U.S. Fire Administration

Operational Lessons Learned in Disaster Response

June 2015

FEMA

U.S. Fire Administration

Mission Statement

We provide National leadership to foster a solid foundation for our fire and emergency services stakeholders in prevention, preparedness, and response.

FEMA

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June 2015

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Table of Contents

Preface

This report follows extensive research by the U.S. Fire Administration (USFA) of after action reviews from major disasters of the past decade into lessons learned. The disasters studied were weather-related events that required responding firefighters to assume duties for which they were unprepared or for situations they never anticipated.

The relative frequency and severity of extreme weather events and their consequent impact on the U.S. population provide ample reason to study what other responders have experienced and what they could or could not do in the face of such challenges. While after action reviews produce valuable lessons, lessons alone are not the end of the story. In fact, lessons learned should rightly be the beginning of a new chapter in a fire department's operational behaviors. Lessons without a corresponding change in operational behavior are not lessons learned.

This report encompasses and updates the information from two existing USFA publications, "TR-162: Fire Department Preparation for Extreme Weather" and "TR-159: After Action Reports — Lessons Learned." The USFA acknowledges the effort of the individuals responsible for producing those legacy works. The updated content from those two publications is coupled in this report with a stronger focus on learning from lessons learned.

The lessons learned by first responders and emergency managers in the April 2011 tornado outbreak in the southeastern United States provides a rich resource for the fire service to study and apply. Research for this report relied heavily on USFA's publication, "Fire Service Operations for the Southeastern Tornados — April 2011," for operational lessons learned from that event.

In the process of researching lessons learned in disaster response, it readily became apparent that while we have plenty of lessons learned there is a gap in applying those lessons to disaster response and recovery operations. The material here on applying lessons learned references the research work of Amy K. Donahue and Robert V. Tuohy. Their extensive interviews with Incident Commanders (ICs) as reported in "Lessons We Don't Learn: A Study of the Lessons of Disasters, Why We Repeat Them, and How We Can Learn Them" is published in Homeland Security Affairs, Vol. II, No. 2, July 2006.

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Introduction

The final two decades of the 20th century foreshadowed the future of the fire service in America. Forces of natural disasters — earthquakes, tornadoes, and hurricanes and acts of terrorism unleashed against densely populated centers highlighted the role of firefighters in first response. The tragedies that arose from the events of Sept. 11, 2001, and Hurricane Katrina proved the value of firefighters in the emergency management equation. This occurred simultaneously with the self-examination by the fire service of its own record of occupational safety and an effort to learn from its mistakes.

The fundamental doctrine of emergency management encompasses specific phases of human intervention (i.e., preparation, mitigation, response, recovery) intended as a means of focusing our effort to withstand, recover and restore from disaster. Significant disasters arise from extreme physical forces of nature, failures of technological systems, and acts of terrorism. Emergency managers use the term "all-hazards" to denote such events. Any of these events may require a response from first responders. However, first responder agencies may lack the capacity to mitigate the hazards posed by such disasters or may be rendered inoperable to some degree by the catastrophic impact of the event.

From that assumption, the USFA conducted research to identify gaps and needs in first responder training and resources and to present solutions that serve to better prepare local-level fire services for all-hazard events and to interact with federal resources. Local fire departments routinely handle the majority of fires, rescues and medical emergencies without outside assistance. We generally categorize these as low-risk/high-frequency events. However, a given fire department will typically have less experience with large-scale natural disasters, technological accidents, and terrorist attacks. We categorize these events as high-risk/low-frequency, any of which may impact the operational capacity of a fire department.

Because experience in disaster response confirms that high-risk events threaten and impact fire service infrastructure presenting unique challenges, it is critical that the nation's fire service be prepared for disaster responses and the recovery phase. The research proved the importance of providing sufficient resources for disaster management through a partnership at all levels of government — federal, state, local and tribal. The research also revealed something that the fire service at large should note — the idea that recovery from disaster involves everyone, including the local fire department. The fire department's role may begin with the response, but it doesn't end there; it continues through the community's recovery process.

To better understand the impact of significant disasters on the fire service, the following reports from disaster planning resource allocation workshops and after action reports for some recent, large-scale natural disasters were researched and analyzed.

- Alabama-Georgia Tornadoes — USFA report.
- Tropical Storm Irene AAR.
- Fire Service Response to Hurricane Irene — USFA report.
- Maintaining Fire Services in the Wake of Hurricane Sandy.
- Wasatch Earthquake Planning/Resource Allocation.
- New Madrid Earthquake Planning/Resource Allocation.

To further gain a thorough understanding of where we stand in terms of lessons learned, the research examined secondary sources, especially those focused on lessons learned. These resources yielded a broader perspective of the true nature and extent of the problem or disconnect associated with organizational learning from operational mistakes.

After action reports usually offer considerable insight into what occurred, and the USFA has a history of reviewing the reports and sometimes even conducting its own technical investigations into major fires and disasters. This was the case with several of the events listed above and studied for this report. The USFA focused its search for information on seven questions.

1. What impact did the storms have on your community?
2. Did you have sufficient resources to fulfill your responsibilities and missions? If not, could you acquire them (by other means)? How did you obtain them?
3. What resources were not available, and how successful were you in acquiring them?
4. Assuming at least one or more of needed resources were not available, how did you set priorities and what were they?
5. How did you triage incidents, and how were they addressed in priority?
6. What parts of the Incident Command System (ICS) and National Incident Management System (NIMS) were activated or used?
7. What lessons were learned? And share any other thoughts that you have for other agencies to benefit from this experience.

What is very clear from analysis of post-incident operational evaluations is that the fire service at many levels and many geographic areas lacks an appreciation of the need for self-protection and preservation of critical response infrastructure. Stated another way, the fire service at large, as post-incident analysis (PIA) of major disasters reveals, is unprepared for large-scale all-hazard operations at the regional and national level.

Repeated mistakes flow from a failure to share and learn from past mistakes.

The review of after action reports compiled following major regional disasters revealed that regardless of equipment, training, resources or communications, the rural fire departments in the disaster areas were faced with four universal tasks or operational domains while suburban and urban fire agencies in the disaster areas focused on the first three. Those tasks are (1) opening roadway access to structures; (2) search, rescue, treatment and transport of occupants; (3) self-protection and survival; and (4) providing food, water, housing and sanitary needs for their communities.

The theoretical and practical applications of traditional firefighting strategy and tactics apply most aptly to fighting building fires and in some cases to localized natural disasters, as well as small-scale hazardous materials incidents. They do not, however, necessarily transfer over to large-scale disasters and unplanned events. Incident management and command systems provide a defined structure upon which certain operational components are attached, as necessary, to meet the needs of the incident. Thus the functional need for command and control is met, yet that alone does not ensure a successful outcome. An event of disastrous or extraordinary proportion requires logistical and resource support. To ensure the readiness of resources when and where needed, an Emergency Operations Plan (EOP) is essential.

Changes in objective reality often require fundamental changes in our subjective thinking if we are to survive successfully in a dynamic and often hostile world (James J. Schneider, Ph.D., in the introductory essay of "The Evolution of Operational Art").

Comprehensive emergency plans help to ensure that communications, responders, resources, supplies and shelters are made available when needed. We need to know what resources are available, what types, where they are located, how are they requested, and how much it will cost to use them in a disaster. The time to develop and test an EOP is before a disaster strikes. After action reports from our country's worst disasters reveal that many fire departments are not prepared.

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New Orleans, Louisiana, Sept. 21, 2005 — Arson fires were still a major problem over two weeks after Hurricane Katrina ravaged the city. FEMA Photo/Greg Henshall

Part 1 — The All-Hazard Fire Service

Our nation's fire heritage spans three centuries. The organization of America's municipal fire and rescue services, best exemplified in the deployment of stations and apparatus, as well as the staffing of those resources, is based on the lessons learned from the great urban fires of the 19th century. The fires of that era and the early 20th century led firefighters to embrace an occupational philosophy of both saving lives and preserving property. Firefighters largely interpret this oath in terms of fighting fires, thus making it the dominant hazard for which they plan and prepare. Just as important is the implied social contract between firefighters and the people they protect. Given the regard and confidence society holds for firefighters, there is an increasingly expanding reliance on fire-rescue agencies to also render medical aid, control dangerous situations, and intervene in aggressive and terrorist activities.

> **"Fire departments need to plan and train for becoming the agency of last resort and the place people turn to when community and infrastructure collapse."**

For the fire-rescue service, these added challenges — call them all-hazard risks — require an increased level of mission preparedness and readiness. The increasing frequency and complexity of these all-hazard incidents places unprecedented demands on fire-rescue services. All-hazard responses represent some of the most difficult and complex challenges in public safety. Among the incidents in this category are hurricanes, floods, tornadoes, urban-wildland fires, hazardous material releases, communicable disease outbreaks, animal disease outbreaks, terrorist attacks, and search and technical rescue operations.

Planning and training for all-hazard responses, especially in the wake of increasing extreme weather events and natural disasters, place fire and emergency services in a position of having to do more with less. If past disasters have taught us anything, it is that emergency 911 requests, welfare/safety checks, evacuations, rescues and damage assessments will overwhelm response agencies. On top of that responsibility, as learned from Hurricane Katrina and Superstorm Sandy, fire stations and other public buildings

(such as libraries) may become shelters of last resort, so firefighters, in some cases, may find themselves managing shelters and providing mass care for survivors in facilities poorly equipped for mass care or survivor comfort.

> "In all-hazard events responders should recognize the inevitable need to adapt, meaning that sometimes the critical need is not the assigned mission or traditional mission to which they are accustomed."

Because public health and welfare during and immediately after severe events, as well as the safety of the first responders, depends on the operational capacity of the individual responding agencies, it is imperative that fire and emergency services prepare for meeting these extraordinary demands. During Superstorm Sandy, many fire and emergency services found that they were facing challenges for which they were not prepared or properly equipped. It is the unknown or those situations for which you are ill-prepared or not expecting that have the greatest potential to render you and your effort ineffective, haphazard or worse.

What actually constitutes emergency or disaster planning? Is it a meeting? Is it a printed document with information and checklists? Is it a set of standard procedures to follow during an emergency or disaster? Is it an emergency or disaster planning exercise with the participation of affected organizations?

> Regardless of equipment, training, resources or communications, rural fire departments were faced with four universal tasks or operational domains while suburban and urban fire agencies focused on the first three (1) opening roadway access to structures; (2) search, rescue, treatment and transport of occupants; (3) self-protection and survival; and (4) providing food, water, housing and sanitary needs for their communities.

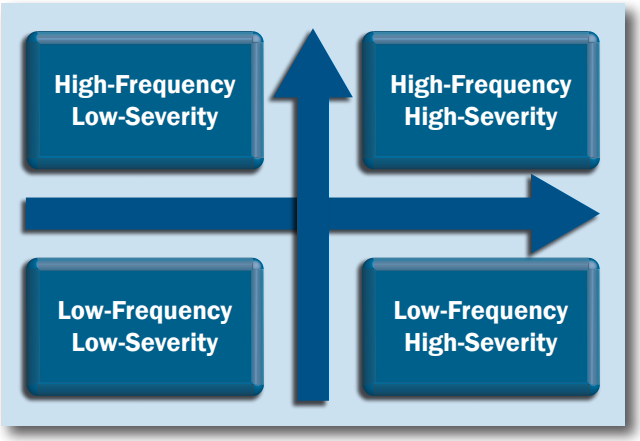
"Some years ago, there was a group in the staff college of which some of you may have heard, Leavenworth Staff College. This was before our entry into World War One, and in that course it was necessary to use a number of maps and the maps available to the course were of the Alsace-Lorraine area and the Champagne in France. But a group of 'young Turks' came along who wanted to reform Leavenworth. They pointed out it was perfectly silly for the American Army to be using such maps which could after all be duplicated in other areas without too much cost--they would get some area maps where the American Army just might fight a battle. So they got, among other things, maps of the area of Leavenworth and of Gettysburg, Pennsylvania, and in succeeding years all the problems have been worked out on those maps. The point is, only about two years after that happened we were fighting in Alsace-Lorraine and in the Champagne. I tell this story to illustrate the truth of the statement I heard long ago in the Army: Plans are worthless, but planning is everything. There is a very great distinction because when you are planning for an emergency you must start with this one thing: the very definition of 'emergency' is that it is unexpected, therefore it is not going to happen the way you are planning. So, the first thing you do is to take all the plans off the top shelf and throw them out the window and start once more. But if you haven't been planning you can't start to work, intelligently at least. That is the reason it is so important to plan, to keep yourselves steeped in the character of the problem that you may one day be called upon to solve--or to help to solve."

—President Dwight D. Eisenhower, from remarks made at the National Defense Executive Reserve Conference on Nov. 14, 1957

Planning is a way of thinking about something that will or may occur in the future. Whether it is something simple or complex, you thought about it or considered it at some point. Planning is a lot like imagining what a successful outcome looks like and then working backward to determine what you have to do to reach that goal. The fundamental doctrine of emergency management encompasses specific phases of human intervention (i.e., preparation, mitigation, response and recovery) intended as a means of focusing our effort to withstand, recover and restore from disaster. Significant disasters arise from extreme physical forces of nature, failures of technological systems, and acts of terrorism. We use the term all-hazards to denote such events. Any of these events may require a response from firefighters. However, fire-rescue agencies may lack the capacity to mitigate the hazards posed by such disasters or may be rendered inoperable to some degree by the catastrophic impact of the event.

"Effective emergency response depends on planning and preparation and is a critical component for a successful recovery from disasters and all-hazard events. Building and establishing ties with state and federal emergency and disaster response partners before something happens will pay dividends when disaster strikes."

Local fire departments routinely handle the majority of fires, rescues and medical emergencies without outside assistance. We generally categorize these as low-risk/high-frequency events. Large-scale disasters are categorized as high-risk/low-frequency, any of which may impact the operational capacity of a fire department. While the optimum response is to avoid unnecessary risk, firefighters generally do not have that option. Because experience in disaster response confirms that high-risk events threaten and impact fire service infrastructure presenting unique challenges, it is critical that the nation's fire service be prepared for disaster responses and the recovery phase.



A successful outcome from major emergencies and disasters necessitates having sufficient resources for managing the disaster response and recovery through a partnership among all levels of government — federal, state, local and tribal. To better understand the impact of significant disasters on fire and emergency service, it is necessary to study and analyze after action reports for recent large-scale natural disasters as primary sources for lessons learned that may then be used to improve operational response and readiness in a safe, efficient and effective manner.

Few organizations are as resourceful and multitalented as our public safety services. Called upon to respond to emergencies, disasters and situations in all kinds of weather, day and night, our country's fire and emergency services represent an amazing cadre of specially trained and skilled individuals. They save heart attack victims, rescue people from flash floods, and ensure that buildings meet applicable fire and life safety codes. They can decontaminate individuals exposed to harmful chemical and biological agents, extricate victims of vehicle crashes, educate the public about preventing fires and how to escape, extinguish fires, and bring arsonists to justice.

The public relies heavily on first responders during emergencies, and the more substantial the incident or the disaster, the greater the need for assistance delivered by the fire department and others with public safety missions. Under extreme conditions, providing that assistance becomes more challenging. Earthquakes, hurricanes, blizzards and ice storms, floods, power outages, and extreme heat conspire to create dangerous working conditions, impassable roads, access nightmares, and some difficult dispatch

and triage choices. The very circumstances that necessitate more staffing often interfere with the ability of responders to provide that assistance and support, travel to the station, or get to a scene.

Most fire departments will experience severe weather, storms or natural disasters at some point. This has often required improvisation in strategy, tactics, deployment and extended work periods. In general, you work or manage with whatever is available, and some departments have used this base of experience to draft standard operating procedures (SOPs) and guidelines related to the types of extreme conditions that are most common in their area.

Even with advance planning and pre-event preparation, occasionally the magnitude of a disaster exceeds predicted levels, or a community is hit with a natural disaster never before experienced. For example, there are documented seismic zones that have not been active but could become so at any point in time. A community may have gone through its fair share of flash floods but may not have encountered days of torrential rains and associated flood levels. Recent scientific studies have revealed new areas that are at risk from tsunamis in the U.S.; each year tornadoes touch down in a territory that has not previously been hit.

Being prepared as an emergency service for extraordinary events requires extra effort, cooperation and partnerships.

The forces that shape our global climate have an impact on weather, causing more extremes in weather conditions and with increasing frequency wide-scale natural disasters. Emergency first responders must be ready to meet the types of service calls that arise as a result of these disasters and what equipment and planning are needed in order to be prepared. In addition, readiness now encompasses being prepared to assist in community recovery efforts. This report will cover basic topics ranging from operational safety, mutual aid, shift management, resource identification, logistics, and other related issues, along with examples from fire and rescue departments that have learned from experience what can happen. The report provides information that you can use to enhance preparedness and ensure greater safety the next time disaster strikes.

The whole community concept recognizes that a government-centric approach to emergency management is not enough to meet the challenges posed by a catastrophic incident. Whole community is an approach to emergency management that reinforces the fact that the Federal Emergency Management Agency (FEMA) is only one part of our nation's emergency management team; that we must leverage all of the resources of our collective team in preparing for, protecting against, responding to, recovering from and mitigating against all-hazards; and that collectively we must meet the needs of the entire community in each of these areas. This larger collective emergency management team includes not only FEMA and its partners at the federal level but also local, tribal, state and territorial partners; nongovernmental organizations (NGOs) like faith-based and nonprofit groups and private sector industry; and individuals, families and communities, who continue to be the nation's most important assets as first responders during a disaster. Both the composition of the community and the individual needs of community members, regardless of age, economics or accessibility requirements, must be accounted for when planning and implementing disaster strategies. When the community is engaged in an authentic dialogue, it becomes empowered to identify its needs and the existing resources that may be used to address them. Collectively, we can determine the best ways to organize and strengthen community assets, capacities and interests. This allows us, as a nation, to expand our reach and deliver services more efficiently and cost effectively to build, sustain and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all-hazards.

A fire and emergency service that embraces an all-hazard disaster response doctrine will of necessity become involved with disaster planning, preparedness, response and recovery, as well as integrate efforts into a whole community concept. The whole community concept means that preparedness and recovery requires the efforts of everyone, citizens and government.

Many fire and emergency services have learned too late that their failure to plan and prepare for disasters and the aftermath have serious long-term consequences.

Emergencies and disasters are inevitable. Planning, response and recovery phases are interrelated. First responders naturally hold a response-oriented view of emergency planning. Today, society expects more service from government while simultaneously holding that it shouldn't cost any more. Even more important than that is the idea that disaster recovery and the return to normalcy must occur as quickly as possible. Government administrators and elected officials are expected to lead the effort. Modern disaster recovery thinking (theory and practice) stresses that involvement of the whole community is critical for long-term economic recovery. This concept includes the fire and emergency services. A lost or diminished tax base will directly impact fire and emergency services. This is why first responder agencies must be prepared for and get involved with the disaster recovery process. A successful recovery begins before the disaster.

Post-incident reviews with fire officials clearly indicate that fire departments actively participate in all four phases of emergency management.

Principles of Whole Community Engagement in the Recovery Phase

Recognize that a government-centric approach to emergency management is not enough to meet the challenges posed by a catastrophic incident. Whole community is an approach to emergency management that reinforces the fact that first responders are only one part of the nation's emergency management team. The larger "emergency management team" includes the public and private sectors, including all levels of government, NGOs such as faith-based and nonprofit groups, business and industry, individuals, and their families.

When the community is engaged in an authentic dialogue, it becomes empowered to identify its needs and the existing resources that may be used to address them. Only through inclusion do we determine the best ways to organize, strengthen, and leverage community assets, capacities, and interests. Thus, as a nation, we expand our reach and deliver services more efficiently and cost effectively to build, sustain and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all-hazards.

Three principles form the foundation for whole community:

1. Understand and meet the actual needs of the whole community.
2. Engage and empower all parts of the community.
3. Strengthen what works well in communities on a daily basis.

Keys to Success

Act Quickly
Communities take advantage of the window of opportunity post-event to assess and determine the future of the community.

Actively Plan
Planning maximizes the opportunities for communities to coordinate interrelated elements of housing, infrastructure, environment and culture and promote design and policy changes for future development.

Engage the Community
A successful public engagement process gives all residents in a disaster-impacted community a way to interact and provide their input on future development. It legitimizes the planning process, empowers residents, and gives the community ownership of the process.

Develop Partnerships, Networks and Effective Coordination Strategies
A broad and connected network of public, private and nonprofit entities is needed to support community recovery. Stakeholders should coordinate and leverage resources, capitalize on local knowledge, and incorporate community needs throughout the recovery process.

Core Mission Capabilities Checklist for Protection, Response and Recovery

✓ **Planning**
Mission Areas: All
Description: Conduct a systematic process engaging the whole community as appropriate in the development of executable strategic, operational and/or community-based approaches to meet defined objectives.

✓ **Public Information and Warning**
Mission Areas: All
Description: Deliver coordinated, prompt, reliable and actionable information to the whole community through the use of clear, consistent, accessible, and culturally and linguistically appropriate methods to effectively relay information regarding any threat or hazard, as well as the actions being taken and the assistance being made available, as appropriate.

✓ **Operational Coordination**
Mission Areas: All
Description: Establish and maintain a unified and coordinated operational structure and process that appropriately integrates all critical stakeholders and supports the execution of core capabilities.

✓ **Forensics and Attribution**
Mission Area: Prevention
Description: Conduct forensic analysis and attribute terrorist acts (including the means and methods of terrorism) to their source, to include forensic analysis as well as attribution for an attack and for the preparation for an attack in an effort to prevent initial or follow-on acts and/or swiftly develop counteroptions.

✓ **Intelligence and Information Sharing**
Mission Areas: Prevention, Protection
Description: Provide timely, accurate and actionable information resulting from the planning, direction, collection, exploitation, processing, analysis, production, dissemination, evaluation and feedback of available information concerning threats to the U.S., its people, property or interests; the development, proliferation or use of weapons of mass destruction; or any other matter bearing on U.S. national or homeland security by federal, state, local and other stakeholders. Information sharing is the ability to exchange intelligence, information, data or knowledge among federal, state, local or private sector entities, as appropriate.

✓ **Interdiction and Disruption**
Mission Areas: Prevention, Protection
Description: Delay, divert, intercept, halt, apprehend, or secure threats and/or hazards.

✓ **Screening, Search and Detection**
Mission Areas: Prevention, Protection
Description: Identify, discover, or locate threats and/or hazards through active and passive surveillance and search procedures. This may include the use of systematic examinations and assessments, sensor technologies, or physical investigation and intelligence.

✓ **Access Control and Identity Verification**
Mission Area: Protection
Description: Apply a broad range of physical, technological and cyber measures to control admittance to critical locations and systems, limiting access to authorized individuals to carry out legitimate activities.

✓ **Cybersecurity**
Mission Area: Protection
Description: Protect against damage to, the unauthorized use of, and/or the exploitation of (and, if needed, the restoration of) electronic communications systems and services (and the information contained therein).

✓ **Physical Protective Measures**
Mission Area: Protection
Description: Reduce or mitigate risks, including actions targeted at threats, vulnerabilities and/or consequences, by controlling movement and protecting borders, critical infrastructure, and the homeland.

✓ **Risk Management for Protection Programs and Activities**
Mission Area: Protection
Description: Identify, assess and prioritize risks to inform protection activities and investments.

✓ **Supply Chain Integrity and Security**
Mission Area: Protection
Description: Strengthen the security and resilience of the supply chain.

✓ **Community Resilience**
Mission Area: Mitigation
Description: Lead the integrated effort to recognize, understand, communicate, plan and address risks so that the community can develop a set of actions to accomplish mitigation and improve resilience.

✓ **Long-Term Vulnerability Reduction**
Mission Area: Mitigation
Description: Build and sustain resilient systems, communities, and critical infrastructure and key resource lifelines so as to reduce their vulnerability to natural, technological and human-caused incidents by lessening the likelihood, severity and duration of the adverse consequences related to these incidents.

✓ **Risk and Disaster Resilience Assessment**
Mission Area: Mitigation
Description: Assess risk and disaster resilience so that decision-makers, responders and community members can take informed action to reduce their entity's risk and increase their resilience.

✓ **Threats and Hazard Identification**
Mission Area: Mitigation
Description: Identify the threats and hazards that occur in the geographic area; determine the frequency and magnitude; and incorporate this into analysis and planning processes so as to clearly understand the needs of a community or entity.

✓ **Critical Transportation**
Mission Area: Response
Description: Provide transportation (including infrastructure access and accessible transportation services) for response priority objectives, including the evacuation of people and animals, and the delivery of vital response personnel, equipment and services into the affected areas.

✓ **Environmental Response/Health and Safety**
Mission Area: Response
Description: Ensure the availability of guidance and resources to address all-hazards, including hazardous materials, acts of terrorism, and natural disasters in support of the responder operations and the affected communities.

✓ **Fatality Management Services**
Mission Area: Response
Description: Provide fatality management services, including body recovery and victim identification, working with state and local authorities to provide temporary mortuary solutions, sharing information with mass care services for the purpose of reunifying family members and caregivers with missing persons/remains, and providing counseling to the bereaved.

✓ **Infrastructure Systems**
Mission Area: Response, Recovery
Description: Stabilize critical infrastructure functions, minimize health and safety threats, and efficiently restore and revitalize systems and services to support a viable, resilient community.

✓ **Mass Care Services**
Mission Area: Response
Description: Provide life-sustaining services to the affected population with a focus on hydration, feeding and sheltering to those who have the most need, as well as support for reunifying families.

✓ **Mass Search and Rescue Operations**
Mission Area: Response
Description: Deliver traditional and atypical search and rescue capabilities, including personnel, services, animals and assets to survivors in need, with the goal of saving the greatest number of endangered lives in the shortest time possible.

✓ **On-Scene Security and Protection**
Mission Area: Response
Description: Ensure a safe and secure environment through law enforcement and related security and protection operations for people and communities located within affected areas and also for all traditional and atypical response personnel engaged in lifesaving and life-sustaining operations.

✓ **Operational Communications**
Mission Area: Response
Description: Ensure the capacity for timely communications in support of security, situational awareness, and operations by any and all means available, among and between affected communities in the impact area and all response forces.

✓ **Public and Private Services and Resources**
Mission Area: Response
Description: Provide essential public and private services and resources to the affected population and surrounding communities, to include emergency power to critical facilities, fuel support for emergency responders, and access to community staples (e.g., grocery stores, pharmacies and banks) and fire and other first response services.

✓ **Public Health and Medical Services**
Mission Area: Response
Description: Provide lifesaving medical treatment via Emergency Medical Services (EMS) and related operations, and avoid additional disease and injury by providing targeted public health and medical support and products to all people in need within the affected area.

✓ **Situational Assessment**
Mission Area: Response
Description: Provide all decision-makers with decision-relevant information regarding the nature and extent of the hazard, any cascading effects, and the status of the response.

✓ **Economic Recovery**
Mission Area: Recovery
Description: Return economic and business activities (including food and agriculture) to a healthy state, and develop new business and employment opportunities that result in a sustainable and economically viable community.

✓ **Health and Social Services**
Mission Area: Recovery
Description: Restore and improve health and social services networks to promote the resilience, independence, health (including behavioral health), and well-being of the whole community.

✓ **Housing**
Mission Area: Recovery
Description: Implement housing solutions that effectively support the needs of the whole community and contribute to its sustainability and resilience.

✓ **Natural and Cultural Resources**
Mission Area: Recovery
Description: Protect natural and cultural resources and historic properties through appropriate planning, mitigation, response and recovery actions to preserve, conserve, rehabilitate and restore them consistent with post-disaster community priorities and best practices and in compliance with appropriate environmental and historical preservation laws and executive orders.

The Preparedness Cycle

NIMS defines preparedness as a continuous cycle of planning, organizing, training, equipping, exercising, evaluating and taking corrective action in an effort to ensure effective coordination during incident response. This preparedness cycle is one element of a broader National Preparedness System to prevent, respond to, recover from, and mitigate the effects of natural disasters, acts of terrorism, and other man-made disasters.

Components of the preparedness cycle:

- Plan.
- Organize and equip.
- Train.
- Exercise.
- Evaluate and improve.

The National Response Framework (NRF) presents the guiding principles that enable all response partners to prepare for and provide a unified national response to disasters and emergencies — from the smallest incident to the largest catastrophe. The NRF establishes a comprehensive, national, all-hazards approach to domestic incident response.

Preparing for Extreme Weather

Planning makes it possible to manage the entire life cycle of a potential crisis. Strategic and operational planning establishes priorities, identifies expected levels of performance and capability requirements, provides the standard for assessing capabilities, and helps stakeholders learn their roles. The planning elements identify what an organization's SOPs or EOPs should include for ensuring that contingencies are in place for delivering the capability during a large-scale disaster.

Many, if not most, of the operational challenges fire-rescue services face during disasters may be anticipated and planned for while there is time to resolve any policy issues that would arise concerning operating procedures. The first step is to conduct a community risk assessment which is a procedure that looks at the types of natural disasters and severe weather events as well as any hazard — natural or technological — with the potential to have an impact on the community. The low-frequency/high-severity vulnerabilities in a given community may include chemical, biological and radiological incidents (accidental or intentional). Public infrastructure — transportation, electrical, natural gas and water — systems are vulnerable to damage during disasters.

There are common topics across the range of emergencies, including preparing for extended operations, coordinating with Emergency Operations Centers (EOCs), ensuring personnel safety, working out logistical challenges, caring for mass casualties, providing services under adverse, challenging conditions, and more — all require strategies with which fire and rescue personnel should become familiar. Fire department leadership and planning personnel also need to address demobilization and recovery from a major disaster.

State and federal government disaster assistance can be requested during severe weather emergencies when local resources are exhausted or require additional support. However, this assistance normally arrives only after executing a series of procedures, and that takes time. Moreover, the extent and type of those resources is dependent upon preliminary damage assessments, and fire department personnel often are involved in quantifying and qualifying that information. The lessons learned from Hurricane Katrina, Superstorm Sandy, and other major events underscore a fundamental reality that communities (including fire-rescue services) must be self-reliant for at least the first three days and possibly longer. Given this fact, it is critical to plan.

Resource and Logistics Management

Organizing and equipping provide the human and technical capital stock necessary to build capabilities and address modernization and sustainability requirements. Organizing and equipping include identifying what competencies and skill sets people delivering a capability should possess and ensuring an organization possesses the correct personnel. Additionally, it includes identifying and acquiring standard and/or surge equipment an organization may need to use when delivering a specific capability. This element of the planning cycle is guided by stakeholder needs, national priorities identified in the "National Preparedness Guidelines," capabilities-based planning described in the "Target Capabilities List," and relevant legislation, policies, doctrine and risk assessments.

Resource typing is the categorization and description of response resources that are commonly exchanged in disasters through mutual-aid agreements. Resource typing definitions can give emergency responders the information they need to make sure they request and receive the appropriate resources during an emergency or disaster. Credentialing documents with minimum professional qualifications, certifications, training and education requirements that define baseline criteria are expected of emergency response professionals and volunteers for deployment as mutual aid to disasters. FEMA maintains a database of NIMS-compliant resource types.

Training, Testing and Exercising

Training provides first responders, homeland security officials, emergency management officials, private and nongovernmental partners, and other personnel with the knowledge, skills and abilities needed to perform key tasks required by specific capabilities. Organizations should make training decisions based on information derived from the assessments, strategies and plans developed in previous steps of the preparedness cycle.

Warning and Notification

Many severe weather situations provide warning of their impending arrival. Hurricanes, blizzards, ice storms, extreme cold, and extreme heat usually are predictable situations that meteorologists can track and monitor for hours or days prior to the onset of conditions. It is generally possible, therefore, to ramp up emergency operations in stages and make real-time adjustments in concert with changing conditions and the latest forecasts. Although technology improvements today permit better seismic activity monitoring — and we know when conditions are favorable for tornadoes to develop — earthquakes, tsunamis and tornadoes offer little notice before threatening lives, property and infrastructure. This reality underscores why it is so important to predetermine how essential services will be provided under disaster conditions. Continuity of operations is best accomplished when everyone who is responsible for essential services has been trained on special procedures and understands his or her role within the emergency management structure and the department's strategic plan.

Assessing Staffing Requirements

Significant events may demand an all-hands response. Meaningful plans should cover the manner in which personnel will be activated, how coverage will be managed, and how shifts will be constructed. Career fire departments generally have existing plans to ensure that there will be enough staffing to cover other than normal requirements. Typically, there are written procedures and rules governing callbacks, canceling leave, and so forth, and these plans are used to fill surge requirements of short duration. When planning for major natural disasters, those standing plans need to be reviewed with extended operations in mind. Very likely there will be roadblocks, both literally and figuratively, to providing services. Alternative staffing levels, redefining service priorities, and the operational environment all should be considered.

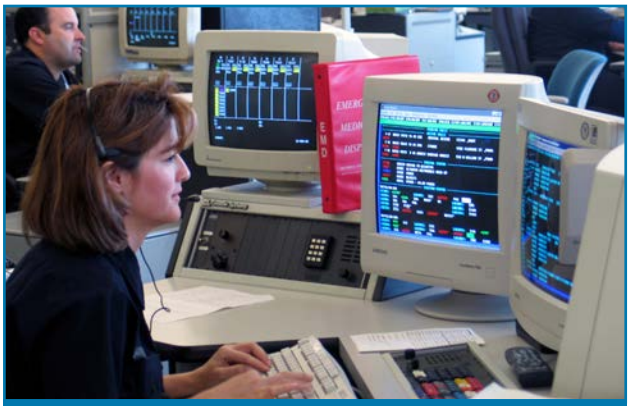
Another factor to consider in planning staffing resources is that reliance on standard mutual aid probably will not be possible. Blizzards, earthquakes, ice storms, and hurricanes may cause regional impacts, cross jurisdictional boundaries, and transcend state boundaries. Planning personnel should consider what other more distant fire departments could be tapped for help and whether neighboring departments are looking for the same backup assistance. Ideally, fire departments will tackle these deliberations on a regional basis and develop their plans accordingly. Moreover, the fire departments that are identified for such longer-reach assistance need to agree with such designation and participate in the planning process.

Another element of mutual-aid planning should address those unrequested resources that will self-deploy. Despite standard protocols to the contrary, individuals and units likely will arrive unsolicited to the emergency scene. This ad hoc response often places an additional strain on the fire department at the worst possible time. Self-dispatching is a long-standing problem with police departments, EMS departments, and fire departments. It created problems at the Columbine High School shootings, the Oklahoma City bombing, the Sept. 11 attacks, Hurricane Katrina, and the Newtown school shootings.

Fire departments use EOPs to document their resource and logistic needs within the spectrum of their anticipated and potential disaster conditions. It is important to differentiate the types of assistance that could be needed, depending on the nature of the emergency. At the local and regional level, additional resources might include search and rescue personnel, paramedics, or hazmat teams. Various types of fire apparatus might be needed, such as more command vehicles, rescue units, small boats, nonmedical transports, snowmobiles, all-terrain vehicles, etc. Water tenders/tankers may be needed to supplement depleted or damaged water distribution systems. Portable radios, thermal imaging cameras, scene lighting, extra hand lights, self-contained breathing apparatus, and other equipment might be in short supply for myriad reasons, including the possibility that the department's supplies have been damaged, destroyed or exhausted.

Alert, Callback and Notification

Fire departments should have a primary and a backup system for informing their uniformed and civilian members (including full time, part time, per diem and volunteer) about the status of operations during major incidents. For events with warning — such as tropical storms, anticipated flooding, major snow or ice storms — communications with personnel can be carried out on several levels. Information can be disseminated before the emergency through local media. Messages can be sent via the Internet and any intranet capability the department may have. Telephone calls (landlines and cellphones) are a standard for communicating, and simultaneous paging or data transmission systems may be used as well. Whatever system is in place, it should be redundant and sufficiently robust to survive the effects of a short- or no-notice event, such as a tornado or earthquake, or when catastrophic damage occurs.



Los Angeles County, California, Nov. 21, 2003 — Dispatchers and call takers with the Los Angeles County Fire Department answer 911 calls from the public. FEMA Photo/Jason Pack

Many communities have invested in a commercial rapid notification system that uses multiple means of communication and keeps records using pre-established call lists and prerecorded instructions based on the type of emergency. Once the system for notification and callout is established and tested, the content of the messages can be determined. Department members will need to know the following:

- When to report for duty (regular hours or other).
- Where to report for duty (especially important for support and nonoperations staff members, such as fire prevention and training).
- How long to anticipate the extra-duty hours will last.
- What to bring with them (personal go-bag, extra uniforms, food, water and other essentials).
- Where family members can call to check on the status and safety of fire department members.
- Other essential information (station closings/relocation).

An essential element of the messages is the update on impending events and the impact of events on department operations. The members should be given as much information as possible. With some weather events, conditions may change rapidly, and the effects could be more or less severe than anticipated or present localized conditions requiring special attention. The department's members can learn from the notifications what conditions are expected to occur, or have occurred, and whether any extraordinary requests have changed the department's normal operations.

Liaison With Dispatch, Weather Service and Utilities

Fire departments should establish and maintain liaisons with both the National Weather Service (NWS) and local utility companies that service their areas. This often is best done via the local EOC. The local EOC and its links to the state emergency management agency are vitally important in the lead-up to events during and in the aftermath of natural disasters. The NWS will provide regular briefings on conditions, often through the state emergency management agency. Typically, there are conference calls with multiple jurisdictions. Some local governments or departments may choose to use the services of private weather forecast organizations. These services may offer more detailed microforecasts for smaller areas for a fee.

Bethesda, Maryland, Aug. 27, 2011 — Pepco crews clear power lines of obstructions in anticipation of Hurricane Irene's arrival. Crews from around the country were coming into the area to assist local power companies with anticipated power outages. President Obama had signed several emergency assistance orders allowing FEMA to provide assistance to these states. FEMA Photo/Patsy Lynch

Likewise, the fire department must be in close contact with the local utility companies that service its area. The restoration of essential services such as telephone, electric, water, sewer and natural gas are the foundations of recovery. The status of such recovery efforts will affect the demands for fire department services directly. As the community recovers, the fire department will recover and be able to return to more normal operations. The fire department should have a liaison at the EOC and should be present when the emergency manager conducts regular briefings. Utility companies also should have a presence at the EOC to provide this information and to coordinate restoration of service with first responders and the Public Information Officer (PIO). Fire department and other emergency services facilities, along with other critical infrastructure assets, should be among the priority for the restoration of utility services.

Mutual Aid

Mutual aid is the process of obtaining material or personnel support from other agencies. In some fire departments, mutual aid is a common occurrence, with nearby companies responding to emergency calls, covering stations, or other situations. In other fire departments, outside assistance is rarely available or requested. In some communities, the mutual-aid agreement is informal — the departments have just always helped each other, and it is understood that such assistance is available. Other departments have written agreements. Written agreements are preferred. Automatic aid is a formalized agreement to provide mutual aid under a contractual agreement in specific circumstances or conditions.

Extreme weather events and natural disasters place a higher demand on fire department services and resources. The larger the scope and scale of the emergency, the larger the surge of response activities required. In events such as earthquakes, tsunamis, hurricanes, floods and tornadoes, the department may have suffered damage to its facilities, and its personnel (both on- and off-duty) may have become casualties. Personnel and equipment are the two key elements of any mutual-aid plan. Mutual-aid plans describe how a state (or region within a state) will mobilize personnel and equipment and how it will organize and administer those resources. If not in place already, fire departments should have a system set up, so they can obtain and sustain incoming personnel quickly from outside agencies. The system should plan on supporting a personnel surge for at least several days, and ideally for two or more weeks in the event of a catastrophic event. Generally, regional or statewide plans have similar components, as follows:

- A legal basis or authority for establishing the agreement.
- Assumptions of the situations that could require mutual aid.
- A description of how mutual aid will be mobilized.
- Definitions and terms (e.g., types and location of equipment and supplies; descriptions of disaster worker and first responder credentials; assembly and reporting locations for mutual-aid resources; and regional boundaries or districts).
- Operations (e.g., command structure; communications; local plans; and EOCs).
- Policies and procedures (e.g., liability; workers' compensation coverage; reimbursement; dispatch procedures; plan activation; logistical support; self-supporting team needs; documentation procedures; and communications procedures).

NIMS is the template for organizing disaster response and is mandated by the federal government for federal agencies and those nonfederal agencies that receive federal homeland security funds. In NIMS, there are specific position descriptions covering all of the functions and tasks involved in supporting disaster response, public safety and recovery. Departments that use mutual aid from adjacent communities know that these resources meet the needs of most common service requirements. This local aid often shifts back and forth, with communities routinely cooperating on individual incidents. When a severe weather event or other large-scale disaster occurs, regular mutual-aid response may not be available. Floods, high winds and earthquakes, for example, do not follow geopolitical boundaries. The larger and more widespread the event, the greater the likelihood that the existing mutual-aid system will not meet the demands placed upon it. Fire departments will have to draw on assistance from fire departments beyond their normal mutual-aid area.

How then does one address the needs of a situation where the demands for fire department services have multiplied at a time when the department's ability to respond to these demands has been limited or compromised? A method that has been adopted in many locations is a regional, statewide and interstate mutual-aid system. Communities benefit greatly from such pacts by ensuring that they will receive access to vital basic services when needed most.

- Coordinated planning, especially for incident command.
- Multiple response resources during major incidents or events.
- Timely arrival and dependability of requested aid.
- Availability of specialized resources.
- Minimal administrative conflict and litigation following a response.

Emergency Management Assistance Compact

The Emergency Management Assistance Compact (EMAC) is an example of an interstate agreement. In this system, a state legislature passes EMAC law committing the state to join the compact and provide assistance — fire services for example — to other members of the compact. This agreement addresses a wide range of government services including public works and law enforcement. EMAC law states that through EMAC, states can share all available resources in their state with other EMAC member states. Established in 1996, EMAC is the cornerstone of the national mutual-aid system. The compact was ratified by Congress under Public Law 104-321 (1996). All fifty states, as well as the District of Columbia, Puerto Rico, Guam and the U.S. Virgin Islands have enacted legislation to become EMAC members.

EMAC offers assistance during governor-declared states of emergency through a responsive and flexible system that allows states to send personnel, equipment and commodities to support disaster relief efforts in other states. The strength of EMAC is the willingness of states and territories to provide response and recovery personnel for deployment to other areas. EMAC establishes a firm legal foundation for this cooperation. EMAC legislation solves the problems of liability and responsibilities of cost and allows for credentials, licenses and certifications to be honored across state lines.

The EMAC process consists of distinct procedural steps that provide form and structure needed to share resources during times of emergency/disaster and that serve to help ensure compliance with applicable laws. This multistep process provides a systematic approach that has been proven to work when state emergency management agencies are actively engaged and the various steps are followed. States use enabling mechanisms (intrastate law, intergovernmental agreements, memorandums of agreement or understanding, and governor executive order) to share resources within their state (from all jurisdictions) with other member states through EMAC.

All EMAC member states have enacted the EMAC legislation and have agreed to use the EMAC process and procedures. EMAC is implemented through the state emergency management agency of the respective member state acting on behalf of its governor. The EMAC Operations System facilitates all phases of the EMAC process.

The five distinct phases of the EMAC process include the affected state(s) involved in a declared emergency, as well as the assisting state(s). The process commences before the event and ends when the requesting state has reimbursed the assisting state.

Phase 1 — Pre-Event Preparation
To ensure successful EMAC implementation within states, state emergency management agencies and resource providers from all jurisdictions (state, county, local or private sector) have a responsibility to prepare for resource needs before an emergency or disaster occurs.

All jurisdictions (local, county, state and private) should:
- Work with the state emergency management agency to develop in-state EMAC procedures.
- Incorporate lessons learned from past deployments.
- Match resources to NIMS Tier 1 Criteria.
- Develop mission ready packages (with cost estimates).
- Train and exercise personnel.

Phase 2 — Activation
When local resources are exhausted and resource requests reach the state emergency management agency, the state sources the resource need to intrastate mutual aid, federal, private sector, volunteer or EMAC. That state's governor will declare an emergency or disaster, authorizing funds to be expended for response and recovery and activating EMAC. The affected state's EMAC authorized representative or EMAC designated contact opens an event in the online EMAC Operations System, alerting both the National Coordinating State and National Emergency Management Association (NEMA) that a request for resources is likely. Note that only the affected state needs to declare an emergency or disaster.

Phase 3 — Request and Offer
The affected state will route resource requests to the EMAC A-Team that, in turn, will contact EMAC member states to source the request starting with the closest states (in terms of time/distance). The potential assisting states assess their own risk level, and if able, use their in-state EMAC activation protocols to contact resource providers to determine availability and to collect offers of assistance (such as requesting their mission ready package). The requesting and assisting state emergency management agencies complete the EMAC Request for Assistance form (REQ-A) for accepted offers of assistance. The completed REQ-A constitutes a legally binding agreement between the two states. Note that the A-Team facilitates the EMAC process under the direction and control of the EMAC authorized representatives of the requesting and assisting states.

Phase 4 — Response
Once the REQ-A is complete, resources prepare to mobilize (i.e., prepare for their mission), deploy (i.e., conduct the mission in the requesting state), and demobilize (i.e., return home). It is critically important that deploying personnel receive a predeployment briefing, receive an EMAC Mission Order Authorization form prior to their deployment, are educated on EMAC, understand their responsibilities in tracking mission expenses and maintaining documentation, and maintain contact with the assisting state emergency management agency while on their deployment. Due to the nature of the situation, deployed personnel will likely encounter difficult living and working circumstances, limited communications, traumatized residents and co-workers, long working hours, primitive field conditions, and other difficult situations.

Phase 5 — Reimbursement
Deployed personnel, resource providers, assisting and requesting states share the responsibility for the timely processing of reimbursements. Reimbursement starts with deployed personnel and resource providers submitting a reimbursement package to the assisting state. Assisting states audit reimbursement packages that are sent to requesting states who, upon completing an audit and resolving any outstanding issues, issue payment back to the assisting state. Note that a state's obligation to pay EMAC reimbursements is not contingent upon the receipt of federal funds and that the EMAC REQ-A (the legally binding agreement completed for every EMAC mission) is based upon estimated costs. Reimbursement costs should mirror but will not exactly match the REQ-A.

Chino, California, Nov. 20, 2008 — These wildland firefighting apparatus are staged at the Prado Staging Area. They were used to fight wildland fires in Southern California. FEMA has the ability to provide funds through the Fire Management Assistance Grant Program to reimburse states for the costs of fighting wildland fires. FEMA Photo/Unknown Photographer

Accommodations, Food and Support for Responders

When a fire department designs plans for disaster operations, there are several internal components to consider: extended shifts, personnel accommodations, and food. There are a number of key issues. How will the department mobilize all of its personnel and provide shelter once everyone is mobilized? Additionally, how will the department provide food for them when the distribution system is disrupted?

Departments with paid full-time and part-time personnel have plans and procedures in place to provide short-term (48 to 72 hours) increases in staffing by canceling vacations and other types of leave or holding over shifts. Crew fatigue becomes an issue when shifts are extended, especially in times of higher-than-average activity or longer shift duration. One solution to preventing overload and burnout during emergencies is to condense three or four shifts down to two shifts, each of which then has larger staffing. The shifts work a 12-hours-on/12-hours-off rotation. This type of staffing requires some advance notice to implement and to mobilize.

For volunteer departments, the challenges are similar, with the added fact that volunteers may have to be released to return to their regular jobs during an extended response and/or recovery phase. The department should devise a schedule that addresses longer range operations. If an event lasts for more than two or three days, there will be pressure on volunteers to return to their regular place of employment, so the availability of other resources becomes especially critical. State resources may be available to provide backup for disaster response in inadequate coverage areas, as may other volunteer or career departments. State-level resources may include National Guard, state police, forest service, wildlife management, health department, finance department, and other agencies.

When staffing is increased, regardless of the method or plan, all personnel should have a clear indication of where to report and when. This may involve temporary assignments to other stations to fill gaps in coverage. Another consideration is the use of support services staff. Personnel assigned to training, public education, fire investigation, and code enforcement can be used to fill a departmental command post, coordinate information at the EOC, function as the PIO, or perform other duties as needed. Plans

for the alternative assignment of staff should ensure that personnel are trained appropriately for those task requirements. Failing to rotate crews during extended operations can have a severe negative impact. Given the immediate circumstances, some people will have to work for extended times. This may be particularly true of headquarters or EOC staffs. Managers should enforce 12-hour shifts and serve as examples of this policy.

Part of the planning process mentioned earlier is assessing hazards and damage. By understanding the risks encountered by a community, fire department personnel can plan accordingly. Fire department leadership should consider that, prior to some weather events and following the effects of other events, it may be necessary to move fire department personnel and equipment to safer locations. This may be done in advance of an event such as a flood or as the result of damage from an earthquake or tornado. Relocation planning for apparatus and personnel should include locations that are not in the path of the flooding or other dangers. When planning for relocation, the length of the stay is a factor, as are the changes in response time and patterns. Also, companies may be relocated not because their station is in danger but because response patterns may have been altered due to flood damage to roads and bridges or other hazards. In forming relocation plans, consider, as much as is practical, the safe removal and storage of all types of equipment in the fire station, not just the personnel and apparatus. If time allows, anything that can be moved to higher ground should be moved. If time is short, then move as much equipment as possible to higher portions of the station, if possible. The equipment should include computers and other electronic gear, hard copy files, and records. Generally, as much as possible should be moved if time and conditions permit.

When the members of a department are directed to report for extended duty hours, they should be reminded to bring along additional personal supplies for at least the expected duration of their overall assignment. For example, if members are directed to report for a minimum of three days, then they should bring at least a three-day supply. An emergency go-bag might include such items as work clothing, uniform, undergarments, socks, off-duty clothing, toiletries, bottled water, nonperishable food supplies, personal medication, sleeping bag, extra sheets and blankets, flashlight, batteries, and charging adapters for personal cellphones or tablets. Members should report with their own supplies because, depending on the type of disaster, stores may be unable to open for several days or even weeks. Curfews, evacuations, road closings, power failures, or structural damage may affect access to needed personal items. When planning for extended operations, fire departments need to consider shelter capacity, food services, and basic supplies to maintain the personnel on-duty. Optimally, shelter space should be located away from operational areas. Portable cots, blankets and so forth should be acquired and predeployed in designated sleeping areas. Cots may be available through the EOC or other service agencies.

Some departments have canteen units that respond to multialarm fires or other operations. Some departments have rehabilitation units that supply refreshments. These units, while effective for the short term, will not likely support the food service needs of an entire fire department and mutual-aid partners for several days. Just as with the personal kits, the normal food distribution systems probably will be disrupted by the disaster. This disruption may last for as long as it takes to restore power to stores, repair the stores, and reopen the highways and railroads that lead to the stores, and that time period could be weeks or months. Some businesses never recover from the effects of weather-related or natural disasters. Fire departments should develop plans for how their personnel will be fed while disaster response and recovery operations are in effect. A variety of basic supplies are needed to sustain a fire station and the equipment that is kept there. The regular supplies and food will be consumed during the early days of disaster. If the department experiences increased service demands and staffing, the rate of consumption and use of supplies will rise.

While fire departments may have adequate support services during normal operation, a disaster and the extended operations that follow will affect the continuance of these services. One solution is to use the principles found in NIMS to address logistical needs. While the subject of logistics may not be at the top of the priority list for planning, the fact is that if logistics fail, and fuel, food and other supplies are halted, tactical

operations could be markedly hampered. Personnel should be dedicated to establishing a departmentwide Logistics Section in a departmental ICS structure. By having such a system, supply restocking and maintenance during and after a disaster can be addressed systematically.

A desirable alternative to quartering personnel in fire stations is to provide other locations where fire department members can stay if the fire stations are too crowded or lack basic services such as electricity, water and sewer — or are structurally unsound or unfit for use. A safe haven or rehabilitation location can be established in a variety of places. There are several factors to consider for virtually any type of off-site location, including the following:

- Secure, safe and patrolled by law enforcement.
- Power for heat and air conditioning.
- Showers and lavatories (or bathrooms).
- Sleeping quarters.
- Kitchen area or means to refrigerate, store, heat and prepare food.
- Telephone, Internet or other means for members to communicate with their families.
- Recreational facilities, if possible.

Departments with wildland firefighting experience will recognize the description above as elements of a base or support. Again, NIMS offers position descriptions for the people and assignments to staff the logistical elements of an event.

Physical and Psychological Support for Personnel and Their Families

In the event of an extreme weather situation or natural disaster, the members of the fire department will encounter the same issues as the rest of the general population. Members' homes may be damaged, and department personnel or their family members may have suffered injuries, or worse. How does a fire department continue to operate efficiently when its members have been affected directly by a disaster? Departments should develop and practice methods to check on their personnel to ensure that they are not in distress and can report for duty. If telephone, cellphone and other communications are unavailable, and they may be, this task may require face-to-face verification, if that is possible.

- What does the department plan to do if members cannot report for duty?
- How will their shifts be covered?
- Will members be allowed to leave duty stations to check on the well-being of family members?
- How will family members stay informed about the safety of department members on-duty?
- Should arrangements be made for family members to have specifically designated shelters?

Fire department leadership and department policy should address the methods by which the department would shelter and evacuate its members. These deliberations may extend to providing similar assistance to the service members' families. Some communities have established plans for specific shelters to house emergency workers. The municipality identifies, equips and staffs shelters for emergency workers and often their families as well. Like other shelters, these should be capable of functioning under conditions of prolonged power failure. By having a central location or locations where the families of fire department members can be sheltered, a large stressor on the department's members can be reduced. One of the lessons learned from many disasters in the past is that people may not evacuate to a shelter if they have to leave their pets behind. Some fire department families may feel the same way. Ideally, shelters should have provisions for common domestic pets.

The members of the department will be much more effective when the stress on them and their families is reduced by a system to coordinate information about relief efforts. During a major weather disaster, fire departments should activate a departmentwide personnel accountability plan in order to track

and document personnel status via a Personnel Accountability Report (PAR). Just as a PAR at a fire or emergency scene confirms status, doing so during disaster operations does the same. This information will help determine which personnel are available, who may need transportation to the station, or even which members require disaster assistance themselves. How does a department know if a member is just late for an assigned work period or if he or she is a victim of the storm and needs assistance? How will the department ascertain whether unavailable personnel are absent with just cause, or not? The emotional and physical well-being of fire department members also will be a major operational consideration following a weather-related or other major disaster. Longer shifts and the effect of seeing widespread devastation in the community (including among friends and family) will impact the state of mind. Rest, food and rehydration, along with mental health support, are necessary and essential to help keep personnel working effectively during and after a disaster. Mental health interventions may last for weeks or months following a large-scale event.

Just as a PAR at a fire or emergency scene confirms status, doing so during disaster operations serves the same purpose. This information will help determine which personnel are available, who may need transportation to the station, or even which members require disaster assistance themselves.

Protocols to Ensure Personal Safety and Accountability

During periods of extended or prolonged operations following a disaster, personal protective equipment (PPE) issues may arise. After the Sept. 11 terrorist attacks and several anthrax incidents, the National Institute of Occupational Safety and Health held a conference to share information and experiences regarding PPE and its use. While conditions are not exactly the same between a terrorist event and a natural disaster, there are parallels that can be made about operations following a disaster. Structural firefighting PPE is not designed to be worn for extended time periods. An hour or two is generally accepted use. Wearing it for multiple hours contributes to fatigue and heat stress. The PPE may become damp from perspiration, increasing the hazard for steam burns if the PPE is not permitted to dry thoroughly. Gloves, footwear and eye protection all have similar limitations when they are worn for longer than originally intended.

Natural disasters can present fire department personnel with situations they have seldom encountered. Hurricane-force winds, extended power outages, and major infrastructure damage are only a few of the hazards that may arise. Developing protocols or SOPs covering potential hazards with risk that may affect responders is necessary to ensure operational effectiveness and personnel safety.

These are some examples of scenarios where a response policy is recommended:

- Dispatch and response in high winds (i.e., wind speed greater than 39 mph).
- Policies for go/no-go situations.
- Swift-water scenarios.
- Collapsed buildings.
- Water distribution system problems due to contamination and/or prolonged power outages.
- Street, bridges and tunnel closures/access limitations.

Disasters can disrupt all types of business and supply systems. Many businesses use a "just-in-time" inventory management process. In that process, inventories of all types of materials are kept low intentionally to reduce storage costs. This system reduces the cost of excess inventory, but it relies on the uninterrupted transportation of goods. A disaster likely will disrupt these systems, and many materials and supplies will not be available. The number of days of motor fuel (gasoline or diesel) on hand for fire apparatus and ambulances is the number of days the fire department continues operating if roads are closed and fuel deliveries cease. Accordingly, the department's logistics plan should address how it will

Poydras, Louisiana, May 24, 2011 — FEMA funded nearly $2.05 million for the replacement of the building and contents of Fire Station No. 8. Funding covered the complete replacement of the facility. The new facility was built to current codes and standards in order to meet all safety requirements appropriate to, and required of, a contemporary fire station. FEMA obligated over $14.3 million for St. Bernard fire stations post-Katrina. FEMA Photo/Manny Broussard

sustain the availability of critical, expendable supplies and other operational assets. Many departments maintain substantial caches of such materials to ensure operational readiness for extended periods, or they should make arrangements or mutual-aid agreements with places that have such storage.

Many fire departments have a permanent, dedicated Safety Officer position. In a disaster environment, the demands on this position will increase. If a departmentwide ICS or Area Command is established, the safety function will require more personnel to handle the myriad assignments. At a departmentwide or Area Command level, safety personnel must monitor and evaluate conditions and essentially maintain situational awareness for weather; seismic conditions (aftershock potential); work hours; crew fatigue; facilities for rest and sleep; crew conditions; food and water; PPE; evidence of onset post-traumatic stress; station status, structural safety, and sanitary conditions; and family support. As in structural firefighting situations, the Safety Officer must have the authority to suspend operations temporarily if conditions present too high a risk (e.g., a Category 4 hurricane) for personnel to respond or continue operations.

It is important to identify which fire stations in a community are at risk of flooding or other likely natural disasters. In selecting sites for new stations, consider flood plains, fault lines, wind resistance, and other natural hazards. Palm Beach County, Florida, has called for design features for all new fire department facilities to protect against the effects of a Category 5 (wind speed greater than 155 mph) hurricane. Many types of natural disasters can cause damage to fire stations. For example, substantial snow loading on flat-roof stations may produce structural failure risks. If stations must be evacuated, they should be inspected by qualified individuals who can evaluate the safety and operability of the building before the station is placed back in service.

Emergency Mode for No-Notice Events

Following an earthquake or other no-notice event such as a tornado, fire department safety personnel should assess viability of their stations to determine if they have been affected. Fire departments with experience in dealing with no-notice events typically have policies and procedures for rapidly transitioning into an emergency mode whereby personnel react to the event. For example, after an earthquake of certain magnitude, the first order of business is for companies to exit their quarters, account for personnel, and survey damage to the fire station and apparatus. A fire department needs a plan to prepare for extreme no-notice events to readily assess its potential losses, readiness status, and additional assets required.

Operational Support

There are other operational considerations beyond safety in the natural disaster environment. Fire departments must cooperate with other agencies more than usual. Coordination with local and state agencies such as the departments of public works, transportation, law enforcement, and the National Guard, as well as utility companies and NGOs is likely.

Weather-related and other natural disasters may cause damage to the transportation infrastructure. Fire departments will be called to respond on streets that may not be passable because of debris on the roadway; physical damage to the roadway, including traffic signals and signs; flood waters; snow and ice; downed and/or energized power lines; and other hazards or conditions.

The best way to coordinate the activities of multiple agencies is through a Unified Command structure. The agencies normally responsible for the roads (i.e., public works, highway department, engineer's office) should be represented, along with the fire department and other emergency services. The public works department usually can provide assistance with barricades for road and street closures. They also may have the heavy equipment needed to clear streets to provide passage for emergency vehicles. Many public works agencies have structural engineers on staff, and they can assist in making building safety assessments. Public works units may have pumping capabilities that could be a resource for removing water, thus augmenting fire department personnel providing that service or freeing them for other operations.

Dealing with disasters, small or large, is all about movement — getting people away from the danger, bringing emergency response operations toward the danger, transporting casualties to medical services, delivering supplies and materials to support these operations, and managing this movement through areas with infrastructure that may be either damaged or loaded beyond capacity. Threats like earthquakes and terrorist attacks give no notice, but one thing we know for sure — the water will keep rising. The growing consensus is that while attempts to halt climate change and rising sea levels are necessary, coastal cities have no choice but to prepare for its inexorable encroachment.

Public works may be called to assist in opening the streets and roads to allow members access to the fire stations or operational areas. These agencies also may be a resource in moving personnel from one area to another. Due to traffic, safety or other concerns, it may be best to have members stage their personal vehicles at a given location and use an expedient transit system to take them to and from their duty stations. Transportation departments and traffic engineers can assist if they are the ones that manage the traffic signal system. The traffic signal system is not just about lights; it is an entire system of signage that directs and controls traffic flow. If the traffic lights and signs are disrupted due to damage or extended power failures, the local transportation or public works department may be able to erect stop signs and make four-way-stop intersections to re-establish control of intersections. This can lessen the burden on law enforcement personnel and help prevent accidents to which both fire and police would have to respond, increasing their operational burdens.

Disaster and major incidents demand effective coordination among fire and police personnel. Traffic control, curfews and limits on access to damaged areas all affect fire department operations and require close cooperation with law enforcement. Some disasters may spawn lawlessness in the form of looting and arson, which can place unarmed fire and EMS personnel at risk. Plans should spell out how fire and police will communicate and when law enforcement needs to indicate an "all-clear" before fire department members respond at a scene.

If the disaster is large enough or local governments request such assistance, the governor of the state declares that a state of emergency exists and mobilizes the National Guard. The National Guard, law enforcement, and highway department may have various overlapping duties and capabilities. The National Guard can assist with traffic control and security needs while also assisting with tasks like debris removal. Some National Guard units may assist with other challenges, such as providing shelter with tents, or other assistance. The National Guard will need a liaison in the EOC to coordinate support for local officials.

The highway or public works departments and the National Guard may be able to help fire departments get to and from the scene of an emergency. This may require the use of heavy equipment to clear the streets of debris or other hazards, such as snow and ice. These agencies and the National Guard will have four-wheel-drive vehicles, which can be used to gain access to various types of emergencies. For example, EMS patients in places that are not accessible to regular vehicles can be picked up by four-wheel-drive vehicles and taken to regular EMS transport vehicles. These same agencies also may have small boats for the same purpose.

If there is a U.S. Coast Guard presence in the region, the fire department should develop disaster response plans with them. If not, contingency planning for flooding should include swift (moving) water and other waterborne operations. The U.S. Coast Guard possesses various resources to support these kinds of operations.

Aircraft may be another resource for use in the movement of patients or in other operations. Some law enforcement agencies have this capability, as do the National Guard and the U.S. Coast Guard. If a local transit system has buses, they may be pressed into service for the movement of personnel, as mentioned above, or used in the evacuation of civilians and for medical transportation. There also may be National Guard or public school transportation resources available for this purpose.

Providing EMS care for people in emergency shelters will be a factor in disaster response. In many, but not all communities, agencies such as the Salvation Army or American Red Cross are the responsible organizations for shelter management. They may provide a nurse for medical support. The American Red Cross, however, does not, as a matter of practice, transport people to and from shelters. If the fire department provides EMS transport services, then planning should anticipate the surge of patients that will follow the opening of shelters. Some people come to shelters in bad health; some have their conditions aggravated by the process of travel to and the life in the shelter. Many people will not have their medications with them at the shelter, and that can quickly develop into serious health situations.

EMS units at shelters will be governed by the same go/no-go procedures as when high winds or other hazards are present, limiting safe operations. If EMS transport units are to operate from shelters, plans should address certain considerations:

- Whether these EMS units will be dedicated to shelter services only, or whether they will be available to respond to other emergencies near the shelters.
- How crew rotation and logistical issues at shelters (such as fuel, supplies and staff rehabilitations) will be addressed.
- What to do if hospitals and emergency departments are over capacity and cannot take more patients.
- Finally, shelters may remain open for several days. Any EMS deployment must take extended operations into account.

Special Concerns for Extreme Weather Events

This section addresses particular concerns related to several different types of weather-related emergencies and provides an NWS definition for the event. An event in one part of this country (e.g., a snowstorm) may be considered a disaster, while in other parts it is just considered inclement weather. Part of the hazard assessment process is an understanding of historical weather patterns for your community and how local capabilities are prepared to address the likely consequence of those events, as well as more extreme conditions.

Blizzards are defined as a snow event with sustained winds of 35 mph or more. In addition to the hazards from the accumulation of snow, visibility decreases from blowing snow. Snow accumulation may damage utility lines and disrupt highway and rail transportation. Structural collapse is a real threat from heavy accumulations of snow, which increases the structural load on roofs and walls. As heavy snow falls on highways, snow removal becomes essential to maintaining public safety services. Many cities have well-fielded procedures in place to mobilize de-icing and snow removal operations during winter storms. However, a 12-inch snowfall in Boston is not the same event as it would be in Atlanta. Fire departments where heavy snow is an anomaly nevertheless should establish procedures on how to handle the unlikely, but not impossible, threat from snow. As mentioned earlier, coordination with public works and the state's department of transportation is crucial during these types of events. There will be stranded motorists, and recovering them will be a challenge; fire departments will be called upon to help.

If blizzard conditions close highways and streets for several days, the demand for EMS services could increase dramatically. This is particularly true for situations where residents require regular treatment at health care facilities. People who require chemotherapy or dialysis and who make frequent trips to treatment centers will end up calling EMS for transportation. Typically, these people use some form of public or private transportation, which may cancel service in seriously inclement weather. At the same time that EMS responses take longer due to road conditions (increased travel times), there also will be an increase in demand for services. As many fire departments know from experience, this situation will strain the fire department and EMS system. One solution for this problem is to have a pre-established network of four-wheel-drive vehicles that can take ambulatory patients from their homes to treatment centers and then back to their homes. In this way, the patient receives the best level of care while reducing the demand on both the fire/EMS services and the emergency departments in hospitals.

Nontidal flooding can be caused by heavy rains, rapid snow melt, or failure of dams. Depending on the circumstances, the onset of flooding can be sudden or anticipated. In either case, water levels will rise well above the norm and inundate the surrounding area. This condition may last for several days or even weeks.

During flooding, fire departments are faced with these challenges:

- Structural damage from fast-rising or swift-moving water.
- Disruptions to utility services.
- Damage from debris being moved by the water.
- Evacuation of low-lying areas.
- Rescue situations with people trapped in structures by rising waters and in motor vehicles.
- Damage to infrastructure, such as roads and bridges, with an impact on response.
- Rescues, removals and recoveries from flooded areas or under swift-water conditions.

Bucks County, Pennsylvania, July 5, 2006 — Heavy rain caused the Delaware River to flood, closing this road between New Hope and Yardley. Roads remained closed, and homes and businesses remained damaged from that severe weather. FEMA Photo/Leif Skoogfors

During flood events, the fire department usually works closely with law enforcement and the agencies that maintain the roads and highways. Access into many areas may be limited or impossible without assistance from other agencies and special equipment. The movement of the water and the speed of the water's movement also can affect fire department operations. Flash flooding, or a rapid rise of water, can catch a community off guard. Some communities that are prone to this type of weather predeploy their specialized rescue teams when heavy rains are forecast or when ground saturation levels reach predetermined points.

A hurricane is a tropical cyclone with sustained surface winds of at least 74 mph that forms in the Atlantic and eastern Pacific Ocean basins. In the western Pacific, these storms are called typhoons**.** Hurricanes are further defined as Categories 1 through 5, based on the velocity of sustained winds. Category 3 hurricanes and higher are considered major hurricanes that will likely require special operations and present atypical challenges in any affected community. Tropical storms are cyclones with sustained surface winds of at least 39 to 73 mph. The entire Eastern Seaboard and Gulf Coast of the U.S., as well as California and Hawaii, are vulnerable to these storms. The heavy rains and winds cause damage far from the coastline. For that reason, even fire departments not located along the coasts must be aware of the potential for effects from storms that have made landfall several states away.

Perhaps the most dangerous hurricane threat is tidal flooding along coastal areas that develops near the eye of the storm as it approaches landfall. Storm surges raise water levels several feet above normal high tide and may last for more than one tidal cycle. Wave action driven by storm winds increases the potential for damage to property. With higher category storms, the potential for damage can rise to catastrophic proportions, as was seen along the Gulf Coast from Hurricane Katrina in 2005.

Chalmette, Louisiana, Sept. 17, 2005 — Jeff Barry of California Task Force 2 Urban Search & Rescue from the Los Angeles County Fire Department marks another home that was searched inside and out for possible survivors or fatalities from Hurricane Katrina. The height of the storm surge was evident by the boat and trailer lodged on the roof of the house. FEMA Photo/Bob McMillan

Fortunately, hurricanes generally provide ample time for communities and fire departments to prepare and to situate personnel and equipment in safe areas. One prediction tool in use by some emergency managers is called Sea, Lake, and Overland Surge from Hurricanes. This is one of several programs or models that can be used to project the track and potential damage from hurricanes. Communities can use this model to estimate storm surge depths and determine which areas need to be evacuated. This also would help project which stations would be threatened by the various categories of hurricanes and whether evacuations should be considered in advance of landfall. Prediction tools also aid in planning for which infrastructure (such as roads, bridges, power-generating and water-treatment facilities) may be the most vulnerable to flooding from storm surge. The threat and relative risk to critical infrastructure target-hazard occupancies is assessed and contingency strategies developed.

For practical purposes, hurricane operations are categorized in two ways — pre-landfall and post-landfall, with each phase having its own operational mode due to the respective circumstances and challenges. In the pre-landfall mode, there is generally a 48- to 72-hour notice. With all of the media attention given to tropical weather, there is little reason to be surprised by the approach and timing of a named storm. The forward motion of these storms can slow or accelerate, or the storm may change course, but they never arrive without warning.

Most pre-landfall operations address preparing for the storm. Fire stations, equipment and personnel have to be made ready for the storm, which may require evacuation of fire department personnel and equip-

Breezy Point, New York, Nov. 8, 2012 — Aerial views of flood and fire damage in the Breezy Point neighborhood as a result of Hurricane Sandy. Following the hurricane, a nor'easter struck the area causing more power outages and additional flooding. FEMA Photo/Andrea Booher

ment to safe havens if flooding is a concern. Backup generators and special equipment to support special response demands — swift-water rescue, for example — will need to be secured. Cooperation with law enforcement and agencies with boat and airlift capabilities may be essential for rescue of people isolated by flood waters. With tidal surges, the flooding could last for several days. As the storm approaches and winds increase, decisions will have to be made regarding ongoing operations. Winds above storm force (above 39 mph) will cause debris and any other objects not secured to move or become airborne, posing serious hazards to personnel, vehicles and structures.

Departments that have hurricane plans should include a provision for the cessation of the normal mode of operation. Sustained winds of 39 mph generally are the accepted threshold for this no-go period. The stand-down lasts until the sustained winds once again drop below the designated threshold. During this time, procedures should be in place to put calls on hold until conditions warrant a safe response. Because fire departments normally are accustomed to answering every call as soon as it is received, personnel may need specific policies and direction to restrict unsafe operations.

After the storm has passed and the winds have diminished, fire departments will have to assess whether there are continuing risks to personnel and if their structures and equipment have sustained damage. Some fire departments also help conduct damage assessment in the community. Units from each station have a predetermined list of target hazards to survey for preliminary damage. This process is completed before rescue or other fire operations missions begin. A preliminary damage assessment also is crucial as a prerequisite for requesting federal disaster assistance through FEMA.

The information obtained also permits an orderly prioritization of operations for specialized units such as Urban Search and Rescue (US&R) teams. A family relief and recovery survey of members' homes is also an idea. One of the major post-landfall challenges is restoration of services and in particular electrical service, including calls for electrical fires that may occur as the power restoration process begins, restoring power in buildings with damaged wiring that may cause fires, and tree limbs on power lines. Flooding, wind-damaged roads, missing signs, and inoperable signals that control traffic flow may, in turn, affect the timely arrival of mutual-aid resources attempting to assist. Providing a firefighter to coordinate logistics with mutual-aid companies and act as a navigator to direct incoming units is helpful. Planning efforts

for the post-hurricane environment should include anticipation that there will be an increase in requests for EMS service resulting from minor injuries such as falls, sprains and lacerations as people begin debris removal and repair of their homes.

During an earthquake, the plates of the Earth's surface move and release energy in the form of seismic waves. Such waves vary in intensity, duration and in the amount of damage they cause. The epicenter is the point of highest energy release and typically of the greatest damage. Earthquakes strike without warning, as currently there is no proven prediction system. There are areas that are well identified as earthquake-prone, with fault lines and historical data on events, such as California and Alaska and the area around the New Madrid Fault Zone in the Midwest, but many other areas also are at risk.

Earthquakes can cause massive damage to buildings, power and water distribution, pipeline systems, and the infrastructure in general. Fire department properties are not exempt from this potential for damage. The damage from earthquakes can include damage to buildings; damage to roadways and other infrastructure; fires from ruptured gas lines, downed wires, and collapsed structures; the release of hazardous materials; multiple rescues of people who were occupying damaged buildings; and potential for mass casualties and mass fatalities.

After an earthquake, the fire department first should check to see if any of its resources have been compromised. Then, a survey to determine the extent of damage in each company's first-due district should be conducted. Responding to earthquakes in this manner requires a plan and training on the plan, such as was used by the city of Los Angeles. Immediately following the Northridge earthquake in 1994, the Los Angeles Fire Department went into an operational stance they define as Earthquake Emergency Mode. Companies conducted a PAR at the battalion level. Following the PAR, the companies performed district drive through where they surveyed damage in their area. Instead of committing to the first emergency they spot, companies should not respond to emergencies until this damage triage survey is completed, since there may be more serious emergencies having greater priority.

Depending on the magnitude of the earthquake, fire department operations may continue for some time. There are many cases of people surviving for days in collapsed buildings. The US&R system likely will deploy its resources, which will involve mutual aid, extended shifts, and all of the challenges associated with large-scale operations.

Tsunamis are a disruption of regular wave action caused by underwater seismic activity. These waves can travel great distances at high speeds until they collide with a shoreline. When a tsunami impacts the shoreline, it often behaves like a flash flood (or perhaps more closely, a dam failure). Instead of waves that simply break on the beach, tsunamis have the entire mass of the ocean behind them. When they strike land, they may be a miles-long wall of water. As they roll across the land, they pick up boats, debris from crushed buildings, automobiles and people. When tsunamis reach the apex, they reverse course and rush back to the sea, carrying everything they picked up with them. There may be more than one of these waves as the result of a seismic event. A tsunami of great magnitude was the Indonesian tsunami of Dec. 26, 2004, which killed an estimated 300,000 people. No portion of the U.S. coastline is immune from this phenomenon. While earthquakes are a no-notice event, there is a system in place for tsunami warning. The NWS operates two tsunami warning centers, one in Alaska and the other in Hawaii. These centers can provide information regarding the intensity and speed of the tsunami.

A tsunami created near the shore will limit the warning time. The only way to protect one against tsunamis safely is to get out of the way. Evacuation inland and to higher elevations along the direct path of the tsunami is the most effective way to save lives. Fire departments, in conjunction with emergency managers, should have a formal means to receive tsunami warnings when they are issued. While fire departments in coastal areas are performing damage assessments, rescue and firefighting operations, they could be at risk from a tsunami in the hours following an earthquake. This is exactly what hap-

pened in the earthquake that struck the Japanese Island of Okushiri in 1993. As residents evacuated the coastline for high ground in the dark of night, fires started by the earthquake lit up the city, and within three to five minutes a black wave swept into the city and destroyed burning buildings and fire engines alike. Several more tsunamis followed, destroying large sections of the city and killing more than 200 people, including many firefighters.

The NWS defines an ice storm as "… a form of winter storm where ice accumulates 1/4-inch or more." The accumulation of ice, especially on power lines, and on trees that fall on power lines, can cause major disruptions to electrical and telephone service. Until the streets can be plowed and treated with sand, salt or other chemicals, the roads may be impassible to vehicles lacking tire chains. Motor vehicle accidents will increase until the roads are safe, and fire departments can expect requests to assist people who are stranded in their homes or vehicles. Power outages force people to seek other means for heating their homes, often with deadly results. Unvented generators or other improvised heating systems may cause structure fires or carbon monoxide poisoning.

After an ice storm, if thawing is rapid and begins before power is restored, there is an increased risk of flooding, especially in properties protected by sump pumps. Fire departments can expect more calls for assistance. EMS calls also go up for ice-related injuries caused by falls (fractures, sprains, etc.). In severe cases, communities may need to open special shelters to protect indigent populations, and EMS support for these shelters may be required. Extreme cold and ice will complicate fire department operations in several ways.

- Roads are less passable or altogether impassible from heavy ice on the roadway or from broken water mains that flood and then freeze.
- Snow and ice present operational hazards to on-scene personnel (slips, falls).
- Equipment and apparatus will be more susceptible to damage (pumps freezing, etc.).
- Improvised heating systems may cause more fires or carbon monoxide poisoning, placing additional service demands on the fire department.
- Risk of hypothermia for both firefighters and civilians increases.

Fire department personnel must take precautions to limit exposure to extreme cold. This often is accomplished by rotating crews more often and providing heated rehabilitation areas. It also is recommended that personnel have an extra change of dry uniforms and protective clothing. An extended cold spell may cause bodies of water to freeze that do not normally do so. There is a greater potential for ice rescue calls. Fire departments should prepare for ice rescue operations with the proper equipment and training to reduce the risk of injury and enhance unit effectiveness.

Just as extreme cold and ice will complicate fire department operations, extreme heat and droughts can cause problems too. Extreme heat is an additional stressor for personnel and equipment. The same strategies of more frequent crew rotations and, in this case, an air-conditioned rehabilitation area are needed. Fires that might be handled with a single alarm may need additional companies to provide more crews to minimize the potential for heat-related injuries (heat exhaustion and heat stroke). Again, just as with extreme cold, communities may open designated cooling centers to provide relief, and these shelters may need EMS support. EMS service requests likely will increase, especially from the elderly and others with respiratory and heart problems. In urban areas, the problem is even more pronounced because people are more likely to keep windows or doors open when there is no air conditioning.

Droughts generally will reduce community water supplies. Provisions for additional water supply may be needed. These provisions may include acquiring additional water tenders/tankers and large diameter pumps for relays to supplement the existing distribution system shortfalls. Beyond the challenge of providing sufficient water for structural suppression operations, departments may be requested to support subsistence effort for livestock, wildlife or other nontraditional service requirements.

Power outages can be brought on by a variety of situations. One type is from intentional reductions in service to prevent system failure. During a period of extreme heat or cold, there are times when the demand for electricity exceeds the supply, and the utility companies selectively ration the supply by curtailing service to various areas for short periods of time, a practice called rolling blackouts**.** Such events should be addressed in the department's preparedness efforts. Liaisons should be identified who will alert the department to service interruptions and to where and when such interruptions will occur.

Another type of impact to power is caused by physical damage to lines and generating stations, such as from the effects of tornadoes, hurricanes and earthquakes. These extreme weather conditions can disrupt power for hours, days or even weeks. Situations where generation and distribution systems fail due to mechanical causes unrelated to weather events may occur. One such occasion was on Aug. 14, 2003, when eight states and provinces covering an area exceeding 9,000 square miles over the U.S. and Canada lost power, affecting millions of people.

The sudden loss of electrical power can cause huge problems. People get stuck in elevators, are thrown into darkness, or are left without power to run critical medical equipment, refuel vehicles, communicate, conduct banking, and so forth. If a blackout occurs for more than a few hours, other problems will arise. Water supply becomes a problem if pumping stations are without power for extended periods of time. Cellphones will fail within a few hours when the batteries that provide backup power to the towers are exhausted. Communications in general are affected severely when electrical power is lost. Battery-powered radios are often the only means of staying informed about conditions, warnings and instructions. Individuals with home health care equipment may call for assistance when the batteries are exhausted on their machines. Response times and patterns may be affected by loss of power to traffic light systems. Mass transit may be shut down or severely curtailed.

Rockaway, New York, Nov. 3, 2012 — Local residents use a charging station set up by the New York Police Department in an area impacted by Hurricane Sandy. FEMA Photo/Jocelyn Augustino

The fire department EOP should address power blackouts that last longer than four hours. The plan should include a clear protocol for liaison with representatives of the local emergency management agency and the power companies. Restoration of service priorities will affect fire department operations, and the fire department should have a role in determining when and where power is restored. In many areas, power companies already have established priority locations and zones for power restoration. Fire departments should know what the plans entail and address their operations accordingly.

At the local level, a tornado is the most destructive of all atmospheric phenomena. Tornadoes are measured in the Fujita or F-scale of wind damage intensity. The range is from EFo (40 to 72 mph) to EF5 (261 to over 300 mph). On average, 1,000 tornadoes occur every year in the U.S., resulting in approximately 80 deaths and 1,500 injuries. Tornadoes can develop anywhere in the country, although they are more prevalent in the Midwest and South. Most tornadoes form between March and September and often are associated with violent weather such as thunderstorms. Tornadoes also may form when tropical weather systems make landfall. Storms have the potential for causing catastrophic damage to anything in their path. Weather forecasters can warn residents when conditions become conducive for tornadoes to develop, and with the ever-improving technology of Doppler radar, it is possible to detect the formation and likely path of tornadoes. Despite these measures, tornadoes develop quickly with relatively little, if any, advance notice. The prompt warning of the general population and those with special needs remains a challenge for emergency managers and weather officials.

If a tornado travels through a residential area, there is the likelihood that people could become trapped in damaged homes. Fire departments may be faced with multiple collapsed buildings and rescue emergencies. Tornadoes may travel for several miles, causing a linear event that can cross jurisdictional lines. Mutual-aid agreements may be compromised as the damage path becomes more widespread. One of the first tasks confronting a fire department following a tornado should be to determine the status of its members and equipment. Tornadoes can cause especially challenging problems for smaller jurisdictions.

Large-Scale Event Incident Command Issues

Large-scale natural and weather-related disasters will strain the resources of a fire department. In all cases, the workload of the fire department will increase and will require that the fire department work closely with other agencies. These agencies may be from the same jurisdiction; mutual-aid jurisdictions; or state, federal and private sector organizations. There may be conflicting lines of authority and competing goals and objectives among agencies. Who is in charge or should be in charge is the classic dilemma of large-scale emergencies. Some events will be spread over large distances; others may have multiple events in close proximity. The responses generated by some events will last for hours; some will last for days or longer. Fire departments must have command structures that allow for expansion and contraction of the scope of operations and for cooperation with other agencies. Fortunately, two structures in NIMS specifically address command and control in a multilayered response situation. They are Unified Command and Area Command, derived from ICS.

An application of ICS is used when more than one agency has incident jurisdiction or when incidents cross political jurisdictions. Agencies work together through the designated members of the Unified Command, often the senior person from agencies and/or disciplines participating in the Unified Command, to establish a common set of objectives and a single Incident Action Plan (IAP).

Unified Command is particularly appropriate for large-scale disaster operations, as natural disasters seldom limit themselves to political boundaries, thus creating a need for more multiagency cooperation. During the course of major operations, the requirements will change as the incident itself changes, and it may become necessary to have representatives from different agencies assume various leadership positions. For example, 30 dwellings in a neighborhood have been heavily damaged by a tornado. After the area has been searched and injuries triaged, treated and transported, which agency has jurisdiction to ensure the security of the property? What agency can limit access or re-entry into the affected area? What agency is responsible for the legal identification and removal of human remains? As the event shifts from rescue to recovery mode, the leadership of the Unified Command may shift from fire/EMS to law enforcement or another agency, like public works, that has a mission to complete. The fire service still has a role to play at this point, but it may not be the lead role.

Unified Command is difficult to establish on the spur of the moment. Only through joint training and exercises can the stakeholders establish the relationships and test written plans to implement Unified Command effectively. Unified Command is not easy. To apply the construct effectively requires personal and organizational discipline, delegation skills, and a substantial understanding of the roles and responsibilities of each function. Turf battles are not uncommon among the agencies that have designated response roles. Some agencies have a history of competition, and this factor adds to the challenge of operating under a Unified Command structure. Independent dispatching and freelancing groups complicate the situation. Working out some of these issues before a major incident can reduce the likelihood that tense situations will develop during actual operations.

There are several recurring issues that often develop during Unified Command. Key among those issues is the relatively common failure of the IC to activate the logistics and planning functions on-scene and instead rely on the already overburdened dispatch center. The dispatch center may serve command well

during normal operations, but relying on it in larger scale weather emergencies or disasters may overburden an already stressed, critical communications asset. Likewise, an incident that may last for several days must have its own incident management structure that includes the Planning, Logistics and Finance/Administration Sections. Most municipal fire departments do not establish those functions on structure fires and other operations because the incident concludes quickly, generally in a matter of hours or less. Disaster operations should be thought of and planned for in terms of days, weeks or months.

Area Command is useful when faced with multiple separate incidents clustered within a geographic area. As noted earlier, some disasters can cover large geographic areas or create multiple incidents that must be handled separately. Hurricanes, earthquakes, extremes in heat and cold, and floods all can present multiple incidents and operations for a fire department.

Area Command is defined as an organization established to oversee:

- Management of multiple incidents that are each being handled by an ICS organization.
- Management of large or multiple incidents to which several Incident Management Teams (IMTs) have been assigned.

An Area Command has the responsibility to set overall strategy and priorities, allocate critical resources according to those priorities, ensure that incidents are properly managed, and ensure that objectives are met and strategies followed. Area Command becomes Unified Area Command when incidents are multi-jurisdictional. Area Command may be established at an EOC facility or some other location other than an Incident Command Post. As many of the disasters that have been described are large scale in both impact and geographic area, Area Command helps to coordinate scarce resources among the huge requirements arising from multiple incidents. Area Command is widely used by the U.S. Forest Service and has been used in post-earthquake operations in California. The effective application of either Unified Command or Area Command structures or principles will benefit from, and be materially enhanced by, appropriate training for all the participants. To operationalize this knowledge transfer, the department must conduct periodic drills and exercises, which will help to hone specific skills and identify planning shortfalls. Rotating personnel through various functions also improves participant awareness of each capability and the interrelationship of current activities. Consequently, the typical byproduct of such exercises is improved readiness and more capable staff.

Some of the agencies felt strongly that the more often that they had an opportunity to practice and be involved in the EOC the better. All recognized that EOCs could have opened sooner but worked well when needed.

Coordination With the Emergency Operations Center

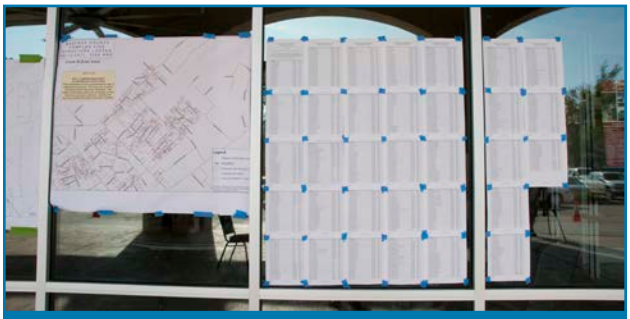
The EOC is a designated location in a community where the response and recovery actions of a community or government can be coordinated during a disaster or other large-scale event. The EOC is the location for strategic, big-picture decisions, not a dispatch center for the tactical assets of response agencies. A dispatch center may be, and often is, located in the same structure as the EOC, but it is preferable that the EOC and the dispatch center not be in the same room. State agencies have EOCs to coordinate their resources in support of local government; FEMA and the Department of Homeland Security have regional and national-level facilities as well. Typically, a local EOC will designate space for representatives from the state and federal government or will arrange for those coordinators to operate in a nearby, satellite facility with communication links to the main EOC.

EOCs should have sufficient conference and telecommunications capabilities to interact with all the agencies and organizations that their planning efforts suggest would be involved in resolving the respective types of emergencies. An EOC should have backup power, redundant communications capability, water, bunk rooms, kitchen area, and sanitation facilities for around-the-clock operations during emergency conditions. EOCs must be able to withstand the effects of the expected, foreseeable and anticipated risks for that community and remain operational. However, plans also should include provisions for relocation of the facility to an alternate location. When fully staffed and operational, EOCs become the focal point for the level of government (federal, state, county or local) they represent. The agencies of that level of government should provide senior-level managers to a Unified Command that deals with issues relating to disaster response and recovery. Senior-level members of the fire department should be part of the command team in the EOC. Those members must have the authority to commit resources and make decisions appropriate to the role of the respective agency representatives.

EOCs typically coordinate evacuation and sheltering of threatened populations. The EOC and the emergency manager are the conduits for requests for assistance that are outside existing mutual-aid capabilities. For example, any requests for federal assistance, such as a team from the National Disaster Medical System or a federal US&R team, go from local to state to federal levels prior to the deployment of assistance. Federal financial assistance also goes through this channel, and that requires proper documentation and coordination with the emergency manager. It is vital, then, that fire department officers are familiar with the capabilities and limits of their local emergency management system.

Some of the tasks that are handled at the EOC include:

- Warning for threatened populations.
- Dissemination of official, public information.
- Evacuation and shelter management.
- Curfew and re-entry to damaged areas controls.
- Damage assessment and requirements documentation.
- Requests for state and federal assistance.
- Coordination of resources (food, water, financial assistance).
- Documentation, reporting and auditing.
- Coordination with volunteer organizations and private sector assistance.



Bastrop, Texas, Sept. 13, 2011 — A list of homes that were destroyed in the Bastrop fire line the windows of the Bastrop Convention Center in Bastrop, Texas. At least 1,500 homes were damaged or completely destroyed. FEMA Photo/Patsy Lynch

Note once again, for it is important, that these tasks are strategic-level functions not to be mixed along with the dispatch of individual resources such as fire or EMS units. As with all disaster scenarios and the resources that accompany them, the best time to become familiar with the operation of the EOC is before the event by participating in drills and exercises. Inviting the emergency manager to participate in fire department training and planning activities likewise brings the emergency manager into the fire department loop and provides understanding of the capabilities and limitations of the local fire department.

Centralized Resource Ordering

Large-scale and regional disasters and events require off-site support and coordination. Well-developed EOPs identify one specific agency's dispatch center for the purpose of accessing and allocating mutual-aid resources. This is often referred to as single-point ordering. With single-point ordering, the task of finding requested resources is placed with one responsible party at the EOC or Department Operations Center (DOC) thus freeing the incident operations staff of this task. Some jurisdictions refer to this as unified-ordering or central-ordering point. Whatever it is called, the idea is the same. A single-point ordering system acquires resources, through established channels, from neighboring cities and counties, the state, and the federal government. Single-point resource ordering minimizes lost or duplicated resource requests. It is the preferred method of ordering under NIMS. The result is a hierarchy for resource requests within the county, between states, within a geographic FEMA region, or directly from federal agencies working through FEMA.

Form a Community Emergency Response Team

Disasters have a way of bringing out the best and the worst in people. One of the better traits exhibited is that ordinary people will go to great lengths to assist others in need. This trait surfaces in stories of historic disasters and is demonstrated in disasters around the world. If you see something bad happening, look for people helping; you'll almost surely see them.

The Community Emergency Response Team (CERT) initiative is a federally established program designed to use community members after a disaster strikes. The CERT concept was developed by the Los Angeles City Fire Department in 1985. The idea was to train citizens in the hazards and conditions they might face when providing disaster assistance through the CERT program. They would be better prepared to help themselves and others and to know when they should wait for more highly trained assistance to arrive.

The CERT program has been embraced by FEMA and has expanded all over the country. The CERT program today provides trained teams to assist local first responders in fire suppression, medical assistance, light search and rescue, and disaster psychology. There are special teams to assist law enforcement as well. FEMA has provided grant monies for training and to start or expand existing programs. CERT member training includes:

- Disaster preparedness: This portion of the training deals with actions that citizens can take prior to, during and after a disaster to lessen the effects upon themselves and their neighbors. The organization and background of the CERT programs also is covered, as well as any laws that apply to volunteers in that jurisdiction.
- Disaster fire suppression: This training covers the basics of fire dynamics and the safe use of portable fire extinguishers. Awareness training on hazmat also is covered, as is controlling utilities such as electricity and natural gas to reduce hazards.
- Disaster medical operations: In this section, the CERT member is given basic first-aid skills such as airway management and bleeding control. Simple triage and the concept of establishing a safe and sanitary medical treatment area also are covered.
- Light search and rescue: CERT members receive basic search and rescue training, size-up, and safety for the rescuers. The ability to determine if a structure is safe for operation is an important concept and is covered in this section.
- Disaster psychology and team organization: The effects of a disaster are not only physical. The emotional impacts of the event on both the worker and victims are addressed. The need for proper documentation and organizational principles are covered.

Fire departments should know if their community has organized a CERT and should take advantage of this resource. A well-trained CERT volunteer can provide some extra support at times when a fire department is stretched thin. CERTs are being established all over the country and are being incorporated into disaster plans, drills and exercises in many communities. Their participation as part of a citizen volunteer corps is a resource that should be identified in a community's disaster plans, along with specific information on what roles they will be assigned and can support effectively, given a specific incident type and scope.

Charlton County, Georgia, May 17, 2007 — The IC (right) explains the extent of the Big Turnaround fire to the incoming crew. The Southern Area Red Team was handing off the duties to the Southwest Area Team. DHS's FEMA had authorized four Fire Management Assistance Grants between April 18 and May 10, 2007, to help Georgia fight fires in four counties. FEMA Photo/Mark Wolfe

Part 2 — Critique and Evaluation Methods for Organizational Learning

There is a connection between evaluation and learning. Whether individuals evaluate their own behavior or organizations look within at what they do, using lessons learned to improve and grow is a precursor of highly effective action and behavior. Individuals and organizations learn from errors, omissions and mistakes. The key, however, is not just awareness that something went wrong or could have been done better but actually doing something to integrate the lesson. Learning the lessons learned and turning that into actionable behavior requires real effort at the individual level and for the organization. Evaluation is simply a tool to measure performance. What an individual or organization does with an evaluation is as important as the evaluation itself. Various reasons impede the process of learning lessons learned.

Common reasons organizations fail to learn from and even repeat errors and mistakes:

- Failure of leadership.
- Failure of communications.
- Failure to plan.
- Lack of ethics.
- Resource conflicts.

The public along with their elected representatives and public administrators want to know how well first response agencies deal with emergencies. Public officials regularly request organizational reviews and reports. Some public safety agencies undergo accreditation in order to document their internal efforts for efficiency and effectiveness. There is a long tradition in the fire service of conducting a post-fire critique after a major fire. It is very likely that all fire departments at some point have engaged in discussions of their response to large fires and major emergencies, whether held by the tailboard, in the kitchen, or at a training session.

"As we do not face large-scale disasters and emergencies on a regular basis, it is beneficial to learn from the experience of others."

Extreme weather, major disasters, large fires, and unplanned events that disrupt normal everyday life are out of the norm and as such require vigilance. Emergency planning, preparation and readiness training will benefit from the lessons learned in past operations. While a strong tradition of post-fire critique exists along with growing emphasis on lessons learned, the fire and emergency service is too often missing a critical piece in organizational learning. Failure to take constructive action on lessons learned and integrate them into training and operations is evident in the line-of-duty death (LODD) and injury statistics. Repeating past mistakes indicates a breakdown in the feedback loop between learning the lesson and changing behavior. A lesson cannot really be said to have been learned if it is repeatedly repeated.

There is a high price to be paid for learning that we may not be as rational as we thought. Our mistakes are rarely random, and in fact they are often quite predictable — they are simply part of what makes us human. It is often under extreme conditions that individual and group errors compound or escalate to a critical tipping point, resulting in an unintended consequence. Research into firefighter fatalities and less-than-effective responses to major incidents show time and again that the causes come from a list of contributing factors that are well-known in the emergency response field. Despite the good intention of lessons learned, we make the same mistakes over and over.

Studies of ICs conducted by researchers explored this problem, and their research offers specific answers that help to better understand how lessons learned may be turned into behavior. One of these is providing context to lessons learned because a single "lesson learned" in isolation without the context of a backstory has minimal chance for influencing behavioral change. Stories provide context, and context is critical for filing a lesson away for future reference. The second essential piece is actually a multistep, cyclical process of implementing change thus ultimately leading to full integration of the lesson learned into everyday behavior (Donahue and Tuohy, 2006).

A lesson cannot really be said to have been learned if it is repeatedly repeated.

Repeated Failure to Learn From Past Lessons

The complex, chaotic and negative effects of disasters should provide sufficient inducement to learn and translate the lessons into behavioral change, but for some profound reason that is not the case. Without going into deep analysis, it is sufficient for our purpose here to note that humans simply fail to plan and prepare for future events that may or may not occur. While true that disasters may provide a powerful motivation for responders to want to be good at response, the degree of potential for the event gets in the way of things. People have to know intuitively that the potential for an extraordinary disaster — to directly affect them — is great enough to reallocate their time and resources from routine matters to the extraordinary event. This applies as well to the fire and emergency services. Only in areas or regions that experience potentially hazardous or severe events on a predictable or regular basis will people be motivated to adapt or change their behaviors.

Fire-rescue services face a challenge here because the track record of successes with lessons as measured by changed behavior is less than optimal, if not actually dismal. It's not that the firefighters do not want to learn the lessons; anecdotal evidence supports the collective desire to learn. The problem is in practical application. Fire-rescue services, in a general sense, lack a systematic method for not only simply collecting lessons learned but also applying those lessons in a structured manner to change behavior.

There is a powerful appeal of learning from experience because we know that it is a proven method for avoiding duplicate mistakes and repeating successes. The evidence of this lies in the fact of all of the organizational resources devoted to formalized procedures for identifying, documenting and disseminating lessons from incidents to learn from past experience and thus improve future responses. It is worth our time to take a brief look at the various mechanisms for the ways that sharing experience has emerged.

The mechanisms are termed lessons learned processes, and they include tools such as the in-progress review, after action report, hot-wash, debrief, PIA, and the post-incident critique. Structurally speaking, all of the mechanisms mentioned are similar in nature, but their processes vary. The common goal is the sharing of information in order to prevent the recurrence of noted problems and adapt future actions in order to better meet future challenges.

Most processes involve some version of three core components:

- Evaluating the incident — through systematic analysis of what happened and why.
- Identifying lessons' strengths — to be sustained and weaknesses to be corrected.
- Learning — by specifying the desired outcome and integrating behavioral changes consistent with that objective.

Army commanders have long used evaluation after a battle to learn from mistakes and more importantly to discuss what worked.

There are several representative examples of lessons learned systems. One of the more popular methods is the U.S. Army's process for conducting a post-action critique known as the after action review. Army commanders have long used evaluation after a battle to learn from mistakes and more importantly to discuss what worked. One form of this process in the American army was the staff ride used in the years after the Civil War. The modern after action review was developed in the 1970s as a response to recognized failures in fighting the Vietnam War. Since then, the after action review has found application in both the public and private sectors. Another similar form of comprehensive evaluation is the PIA, which is similar to post-fire critiques in that it involves one or more agencies in an effort to document and discuss what happened during a fire, disaster or exercise.

To varying degrees, these reports include a summary or accounting of the various actions taken and the results of those actions or inactions (i.e., failure to act). These reports may also offer potential remedies to problems that were identified in the critique. The reports are typically used internally, and it is rare that they are shared among the agencies involved. If lessons learned are identified in the review or critique, they may or may not be compiled in the final report; however, they should be documented for internal use to develop new policies, procedures and training.

Operational evaluations always revolve around the same four questions:

- **What did we set out to do?**
- **What actually happened?**
- **Why did it happen?**
- **What are we going to do next time?**

A rough guideline to follow for the amount of time to spend on the four questions gives 25 percent of the time to the first two questions, 25 percent to the third, and 50 percent to the fourth.

Learning Lessons Learned

Large and complex incidents challenge incident managers in terms of demand on the decision-making process, service delivery, and resource acquisition. After action reports and similar post-evaluations identify recurring problems — problems that are well-known and understood but that seem to surface repeatedly. This recurrence suggests the need for making process improvements over time to ensure the lessons learned are not repeated. The challenge lies in five general areas: motivation, reporting, learning, exercising and resources. Because the challenge centers mostly on changing human behavior, it implies that the solution lies in the way we train and practice (i.e., exercise). The greatest area of neglect in the learning lessons learned equation is a process for integrating the lessons so as to induce behavioral change that in turn leads to desired outcomes and not an instant replay of past mistakes. We need a training doctrine for lessons learned that goes beyond mere awareness of problems and also builds upon the successes.

Lessons learned have minimal chance for impact unless connected with a change in behavior. The evidence of repeated failure to learn the lessons we know all too well tells us that simply promoting awareness will not achieve the desired results.

Some post-incident critiques and evaluations play a part in the failure to truly learn lessons learned. While some reports are thorough and comprehensive, they are on the whole ad hoc in nature. This fact hinders their utility for widespread acceptance outside of the organization in which it was created. The fire service lacks a universally accepted approach to learning lessons learned in part because it lacks an accepted approach to analyzing and evaluating its field-level operations. An incident or event may generate more than one report from the various agencies or jurisdictions that may have participated. Interagency cooperation for a joint analysis rarely occurs unless demanded or ordered. Even where the analysis and reporting is reliable, it may differ in various aspects and may even be in conflict between the various reports. De-conflicting several reports presents a challenge because of the difficulty presented by the need to validate lessons learned and differentiate whether the findings (and lessons) are indeed the right ones.

Identify the lesson → recognize the causal process → devise a new operational process → practice the new process → embed and institutionalize the new process → sustain the new process.

A PIA, critique or evaluation may give rise to feelings that the goal is to point the finger at someone or some group. This fact raises concern over who did or did not say or not say something relevant, putting an air of concealment on the process. Holding back information or purposely deleting important information about the incident threatens the level of detail required for meaningful fact-finding and actionable lessons. The lack of common terminology may shade or distort meanings across disciplines, agencies and regions of the country. With the focus of most reports on what went wrong, valuable lessons about what worked may be lost. The need to know what to do should be as strong as the need to know what not to do (Donahue and Tuohy, 2006).

The failure to learn from the lessons starts with the leadership of and management of the organization. The organization must support needed change and if necessary enforce the change. Behavioral change through lessons learned requires a systems approach and a methodology to identify and disseminate the lessons. Identifying the causes and processes that underlie the failure is directly related to the potential for learning the lesson. Without an understanding of cause and effect, there will be no confidence in the proposed remedies (Donahue and Tuohy, 2006).

Following the analysis through which lessons are identified and appropriate remedies understood, focused practice and exercising of the training is required to integrate the new desired behavior. The work of identifying relevant lessons and devising corrective actions may deceive by allowing an agency to feel it now knows what to do because it has invested some time and effort into AARs and identifying learned lessons. But that alone is not sufficient because if the lessons are not integrated into a training regimen, there will be no organizational learning. Furthermore, there are additional steps to practicing a new process.

Research based on interviews with incident managers reveals that they "find it difficult to think in general terms to the degree necessary to see how lessons from one incident or discipline might apply to another. Overlying this is the fact that the emergency response disciplines lack a common operating doctrine. Without common, accepted conventions against which to compare behavior, it is hard to spot deviations and inconsistencies that suggest the need for learning and change."

When firefighters learn something new, the real test of that learning comes under emergency conditions. If firefighters do not understand and/or trust a new process, they will revert to old habits — even where experience shows that they do not work or may even be unsafe. Learning lessons learned is a long-term commitment because even where lessons are identified and corrective action applied and implemented through training, practice, procedures and policies, the real test is under the worst conditions. If those tests are few and far between, an organization may never really know if it has learned the hard lessons. Fortunately, there is another way to approach this problem.

If the lessons are not clearly linked to corrective actions, then to training objectives, then to performance metrics, an organization will not know for certain until the next incident.

Fixing the weak links in the lessons learning cycle requires a deeper understanding of how to learn. It is a learning process that is not taught in our emergency response educational institutions. The key mechanism for testing, practicing, refining and integrating new lessons-derived behaviors is exercising. Almost every AAR discusses the crucial role that training and exercising play together in building capacity. But there are flaws in how we exercise, and a commitment to learning is wasted without critical resources to support the process (Donahue and Tuohy, 2006).

In real terms, the resources needed for a dedicated learning are dependent on adequate funds (for people and the tools) to sustain training and exercise programs. In the wake of years of a lean economy, the budgets of many fire and emergency services have been hit hard. It is always the so-called nonessentials that are axed — quite often training and prevention programs. Investments in basic capacity are not as marketable as equipment for combating fires and terrorism. Training and exercise programs are expensive in time and dollars, and unlike the military which supports robust training when they are not actually war fighting, emergency responders have far too many ancillary duties aside from responding to calls (Donahue and Tuohy, 2006).

Until we create a universal doctrine for learning lessons learned, the managers of fire and emergency services will not take personnel off the line for training and exercises until we can be assured we are actually solving problems. The fundamental challenge is a long-term commitment of finding resources and upholding organizational discipline

The key mechanisms for testing, practicing, refining and inculcating new lessons-derived behaviors is training and exercising.

to solve recurrent planning and operational problems. The best we can hope for is awareness and recognition that offers at least the opportunities to incrementally embed change through small internal adjustments. Broad cultural changes through vision and doctrine and shared across agencies, jurisdictions and disciplines may be too much to hope for in the present arrangement (Donahue and Tuohy, 2006).

Research on a group of all-hazard ICs revealed three themes related to lessons learned:

- **The need to radically improve the way we train and exercise.**
- **The need for a comprehensive, nationwide capability to gather and validate the information we learn from incidents, develop and vet corrective actions, and disseminate them to those who must inculcate the changes.**
- **The need for incentives to institutionalize lessons-learning processes at all levels of government.**

Evaluating the response to emergencies should occur at all levels of operation. At the tactical level, tasks and, at the company level, responses are examples of what requires constant evaluation. At the tactical level, consider using less complex debriefing techniques such as hot-washes, post-fire critique, and post-incident reviews. Major incidents that affect a state, geographic region, or that require a multiagency response should undergo a similar review at the strategic level in the form of a PIA or an after action report.

For the purposes of this discussion, the terms critique and hot-wash will be used interchangeably when referring to informal evaluations, and after action report will be used when referring to formal evaluations.

Methods of Evaluation: Critique, Analysis and Review

A fire service that strives for professionalism in its operations and management actively seeks to improve as an organization through continual learning, evaluation and practice. Evaluation using tools such as PIA and after action reports is critical to organizational learning. Self-evaluation for individuals and organizations is a powerful tool for effecting lasting change when what is learned is in turn applied throughout the organization via policy, procedure and training. Comparing expected outcomes to the actual consequences facilitates change initiatives in the fire department and its members. There is more than one method of conducting an evaluation of an incident or event. The most prevalent are the post-fire critique, PIA, and the after action report. While the terminology or names differ, the process of evaluation whether informal or formal should yield the same answers or findings. From the findings, we seek answers to problems and in turn behavioral and organizational change as appropriate to the need.

Evaluation is a fact-finding exercise and a chance to relate and record pieces of information that collectively form a picture of the event and how personnel responded from both a command (tactical) and line (operational) standpoint. It is a tool to assess firefighting, rescue, and training effectiveness and should include tactical plans and command decisions accompanied by how well they were followed. Lessons learned from the experience should be used constructively to correct deficiencies and influence training and education. Changes made to the department's plans and procedures typically occur per the outcome of incident evaluations. Management must be willing to act upon the lessons learned and correct the problems as quickly as possible; otherwise, subordinate personnel will think the evaluation process is a waste of time and future efforts to learn from real-world lessons could suffer accordingly.

Evaluation serves to bridge the gap in experience through post-incident fact-finding. Whether called analysis, critique or review, the underlying purpose is the same. In the process, the department compiles and catalogs the problems encountered and the successful actions taken, thus creating a repository

of information encompassing a wide variety of subject matter. The department then uses the lessons learned to improve plans and procedures. Personnel quickly learn that their actions or inactions at an incident may be reviewed as a means of correcting problems or, conversely, indicating that training was effective and the firefighters correctly applied the skills they learned. If problems show up, personnel at all levels will discern what went wrong and how to improve the outcome the next time.

Examples of the inherent value derived from examination of operations after an incident or event and what the lessons offer — in this case a major fire:

- Provide emergency service personnel with a clear indication of the impact their actions had on the general outcome of an incident.
- Findings are used to analyze and compare how different applied strategies and tactics affect the outcome of incidents.
- Identify trends and patterns in errors during emergency operations so that immediate action can be taken to prevent them from reoccurring.
- Identify positive outcomes that reflect proper attention to procedures, good decision-making, leadership skills, and so forth.
- Serve as a catalyst for revising flawed tactical plans and SOPs.
- Used as a test bed where alternative tactics and evolutions are attempted, and to study their effect on the outcome of the incident.
- Help identify additional or remedial training for personnel.
- Used as technical reference material and cataloged for retrieval and examination during any similar future incidents.
- Disseminate critical lessons learned during an incident to personnel throughout the fire department.
- Identify fire prevention and code enforcement deficiencies.
- Determine the need to install fire detection and suppression systems.
- Identify illegal and required modifications to structures.
- Identify structural and fire protection system failures.
- Identify built environment and operational challenges that contribute to civilian and firefighter injuries and fatalities.

A Structure for Evaluations

The key to successful critiques is having and enforcing a written policy that establishes a systematic, standardized approach for conducting them and clearly explains the purpose and objectives of evaluating the department's responses to incidents. The policy should lay out the process and define the types of incidents that will undergo evaluation and the criteria for using an informal or formal process. By establishing a policy, the fire department can ensure that every evaluation is conducted in a consistent manner and achieves the goals intended.

Fire department leadership has a duty to create an environment that promotes trust and encourages personnel to participate openly and honestly in the critique process without fear of personal attacks or official retribution. Otherwise, some personnel may withhold valuable information that could be beneficial in determining how to improve future operations and enhance the safety of personnel. It is important when developing a critique policy that it be a collaborative effort. One approach used by many fire departments is to appoint a committee comprised of both line and staff personnel when drafting the operational evaluation policy, which helps dispel much of the cynicism associated with the process. In departments with labor organizations, their representatives should be encouraged to participate.

Frequency of Evaluations

The decision whether to conduct a formal evaluation is made as soon as possible into the incident as opposed to after the incident. An early decision allows appointment of one or more individuals to begin to gather data and evidence. The best time to conduct an informal evaluation (also known as a critique or a hot-wash) is immediately following an incident when emergency personnel and units are still on the scene and while the information is still fresh in the mind. Where it is not possible because of limited resources that must be made ready for the next emergency call, conduct the hot-wash back in the fire station.

Major incidents occur infrequently, and all of them should be evaluated. Small-scale incidents occur more frequently. Department policy should govern the criteria that trigger an evaluation. Give Company Officers (COs) guidance and authority to select the responses, incidents, events and training sessions that require an informal evaluation. Give chief officers and ICs the authority and discretion to hold both informal and formal evaluations.

A hot-wash or critique is an informal evaluation, done as soon as practical, so events and actions taken are still fresh in the mind

Evaluation of small-scale incidents is beneficial in detecting trends and errors in operational procedures and safety compliance that may become entrenched and impact large-scale emergencies. If mistakes are made during small-scale incidents, it can be assumed that similar ones are being made during large, complex incidents. It could be difficult to detect such problems without having a mechanism for evaluation in order to compare actual operational outcomes with the department's defined goals and objectives. Future success depends on the early detection and correction of problems.

Evaluation of Small-Scale Incidents

The term after action report will be used when referring to formal evaluations. A hot-wash to review what actions were taken or not taken is appropriate before returning to quarters. If the situation does not allow for that, the critique may be done back in quarters. A structured discussion led by the CO or IC stands as an informal evaluation. It may be held in the training room or around the firehouse kitchen table. An after action report is a formal evaluation or review requiring more planning and preparation.

Critiques and Hot-Washes

Critiques and hot-washes occur at the company level (although multiple companies may be involved as well) and typically cover a review of how well specific tactics worked and what changes might induce better results. They are conducted on a case-by-case basis, mostly for training purposes and for the overall improvement of fire department operations. The critique can be initiated by either the CO or IC immediately following an incident as determined by department policy.

Using a fire as an example, the assessment is done while the crew and apparatus are still on the scene with hoselines still deployed. This provides optimal conditions for retracing the actions of individuals and teams for analyzing the tactical or operational problems that may have been encountered. Timed in this manner, the situation provides an excellent opportunity to suggest alternative tactics and fireground evolutions, as well as assess their potential impact on the outcome of the incident. It may not always be possible or desirable to conduct a hot-wash at the fire scene. Inclement weather, the time of day, and excessive call volume might prohibit units from immediately evaluating their response. In these situations, the officer or commander may conduct the critique after returning to quarters.

During the critique, the officer or commander acts as a moderator to ensure the discussion stays on track. The critique should begin by reviewing the company's assigned objectives during the incident. Each crew member should be given the opportunity to explain assigned tasks, problems encountered, resource constraints, influencing factors, and the actions taken during the incident. One method to get the facts out is to apply the five W's to the process — who, what, when, where and why. Seek the answers to the five W's, and you have the ingredients for an analysis of what happened.

The officer should take the time to recognize exceptional performances by personnel. Everyone deserves recognition for a job well done, and positive reinforcement goes a long way to improve an individual's confidence and morale. This is especially important if the firefighter also made a mistake that had an adverse impact on operations. If an individual firefighter failed to perform as well as expected during an incident, admonishment in front of the rest of the crew serves no useful purpose. It is embarrassing, undermines the self-confidence of the individual, and ultimately affects company morale. Any adverse performance-related discussion with employees should be conducted in private, but they should take place because mistakes can place other firefighters at greater risk. The rest of the crew needs to know that all problems will be addressed, even if some are handled behind closed doors.

If operations failed to go as planned, the problems need to be identified and corrected. The officer has many options when considering corrective action. These may include simply reviewing departmental policy and procedures with personnel, arranging for remedial individual training, or increasing company-level training. Remember, the hot-wash or critique is a learning exercise. The point is to acknowledge success or correct and prevent similar mistakes from being made in the future, not to publicly embarrass those responsible for making them.

It is important that officers include themselves in this exercise by explaining their responsibilities and actions during the incident, including admitting to any tactical mistakes they may have made. Once the firefighters know the officer is willing to acknowledge a less-than-perfect performance, they will more readily admit their own or identify mistakes by others. Seeing the incident from the officer's perspective and understanding the methodology behind the decisions gives the crew members a better understanding of what is expected of them during an incident. To maximize the learning experience, sufficient time should be allocated to complete the review. The objective is for the entire crew to get a clear picture of the impact that its actions had on the outcome of the incident, and what it could have done better to improve the outcome.

An informal evaluation may be used by command officers to meet one-on-one with newly appointed firefighters and officers to discuss their performance. The review of actions and decisions lets the officer praise subordinates for jobs well done and provide new firefighters and officers detailed guidance for improving performance, which is beneficial to their professional development. Normally an informal critique is not documented. However, if a unique situation is encountered that might affect emergency operations in either a positive or a negative way, the officer should forward the information gleaned to the next level in the chain of command for further consideration.

Hot-washes and critiques are learning exercises, and officers must include themselves in the assessment or evaluation.

Evaluation of Major Incidents

The formal review is a detailed analysis and review of large-scale and other complex or tactically challenging operations. Examples include natural disasters, extreme weather events, mass casualty incidents, large-loss fires, civilian fire injuries or deaths, firefighter line-of-duty injuries or LODDs, building collapses, large-scale hazardous material incidents, transportation disasters, compromises of critical infrastructure, and major wildland fires. These types of incidents normally involve a large-scale response with assistance from other agencies. A fire department may never experience a major incident; however, when one does occur, the department's ability to respond effectively will quickly be put to the test.

In the after action review process, it is necessary to create a chronological timeline of events from initial dispatch to return to quarters and a sequential listing of what each position did and when it was done.

The formal operational review is an evaluation that reconstructs an incident to determine if the department used an appropriate strategy and deployed effective tactical evolutions and if they were followed, as well as how effective they were in mitigating the incident. Every aspect of the incident is carefully reviewed and analyzed to determine what went well, what could be improved, and why. The results of such analysis can suggest changes to a department's plans and procedures that may be necessary.

The determination to review is dictated by department policy and the uniqueness of the situation. Make every effort to appoint someone with the authority to begin collecting incident data as soon as possible. It is not too early to start while the incident is occurring, if that is possible. The person selected to lead the review must have integrity and command respect. If the review finds that improvements are needed, the process used to reach the findings must be unimpeachable. If not, little will be learned from the effort. The person leading the review must have excellent organization, communication and people skills. While the IC or Safety Officer might be a logical choice to assume this position because of their intimate knowledge of the tactical and operational plan, they may not be the best choice, especially if things did not go well during the incident. Objectivity is critical in an evaluation.

Incident Data Collection

An important element of operational reviews is that questions are consistent within each type or level of personnel. For example, suppression personnel would be asked the same questions; EMS members would have a set of questions, and so forth. In this way, the opportunity to identify trends and repeated problems during emergency operations will be enhanced. Even though every incident is different, command and control of the incident should generally adhere to the department's tactical plans and SOPs. Therefore, the review should determine if the department's plans and procedures were followed and if so, how effective they were.

One way to maintain consistency is to use a post-incident questionnaire. A growing number of fire departments now use some form of questionnaire to collect information after an incident. Questionnaires can be used for any level of operational evaluation; however, they always should be used during formal critiques of major and complex incidents in which the department had significant resources committed. Fire departments that use the National Fire Incident Reporting System (NFIRS) report can obtain much of the basic information regarding the incident to be critiqued from the various NFIRS report modules. Using a standard questionnaire is a fast and efficient way to collect information for the critique. Note that these questionnaires lean toward post-fire reviews and so may need to be adapted for a nonfire event.

Any questionnaire used must lend itself to queries to identify root causes for problems because improvement is the goal. To implement change requires understanding root causes and effects. The information gleaned from questionnaires can provide reviewers with an understanding of what occurred during the incident and the problems encountered during operations. A list of discussion points can be developed then to ensure that all relevant issues and concerns regarding the incident are addressed adequately during the review. The questions also will help keep personnel engaged in the review process and help keep the evaluation on track.

Once a determination has been made to review how the department responded to an incident, questionnaires should be sent as soon as possible to all levels of the fire department that participated in the incident. It is important that a firm deadline be established for completing and returning the questionnaires. Officers need to monitor compliance. Responses are needed quickly so that there is ample opportunity for the review team to compile and analyze the results. The response results will form the basis for both the all-hands review meeting that follows and for the written after action report.

Prepare for presentation of the formal review as you would an important meeting, conference or similar event. Employ an independent facilitator to run the review meeting. Select a facilitator who has experience with groups and follows procedural rules to ensure a high degree of fairness, full participation, and generally maintain an air of civility. The full meeting should be videotaped and recorded with an accurate transcription prepared afterward.

A skilled facilitator will bring much to the review. Facilitators guide the discussion from beginning to end, ensuring that participants stay on track. They introduce the topic, keep the group focused, establish and enforce ground rules, monitor and maintain the schedule, transition from one question to the next, and summarize the resulting action plans. Even more important, they personally set the tone. A formal after action review requires openness and candor, a willingness to set aside traditional lines of authority. There must be honest interchange between superiors and subordinates, and a solid recognition disagreement is not disrespect. Because this attitude seldom comes naturally to hierarchical organizations, it must be carefully and consciously cultivated.

The following are basic topics that should be addressed during the formal review:

- Introduction: An officer of the department should open the review, explain the purpose, and introduce the facilitator.
- Ground rules: The facilitator/leader should establish the ground rules at the beginning. Reviews (just as critiques) represent a conscious and deliberate effort at fact-finding in terms of cause and effect to uncover lessons learned. Remind those in attendance to adhere to good rules of conduct during the review. Outrageous and unprofessional conduct (e.g., finger-pointing or derogatory comments) directed at anyone is counterproductive and will not be tolerated. The review should have a time limit. However, meaningful dialogue regarding the incident should be permitted by the facilitator/leader as long as the discussion does not get off the topic or become a sounding board for griping and complaining. The facilitator/leader ensures that all who wish to speak may do so, as appropriate to the meeting's purpose.

- Facts of the incident: The facilitator may select one or more officers to provide overviews of the incident, including relevant facts such as type of the incident, date, time, location, weather conditions, and the initial deployment of resources. If applicable, the tactical preplan should be reviewed to familiarize personnel with the structure or conditions (hurricane, mass casualty event, etc.) that are the focus of the review. The officer should describe the situation as it was reported to 911 dispatchers and identify special requests for equipment, apparatus, and mutual aid received or given.
- Operational review: The facilitator may ask the IC to provide an overview of the aspects of the incident, including strategic decisions made by the Command Staff and tactical decisions by line officers and their companies. The fastest way to gather information is by asking open-ended questions that require a direct response, such as What did the crew observe upon arrival? What information did they receive? What problems were encountered? Were the problems reported and to whom? How were the problems overcome? The same process should be followed for other elements involved in the operation. Remember the five W's mode of inquiry.
- Discussion points: The critique should conclude with an open discussion about the participants' observations, specifically the strategy, its defined objectives, and how tactical efforts unfolded during the operation. What worked well? Where is improvement needed? Were the department's tactical plans and procedures applied, and if so how effective were they? Do they need revision or modification? What remedial or additional training should be scheduled? These are the basic questions that should be addressed.
- Performance recognition: Exceptional performances by personnel should be acknowledged during the critique. Everyone enjoys a pat on the back, and recognition for a job well done will encourage others to do well too. A poor performance should not be discussed during the process; it should be done privately, as in the case of informal critiques.
- Report: The most important part of the critique process is the report. This document summarizes the entire incident and provides recommendations for correcting problems based on the lessons learned during the critique. It also can serve as a blueprint for additional training and the development of better plans and procedures.
- Lessons learned: Nearly every evaluation (formal and informal) will reveal problems that need to be addressed to improve future operations. Problems experienced during operations are generally attributed to ineffective plans or procedures or improper actions by personnel. Problems related to the department's SOPs may require the department to revise those or create new ones. Performance-related issues are generally training related. Personnel are either unfamiliar with relevant policies and procedures or have little or no practical experience in a given area. This situation often can be corrected through additional training and education. The department leadership routinely should compare critique and review findings to detect trends or recurring problems that may signal deeper problems that may need to be addressed. The final component of the process should be a management-approved action plan to adopt the issues addressed in the lessons learned portion of the critique.

In an after action review, an honest dialogue between superiors and subordinates is essential. To really get at lessons learned requires recognition that disagreement is not disrespect. Because this attitude seldom comes naturally to hierarchical organizations, it must be carefully and consciously cultivated.

Overview: The After Action Report

The completion of after action reports is part of the reporting process for responsible public safety agencies. After action reports are completed within 120 days of every major or significant incident or event. An AAR should be shared with all interested public safety and emergency management organizations.

The AAR fulfills the needs of the following critical functions:

- Source of documentation for response activities.
- Identifies problems and successes during emergency operations.
- Analyzes the effectiveness of the participating components.
- Describes and defines lessons learned.
- Provides a plan of action for implementing improvements and closing gaps.

Applications

The AAR is a leadership and knowledge-sharing tool used to better understand important events, activities or programs. The use of after action reports emphasizes the improvement of emergency management and first response operations at all levels. The after action report provides a vehicle for not only documenting system improvements but also, if desired, including a work plan for implementing improvements. It may be useful to coordinate the after action report process when multiple agencies or jurisdictions are involved in the same emergency. Jurisdictions are encouraged to work together in the development of after action reports when appropriate and feasible. For example, an operational area may take the lead in coordinating the development of an after action report that involves several jurisdictions. If appropriate, jurisdictional reports may become part of an overall operational area report.

Process

This is a suggested course of action for developing after action reports. The first step is to assign responsibility for producing the report. Initiate the assignment as early as possible during the response phase of any emergency that will require an after action report. Ideally, the person assigned should have a background in the planning function, be familiar with emergency organization functions, and have a level of understanding commensurate with evaluation of a public safety activity.

At both the field and EOC levels, the responsibility for initiating the after action report process should be assigned to the documentation unit within the planning/documentation unit leader function. At the completion of the emergency period, and after the field ICS and EOC level organizations have been deactivated, the responsibility for the continuance of the after action report process should be assigned elsewhere within the organization. In many organizations, the same personnel may actually be assigned to the after action report function to provide continuity. While it may appear to be a luxury to assign a person to this duty early in an emergency, it actually permits several key things to occur.

- It emphasizes the importance of documentation.
- It allows for early identification of possible system improvements and possible on-the-spot improvements.
- It allows data to be compiled before too much time has elapsed and participants have returned to their normal duties.
- It also allows for establishment of timelines and expedites the actual preparation of the after action report.

Documentation actions should be initiated in the early stages of an emergency. Although it may be tempting to forgo documentation during the emergency response, adequate documentation:

- Is essential to operational decision-making.
- May have future legal ramifications.
- May have implications for reimbursement eligibility.

Depending upon the situation, different types of documentation comprise the source documents for the after action report. Documentation should not be restricted to those reports or forms used exclusively by the planning function but should include materials from the entire emergency organization. Ideally, key components of this database, such as time-keeping procedures, would be identified as part of pre-event planning and would then be used during an actual event.

Examples of the possible types of documentation:

- IAPs developed to support operational period activities.
- Forms used by the field level ICS.
- Unit activity logs and journals.
- Written messages and maps.
- Function and position checklists.
- Public information and media reports.
- FEMA-developed forms.
- Other forms or documentation.

Aside from reliance on documentation developed during emergency operations, there are other methods for gathering information:

- Questionnaires, exit interviews, or survey forms are distributed and completed as personnel rotate out of a function and/or after the incident or event.
- Critiques performed at various time frames after an operation. Some critiques may be conducted immediately after an event and may be fairly informal in approach. Others may be conducted substantially later and may employ more formal, carefully structured workshops.
- Surveys distributed to individuals and organizations after the fact, which can be used either for direct input to the after action report or as a basis for workshop discussions.
- After action review teams, whose function is to gather information and write the after action report.

Example of a four-step process to prepare an after action report:

1. Compile the results of surveys, critiques and workshops, and sort the information according to the areas covered in the attached sample after action report.
2. Review, analyze and sort documentation according to the areas covered in the attached sample after action report or another format as appropriate to the organization.
3. Prepare after action report drafts and distribute for review and approval to participating agencies, advisory boards, political bodies, and other appropriate interested parties.
4. Prepare final after action report, and forward it to the agency, organization or approving entity.

An Outline for Conducting an After Action Review

Having a plan to develop an after action report facilitates timely completion of the review process. Holding a workshop is one way to review an event and produce a report in a reasonable time frame. A workshop will include representatives of the agencies directly involved with response and recovery activities and those agencies providing support. Surveys and/or interviews serve as additional data-gathering techniques and/or methodologies for the after action reports. The first activity will be the assignment of a team and team leader for the after action report.

1. Assign team leader and members:

   ✓ Make the assignments as early as possible into the event.
   ✓ Assign staff members familiar with emergency operations.

2. Develop a work plan that includes:

   ✓ Scope of work.
   ✓ Work schedule with deadlines and milestones.
   ✓ Budget and resource needs.
   ✓ Primary and secondary cooperating agencies/organizations/individuals.

3. Initial data gathering:

   ✓ Prepare an incident operations oriented survey/questionnaire to distribute to those agencies/organizations/individuals identified.
   ✓ Follow-up interviews may need to be conducted to better understand survey results.

4. Conduct the after action review workshop:

   ✓ Include key representatives of all the involved emergency response agencies.
   ✓ Representatives must be able to address the emergency and incident operations of their respective organization.
   ✓ Concentrate on fact-finding and discovery of pertinent information related to the emergency response and recovery activities.
   ✓ Employ a facilitated process to ensure a fair and balanced inquiry.
   ✓ Allow for an atmosphere of openness with a forum to air concerns.
   ✓ Seek objective information on what went right and what did not.

5. Compile and analyze the workshop data to begin preparation of the after action report:

   ✓ Compile the results of the survey, interviews and workshop, and sort the information according to the specific areas covered in the after action report.
   ✓ Review, analyze and sort documentation according to the areas covered in the after action report.
   ✓ The main purpose for analyzing the data is to verify and support comments and conclusions reached by participants and team members.

6. Prepare after action report drafts, and distribute for review and approval to the appropriate parties (e.g., primary responders).

7. Prepare the final after action report, and share it with interested parties.

Sample Format of an After Action Report

The following is an example of just one way to structure an after action report. Other options are possible. The format of the report should fit the situation, and there is no requirement to force the report into a single, structured format.

I. Executive summary
   A. Overview of event and data gathering methodology
   B. Principle findings
   C. Lessons learned
   D. Principal recommendations

II. Introduction
   A. Political jurisdictions involved
   B. Type of event
   C. Geography of event location (include maps)
   D. Chronology of what happened, including a description and list of items such as key evacuations, areas destroyed, units/agencies/organizations deployed, etc.
   E. Date/Time and content of proclamations/declarations

III. Discussion of policy-level issues
   A. Provide a summary of the preincident preparation, planning objectives, response strategy, major decisions, and conclusions

IV. Field-level response — incident command and control activities
   A. Description of operations (including all ICS functions activated)
   B. EOC
   C. DOC
   D. Special districts, other local government support, volunteer agencies, etc.

   Note: For each item above, discuss management, Operations, Planning/Intelligence, Logistics, Finance/Administration, and multi or interagency coordination as appropriate

V. Interaction and/or establishment of Operational Areas (discuss as appropriate)

VI. Interaction with programs, agencies and special systems
   A. Mutual-aid systems (e.g., law enforcement, fire-rescue, emergency medical)
   B. Cooperating agencies
   C. Utilities (e.g., telephone, electric, gas)
   D. Organizations (e.g., American Red Cross, Salvation Army, faith-based groups, others)

VII. Telecommunications and information processing at the field level
   A. Local government operational area interface with regional interface
   B. Media relations and interactions

VIII. Interactions with state emergency management officials/state EOC

IX. Interactions with other state agencies and EOCs

X. Interaction with the FEMA regional level officials/regional EOC/Regional Coordinating Center

XI. Interaction with FEMA, Federal Coordinating Officer, National Response Coordination Center

XII. Interaction with other federal agencies

XIII. Training needs (consider all levels)

XIV. Recovery activities

XV. Summary of principal recommendations

XVI. Reference support materials (e.g., supporting maps, charts, tables, lists)

XVII. Bibliography

XVIII. Improvements action plan

Note: This section of the report may be separate or included as appropriate for the situation. It should describe for each of the principal recommendations.

- Description of actions to be taken.
- Assignments.
- Associated costs and budget.
- Timetable for completion.
- Follow-up responsibility.

CONDUCTING AFTER ACTION REVIEWS

Do	Don't
Schedule after action reviews shortly after the completion of an activity.	Conduct after action reviews without planning.
Make reviews routine.	Conduct reviews infrequently or irregularly.
Collect objective data whenever possible.	Allow debates to bog down when establishing the facts.
Use trained facilitators.	Allow dominating leaders to run after action reviews.
Establish clear ground rules: encourage candor and openness, focus on things that can be fixed, keep all discussions confidential.	Base performance evaluations or promotions on mistakes admitted in after action reviews.
Proceed systematically: What did we set out to do? What actually happened? Why did it happen? What are we going to do next time?	Permit unstructured, meandering, disorganized discussions.
Involve all participants in discussions.	Allow senior managers or facilitators to dominate discussions.
Probe for underlying cause-and-effect relationships.	Criticize or fault individual behavior or performance.
Identify activities to be sustained as well as errors to be avoided.	Conclude without a list of learnings to be applied in the future.

Conclusion: Turning Lessons Into Reality

The fire service has a good track record when it comes to post-event critique of major fires and similar incidents, as well as identifying lessons learned. At the national level, a mechanism for sharing lessons learned exists. Despite these efforts, there is a discernable failure to apply lessons learned to training and operations. That firefighters fail to learn the lessons we identify in critiques and reviews is evident in recurring problems in emergency planning, dispatch/communications, and incident management, as well as deaths and injuries to civilians and firefighters.

The answer to this problem is simple enough, but that old saying about the devil being in the details applies here. We know the cause and effect of operational errors and omissions, the critiques/reviews that follow report similar issues in disaster after disaster, and the lessons learned are so identified in the evaluations. As long as we fail to implement the knowledge of disaster response into training and operations, lessons learned will not be much more than a catch phrase. The best evidence for our failure to learn from past experience and lessons and the lessons of others comes in the testimony from after action reviews conducted after devastating events. For an example, read the City of New Orleans Fire Department Report: "Recovery and Reconstitution Planning Process after Hurricane Katrina."

Honest self-evaluation by the organization is the most important first step, getting to the facts and recognizing what may be learned from the event. From evaluation flows the lessons learned. Now comes the critical piece: Will lessons learned be shelved or will they lead to organizational learning? That is the question. Implementation of lessons learned into organizational training and operations comes down to a question of leadership. The success or failure of learning lessons learned will depend on strong leadership at all levels of the fire department.

Takeaways from the Alabama-Georgia Tornadoes:

- Plan, train, exercise, evaluate, implement and repeat.
- Develop or revisit the community EOP regularly.
- The EOP should have annexes for a variety of events, provide flexibility, be followed or used regularly, and be updated periodically.
- Plan for, train with, and use GPS for multiple missions.
- Plan and train to do preliminary damage assessment.
- Plan for the fire department to become the community's hub of activity.
- Plan for and exercise continuity of operations and government.
- Plan for failure of the 911 communications system, use of the alternate facility, and triaging calls.

The USFA after action review of the 2011 tornado event in Alabama and Georgia identified almost 66 specific observations and recommendations, as well as the four operational domains of all-hazard response:

✓ Opening roadway access to structures.
✓ Search, rescue, treatment and transport of occupants.
✓ Self-protection and survival.
✓ Providing food, water, housing and sanitary needs for their communities from the fire department.

Regardless of planning, staffing, training and equipment, this series of events exceeded almost every community's self-sufficiency. The state emergency management agencies, mutual-aid organizations, a timely FEMA response, and, most of all, hard and focused work by local responders and citizens all contributed to the local successes.

Analysis of the Alabama-Georgia after action review highlighted several overarching critical areas:

- Lack of disaster preparedness.
  - Some communities were better prepared than others; however, emergency operation planning is largely nonexistent or maintained.
  - Many responders admitted to not knowing the details of their community EOP.
  - The exceptions were the communities with staffed emergency management offices, strategic plans, and a training program.
  - This is an area that can be addressed with available training and leadership attention.
- Need for more disaster management training.
  - Attendees identified various needs, especially for more training and exercises.
  - Integrated emergency management courses.
  - Administrative training for documentation required for cost recovery, as well as job aids to assist them while performing these jobs.
- Need for closer coordination and communication with state and federal recovery staff.
  - Attendees indicated a need for a tighter connection with their recovery assistance teams.

- ICS used and supported operations.
  - The use of ICS is now widespread among these agencies.
  - While it is likely that the individual systems are of the purest form, the responders and emergency managers understand the process.
  - They apply what seems to work for their agencies.
  - They converse with external personnel and each other with confidence and understanding using ICS terminology.

- Need for public works departments to participate, learn and practice ICS.
  - Natural disasters quickly turn into public works events once the response phase is over.
  - There is a need to prepare the local public works personnel for participation in ICS, as well as how to take an active role in recovery leadership.

The primary functions — regardless of equipment, training, resources or communications — performed by rural fire departments involved all four operational domains (or universal tasks) while their suburban and urban counterparts focused on the first three:

1. **Opening roadway access to structures.**
2. **Search, rescue, treatment and transport of occupants.**
3. **Self-protection and survival.**
4. **Providing food, water, housing and sanitary needs for their communities.**

West, Texas, April 20, 2013 — A state/federal joint preliminary damage assessment team walks by an apartment building heavily damaged by the explosion of a fertilizer plant. FEMA Photo/Earl Armstrong

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APPENDIX

Examples From AARs — In the Words of Those Who Worked the Disaster

Reported People Issues

- Spontaneous volunteers were useful for roadway clearing.
- Volunteers arrived spontaneously. Some were prepared for operations work while others were not prepared to begin the necessary work; the ICS system was not able to assimilate or manage them for the first 48 hours.
- It might take 24 to 48 hours to determine where the volunteers are most useful in the operation.
- After 48 hours, one county established a volunteer hotline to get a handle on its spontaneous volunteer issues.
- Some faith-based organizations arrived, outside the scope of NRF roles or of any state or national coordination often duplicating another group's services.
- Some faith-based organizations only provided services to their members.
- Where established, CERT resources were used effectively and extensively in much of the disaster area.
- Amateur radio operators are an essential resource for back-up communications when primary (e.g., 911 call centers and cellphone systems) communications fail.
- Be thoughtful in using social media to ask for resources since there is no way to modulate (or regulate) what is coming in terms of quality and quantity.
- Ensure command and control of volunteer resources.
- Assign people as required to document and engage these personnel based on their demonstrated training and/or skills. In some cases, unqualified personnel may have to be escorted out of town by law enforcement or assigned to non-immediately dangerous to life and health positions.
- Plan on fire/EMS personnel self-dispatching and arriving looking to assist in the disaster operations.

Reported Resource Issues

- Advise the fire departments to have all protective equipment and other assets decontaminated as necessary, by manufacturer's recommendations. Fire departments should inventory contaminated assets and inspect more frequently to ensure usability.
- Advise the fire departments to inventory damaged and destroyed equipment and promptly submit claims through their insurance companies. Also, revise insurance as necessary to ensure any future losses are protected or insured (public assistance grants may cover the losses).
- Agencies should plan initial logistic needs based on those identified in exercises but be prepared early on to increase levels on requests as the event unfolds.
- Consider developing a contract for per diem fire service personnel at various levels to be deployable for major events and act under the direction of the state fire marshal.
- Create a Multiagency Coordination Group to exert direction and control and allocate resources statewide.
- Explore the development of state and local shared apparatus and programs where the state pre-positions assets in various fire facilities.
- Facilitate immediate and short-term emergency response protection during recovery and rebuilding by requesting qualified firefighting/EMS resources through EMAC.
- Identify and align state capabilities-based resource requirements with federal and other provider agencies and organizations.
- Incomplete resource ordering processes and tracking procedures got in the way of getting things that were needed. Lack of paperwork should not be an impediment.

- Maintain pre-scripted mission orders for post-disaster deployment, and use qualified temporary fire service personnel through the EMAC, enabling local jurisdictions to call for assistance quickly and free existing members to attend to their own needs.
- No plan for resource ordering and tracking.
- Order what you need early.
- Perform a gap analysis for key resources required in order to provide life-saving and life-sustaining capabilities.
- Physical assets damaged or contaminated may require extensive and costly replacement resulting in a prolonged out-of-service time. Explore consideration of a strategic equipment cache accessible and deployable on short notice.
- Regional cooperation and sharing of resources is very important.
- Without power, obtaining fuel was a problem. Many facilities did not have back-up power and few had "hand-pumping" capability.
- Employ NIMS-recommended resource typing, inventory all fire service assets in the state, and employ a database for tracking.

Reported Incident Management Issues

- Customize ICS as needed, if assigned something that doesn't quite fit with the system.
- De facto area and Unified Commands were established in several events. You need to understand how to implement ICS.
- A good IAP goes a long way to getting individuals, teams, groups, and organizations focused and coordinated.
- As natural disasters evolve, they quickly become public works events, making it important that public works departments take a more active role in ICS/NIMS by participating, learning and practicing.
- Need depth filling ICS, EOC and IMT positions; some members will not make it to every event.
- Need to staff critical EOC positions three-deep.
- Relocation of personnel to hazard-free area until safe to respond was not covered in the EOP.
- Role of the fire service in Unified Command at the state or cabinet level not understood.
- Safety is a big problem; everybody has a chainsaw, but few know how to use it safely or have the proper safety equipment.
- Search, rescue, treatment and transport of occupants not covered in EOP.
- Seek authority to direct local fire service apparatus and equipment to relocate before a declaration of a state emergency to ensure assets are not damaged or destroyed.
- Self-dispatching was a problem.
- Self-protection and survival not realized fully by fire service.
- Sheltering (i.e., designation, opening, support and management) was an issue that — through communication problems, lack of knowledge regarding the EOP, or default — the fire service was expected to manage.
- Staff campaign events appropriately to allow for 24/7 coverage; remember redundancy.
- Staffing (especially in the planning cell) should include representatives from each agency.
- The fire service needs a direct connection at all levels of emergency management.
- Street signs disappeared; you may need to mark streets and designate locations beforehand.
- GPS and Geographic Information Systems are important tools for disaster operations.
- Technical rescue team mobilized to staging area in another part of state leaving home base area uncovered; members with less specialized training had to fill in and perform rescues that would have been done by the team.
- Test and fuel backup power generators before the event was not done.
- The emergency management agencies, fire departments, and law enforcement agencies receive a large number of requests for welfare checks that place a burden on resources if answered.

- The ICS/NIMS/IMT training has worked; several IMT members were deployed and proved to be valuable assets.
- In most areas, the EOC staffs and the assisting/responder communities were familiar with ICS terms, meanings and applications.
- The utility companies did not communicate with the EOC initially; they need to communicate their priorities for power restoration to emergency management officials.
- There was no assigned command Safety Officer.
- This was really a public works event. After the initial phase of accounting for members of the public and handling injuries, this becomes something other than an emergency response.
- Triage incident based on operational priorities and people most at risk.
- Use a staging area for the spontaneous volunteers so that you can manage and control them until a plan is in place to collect their information, issue credentials, and assign them to tasks.
- Utilities, especially electric power companies, must improve communication with local EOC and responders; this would have meant roads opened sooner.
- Volunteers were unable to respond due to blocked roads from downed trees and power lines.
- WebEOC produced good results for an overview of resources, but not all states use the mechanism. Only a few fire departments use the application.
- When confronted by emergency plans from multiple jurisdictions, develop a common understanding of the rationale for the various plans and the required resources under the plans.
- Coastal tourist areas must force evacuation of tourists due to the greater risk posed by larger numbers of people and consequent risk to and resource strain on first responders.
- Communities need traffic flow and access plans for predetermination of priority for closing and opening roads for access.
- Flooding made response routes inaccessible, forcing the use of alternative ad-hoc plans.
- Personnel don't know how to use or read the US&R marking system.
- Have a plan to triage calls for nonlife threatening and nonemergency requests for assistance.
- It was necessary to have a plan to triage 911 calls and assign a priority to each request.
- Local governments need to be prepared to establish and staff a helpline for reporting situations that are not 911.
- Local veterinarians were an important resource for animal care and sheltering.
- Look out for the well-being of the first responders, disaster workers, and their family members.
- No consistent means to track firefighter activities in near real-time (i.e., during and just after an event).
- Opening roadway access to structures.
- Opening the EOC facilitated effective command and control; having a rep from the public works department would have been helpful, but they were all in the field.
- Need for a universal means to track and document the activities of fire service personnel and units during response and recovery operations. No viable method identified to date that would meet this need.
- Need for distinct definition of a save versus a recovery for tracking purposes.
- Need for strategic discussions between federal fire agencies and stakeholders regarding improving the means of collecting and gathering fire service response information.
- Need to have a dedicated EOC designed for that purpose. A makeshift arrangement is not suitable in an extended event.
- Need training on how to conduct searches.
- Most local government recovery needs are outside the usual fire service mission (e.g., requests for heavy equipment, moving equipment, and resource managers).
- Need training on how to create and maintain a unit activity log.
- Need training on how to manage search grids, including logistics and planning.

Reported Recovery Issues

- More training and job aids needed for preparing and processing FEMA cost-recovery documentation.
- Need for a stronger connection between fire agencies and their FEMA recovery assistance team, specifically a specially qualified USFA representative that would remain assigned to them throughout the public assistance grant process.
- Need training on how to request disaster assistance, including the application process and documentation.
- Need training on public assistance programs and processes and other assistance available to assist agency recovery from disasters.
- Plan and train to do primary damage assessments.
- Preidentification of debris collection and process points allows early engagement in community recovery.
- Preliminary property damage assessment was a major task, and it was difficult to complete due to a lack of trained personnel. If fire agencies take on this role, they will need training, equipment and practice. They will also need to realize that primary damage assessment is a priority and assuming that role could impact response capability.
- Training on the public assistance manual would be helpful, and a field version of the public assistance manual with quick access to information for resources would be a significant and useful tool.
- Recovery to normal operations was slow; one week to 10 days from the end of the storm, agencies were still actively involved in response and recovery activities, including returning their own facilities to operational order; few had drafted reports at this point, making assessments difficult.