoration agreements is to establish an authority that controls use of the agreement. For example, Presidentially declared disasters put in place specific mechanisms that enable a coordinated Federal disaster response. In New York City, the Commissioner of the New York City Department of Telecommunications and Energy authorizes the use of the New York City Mutual Aid Agreement. Because outages are seldom routine events, the establishment of an agreed-upon authority provides a mechanism to evaluate each outage as an independent event. This may prove preferable to defining Emergency in sufficient detail to cover the entire scope of potential outages and their impacts.

5.1.2 TSP Emergency

The Telecommunications Service Priority (TSP) system defines emergency telecommunications services to prescribe the level of provisioning priority that specific users should be able to command. Telecommunications Services in the "Emergency NS/EP" category are those services so critical as to be required to be provisioned at the earliest possible time, without regard to the costs of obtaining them. To qualify under the Emergency NS/EP category, a service must directly support or result from various NS/EP functions.

5.2 Communications/Contact Methods

Having procedures for inter-company contacts and communications during emergencies is a key element in mutual aid and restoration. Those procedures are a significant part of the existing agreements. An excellent model is provided by the Bellcore Client Companies National Security Emergency Preparedness (NS/EP) Agreement.

The Bellcore NS/EP group is the Single Point of Contact for the Federal Government in response to events that impact Federal Government NS/EP telecommunications capability. Since divestiture, the Bellcore NS/EP group has developed a set of communications and contact methods that have served well during natural disasters, large public switched telephone network failures, and National Security incidents. The following information is a summary of what has worked for Bellcore NS/EP in response to the disasters and failures. Applying these principles should result in the development of an adequate set of mutual aid communications and contact procedures.

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In order to adequately respond to a crisis requiring implementation of a mutual aid agreement, consideration must be given to a range and mix of communications means. The Bellcore NS/EP group has assigned communications planning and operational responsibility for the emergency communications networks to a key manager within the group. This has resulted in a more detailed and cohesive emergency communications plan than when the responsibility was dispersed within the group. As a result of these efforts, emergency communications networks have been developed which are national in scope and based on the latest technology. Oversight is provided by joint planning groups consisting of appropriate representatives from the Bell Operating Companies and the Federal Government. Development and maintenance of local mutual aid and restoration plans should be based upon involvement of appropriate joint planning groups from the LECs, IECs, and governmental agencies as required.

Consideration should be given to using dedicated communications capabilities between the appropriate network management/operations control centers and the other critical work centers required for to support network restoration. Reliance solely on the public switched telephone network without appropriate backup facilities may not be adequate, considering the impact of a large network failure. The use of non-switched private lines, foreign exchange lines, private corporate network facilities, cellular, and radio are appropriate alternatives.

Because of the numerous organizational and structural changes that occur within the telecommunications industry, it is important that updated contact lists of key restoral centers and personnel be maintained. This may be accomplished in a number of ways. First, a specific update procedure should be developed. Second, the maintenance responsibility should be clearly assigned to an appropriate key individual and the performance of this responsibility should be monitored closely. Finally, consideration should be given to the use of PC-based software tools to assist in day-to-day recordkeeping.

Backup communications facilities should be tested frequently. This should include a routine of calls to key contacts to check the validity of the contact lists. Appropriate logs of tests and troubles should be maintained.

In summary, to ensure that mutual aid support can be carried out in an emergency the following key steps are required:

- Consider scenarios which will generate mutual aid requirements.
- Assign responsibility for emergency communications planning and operations to a key manager.
- Form a joint planning and oversight group.
- Develop a plan that does not rely solely on public switched network facilities.
- Develop a contact list maintenance procedure and assign responsibility.
- Test backup facilities periodically and validate contact lists.
- Practice and exercise the plan with simulated network failures at least on an annual basis.

5.3 Liabilities/Compensation

Telecommunications carriers typically utilize tariffs to define their services, their responsibilities and those of their customers, and the rates for the service. In addition, the tariff explains the carrier's liability should a customer's service be disrupted. Generally, this liability is limited to the cost of the service and does not cover any loss of revenue that the customer may incur as a result of the disruption.

In a mutual aid situation, care must be exercised about the potential liability to which an assisting carrier may be exposed by helping another carrier. As detailed below, both the California and New York City Metropolitan Region Consortium agreements address the liability issue. However, there is no mention of liability in the Tennessee and Alabama agreements.

- The California agreement addresses the issue of liability as follows:

> "Subject to applicable law, the Requester will defend, indemnify and hold the Provider harmless from any and all claims, demands, suits, judgments, liabilities, obligations, penalties or damages and the costs and expenses incident thereto (including reasonable attorneys' fees and disbursements) incurred by, imposed on, or asserted against the Provider in any way arising

out of or relating to the use of supplies, portable equipment and motor vehicles provided by the Provider or acts or omissions of either the Provider's or the Requester's employees in connection with the services rendered by the Provider pursuant to this Agreement. Provider shall promptly notify Requester of any claim, loss, or damage for which Requester is responsible under this paragraph and shall cooperate with Requester to facilitate the defense or settlement of any such claim."

• The New York City Metropolitan Region Consortium agreement addresses the issue of liability as follows:

"The FAILED COMMON CARRIER(S) shall hold harmless the RESTORAL COMMON CARRIER(S) from all claims relating to the EMERGENCY RESTORATION SERVICE that are not the direct result of gross negligence or willful misconduct on the part of the RESTORAL COMMON CARRIER(S).

"In no event shall any party to this Agreement be liable to any other party for indirect, incidental, consequential, exemplary, reliance or special damages, including, without limitation, damages for lost profits, regardless of the form of action whether in contract, indemnity, warranty, strict liability or tort."

Another important consideration that should be addressed in developing a mutual aid agreement is the issue of compensation. The complexity of this item will vary depending on the extent of sharing that is contained in the agreement. To this end, the California agreement has very detailed compensation guidelines since the agreement provides for the sharing of supplies, portable equipment, motor vehicles and personnel. For equipment, the requester is responsible for the actual cost of transporting the equipment, the administration costs associated with responding to the request, and a contribution factor applied to the total cost. For personnel, the requester is responsible for all employee travel and living expenses, fully loaded labor costs, and a contribution factor applied to the total cost.

The New York agreement is concerned only with the provision of transmission facilities. The agreement does not specify any charges other than state that the failed carrier would be expected to pay the restoral carrier reasonable and customary out-of-pocket expenses associated with providing service to the failed carrier. For example, if the restoral carrier must call out technicians to perform work for the restoration, these charges could be billed to the failed carrier. It is important to note that while no specific charges are contained in the agreement, the agreement does not preclude the carriers from filing tariffs for the services provided under the agreement. However, if such tariffs are filed, the company is obligated to provide copies of the tariff to all parties of the agreement.

5.4 Use of Confidential and Proprietary Data

All proprietary data exchanged between carriers during the use of mutual aid agreements should given confidential treatment. The NSEP, California and New York Metropolitan Region agreements all have similar provisions that address this issue. The following example is from the California agreement.

"Any specifications, drawings, sketches, models, samples, tools, computer or other apparatus programs, technical or business information or data, written, oral or otherwise (all herein designated "Information") furnished under this Agreement shall remain the property of the disclosing party. All copies of such Information in written, graphic or other tangible form shall be returned to the disclosing party at its request. Unless such Information was previously known to the receiving party or its employees, free of any obligation to keep it confidential, or has been or is subsequently made public by the disclosing party or a third party, or has been independently developed by the receiving party, such Information shall be kept confidential by the Provider and its employees at all times during and after their employment with said company. All such Information shall be used only for the purpose for which it was disclosed, shall be protected and safeguarded according to security regulations, shall not be disclosed or communicated to any third party for any reason, and shall not be used by the receiving party or its employees on its or their behalf or on the behalf of any third party, and may not be used for any other purpose except as may be agreed to between the disclosing and receiving parties in writing."

5.5 Telecommunications Service Priority (TSP) System

Following communications outages, service vendors are immediately confronted with determining what service to restore first and how to prioritize customer service requests. The primary method available for prearranging this process for critical users is through

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the use of the Telecommunications Service Priority (TSP) System.

The TSP System is the regulatory administrative, and operational system authorizing priority treatment for national security and emergency preparedness (NS/EP) services. NS/EP services are those critical for maintaining a state of readiness or responding to and managing any event or crisis which causes or could cause harm to the population, damage to property or a threat to the security of the United States. The priority treatment provided under TSP consists of priority provisioning and restoration of services with TSP assignments. The TSP System was established by the Federal Communications Commission (FCC) to replace the existing Restoration Priority (RP) System. The RP System covers only restoration of Federal government, inter-city private lines, whereas the TSP System provides for both the provisioning and restoration of all NS/EP services for Federal, state and local governments and private users. RP service subscribers must submit eligible RP circuits for TSP assignments before the end of the transition period in March, 1993. At the end of the transition period, remaining RP assignments will have no meaning and service vendors will disregard them. The TSP Program is managed and administered by the Office of the Manager, National Communications System (OMNCS).

There are two major benefits to using the TSP System. First, a user with a critical need for a new NS/EP service can get it installed or "provisioned" as soon as possible; second, a user's existing TSP services are "pre-positioned" with service vendors. In the event of an outage, the vendor already knows which services to restore first.

TSP service users are not limited to the Federal government. State, local and foreign governments may have services that qualify for TSP treatment, and certain private industry telecommunications services qualify as well. There is only one distinction in access to the TSP System between Federal users and other users of TSP services: requests for TSP assignments originating outside the Federal government must have Federal sponsors. For state and local governments, the Federal Emergency Management Agency (FEMA) will normally serve as the sponsor. Foreign governments may seek TSP assignments on services that are wholly within U.S. jurisdiction and that support NS/EP functions, or on those portions of international services that are provided by U.S. service vendors. The Departments of State or Defense will normally serve as the sponsors for foreign governments. Private or quasi-government entities may determine that they have telecommunication services supporting NS/EP functions and may want TSP assignments for those services. Any Federal organization may serve as sponsor for such requests in which the private entity directly supports an NS/EP mission of the government organization.

All local exchange, interexchange and cellular carriers, as well as resellers, are potential TSP service vendors. However, service vendors are not required to accept a TSP service order if they are not technically capable of providing priority treatment to the service. Other vendors, such as equipment vendors, may be required to expedite delivery or restoration of their equipment as part of their contracts with TSP service users.

For additional information about TSP service contact the TSP Program Manager, c/o NCS, 701 South Court House Road, Arlington, VA 22204-2198.

5.6 Origins of Formal Agreements

The four formal agreements identified in this Compendium originated in one of two ways. The establishment of the single point of contact within the Bellcore client companies for national security emergency preparedness (NS/EP) was required by the consent decree that divested the Regional Bell Operating Companies (RBOCs) from AT&T. The motivation for each of the other agreements was a need to respond to a specific requirement identified within the community and the determination that mutual aid was an effective way to respond to that need.

For example, in the State of California, the frequency of natural disasters motivated the development of the agreement. In the case of the New York City Metropolitan Region agreement, the City of New York recognized that the region's financial well-being is critically dependent on its highly concentrated communications facilities in Manhattan, an island with limited access and egress, and determined that a mutual aid agreement could have value in a telecommunications emergency. Through its Mayor's Task Force on Telecommunications Network Reliability, the City brought together fourteen interexchange carriers and coordinated their efforts in crafting the agreement.

5.7 Roles and Responsibilities

Certain roles and accompanying responsibilities are specifically assigned in the existing formal arrangements. These roles include the following:

- Declaration of the Emergency,
- Coordination,
- Signatory.

These roles and their accompanying responsibilities are discussed in the remainder of this section.

5.7.1 Declaration of Emergency

Three of the four agreements specify the role of declaring a telecommunications Emergency. (It is not discussed in the BellSouth agreement.) In each, a party other than the affected telecommunications operator is responsible for declaring the emergency condition and invoking the provisions of the formal agreement. For the Bellcore Client Company agreement, the Federal government declares the Emergency condition. For the Pacific Bell agreement, the Governor or head of any City or County in California can declare an Emergency, as can the utility experiencing the failure. In the New York City Agreement, the common carrier experiencing the failure notifies the Commissioner of the Department of Telecommunications and the Commissioner subsequently declares the Emergency. In contrast, when a carrier solicits assistance through informal agreements, the timing of resource lending and network sharing is unrelated to any official declaration of an emergency by a third party .

5.7.2 Coordination Role

Three of the agreements specify individuals or organizations responsible for coordinating the mutual aid and restoration effort. (Coordination is not discussed in the BellSouth agreement.) A Bellcore employee at the National Coordinating Center for Telecommunications is responsible for helping coordinate restoral efforts in the aftermath of a Federally declared NS/EP emergency. Resource lending under the California agreement is coordinated by either the State of California Office of Emergency Services or "directly between the involved telecommunication companies." The New York City agreement assigns the task of coordinating mutual aid communications among carriers to the New York Telephone Network Surveillance Maintenance and Assistance Center (NSMAC), which maintains a carrier mutual aid contact list and, on declaration of an Emergency, contacts each carrier and sets up a restoration conference call. If there is formal agreement, the carrier experiencing the outage is the likely coordinator. Any arrangement, whether formal or informal, should establish a point of contact and communications procedures to coordinate mutual aid communications and/or response activities.

An example that illustrates coordination under an informal arrangement is the response effort in the aftermath of the Sprint outage in Fairfax, South Carolina. In accord with pre-planned restoration procedures, Sprint convened a restoration team at its headquarters to coordinate short term and long term restoration activities. In cooperation with Sprint, BellSouth set up a secondary team to coordinate traffic rerouting within the BellSouth network. This example serves to illustrate both how coordination and restoration leadership will vary depending on the type of outage, and the difficulty associated with assigning any single coordination role in advance for all types of outages.

5.7.3 Signatory Role

Formal agreements identify the specific responsibilities of the signatories once the agreement is invoked. Typically, after restoration needs are identified, the signatories must determine whether it is within their capability to assist. For the New York Consortium agreement each carrier may have to research the availability of spare transmission facilities between specific points. The Bellcore and California agreements may be require identification of spare generators or other hardware. Signatories, however, are not obligated to provide any specific level of assistance.

For informal arrangements, written guidelines and specific responsibilities typically are not identified beforehand. Rather, the carrier experiencing the outage is dependent upon the good will and dedication to the public good of other carriers and vendors to expedite service restoration efforts.

5.8 Priority/Precedence in Outages Affecting Multiple Carriers

An outage affecting multiple carriers participating in a mutual aid agreement is possible (especially where carrier's facilities are collocated), and that situation should be clearly addressed. A neutral third party may be identified to act as arbiter in such circumstances. The New York City Metropolitan Region agreement, the only agreement addressing this situation, contains the following provision.

"When an EMERGENCY is called by the Commissioner for more than one FAILED COMMON CARRIER, and sufficient wideband high capacity transmission facilities to restore the failed facilities are not available, the RESTORAL COMMON CARRIER(S), with the concurrence of the Commissioner, will allocate the available facilities between and among the FAILED COMMON CARRIERS."

5.9 Customer Education

Recognizing that telecommunications network users must take the initiative in providing disaster protection for their own businesses, the New York City Mayor's Task Force on Telecommunications Network Reliability published two documents to give customers a point of reference for developing contingency plans for their telecommunications services.

The *Guide to Contingency Services* (see Appendix 5.1) profiles a list of products and service alternatives offered by three local New York City service providers (New York Telephone, Teleport and Metropolitan Fiber Systems) that customers can utilize to enhance the survivability of their service or to help alleviate the impact of a disaster.

The *New York Telephone Small Business Customer's Guide* (see Appendix 5.2) was published as an appendix of the Final Report of the Mayor's Task Force. It provides information about what customers can do in the event of various types of service outages, including loss of dial tone, key system not working, telephone company cable failures, central office problems and inability to make long distance calls with the regular carrier. It suggests various services that could be used to alleviate such problems and steps that customers can take in advance of a disaster.

5.10 Exercises and Mock Drills

Planning, training and exercises are the keys to an effective response to an emergency. Planning should include a development of threat scenarios which would call for activation of the mutual aid plan. Training, support systems and tools should be developed to respond to the threat scenarios. This threat analysis should be revisited each year as technology, organizations, and situations change.

A well drilled response team typically has meetings of its key players to define roles and responsibilities, review operations and discuss individual action plans. This can usually be facilitated by a one or two hour "table top" exercise. Tabletop exercises help identify communications needs and deficiencies in team assignments and operating interfaces.

Additionally, the team should participate in fully simulated network failure scenario exercises. Following the exercise a detailed critique or readout should be conducted among all the participants. Documented action plans to correct deficiencies should be prepared and assigned for implementation to improve response capability.

Specific types of drills and exercises that are conducted in various parts of the industry are discussed below.

5.10.1 NSEP Drills

Bellcore NSEP coordinates multi-functional exercises with each Bell Operating Company on an annual basis. These exercises usually involve the activation of the appropriate BOC Emergency Operations Center to test and enhance the adequacy of emergency plans and train appropriate emergency management personnel. Recent exercises have included response drills to the following: earthquakes, hurricanes, tornados, floods, nuclear/chemical spills, acts of sabotage or terrorism, network intrusion and large Signaling System 7 failures.

Bellcore usually observes and critiques these exercises based on criteria established beforehand concerning objectives and desired results. Scenarios, results and lessons learned are shared with the exercise planning personnel in the Bell Operating Companies.

A key factor in organizational participation in and support for exercises is the extent to which appropriate executive level management is involved. Their participation, curiosity and follow up sends the appropriate signals and establishes a framework for success.

5.10.2 IEC Drills

The interexchange carriers conduct mock disaster exercises to test the effectiveness of their emergency restoration plans, personnel and procedures. Sprint found this to be vital during the Fairfax, SC, switching center event since its disaster recovery committee had previously handled a similar event in a mock exercise. Sprint has a National Disaster Recovery Committee responsible for coordinating its response to catastrophic network events and conducting mock disaster exercises. If an event

occurs, the committee forms the Network Emergency Operations Center to direct all regional and local operations in restoration activities. AT&T has disaster recovery teams that are specially trained to respond to all types of disaster scenarios. These teams participate in regular, mandatory exercises to maintain their readiness. As conditions warrant, more frequent exercises are conducted. For example, when there was widespread publicity and concern about the possibility of an earthquake along the New Madrid fault in the central part of the United States, AT&T conducted drills to check its emergency preparedness.

Since the local exchange carriers play a vital part in recovery of traffic, the IECs encourage the LECs to participate in their drills. Coordination of disaster plans and joint disaster drills are an inherent part of the IECs' plans. Both AT&T and Sprint have worked extensively with BellSouth and Pacific Bell in conducting joint drills.

Since the New York City Mutual Aid and Restoration Agreement took effect in February, 1992, the New York City Department of Telecommunications and Energy and the members of the Consortium have conducted three exercises of the procedures outlined in that agreement. In each drill, a specific high capacity carrier transmission facility is identified as having failed. A restoration conference call among the members of the Consortium is set up by the New York Telephone Network Services Maintenance and Administration Center (NSMAC). Each carrier determines what spare facilities could be made available for restoration of the failed facility. The failed carrier determines how it would restore service and which, if any, of the offered facilities it would have used in an actual emergency. Each exercise takes approximately half a day.

5.10.3 Local Exchange Carrier Drills

Pacific Bell and New York Telephone provide examples of disaster exercises and simulations conducted by local exchange carriers. Pacific Bell carries out extensive disaster preparation exercises and simulations in each of its operating areas every year . Nine separate exercises were conducted in 1992. Participants have included the Bellcore NS/EP organization, the State Office of Emergency Services, State and county government agencies, other utilities, interexchange carriers, other local exchange carriers, and equipment vendors. In the course of these drills the California Emergency Resource Allocation Agreement is exercised, by requesting vendors and other carriers to identify resources and facilities they could make available for service restoration.

New York Telephone conducts "tabletop" exercises of its procedures for responding to a central office disaster. These drills are conducted in association with the New York City Mayor's Task Force on Telecommunications Network Reliability, but are not associated with any formal agreement. These exercises involve the development of a disaster scenario, setting up corporate and local restoration control centers and developing a specific restoration plan with the active participation by suppliers of switching, transmission and mechanical equipment and Bellcore. The Mayor's Task Force has participated in planning and reviewing these exercises and will observe future exercises. Since these exercises are not related to any formal mutual aid and restoration agreement, they highlight the fact that having a formal mutual aid agreement is not a precondition for conducting inter-company disaster restoration drills.

6. Conclusions

The Mutual Aid and Restoration Compendium Focus Team's investigations affirm that there is extensive inter-carrier and carrier-vendor cooperation and coordination prior to and during emergencies and disasters threatening or impairing telecommunications networks. This has been repeatedly demonstrated, most recently in the responses to Hurricane Andrew and the Fairfax, South Carolina, outage.

These cooperative efforts have taken place even though there are relatively few formal agreements for mutual aid and assistance. This strong spirit of cooperation is evidence of the existence throughout the industry of what are, in effect, informal arrangements for mutual aid and assistance. Though the arrangements are informal, the parties involved maintain up-to-date contact lists and have procedures in place for contacting one another once an emergency condition has been recognized. Commitment to prompt notification, cooperative interaction and the provision of technical and material assistance during emergencies is general throughout the industry.

The formal agreements that exist are, by design, limited in scope and applicability. Each was motivated by and addresses a specific need, such as high likelihood of natural disaster, highly geographically concentrated telecommunications facilities, or critically important services. This

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compendium, by providing the text of the existing major agreements and through highlighting key learnings that make them effective, can serve as a guide for planners considering the development of formal mutual aid agreements. It provides guidelines and examples of format and content from which models for such agreements may be developed. Through highlighting how day-to-day telecommunications industry cooperation serves to coordinate response and recovery efforts, the compendium can help planners weigh whether normal telecommunications industry response efforts are sufficient to meet their needs or whether a specific need justifies the development of a formal mutual aid agreement.

Good communications plans and procedures to facilitate notification and cooperation are critical to the orderly and prompt response to emergency conditions. At a minimum carriers must have a communications structure in place to be used for timely notification of affected parties in the event of disasters or emergencies. The minimum requirements for such an emergency communications structure are:

- Carriers' Network Management/Operation Centers must know who and how to contact one another and have procedures for doing so.

- Contact lists which must be updated and published regularly.

Further, a carrier experiencing a significant telephone service outage must be prepared to contact all relevant Network Management/Control Centers as soon as possible to facilitate the evaluation of restoration alternatives. Where particular circumstances dictate, this essential communications structure may be augmented by voluntary participation in formal mutual aid and restoration agreements. In drafting any formal agreement, care must be taken that the agreement in no way hinders response and restoration efforts by requiring unnecessary contacts and communications.

To enhance the inter-company communications structures that already exist, the Network Operations Forum of the Exchange Carriers Standards Association has compiled and will maintain a Mutual Aid Contact Directory.

The National Communications System's National Coordinating Center for Communications (NCC) has volunteered to be the ongoing custodian of the Mutual Aid and Restoration Compendium. For additional information please contact the Assistant Manager, NCS Office of Emergency Preparedness, 701 South Courthouse Road, Alexandria, VA, 22204-2198.

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Acronyms

ALTS - Association of Local Telecommunications Service Providers

BCC - Bellcore Client Companies

CFG - Communications Functional Group

CTIA - Cellular Telephone Industry Association

ECSA - Exchange Carriers Standards Association

HF - High Frequency (radio)

IEC - Interexchange Carrier

LEC - Local Exchange Carrier

MFS - Metropolitan Fiber Systems

NCC - National Coordinating Center for Telecommunications

NCS - National Communications System

NOF - Network Operations Forum

NRC - Network Reliability Council

NSEP - National Security / Emergency Preparedness

NSTAC - National Security Telecommunications Advisory Committee

NTMS - National Telecommunications Management Structure

PSN - Public Switched Network

RBOC - Regional Bell Operating Company

SHARES - Shared Resources High Frequency Radio Program

SS7 - Signaling System 7

TSP - Telecommunications Service Priority