

NRIC VII

June 14, 2005

FOCUS GROUP 1C

Analysis of Effectiveness of Best Practices
Aimed at E9-1-1 and Public Safety

Report #3 – Effectiveness of Best Practices for
Emergency Communications

Table of Contents

1	Results in Brief.....	2
2	Introduction	2
2.1	Structure of NRIC VII.....	2
2.2	Focus Group 1C Team Members	3
3	Background.....	3
4	Objective, Scope, and Methodology	5
4.1	Objective.....	5
4.2	Scope	5
4.3	Methodology.....	6
5	Analysis and Findings.....	8
5.1	Analysis	8
5.2	Findings.....	10
6	Next Steps	11
7	Appendices	12
7.1	Best Practices developed to address E9-1-1 and Public Safety	12
7.2	NENA Master Glossary of 9-1-1 Terminology	23

1 Results in Brief

Focus Group 1C examined a total of 58 existing NRIC Best Practices that were seen as directly impacting E9-1-1 and Public Safety. A qualitative survey was conducted among the member companies of the Focus Group to determine how effective these Best Practices are in addressing emergency communications in general, and by extension E9-1-1 networks and Public Safety. The results are as follows:

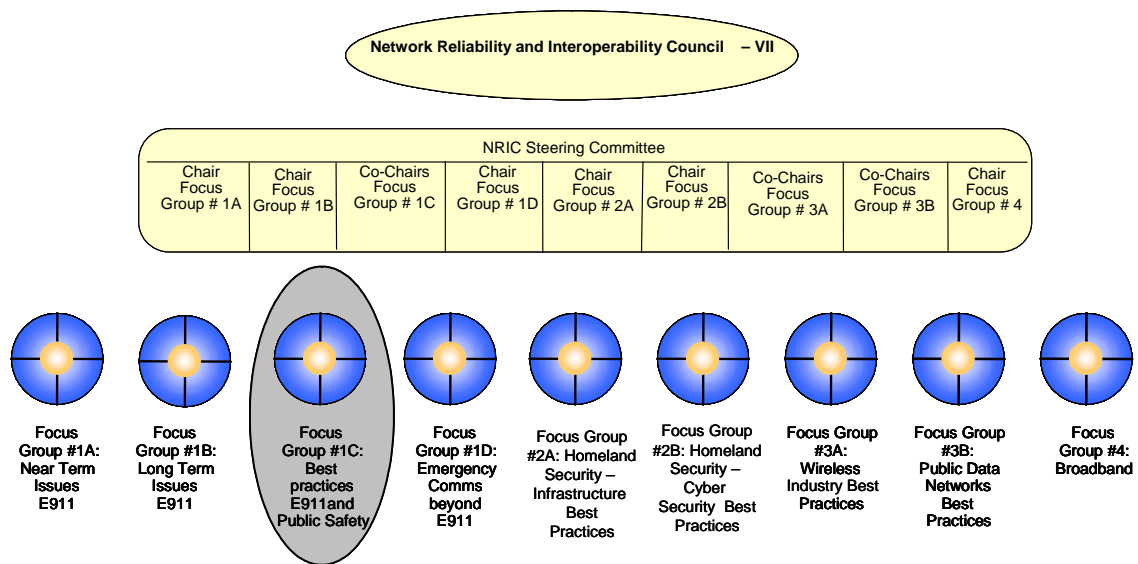
- 33 of these Best Practices were rated as effective
- 3 of these Best Practices were rated as no longer effective and will be recommended for deletion.
- 22 of these Best Practices were rated as generally effective, but were deemed to require some degree of modification or updating. The recommended changes will be incorporated in Focus Group 1C’s final report scheduled for release in December 2005.

2 Introduction

This report documents the efforts undertaken by the Network Reliability and Interoperability Council (NRIC) VII Focus Group 1C with respect to the effectiveness of Best Practices for the E9-1-1 network, Public Safety and emergency communications in general.

2.1 Structure of NRIC VII

The structure of the Network Reliability and Interoperability Council is as follows:



2.2 Focus Group 1C Team Members

Focus Group 1C consists of 25 members with representatives from both Public Safety and the telecommunications industry. The group was broken into two subgroups to conduct an intra-group qualitative survey to determine the effectiveness of Best Practices for Emergency Communications.

Focus Group 1C Members

Name	Company
Michael Anderson	Ericsson
Jay Bennett	Telcordia Technologies
Jim Beutelspacher	Minnesota State E9-1-1
Rick Canaday	AT&T
Doug Edmonds	Northwest Central Dispatch
Ann Gasperich	TAG Consulting
Bob Iwaszko	Verizon Wireless
Percy Kimbrough	SBC
Bill Klein	ATIS
Richard Krock	Lucent Technologies
Ben Lightner	BellSouth
Spilios Makris	Telcordia Technologies
Jeng Mao	NTIA
Ron Mathis	Intrado
Brad McManus	Sprint
Bob Oenning	Washington State E9-1-1
John Rollins	Verizon
John Rosnick	Nextel
Jim Runyon	Lucent Technologies
Robert Schafer	MCI
Thom Selleck	AT&T
Kevin Smith	Nortel Networks
Whitey Thayer	FCC Observer
Rachel Torrence	Qwest
Carla Wirths	Sprint

3 Background

The Network Reliability and Interoperability Council was originally established to study the causes of service outages within and between the nation's

telecommunications networks and to develop recommendations to reduce their number and mitigate their effect on consumers.¹ The focus through NRIC V remained predominantly on telecommunications service and equipment providers. The focus was consistent with the ongoing evolution of technology and introduction of new players in the industry. However, the September 11, 2001 terrorist attacks highlighted the need to include the participation of the Public Safety and Emergency Management Sectors in the NRIC deliberations.

In the wake of the attacks, in March 2002 NRIC VI chartered a Homeland Security Focus Group to develop Best Practices to prevent disruptions of public telecommunications services and the Internet and to effectively restore those services in the case of disruptions.

Under this Focus Group a Public Safety subcommittee was formed to identify the needs of the Public Safety sector and to make recommendations that would ensure that commercial telecommunications services networks could continue to meet the special needs of public safety emergency communications. The subcommittee addressed issues such as the means to prioritize, as appropriate, Public Safety usage of commercial services during emergencies.²

The Public Safety subcommittee identified communications service needs in times of crisis by conducting a nationwide survey of numerous Public Safety entities, and then made Best Practice recommendations to address issues identified in the survey. Included among the recommendations were suggested changes to existing Best Practices and the creation of several new Best Practices specifically developed to address the emergency communications needs of the Public Safety sector.

NRIC VII Focus Group 1C used these Public Safety Best Practices developed during NRIC VI, as well as existing Best Practices that address the E9-1-1 network, the Public Safety Answering Points (“PSAPs”) and/or other emergency communications, as a baseline in determining the impact of Best Practices on emergency communications. (Best Practices that address general network infrastructure, while they might support emergency services, do not address the E9-1-1 network or emergency service directly and were, therefore, not included in this analysis.)

For this June 2005 deliverable, the Focus Group conducted a qualitative survey of the effectiveness of the applicable Best Practices. This report details the results of

¹ www.nric.org

² Homeland Security Public Safety Final Report, NRIC VI, www.nric.org

that survey and sets the stage for the updates to Best Practices that the Focus Group deems necessary.

The Focus Group noted that there was a strong carrier focus to the Best Practices from NRICs I-VI and determined that, due to the interdependencies between 9-1-1 services and Public Safety services, it is advisable to either develop relevant parallel Best Practices for Public Safety Answering Points or revise existing Best Practices to include Public Safety.

4 Objective, Scope, and Methodology

4.1 Objective

The NRIC VII Council has been charged with reporting on ways to improve emergency communications networks. Per the NRIC VII Charter, Focus Group 1C is responsible for performing an analysis of the effectiveness of Best Practices aimed at E9-1-1 and Public Safety.

Report number three addresses the third interim deliverable identified in the NRIC VII Charter for Focus Group 1C: “By June 24, 2005, the Council shall present a report on its survey to determine how effective Best Practices have been for emergency communications.”³

4.2 Scope

The scope of this document is limited to the Best Practices developed by previous NRICs that directly address E9-1-1 networks, Public Safety or emergency communications. It does not address those Best Practices which have a broader scope and whose implications reach beyond E9-1-1 and Public Safety. The Best Practices for the survey were identified through a series of keyword searches of the NRIC Best Practice database, as described in the September 2004 report from this Focus Group.

The Focus Group determined that the survey would only measure impact to 9-1-1 networks, PSAPs, emergency management, and public safety entities. Based on this defined focus, it was determined that numerous Best Practices listed in the September report were outside the scope of the intended analysis. The Focus Group reached a consensus to remove these from their survey list. One additional Best Practice that was not included in the September report was

³ NRIC VII Charter, www.nric.org

revisited and it was determined to be applicable and was included for analysis by the group.

This report contains the results of the qualitative survey conducted by Focus Group 1C among its members who applied consistent evaluation criteria to determine the effectiveness of 58 Best Practices pertaining to emergency communications.

The final report for Focus Group 1C, due in December 2005, will include an updated version of the existing Best Practices for emergency communications.

4.3 Methodology

The following is the methodology that Focus Group 1C utilized to develop this report:

- 1) Best Practices relating to 9-1-1 networks, Public Safety and emergency communications were identified. The group started with the Best Practices identified in its September 2004 report⁴ as relating to 9-1-1/E9-1-1 outages and Public Safety. This list had been developed through a series of key word searches. After reviewing this list, the group removed those Best Practices that were: a) not developed specifically to address E9-1-1 and Public Safety (i.e., had broader implications across other networks) and b) under review by other Focus Groups.

FG 1C then reviewed the NRIC VI final report from the Public Safety subcommittee and identified one additional Best Practice that it deemed relevant to emergency communications. This Best Practice was added to the survey list, leaving the Focus Group with 58 Best Practices to be evaluated for effectiveness for emergency communications.

Once an agreed upon list was compiled, the Best Practices were grouped into the following categories (these are the same categories used in the first Focus Group report):

- Diversity/Redundancy
- Contingency/Emergency Planning
- Cooperation/Communications with Emergency Service Entities
- Data Assurance/Traffic Management
- Prevention
- Emergency Management

⁴ “Focus Group 1C, Report #1”, <http://www.nric.org/fg/index.html>

- Media/Public Awareness
- 2) Evaluation criteria by which the effectiveness of each Best Practice would be judged were established. Each Best Practice was evaluated using the following criteria:
- The extent and frequency of implementation
 - The contribution to emergency communications (whether through reduced 9-1-1 outages, improved emergency response, or delivery of critical information)
 - The technical feasibility, relative to cost

Overall effectiveness for each of the identified Best Practices was judged based on application of the stated criteria, as well as the expertise of both subject matter experts in the group, and those solicited for input by members of the group. The existence of other possibly more effective Best Practices was also explored and noted.

- 3) Subgroups were established to evaluate categories of Best Practices. In order to more effectively manage the amount of data being evaluated, the Focus Group split up into two subgroups, each focusing on a different set of Best Practices.

Subgroup 1, led by Rachel Torrence of Qwest, focused on Best Practices related to:

- Data Assurance/Traffic Management
- Prevention
- Emergency Management
- Media/Public Awareness

Subgroup 2, led by Ron Mathis of Intrado, focused on Best Practices related to:

- Diversity/Redundancy
- Contingency/Emergency Planning
- Cooperation/Communications with Emergency Services Entities

Each subgroup performed a round table analysis on the effectiveness of its assigned Best Practices and determined which Best Practices were effective and which were no longer effective. Furthermore, this analysis yielded a list of Best Practices that will require additions or modifications.

4) The findings of each subgroup were combined. The full Focus Group came together in a two-day meeting to review the work of each subgroup, to compile the final list of relevant Best Practices, and to finalize the results to be included in its report. All analyzed Best Practices were placed into one of the following categories:

- Effective
- Effective – Needs Modification
- No Longer Effective – Recommend for Deletion

The discussion around these Best Practices yielded additional data that was captured for later use as part of the Focus Group’s next deliverable.

- 5) While conducting the analysis of its survey results, it was necessary for the Focus Group to make the following assumptions and decisions.
- The Best Practices selected for the survey were directly applicable to 9-1-1 and Public Safety. Other Best Practices that support 9-1-1 and Public Safety as part of the general reliability of the PSTN were not included in this analysis.
 - Every Best Practice was assumed to have been implemented and effective at some point in time. When determining that a Best Practice was no longer effective, the Focus Group sought an indication of what circumstances had changed or how the promise of the Best Practice had otherwise failed to develop.
 - The Focus Group used materials outlining the approach used across other NRIC VII Focus Groups to develop the survey criteria.
 - Best Practices were evaluated in terms of cost based on technical feasibility and implementation criteria.⁵
 - The criteria were used as a facilitation tool to drive discussion around the effectiveness of Best Practices. Ratings for each Best Practice were predicated on informal evaluations based on subject matter expertise, experience and industry knowledge.

5 Analysis and Findings

5.1 Analysis

In conducting the analysis, it became evident that each Best Practice fell into one of the following three classifications of effectiveness.

⁵ Cost in this case was not identified as a specified monetary amount, but as a general cost level (e.g., high cost, low cost)

Effective: Focus Group 1C determined that 33 of the Best Practices developed to address E9-1-1 and Public Safety were effective in addressing the robustness of emergency communications networks.

For a Best Practice to be considered effective, the Focus Group determined that it met one or more the following criteria:

- Is currently implemented by numerous parties
- Is technically feasible to implement
- Has contributed to:
 - Reduction of 9-1-1 outages
 - Improved emergency response
 - Delivery of critical information to the public or Public Safety
- A more effective Best Practice does not exist

Effective – Needs Modification: Focus Group 1C determined that 22 of the Best Practices developed to address E9-1-1 networks and Public Safety were generally effective in addressing emergency communications, but required some editing or updating to ensure current applicability and accuracy. Planned changes to Best Practices include:

- Standardization of language into Best Practice format
- Clarification of existing language
- Updating of references to include current information
- Inclusion of additional responsible parties
- Elimination of duplication
- Broadening of focus
- Narrowing of focus
- Separation of multiple issues

No Longer Effective – Recommend for Deletion: Focus Group 1C also determined that three of the Best Practices developed to address E9-1-1 networks and Public Safety were no longer effective. These Best Practices were considered to have been overcome by events and should therefore be deleted. New developments that surpassed Best Practices included:

- New network architectures
- Regulatory changes

Recommendations for Best Practice modifications, additions and deletions will be developed from the survey results and presented in the Focus Group's final report.

The Appendix of this report contains the Best Practices that were reviewed for effectiveness for Emergency Communications.

5.2 Findings

The Focus Group found that the Best Practices for 9-1-1 networks, Public Safety and emergency communications are generally applicable and effective. Of the 58 Best Practices reviewed by Focus Group 1C, 95% were considered “Effective” by virtue of their contribution either to reducing 9-1-1 outages, improving emergency response, delivering critical information, or some combination of the three. While considered effective, the application of these Best Practices was recognized, nonetheless, as being situational depending on demographics, geography, available technology, carrier and PSAP resources, and the availability of infrastructure.

Historically, the Best Practices have had a strong carrier focus. The recent direct participation by Public Safety in the NRIC process led to the recognition that Public Safety plays a significant role and shares responsibility in the collective management of emergency communications systems and networks. Thus, it was determined that many of the “Effective” Best Practices, currently aimed at traditional telecommunications industry players, should have parallels for PSAPs. The Focus Group resolved to:

- Suggest extension of the existing Best Practices to include Public Safety, where relevant
- Encourage the future development of new Best Practices with a focus on Public Safety’s roles and responsibilities
- Encourage collaborative partnerships

Finally, several key procedural issues were identified that the Focus Group will consider as it works to make the 9-1-1 and Public Safety Best Practices even more effective.

- Many of the emergency communications Best Practices are long, complex and at times, rather ambiguous. The Focus Group will work to simplify these and ensure that they conform to Best Practice format.
- Several emergency communications Best Practices are duplicative of one another or contain a substantial overlap of issues. The Focus Group will work to ensure that very similar issues are addressed in one, definitive Best Practice, where this can be accommodated.
- Some of the Best Practices addressing emergency communications are also being reviewed by other Focus Groups. Cross Focus Group coordination is necessary to assure that conflicting changes

are not proposed to the Council, while ensuring that the concerns of all parties are addressed.

- When reviewing the Best Practices, the Focus Group found it helpful to refer to the rationale and history behind the Best Practices, when available. The group will work to include similar data with the updates it recommends for NRIC VII.

The process of conducting this survey and the results of this survey led to several findings that will significantly shape the Focus Group's work through the final deliverable. Key findings related to the content of the Best Practices will be considered as the Focus Group develops recommendations to modify, delete and add new Best Practices. Several key findings related to the process of reviewing and revalidating Best Practices also indicated a need to maintain the quality of the Best Practices.

6 Next Steps

With the completion of the survey and analysis as to the level of effectiveness of Best Practices addressing emergency communications, the next step for Focus Group 1C will be to refine the language of the existing Best Practices developed for E9-1-1 networks, Public Safety and emergency communications. The goal will be to make them more effective in addressing the prevention of E9-1-1 network outages, improved emergency response and/or the delivery of critical information.

The group will also work to further include PSAPs in the appropriate "Effective" Best Practices or to develop Public Safety parallel Best Practices as applicable.

The Focus Group recognizes the need to reconcile and harmonize its work on Best Practices with the work of other Focus Groups.

These revised Best Practices will be provided to the Council in accordance with the December 16, 2005 deliverable:

"By December 16, 2005, the Council shall submit a report containing the newest version of each of the Best Practices for emergency communications. The report shall be based on its Best Practices survey and shall include revised language for the Best Practices to make them more precise. The report shall also summarize conclusions from its analysis of 63.100 outages. "

Focus Group 1C previously reported on messaging options when 9-1-1 dialing becomes unavailable. The Focus Group has been asked to and will report on a related deliverable by December 16, 2005:

“Enumerate and evaluate the factors that should be considered in deciding whether redundant E9-1-1 tandems and alternate PSAPs should be provided to avoid a “fast busy” or a recorded message when one or more non-redundant network elements fail.”⁶

7 Appendices

7.1 Best Practices developed to address E9-1-1 and Public Safety

Following are the Best Practices which were included in Focus Group 1C’s survey to determine how effective Best Practices have been for emergency communications.

Best Practice Number	Best Practice Text	Effectiveness Rating
Diversity/Redundancy		
6-5-0566	<p>Diverse Interoffice Transport Facilities - When all 911 circuits are carried over a common interoffice facility route, the Public Safety Answering Point (PSAP) has increased exposure to possible service interruptions related to a single point of failure (e.g., cable cut). The 911 circuits should be placed over multiple, diverse interoffice facilities.</p> <p>Diversification may be attained by placing half of the essential communication circuits on one facility route, and the other half over another geographically diverse facility route (i.e., separate facility routes).</p> <p>Option 1: Diverse Interoffice Transport Facilities with Standby Protection - A variation of the facility diversity architecture is deployment of a 1-by-1 facility transport system. This architecture is protected by a standby protection facility that is geographically diverse from the primary facility. Because no calls are lost while switching to the alternate transport facility during primary route failure, this architecture is considered self-healing.</p> <p>Option 2: Diverse Interoffice Transport Facilities Using Digital Cross-connect System (DCS) - Earlier NRC Focus Group recommendations suggested using diverse interoffice transport facilities from the called serving end office via two diverse DCS. This approach provides diversity and, due to the concentration by the DCS network elements, offers a less costly network solution.</p> <p>Option 3: Fiber Ring Topologies for 911 Circuits - Fiber optic network elements offer network service providers the ability to aggregate large amounts of call traffic onto one transport facility.</p>	Effective - Needs Modification

⁶ NRIC VII Charter, www.nric.org

	<p>Traffic aggregation opposes the diverse facility transport recommendations defined in this document. However, fiber rings permit a collection of nodes to form a closed loop whereby each node is connected to two adjacent nodes via a duplex communications facility. Fiber rings can provide redundancy such that services may be automatically restored (self-healing), allowing failure or degradation in a segment of the network without affecting service. Bi-directional fiber rings are used in some metropolitan areas, ensuring essential communications service is unaffected by cuts to fibers riding on the ring. Ring features and functionality are part of the Synchronous Optical Network (SONET) technical requirements. When essential communications is placed on self-healing SONET rings, service interruptions are minimized due to the architecture employed. This is only true so long as single points of failure do not negate the architectural redundancies. Examples of single points of failure include bi-directional rings within the same route, transport, facility etc.</p>	
<p>6-5-0569</p>	<p>Option 1: PSTN as a Backup for 911 Dedicated Trunks - To ensure that 911 is minimally affected by potential traffic congestion sometimes experienced in the PSTN, PSAPs commonly create dedicated private public safety networks. A low-cost alternative for handling 911 calls during periods of failure in the end office-to-911 tandem transport facility, is to use the PSTN as a backup between the caller's end office and the 911 tandem switch. Such applications may or may not make use of adjunct devices that monitor primary trunk path integrity. If the primary path to the 911 Tandem switch should be interrupted or all-trunks-busy, the call may be forwarded over the PSTN to a preprogrammed directory number. Further, the caller may be identified if the administrative line is equipped with a caller identification (ID) device.</p> <p>Option 2: Wireless Network as Backup for 911 Dedicated Trunks - Similar to the PSTN backup for completing 911 calls when the primary transport facility is interrupted, wireless networks may provide more diversity than the PSTN alternative.</p>	<p>Effective - Needs Modification</p>
<p>6-5-0570</p>	<p>Intraoffice 911 Termination to Mobile PSAP - Commonly, the transport facility between the PSAP and the serving end office may not have facility route diversity. To accommodate instances where these facilities are interrupted or it becomes necessary to evacuate the PSAP location, some PSAPs have established mobile PSAP systems that may be connected to phone jacks at the serving end office. The phone jacks, although usually installed inside the end office for security purposes, are typically installed in an accessible location for ease in locating them during an emergency. Some PSAPs have prearranged with the serving LEC to permit a jurisdictional employee having an emergency vehicle (e.g., police car) equipped with radio capability to retain a key to the LECs' end office and to connect to an RJ-11 jack for 911 call interception. Another type of receptacle may be pre-installed in the end office</p>	<p>Effective</p>

	for connection to a mobile PSAP.	
6-5-0571	Dual Active 911 Tandem Switches - Dual active 911 tandem switch architectures enable circuits from the callers serving end office to be split between two tandem switches. Diverse interoffice transport facilities further enhance the reliability of the dual tandem arrangement. Diversity is also deployed on interoffice transport facilities connecting each 911 tandem to the PSAP serving end office.	Effective
6-5-0572	<p>Traffic Operator Position System (TOPS) as a 911 Tandem Backup - Operator services tandem switches can also serve as backup and/or overflow for network elements, due to their ubiquitous connectivity throughout the telephone network. In most instances, existing trunking and translations may be used when adding a TOPS to the 911 network.</p> <p>When an interoffice transport facility fails or an all-trunks-busy condition occurs, the backup/overflow route to the operator services tandem is selected. The operator tandem switch recognizes the call as an emergency by translating the 911 dialed digits, and may be preprogrammed to automatically route the call to the serving 911 tandem switch.</p> <p>Further, if the operator tandem switch is unable to access the 911 tandem switch, the call will automatically be "looped around" so that an operator may manually answer the call and manually attempt to reach an emergency services provider.</p>	Not Effective - Recommend for Deletion
6-6-0580	<p>Critical Response Link Redundancy/Diversity and Security - The redundancy and diversity concepts set forth in Best Practice 6-5-0566 should be applied to other network links considered vital to a community's ability to respond to emergencies. Security practices and concepts set forth in the Security Best Practices should be applied to the critical systems supporting Link Redundancy and Diversity. Critical links include point-to-point private circuits used by Public Safety networks for radio site communications, but obtained from commercial landline communication providers. Types of links that are critical to the provision of emergency aid include communication links from the PSAP location to:</p> <ul style="list-style-type: none"> ○ Law enforcement dispatchers and/or response personnel. ○ Emergency medical service (EMS) dispatchers and ambulance response units. ○ Fire fighter dispatchers and response personnel. ○ Hazardous material control centers and other agencies offering remote diagnostic information and advice on how to respond to requests for emergency aid. ○ Trauma centers and similar emergency hospices. <p>Standards should be supported to address interconnection issues between PSAP and CMRS, cable television service providers. Media and Repair Link Redundancy/Diversity - the redundancy and diversity concepts set forth in Best Practice 6-5-0566 also</p>	Effective

	<p>should be applied to network links considered vital to a community's ability to respond to emergencies. Types of links that are critical to the provision of emergency aid during such events include communication links from the PSAP location to broadcast media organizations and local network provider repair centers.</p> <p>Media organizations can alert the public during periods of emergency network degradation or outage through appropriately worded public service. In addition, dedicated network links and/or alternate accesses to network provider repair personnel will ensure that interruptions are known immediately and that repair personnel are mobilized expeditiously.</p>	
6-6-1007	Service Providers, Network Operators and Equipment Suppliers should consider establishing a geographically diverse back-up Emergency Operations Center.	Effective
6-6-1033	Network Operators should develop a strategy for employment of emergency mobile assets such as Cellular on Wheels (COW), Cellular Repeater, Switch on Wheels (SOW), Transportable Satellite Terminals (RF equipment), Microwave, Power Generators, HVAC, etc. for emergency deployment and service augmentation.	Effective
6-6-3205	Service providers, network providers and public safety organizations should participate in standards bodies that establish standards for Emergency Telecommunications Services (ETS). ETS is an initiative from the Federal Government so that public safety and first responders have a secure and easily accessible network during times of disasters or national emergencies. 911 is considered a critical service during times of emergency and national disasters and should be included in standards being developed for ETS.	Effective - Needs Modification
6-6-5078	Service Providers and Network Operators should consider establishing and ensuring dual transmission of all sensitive alarms and reliability of all communications links between the areas of critical infrastructure and monitoring stations in order to prepare for possible communication failures during emergency or disaster situations.	Effective
6-6-5204	Service Providers, Network Operators and Property Managers should ensure availability of emergency/backup power generators to maintain critical communications services during times of commercial power failures, including natural and manmade occurrences (e.g., earthquakes, floods, fires, power brown/black outs, terrorism). The emergency/backup power generators should be located onsite, when appropriate. Consider contingency contracts in advance with clear terms and conditions for mobile generators (i.e. Delivery time commitments, T&Cs).	Effective
Contingency / Emergency Planning		
6-5-0574	Network Management Center and Repair Priority - Network Management Centers (NMCs) should remotely monitor and manage the 911 network components. The NMCs should use network controls where technically feasible to quickly restore 911	Effective - Needs Modification

	service and provide priority repair during network failure events.	
6-5-0587	Users, Network Operators and Service Providers of critical services to National Security and Emergency Preparedness (NSEP) users should avail themselves of the Telecommunications Service Priority (TSP) priority restoration for critical facilities. The TSP Program is a FCC program used to identify and prioritize telecommunication services that support NSEP missions. The TSP Program also provides a legal means for the telecommunications industry to provide preferential treatment to services enrolled in the program. More information on the TSP Program can be obtained from the National Communications System (NCOS) Office of Priority Telecommunications, Manager National Communications System, Attn: OPT/N3, 701 South Courthouse Road, Arlington, Virginia 22204-2198, on telephone 703-607-4932 or email at TESP@NCS.GOV.	Effective
6-5-0598	Develop crisis management exercises - Service Providers should, at a minimum, have a communications structure in place for timely notification of affected parties in the event of disasters or emergencies. During the past several years a number of disastrous events have prompted an increased awareness on the part of all members of the telecommunication industry to the critical need to have a Disaster Preparedness strategy. This strategy should outline a network Service Provider's Disaster Preparedness organization, the roles, responsibilities and training of its members and provide for cooperative interaction among both internal and external organizations. The purpose of this strategy is to provide for the development of emergency plans that protect employees, ensure service continuity and provide for the orderly restoration of critical services in the event of a major network catastrophe.	Effective
6-6-0513	Service Providers and Network Operators should maintain a "24 hours by 7 days" contact list of other providers and operators for service restoration for inter-connected networks. Where appropriate, this information should be shared with Public Safety Service and Support providers. The NIIF web site is http://www.attis.org/atis/clc/niif .	Effective - Needs Modification
6-6-0577	911 Contingency Plan Training - Once a contingency plan is developed, it should be periodically tested. These tests can be of various types: <ul style="list-style-type: none"> o desktop check tests (using a checklist to verify familiarity of "what to do in case of") o procedures verification test (verify that established procedures are followed in a simulation) o simulation test (similar to a fire drill, e.g., simulating a disaster and monitoring the response) o actual operations test (cause an event to happen, e.g., power or computer failure and monitor the response) o actual security checks to verify the security of the essential service nodes (e.g., access controls to the ALI and MPC databases). 	Effective

	<p>The importance of testing a contingency plan is critical to its success. An annual schedule of testing and evaluating written results is an excellent method of ensuring that a plan will work in the event of a disaster and for identifying weaknesses in the plan. Close cooperation between a Service Provider and the PSAP in conducting actual operations testing will be of mutual benefit to both the Service Provider and the PSAP. An annual comprehensive operational test of the contingency plan is strongly encouraged.</p>	
6-6-0586	<p>Service Providers of critical services to National Security and Emergency Preparedness (NSEP) users should avail themselves of the Telecommunication Electric Service Priority (TESP) restoration initiative. The TESP initiative helps to ensure relatively stable NSEP communications by enabling utility companies to efficiently identify critical national, state, and local NSEP telecommunications facilities that qualify for priority restoration of electric service. Therefore, by participating in the TESP initiative, telecommunications Service Providers, utility companies, and state organizations and Public Safety Service and Support organizations collectively serve to ensure that essential national defense and civilian requirements are met. More information on the TESP initiative can be obtained from the National Communications System (NCS) Office of Priority Telecommunications, Manager National Communications System, Attn: OPT/N3, 701 South Courthouse Road, Arlington, Virginia 22204-2198, on telephone 703-607-4932 or email at TESP@NCS.GOV.</p>	Effective - Needs Modification
6-6-0599	<p>Test a Network's Operational Readiness through planned drills or simulated exercises. Service Providers should conduct exercises periodically keeping the following goals in mind:</p> <p>The exercise should be as authentic as practical. Scripts should be prepared in advance and team members should play their roles as realistically as possible.</p> <p>While the staff must be well prepared, the actual exercise should be conducted unannounced in order to test the responsiveness of the team members and effectiveness of the emergency processes. Also, callout rosters and emergency phone lists should be verified. Early in the exercise, make sure everyone understands that this is a disaster simulation, not the real thing! This will avoid unnecessary confusion and misunderstandings that could adversely affect service.</p> <p>It is particularly important to coordinate disaster exercises with other Service Provider, Public Safety Providers and vendors. It is very important immediately following the drill to critique the entire procedure and identify "lessons learned". These should be documented and shared with the entire team.</p>	Effective - Needs Modification
6-6-0619	<p>All Service Providers and Public Safety Providers should develop and/or ensure that appropriate pre-plans with fire agencies exist</p>	Effective

	for all equipment locations and provide automatic notification to local fire department.	
6-6-0655	Service Providers and electric utilities should plan jointly to coordinate hurricane and other disaster restoration work. Service Providers should proactively include Public Safety Service and Support Providers when developing disaster restoration and prioritization plans.	Effective - Needs Modification
6-6-1003	The Business Continuity Plan for Service Providers and Network Operators should address critical business processes (e.g., Call Completion, 911/Emergency Services, Provisioning, Maintenance, etc.), support functions (IT, Sourcing, Logistics, Real Estate, etc.) and key business partners.	Effective
6-6-1006	Service Providers, Network Operators and Equipment Suppliers should consider establishing a designated Emergency Operations Center. This center should contain tools for coordination of service restoral including UPS, alternate means of communications, maps, and documented procedures to manage business interruptions and/or disasters.	Effective
6-6-1009	Service Providers, Network Operators and Equipment Suppliers should regularly exercise their Disaster Recovery Plans. Exercise scenarios should include natural and man-made (e.g., nuclear, biological, and chemical) disasters.	Effective
6-6-1010	Service Providers, Network Operators and Equipment Suppliers should designate personnel responsible for maintaining the Disaster Recovery Plans.	Effective
6-6-1023	Service Providers, Network Operators, and Equipment Suppliers should identify key individuals within their organizations that are critical to disaster recovery efforts. Planning should consider maximizing the availability of these individuals.	Effective
6-6-1031	Service Providers and Network Operators should consider entering into Mutual Aid agreements with partners best able to assist them in a disaster situation using the templates provided on the NRIC and NCS websites. (www.ncs.gov/ncc/main.html and www.nric.org/meetings/meeting20020913.html)	Effective - Needs Modification
6-6-1057	Service Providers, Network Operators, and Equipment Suppliers should ensure deployment of Government Emergency Telecommunications Service (GETS) cards to appropriate Disaster Recovery personnel. Appropriate training and testing should be provided as necessary.	Effective
6-6-1062	Service Providers and Network Operators should establish and maintain an interface with local, state, and federal government agencies to ensure effective support is available upon request as part of disaster recovery.	Effective
6-6-1063	All Service Providers and Network Operators should set Initial Address Messages (IAMs) to congestion priority level 0 for all POTS calls. This will ensure government emergency calls (911, GETS) receive proper priority during national emergency situations. Implementation in all networks should be in accordance with ANSI T1.111. The Network Interconnection Interoperability Forum (NIIF) (www.atis.org/atis/clc/niif/pots.htm), is tracking	Effective - Needs Modification

	implementation as part of NIIF Issue 0095 in coordination with the Office of the Manager, National Communications System.	
6-6-3202	The Service Provider and the Public Safety Agency or its agent that utilize an Emergency Notification System (Public Safety Mass Calling) should have a pre-established procedure to notify all impacted network operators, prior to launching an alert event. This process will reduce the potential of switch overload and resultant call blocking that may impact emergency and other essential services.	Effective – Needs Modification
6-6-3212	Service Providers and Network Operators should provide training for their operations personnel on network-level trouble shooting. Network Operators and Service Providers should proactively include Public Safety Service and Support providers when developing trouble reporting plans and subsequent training.	Not Effective – Recommend for Deletion
6-6-5093	Service Providers, Network Operators, Equipment Suppliers and Property Managers should establish, implement and test emergency response and crisis management programs to include external first responders and civic authorities in mutual emergency preparedness planning, as appropriate (e.g., on-site visits, access to facilities, mutual familiarity with plans and procedures, single points of contacts). First responders may include Emergency Response Team (ERT), law enforcement, fire department, FEMA, NS/EP, DHS, etc.	Effective
6-6-5226	Service Providers, Network Operators and Property Managers should maintain liaison with local law enforcement, fire department and other security and emergency agencies to ensure effective coordination for emergency response and restoration.	Effective – Needs Modification
Cooperation/Communications with Emergency Service Entities		
6-5-0579	<p>Improve communications among all Service Providers and PSAPs - Service Providers, 911 administrators, and public safety agencies should continually strive to improve communication among themselves. They should routinely team to develop, review, and update disaster recovery plans for 911 disruption contingencies, share information about network and system security and reliability, and determine user preferences for call overflow routing conditions.</p> <p>They should actively participate in industry forums and associations focused on improving the reliability and security of emergency services and the development of technical industry standards. The National Emergency Number Association (NENA) and the Association of Public-safety Communications Officials (APCO) are two of the organizations that are open to all stakeholders of 911 service delivery and that are focused on finding 911 solutions for emerging technologies (e.g., wireless, PBX, CLEC).</p>	Effective – Needs Modification
6-5-0584	Service Providers, Network Operators and Equipment Suppliers and representatives of the National Security Emergency Preparedness (NSEP) community should work together to support appropriate industry and international organizations to	Effective

	develop and implement NSEP features and functionality in packet networks.	
6-6-1021	Service Providers, Network Operators, and Equipment Suppliers should provide disaster recovery contact information to the National Coordinating Center (NCC) and update this contact information as changes occur or at the direction of the NCC.	Effective
6-6-1058	Service Providers and Equipment Suppliers should work collectively with local, state, and federal governments and other utilities to develop a process for efficient communications and coordination.	Effective - Needs Modification
6-6-1059	Service Providers should work with government and other utilities in the development of State Emergency Communications Networks in order to provide a process for key utilities and government emergency responders to communicate during disaster events.	Effective
6-6-3211	Network Operators and Service Providers should develop and maintain operations plans that address network reliability issues. Network Operators and Service Providers should proactively include Public Safety Service and Support providers when developing network reliability plans.	Effective - Needs Modification
6-6-3213	Service Providers, Equipment Suppliers and Public Safety Service and Support providers should work together to establish reliability and performance objectives in the field environment.	Effective
Data Assurance / Traffic Management		
6-5-0581	Private Switch (PS)/Alternative LEC (CLEC) ALI -- ALI data for alternate providers (e.g., PS, CLEC) should be included in the ALI systems. PSAPs have become increasingly reliant on the ALI data administered by the LECs, and believe that those individuals served by private telecommunication providers and/or alternate LEC providers should have their address information contained in their ALI data base systems. The NENA Recommended Formats for Data Exchange and the NENA Recommended Protocols for Data Exchange were established to enable ALI data integration of these providers.	Effective - Needs Modification
6-5-0585	Service Providers, Equipment Suppliers and representatives of the National Security and Emergency Preparedness (NSEP) community should work together to share information regarding security issues related to packet network convergence with the PSTN, including identification and authentication procedures for emergency calls, and issues related to cyber attacks and malicious intrusion into networks.	Effective
6-5-0758	If 911 call completion is affected, test calls should be made by the Service Provider to the PSAP(s) to assess the impact. Once service is restored, the Service Provider should make multiple 911 test calls to ensure they complete properly.	Effective
6-6-0575	Diverse Automatic Location Identification used in Public Safety, like ALI (Automatic Line Identification) and MPC (Mobile Positioning Center) systems should be deployed in a redundant, geographically diverse fashion (i.e. two identical ALI/MPC data	Effective

	<p>base systems with mirrored data located in geographically diverse locations).</p> <p>To improve ALI/MPC reliability, deployments of fully redundant Public Safety database systems, such that ALI/MPC system hardware and/or software failure does not impair ALI/MPC data accessibility, will further improve ALI/MPC reliability. When deployed with geographically diverse transport facilities, single points of failure may be eliminated.</p> <p>ALI/MPC data should be placed on fault-tolerant and secure computer platforms to increase the reliability of ALI/MPC display retrievals. When possible, "hot spare" computers should be held in reserve for catastrophic events.</p>	
6-6-1061	Service Providers, Network Operators, and Equipment Suppliers should ensure that Telecommunication Service Priority (TSP) records and data bases are reconciled annually.	Effective
Prevention		
6-5-0567	Red-Tagged Diverse Equipment - Depending on LEC provisioning practices, the equipment in the central office can represent single points of failure. 911 circuits should be spread over similar pieces of equipment, and each plug-in-level component and frame termination should be marked with red tags. The red tags alert LEC maintenance personnel that the equipment is used for critical, essential services and is to be treated with a high level of care.	Effective
6-5-0568	<p>Option 1: Alternate PSAPs from the 911 Tandem Switch - A common method of handling PSAP-to-Tandem transport facility interruptions is to program the 911 tandem switch for alternate route selection. If the 911 caller is unable to complete the call to the PSAP, the tandem switch would automatically complete the call to a pre-programmed directory number or alternate PSAP destination. The alternate PSAP may be either administrative telephones or another jurisdiction's PSAP positions, depending upon the primary PSAP's pre-arranged needs.</p> <p>Option 2: Alternate PSAPs from the Serving End Office - Another method of handling PSAP-to-Tandem transport facility interruptions is to program the end office for alternate route selection. If the 911 caller is unable to complete the call to the PSAP, the end office may automatically complete the call to a pre-programmed directory number or alternate PSAP destination. The alternate PSAP may be either administrative telephones or another jurisdiction's PSAP positions, depending upon the primary PSAP's pre-arranged needs.</p>	Effective - Needs Modification
6-6-0512	Service Providers and Network Operators should perform periodic inspection of cable ways (e.g., through floor and through wall passage ways, sealing compounds, fire and water stopping, etc.). Public Safety Service and Support providers should also perform these inspections at their communication centers.	Effective
Emergency Management		
6-6-1011	Service Providers, Network Operators and Equipment Suppliers	Effective

	should consider utilizing multiple alternative communication devices and service providers for critical service personnel during emergencies.	
6-6-1037	Service Providers, Network Operators, and Equipment Suppliers should consider using a disaster recovery support model with escalation procedures that provide a clear escalation path to executive levels both internally and externally.	Effective
Media / Public Awareness		
6-5-0576	<p>Move Mass Calling Stimulator away from 911 Tandem Switch - Mass calling events may cause 911 service interruptions. Service interruptions caused by media stimulated calling has prompted the LECs to reassess and improve the handling of mass calling events. The 911 Tandem switch serves as the most critical network element in providing 911 service. If a media stimulated mass calling event is served by a 911 Tandem, the PSAPs being served by the 911 Tandem may experience delayed dial tone when call transfer is attempted by the PSAP personnel. The PSAP may also experience delays in call completion (ring-back tone) or a fast busy signal, which indicates that the call has failed to complete. To mitigate such instances, high volume call events should be moved to another end office.</p> <p>Pre-Planning for Mass Calling Events - To minimize the potential of interruption caused by media driven mass calling events, the LEC can identify periods of low call volume traffic so that the media may schedule mass calling events during low traffic periods.</p> <p>Carrier external affairs and marketing groups should work closely with media organizations to ensure 911 callers are unaffected by mass calling events.</p>	Effective - Needs Modification
6-5-0578	Educate the public on proper use of essential communications - The public's proper use of 911 service is critical to the effectiveness of the emergency network's operation. Misuse of 911 could lead to the following: congestion of the 911 network, leaving callers with real emergencies unable to contact a 911 operator, exhaustion of resources on non-emergency situations, reduction in a jurisdiction's ability to respond to emergency situations in a timely manner because of the jurisdiction's emergency response agencies being overwhelmed by responses to non-emergency situations. This could have potentially disastrous effects on the public's perception of its emergency network and emergency response agencies.	Effective - Needs Modification
6-5-0582	Commercial Mobil Radio Services (CMRS) - Emergency Calling - The CMRS industry should consider 911 as the standard access code for emergency services (e.g., law enforcement, fire, EMS, hazardous materials). Implementation of such a standard would eliminate confusion among mobile communications users when they are in a roaming mode.	Not Effective - Recommend for Deletion
6-6-3201	Commercial TV and radio broadcasters should work with Public Safety organizations (PSAPs) to have a disaster recovery action in place in the event of a commercial communications failure	Effective - Needs Modification

	effecting their 911 network, to inform callers requiring emergency services that they should dial a 7/10 digit number to reach PSAP administrative lines.	
6-6-3203	To assist in the effectiveness of Emergency Notification Systems (Public Safety Mass Calling) and return calls from PSAPs, Service providers should consider developing options that allow for call delivery from Emergency Notification Services to subscribers with call blocking/screening services.	Effective
6-6-3204	Service providers should work with Public Safety Service and Support providers to educate the public on the proper use of N11 Access codes (211, 311 and 511 services) such that it enables the 911 network and personnel to be exclusively focused on emergencies. Proper use of all N11 codes, including 911, prevents exhaustion of resources of emergency personnel on non-emergency situations. (Reference NRIC BP 6-5-0578)	Effective
6-6-3209	Where practical, CATV facilities shall receive signals from off-air broadcasters via fiber as the primary source with automatic fail over to the off-air signal as the secondary source.	Effective - Needs Modification
6-6-3210	Where practical, CATV service providers should serve Emergency Operations Centers with a CATV connection to provide video for viewing local weather and news information, a diverse connection to the Internet and a diverse telecommunications connection if such services are available on the network.	Effective - Needs Modification

7.2 NENA Master Glossary of 9-1-1 Terminology⁷

See the attached file entitled " FG1C_June 2005_Appendix 7.2_NENA Master Glossary.PDF"

⁷ www.nena.org