NENA PSAP Survivability Information Document

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National Emergency Number Association (NENA) PSAP Operations Committee, Contingency Planning Subcommittee, Contingency Planning Document Review WG developed this document.

NENA recognizes the following industry experts and their employers for their contributions in development of this document.

Executive Board Approval Date 01/12/2017

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Table of Contents

1 Executive Overview

This document is provided to assist Public Safety Answering Points (PSAPs) with the development of a PSAP survivability program. This PSAP survivability document is meant to be used in conjunction with other Contingency Planning Documents to assist the PSAP to better prepare for and react to a disaster situation with the end goal being that the PSAP remains operational. Every PSAP is unique and this document should be used as a starting point in disaster recovery planning.

Purpose and Scope of Document
This document is intended as a guide for PSAP staff to review the many components of their system continuity and disaster plans. It is also intended as a guide for training, testing and reevaluating the PSAPs ability to react to a disaster situation, which may adversely impact their ability to serve their communities. It is recommended that all contingency plans be coordinated with appropriate Emergency Management authorities. This document is not intended as a template, but as a process guide.

Reason to Implement
PSAPs are critical for the safety and security of the public. The ability for manmade or natural occurrences to prevent the PSAP from receiving, processing, dispatching and monitoring incidents places the public and first responders in danger. It is therefore incumbent upon PSAP administrators to prepare for such occurrences.

Benefits

Implementation of this document as a Standard Operating Procedure will greatly improve PSAP survivability and:

- Will help in developing PSAP survivability plans
- Will increase the ability for a PSAP to survive during a service interruption event.
- Will enable the PSAP to continue effective operations for the duration of the event.
- Will assist in identifying supplies and equipment needed on hand to sustain the PSAP during such an event.
- Will better position the PSAP for future reconstitution following a service interruption event.
- Will encourage cooperation and partnership amongst stakeholders (equipment vendors, service providers, agencies)
- May help to reduce the duration of a service interruption.

2 Introduction

2.1 Operations Impacts Summary

This document should help PSAP Authorities to consider risks, disaster and/or contingency plans to assure continuity of operations and survivability. This document is intended as a guideline to PSAP managers to identify vulnerabilities to specific hazards. Adoption of these recommendations calls for the PSAP Authority to develop policies and procedures to address individual PSAP survivability.

It is also recommended that PSAP Authorities review APCO/NENA ANS 1.102.2-2010: Public Safety Answering Point (PSAP)-Service Capability Criteria Rating Scale (or subsequent updates). That document assists PSAP managers and their governing authorities to identify their current level of service capability. An assessment tool is provided to facilitate an objective review of the current capabilities of the PSAP Authority against models representing the best level of preparedness, survivability and sustainability amidst a wide range of natural and man-made events. The self-evaluation assessment tool is also intended to provide the basis for discussion with funding bodies (federal, state, county, municipal, etc.) concerning the PSAP Authority status in regard to their current technological position, and readiness or effectiveness to survive certain risks associated with local vulnerabilities

2.2 Technical Impacts Summary

In the event of a man made or natural disaster impacting the Communications Center/PSAP Authority, alternate means of call reception, data entry and retention, dispatch and monitoring must be available. The technical impact will vary greatly dependent upon the size and complexity of the emergency call center. At a minimum the Communication Service Provider (referred to in the past as the "Telephone Company or Telephone Service Provider"), 9-1-1 System Service Provider (911SSP), radio, IT personnel, Computer-Aided-Dispatch vendor and any other service provider or vendor unique to the agency should be consulted to review options for survivability.

2.3 Security Impacts Summary

PSAP Authorities should consider security impacts on technical and operational issues to comply with current NENA documents when implementing their disaster survivability plans. PSAP Authorities should take into consideration any internal, local, state and federal recommendations and/or legal requirements.

2.4 Reason for Issue/Reissue

NENA reserves the right to modify this document. Upon revision, the reason(s) will be provided in the table below.

Doc #	Approval Date	Reason For Changes
NENA-53-503	06/09/2007	Initial Document
NENA-INF-020.2-2017	01/12/2017	This document was updated and reissued by NENA to ensure content was current with

		industry changes and advancements made since the original issue date.

2.5 Recommendation for Additional Development Work

This document is intended to be used as a guide to assist PSAP Authorities with ongoing disaster planning. Current and future Standards regarding equipment, infrastructure and capability should be used to assist with this PSAP Survivability Document. In particular, the NENA Communications Center/PSAP Disaster and Contingency Plans Model Recommendations, and the NENA Hazard and Vulnerability Analysis Operational Information Document should be utilized. Further development work may be needed to establish a standardized after action report for PSAP Authorities to analyze and evaluate the survivability plan effectiveness. Those after action reports should be shared with PSAPs to promote learning and survivability plan development. Additional development work may be required to update the communication sections of NENA documents related to the survivability of connectivity to the IP protocol "NG9-1-1" environment.

2.6 Anticipated Timeline

The anticipated timeline will vary depending on the size and complexity of the operational and technical requirements of the Communications Center. It is recommended that survivability plans are reevaluated annually taking into account changing technology and organizational structure.

2.7 Cost Factors

PSAP Authorities in preparation for disasters will incur expense in planning, training and exercising disaster and recovery plans. Where applicable, PSAP Authorities should consider implementing diversity and redundancy throughout the system. The expense will be unique to the PSAP Authorities current ability to recover and the safety measures taken. Administrators are urged to look beyond the cost of planning and preventing disaster to the potential cost and liability of a system and/or service failure.

2.8 Cost Recovery Considerations

Cost Recovery will vary greatly depending on the jurisdiction of the PSAP Authority. Administrators are encouraged to review their cost recovery legislation and apply for all available grant and/or funding

2.9 Additional Impacts (non- cost related)

Based on the analysis of the authoring group, the information or requirements contained in this NENA document are known to have several impacts. The primary impacts may be borne by an agency at no additional cost if an existing employee is tasked with these responsibilities and training, testing, review and drills are conducted during already scheduled in-service training. Otherwise, yes there will be a cost associated with these things. The primary impacts include:

a. Planning and preparation of operational and technical needs
b. Staff training and drills
c. Routine testing of equipment

d. Development and review of After Action Reports
e. Regular review of the survivability (risk/disaster/contingency) plan
f. Implement changes to survivability (risk/disaster/contingency) plans as required

2.10 Intellectual Property Rights Policy

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2.11 Abbreviations, Terms and Definitions

See NENA-ADM-000, NENA Master Glossary of 9-1-1 Terminology, located on the NENA web site for a complete listing of terms used in NENA documents. All abbreviations used in this document are listed below, along with any new or updated terms and definitions.

Term or Abbreviation (Expansion)	Definition/Description
LAN (Local Area Network)	A transmission network encompassing a limited area, such as a single building or several buildings in close proximity.
VoIP (Voice over Internet Protocol)	Voice over IP (VoIP) is a methodology and group of technologies that permit delivery of voice communications and other real-time multimedia sessions over Internet Protocol (IP) networks, such as the Internet. Other terms commonly associated with VoIP are IP telephony, Internet telephony, broadband telephony, and broadband phone service.
WAN (Wide Area Network)	A wide area network (WAN) is a computer network that spans a relatively large geographical area and consists of two or more interconnected local area networks (LANs).
SLA (Service Level Agreement)	A service level agreement (SLA) is a contract between a service provider (either internal or external) and the end user that defines the

	level of service expected from the service provider. SLAs are output-based in that their purpose is specifically to define what the customer will receive.
Reconstitution	A planned method for returning a PSAP to normal operations after an event. Ref: FEMA Devolution of Operations Plan Template
FirstNet (First Responder Network Authority)	Signed into law on February 22, 2012, the Middle Class Tax Relief and Job Creation Act created the First Responder Network Authority (FirstNet). The law gives FirstNet the mission to build, operate and maintain the first high-speed, nationwide wireless broadband network dedicated to public safety. FirstNet will provide a single interoperable platform for emergency and daily public safety communications. Ref: http://www.firstnet.gov/

3 PSAP Survivability Components

This list includes some of the major components that should be reviewed for PSAP Survivability.

3.1 Communications Network

3.1.1 9-1-1 Call Routing

Each PSAP Authority should have a written service[1] level agreement (SLA) with their service provider(s). Service provider(s) service level agreement should document procedures for reporting an outage, escalation procedure etc. Service provider(s) should have personnel trained and knowledgeable to react, in a timely manner, to a central office failure (virtual or physical). This includes switch redirect, alternate routing, and diverse methods to keep the network functional. Where feasible in a legacy environment, a minimum of two central offices should be used to route calls to the PSAP. The same function/redundancy would be expected in a NG environment. It is recommended that calls be routed through a dedicated fiber loop directly to the PSAP. Central offices or equivalent network elements should allow the automatic transfer of calls to the other central office or equivalent network elements should the link with the PSAP fail. Where this cannot be accomplished PSAP administrators should consider alternate resources to ensure operations.

- The Communication service provider(s), radio carrier/provider, equipment providers and PSAP administrators should develop disaster recovery plans to be used in the event of the loss of a PSAP, E911 central office or network equipment and facilities servicing the PSAP.

It is highly recommended that a minimum of two separate paths and diverse paths for emergency calls into the PSAP be deployed and maintained.

[1] NENA-INF-016.2-201X DRAFT (originally 08-506) NENA Emergency Services IP Network Design for NG9-1-1 Information Document

3.2 PSAP Equipment

3.2.1 ANI/ALI

PSAP staff should be trained to efficiently and effectively process emergency requests for services in the event of ANI/ALI failure. This should include procedures on identifying, processing and verifying calling party number and location without automatic information.

3.2.2 CAD

Procedures should be developed for uninterrupted call receipt and processing in the event of a CAD failure. It is recommended that PSAP Authorities implement and routinely operate with a CAD down form or alternate application to assist call processing.

3.2.3 Mapping/GIS

Procedures should be developed for uninterrupted call receipt and processing in the event of a mapping failure. Mapping failure MAY include such issues as complete failure, failure of automatic location or geocoding.

3.2.4 CPE

Procedures should be developed for uninterrupted call receipt and processing in the event of CPE failure. These procedures should include switch redirect, alternate routing, and diverse methods to keep the network**.**

3.2.5 Equipment Failure

PSAP staff should be trained to efficiently and effectively route and process requests for service in the event of imminent partial or total failure of any equipment, data processing, or voice or data communications methods.

3.3 Infrastructure

3.3.1 Data

The PSAP Authority should have procedures for continued operation with loss of any and all data sources including: IP network(s) for Data, Voice, Radio, and E/NG911 services. It is recommended that these network(s) have backup connectivity through additional communication ports and/or wireless network connections**.**

3.3.2 Logging Service

PSAPs should have procedures for managing loss of logging and recordings. It is recommended that logging recorders have automatic back-up logging functionality and be protected by either logs stored on networks be backed up to an off-site location or if being stored on site that logs be kept in flame/heat proof containers.

3.3.3 Computer and IP Networks

Procedures should be developed for loss of Local Area Networks (LAN), Wide Area Networks (WAN) and/or Emergency Service IP Network (ESInet). This includes but is not limited to IP

connectivity for information and daily operations. It is recommended that administrators work closely with the providers of these services to provide clear understanding of the PSAP's requirements and specifications.

Currently E911 is in transition to NG9-1-1, based entirely on IP networks and core functions. Therefore, the criticality of IP network survivability becomes paramount to PSAP operations.

The following NENA document excerpts provide background on ESInet[2].

NG9-1-1 is defined as the next evolutionary step in the development of the 9-1-1 emergency communications system known as E9-1-1 that has been in place since the 1970s. NG9-1-1 is a system comprised of managed IP-based networks and elements that augment present-day E9-1-1 features and functions and add new capabilities. NG9-1-1 will eventually replace the present E9-1-1 system. NG9-1-1 is designed to provide access to emergency services from all sources, and to provide multimedia data capabilities for PSAPs and other emergency service organizations.

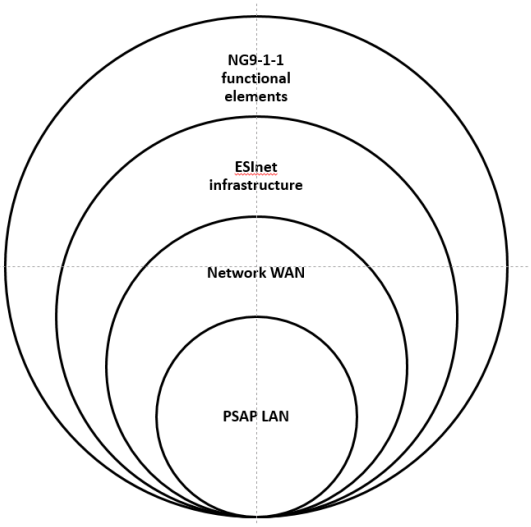
Per NENA-STA-010.2-2015 (originally 08-003) Detailed Functional and Interface Standards for the NENA i3 Solution Stage 3 and for the purposes of this document ESInet is defined as follows:

An ESInet is a managed IP network that is used for emergency services communications, and which can be shared by all public safety agencies. It provides the IP transport infrastructure upon which independent application platforms and core functional processes can be deployed, including, but not restricted to, those necessary for providing NG9-1-1 services. ESInets may be constructed from a mix of dedicated and shared facilities. ESInets may be interconnected at local, regional, state, federal, national and international levels to form an IP-based inter-network (network of networks).

Per NENA-INF-016.2-201X DRAFT (originally NENA 08-506), it is important to understand that an ESInet and NG9-1-1 are not the same. Quite simply, you can have an ESInet without being NG9-1-1; but you cannot have NG9-1-1 without an ESInet.

The diagram below demonstrates the typical hierarchy of networks utilized to reach a fully functional NG9-1-1 system.

[2] Per NENA-INF-016.2-201X DRAFT (originally NENA 08-506) NENA Emergency Services IP Network Design for NG9-1-1 Information Document



3.3.4 Other Communications Contingencies

PSAPs should have procedures to react to other communications service failures such as wide-area power failures impacting Voice over Internet Protocol (VoIP) and wireless communications devices.

3.3.5 Field Communications

Contingency plans for the following should be developed regarding field communications, as part of FirstNet initiatives

3.3.5.1 Radio Communications

Procedures for the detection, reporting, and operations during radio communications failures should be developed.

3.3.5.2 Towers and Transmitters

Plans to maintain operations during the loss of towers or transmitters should be developed. This should include: loss of power, loss of Microwave, or T1 connectivity and/or isolation.

3.3.5.3 Mobile Data

Procedures for operations in case of failure of mobile data should be developed.

3.3.6 PSAP Physical Security

Procedures should be implemented to limit access to the PSAP and access to its critical infrastructure. It is recommended that, where feasible, the use of "SmartCard" technology be implemented to control and monitor security. Procedures should include reaction to a security failure.

3.3.6.1 Computer/IP Network (s)

All local area networks (LAN), wide area networks (WAN), and IP Networks should have appropriate safeguards in place to protect information. Procedures should be developed to react to security failures. REF: NENA INF-015.1-2015 NG9-1-1 Security Information Document.

3.3.7 Critical Facilities

Procedures should be developed for the uninterrupted operation and the loss of critical facilities. Critical facilities include operational facilities required to fulfill the mission. This includes the PSAP, transmitter and receiver sites, central offices, data facilities. It is recommended that administrators perform a resource analysis to identify critical facilities. The PSAP MAY NOT have operational control over critical facilities, but is encouraged to work with those who are to improve survivability and maintain PSAP operations. It is further recommended that PSAPs identify those failures which cannot be mitigated and have back-up or alternate plans to react.

3.4 Human Resources

3.4.1 Staffing

Telecommunicator, administrative, technical, IT and maintenance staff should be sufficient to maintain critical services. It is recommended that PSAP Authorities have a method of increasing staff for critical situations. This includes the sheltering and sustenance of staff for the duration of the event. It is recommended that all PSAP staff and essential personnel be adequately credentialed to ensure access to PSAP and facilities as required.

3.4.2 Education and Training

Administrators should assure that appropriate staff remains current in regards to all disaster and disaster recovery plans and procedures. An emergency support training packet should be developed for support personnel placed in new roles. Training and physical exercises should take place at least annually.

3.4.3 Support Personnel

During a disaster situation support personnel MAY be required to take on additional responsibilities. Support personnel should be appropriately trained for any role they may foreseeably be tasked.

3.5 Support Services

Policies and procedures should be developed to ensure that legal, fiscal and physical resource support services and entities are available to respond to critical incidents. It is recommended that administrators work with support agencies to develop plans, policies and procedures to react should assistance be required.

3.6 Emergency Responders

Emergency responders should be fully aware of PSAP Contingency plans. This should include support and services that may be compromised during critical situations, as well as actions from the emergency responders required to support the PSAP.

4 Continuity of Operations

Policies and procedures should be developed to ensure Continuity of Operations for the PSAP. This includes but is not limited to:

4.1 Orders of Succession

Policies and procedures should be developed to ensure a clear delineation of chain of command.

4.2 Delegations of Authority

Policies and procedures should be developed to ensure a clear line of authority exists, with protocol for change of authority in critical situations.

4.3 Essential Functions

Essential functions are those that are critical to the mission of the PSAP. PSAP Authorities should identify their essential functions and ensure contingency plans are in place for continued operations.

4.4 Alternate Capability

An appropriate alternate site or sites should be identified where essential functions can be carried out if the PSAP can no longer perform the function(s). Capability should be expandable to meet either short, mid or long term requirements.

4.5 Vital Records

Each PSAP should develop policies and procedures to protect paper, electronic, voice, data and any other records as required by law. It is recommended that vital records be protected by either data being backed up to an off-site location or if being stored on site be kept in flame/heat proof containers.

4.6 Capability to Sustain Operations

Each PSAP should have a clear understanding of their sustainability. This includes at the minimum food, power, and expanded living facilities, HVAC, staffing and basic requirements. Sustainability should include a worst-case scenario such as fuel for back-up power not being able to reach the PSAP or tower site for several days. It is recommended that primary and backup generators have a minimum of seven days fuel and that provisions for online (non-stop) refueling be addressed. PSAPs should consider planning to be self-sufficient for five days. This should include a disaster staffing plan and provisions for this time.

Expanded living facilities could include staff bunkroom facilities with gender appropriate separation as well as shower facilities. Due to conditions outside, 2 or more shifts of people may need to temporarily relocate to the PSAP to maintain operations for extended periods of time.

4.7 Internal and External Communications

Each PSAP should have a clear understanding of internal and external communications and have a multilayered contingency plan. This includes communications networks to surrounding PSAPs, Emergency management, and other associated agencies.

4.8 Devolution Plans

The PSAP administration should have a plan of devolution for both short and long-term events. Devolution is a plan to address on an interim basis the ceasing of critical functions and elements when the primary facility is incapacitated or unavailable. Including if personnel are unable to enter or occupy the primary facility. Devolution may include using an alternate PSAP on an interim period. REF: FEMA Devolution of Operations Plan Template (April 2013)

4.9 Reconstitution Plans

After an event the PSAP should have a plan to return to normal operations.

- **Reconstitution Activities[3].** Reconstitution is an essential function since the continuity event cannot end until reconstitution is complete. Reconstitution includes all of those functions and activities necessary to restore full, normal operations, and thus, performance of ALL organization activities. This MAY include activities such as: assessing damage, repairing or replacing facilities and equipment, hiring temporary or new personnel, providing benefits to personnel, recovering and restoring lost records, re-establishing communications, or providing transportation for displaced staff.

5 Plans

All plans require periodic review and revision. Disaster and Contingency Plans should be reviewed no less than annually. Revision should occur as frequently as needed to remain current. Areas of potential improvement, as found through drills, exercises and events should be used to revise and update plans.

6 Drills and Exercises

Contingency plans should be exercised to assure the plans will meet the needs of the incident and to find areas of improvement. It is important that all PSAP staff remain current in the implementation of all Contingency Plans. It is equally important that all staff, whose task assignments or method of performing tasks, is trained and current for the current or alternate environment.

Each PSAP should institute a Training Policy and Procedures to provide a framework for staff to remain current in regards to Contingency Plans. The training should include but is not limited to: initial training, ongoing training, drills and exercises. Each step should include either a

[3] Continuity Guidance Circular 2 (CGC 2) Continuity Guidance for Non-Federal Governments: Mission Essential Functions Identification Process(States, Territories, Tribes, and Local Government Jurisdictions)FEMA P-789 / October 2013

competency sign off or areas of improvement. If areas of improvement are found then a plan of action and re-evaluation should occur prior to competency sign off.

7 Recommended Reading and References

1) NENA INF-017 (originally 53-001) Communications Center/PSAP Disaster and Contingency Plans Model Recommendations

2) NENA-INF-016 (originally 08-506) NENA Emergency Services IP Network Design for NG9-1-1 Information Document **(DRAFT)**

3) NENA-STA-009 (originally 53-002) Mutual Aid Standard Model Recommendation

4) NENA-INF-019 (originally 53-501) NENA Resource, Hazard and Vulnerability Analysis Information Document **(DRAFT)**

5) NENA-INF-015 NG9-1-1 Security Information Document **(DRAFT)**

6) National Fire Protection Association, Standard 1600, Disaster/Emergency Management and Business Continuity Programs. 2016 edition

7) APCO/NENA ANS 1.102.2-2010: Public Safety Answering Point (PSAP)-Service Capability Criteria Rating Scale

8) NENA-INF-006 Next Generation 9-1-1 Planning Guidelines Information Document

9) CSRC Computer Security Resource Center, National Institute of Standards and Technology. http://www.CSRC.NIST.gov

10) Continuity Guidance Circular 2 (CGC 2) Continuity Guidance for Non-Federal Governments: Mission Essential Functions Identification Process (States, Territories, Tribes, and Local Government Jurisdictions) FEMA P-789 / October 2013

11) NENA-STA-010 (originally 08-003) Detailed Functional and Interface Standards for the NENA i3 Solution Stage 3 **(DRAFT)**

12) FEMA Devolution of Operations Plan Template (April 2013)

8 Previous Acknowledgments

NENA 53-503 Executive Board Approval Date, 06/09/2007

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Exhibit A –PSAP Survivability Readiness Checklist

PSAP SURVIVABILITY READINESS CHECKLIST

PSAPs can use this template to evaluate their readiness to prepare for and to survive events that may cause interruption to PSAP operations. The template can be adapted to local architecture and requirements. Furthermore it can be used to track recommendations and areas for improvement.

PRIMARY RADIO SERVICE INTERRUPTION		
	Date:	Recommendations for Improvement
☐	Console Failure	
	Date:	Recommendations for Improvement
☐	Access to Radio System	
	Date:	Recommendations for Improvement
☐	Grounding Protection	
	Date:	Recommendations for Improvement
☐	Encryption	
	Date:	Recommendations for Improvement
☐	Backup Radio	
	Date:	Recommendations for Improvement
☐	Agency Specific Considerations	

PRIMARY ALERTING SYSTEM		
	Date:	Recommendations for Improvement
☐	System failure	

PHONE SERVICE FAILURE		
	Date:	Recommendations for Improvement
☐	CTI Equipment	
	Date:	Area for Improvement
☐	PBX	
	Date:	Area for Improvement
☐	Hosted/Managed	
	Date:	Area for Improvement
☐	9-1-1 Trunks/Lines	
	Date:	Area for Improvement
☐	Backup access/Alternate Routing	
	Date:	Area for Improvement
☐	ESiNet IP Network	
	Date:	Area for Improvement
☐	Agency Specific Considerations	

PSAP EVACUATION PLAN		
	Date:	Area for Improvement
☐	PSAP Evacuation Plan	

EMERGENCY STAFF NOTIFICATIONS		
	Date:	Area for Improvement
☐	Emergency Staff Notifications	

INTERNAL SECURITY ALERT/INTRUDER/BREACH		
	Date:	Area for Improvement
☐	Internal Security alert/intruder/breach	

Backup Power Supply		
	Date:	Area for Improvement
☐	Backup Power Supply	

UPS SYSTEM		
	Date:	Area for Improvement
☐	UPS System	

CAD System Failure		
	Date:	Area for Improvement
☐		

UTILITIES NOTIFICATIONS		
	Date:	Area for Improvement
☐		

NUCLEAR GENERATING PLANT EMERGENCY		
	Date:	Area for Improvement
☐	System failure	

(Agency Specific)		
	Date:	Area for Improvement
☐		