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BEST PRACTICE

Mass Evacuation Reception Planning: Overview of Planning Issues After a Nuclear Incident

PURPOSE

This Best Practice provides planners with an overview of reception issues that are likely to be encountered by jurisdictions adjacent to a nuclear incident in an urban area.

SUMMARY

A nuclear incident in an urban area would likely cause a spontaneous mass evacuation. Jurisdictions adjacent to the urban area would become critical evacuation routes or destinations for residents of the affected area after a nuclear incident. A spontaneous mass evacuation could quickly overwhelm local emergency response agencies in most adjacent jurisdictions. Pre-incident planning can help jurisdictions adjacent to urban areas prepare for, respond to, and recover from the consequences of an unanticipated population surge after a nuclear incident.

This overview document is part of the Mass Evacuation Reception Planning Best Practice series. This Best Practice series supports the pre-planning processes of jurisdictions by providing information on the effects that jurisdictions adjacent to a nuclear incident area will likely experience in the first hours or days following an incident. These Best Practices describe the major issues that emergency managers and responders may face when managing a spontaneous mass exodus from an urban environment.

This series builds upon the principles of mass evacuation planning for natural hazards, particularly related to incident management, transportation, and mass care. Finally, this series is based on a terrorist detonation of an improvised nuclear device or nuclear device up to 10 kiloton (KT) yield.

About This Series of Best Practices

This Mass Evacuation Reception Planning Best Practice series provides information that emergency management and response personnel can utilize to develop a reception plan or annex for operations after a nuclear incident in an adjacent urban area. These Best Practices address the following dimensions of nuclear reception planning:

- Overview of Planning Issues After a Nuclear Incident;
- Mass Evacuation and Transportation Issues after a Nuclear Incident; and
- Resource Management Issues After a Nuclear Incident.

These Best Practice documents describe methods, illustrations, and resources that assist planners when developing a nuclear incident reception plan for jurisdictions adjacent to a nuclear incident. These documents also provide emergency planners with information about how to protect residents and incoming evacuees before federal and state assistance becomes available.

25 Feb 2011, revised 04 Oct 2011

This Best Practice series does not constitute an exhaustive list of reception planning concepts. These documents should be viewed as a supplemental resource when designing a comprehensive nuclear incident reception plan or annex. These Best Practices are predicated on a number of assumptions and parameters. Specifically, these documents:

- Are based on a scenario in which terrorists detonate a low yield, 10 KT nuclear device in an urban area;
- Focus on response operations in the immediate aftermath of a nuclear incident, before significant federal and state assistance is available to the affected area;
- Apply only to response operations in jurisdictions adjacent to an urban area; and
- Assume that the adjacent jurisdictions would not experience detonation-related effects due to either direct physical damage from the explosion or from fallout. However, the adjacent jurisdictions are likely to experience major disruptions as an indirect result of the incident.

About This Best Practice Overview

This Best Practice document provides planners with an understanding of the consequences that jurisdictions adjacent to a nuclear incident site would likely experience. This Best Practice consists of the following sections:

- About This Series of Best Practices;
- About This Best Practice Overview;
- Terrorist Interest in Nuclear Weapons and Materials;
- Urban Areas as Targets;
- Nuclear Incident Response Plans;
- Overview of Reception Plans;
- Consequences of a Nuclear Detonation for Adjacent Jurisdictions: Planning Assumptions;
- Pre-Incident Planning Activities;
- Immediate Response Issues and Priorities for Adjacent Jurisdictions;
- Best Practice Series Sources;
- Planning for a Nuclear Detonation in an Adjacent Jurisdiction: The Ventura County, California, Nuclear Explosion Response Plan; and
- Definitions and Terminology.

DESCRIPTION

Terrorist Interest in Nuclear Weapons and Materials

Al-Qaeda and other terrorist groups have shown strong and consistent interest in obtaining nuclear weapons, nuclear weapon-grade materials, and the expertise needed to develop nuclear devices. Intelligence agencies believe that terrorist groups currently lack the resources necessary to produce weapons-usable nuclear materials. However, these agencies recognize that nuclear material stockpiles in many countries are vulnerable to theft or seizure. In addition, sensitive equipment and technologies may be available in the international nuclear black market. As a result, some terrorist groups could eventually acquire or build an improvised nuclear device (IND).

> The Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) 2008 Planning Guidance for Protection and Recovery Following Radiological Dispersal Device and Improvised Nuclear Device Incidents defines an improvised nuclear device as "an illicit nuclear weapon bought, stolen, or otherwise originating from a nuclear State, or a weapon fabricated by a terrorist group from illegally obtained fissile nuclear weapons material that produces a nuclear explosion."

In 2007, Federal Bureau of Investigation Director Robert Mueller testified before the Senate Select Committee on Intelligence that Al-Qaeda was seeking nuclear materials as well as chemical, biological, and radiological materials. Finally, during the April 2010 Nuclear Security Summit in Washington, D.C., President Barack Obama remarked that Al-Qaeda and other terrorist organizations were attempting to acquire nuclear devices to employ against U.S. cities. As of April 2010, the International Atomic Energy Agency (IAEA) has reported at least 1,383 confirmed cases of illicit nuclear trafficking, some of which involved highly enriched plutonium or uranium.

Uranium-235 and Plutonium-239 are employed in fission weapons. Both isotopes are difficult and expensive to produce.

The IAEA's Nuclear Security Report 2010: Measures to Protect Against Nuclear Terrorism, Report by the Director General maintains that between July 1, 2009, and June 30, 2010, countries reported 222 incidents of illicit trafficking to the IAEA. Twenty-one of these incidents involved such activities as unauthorized possession and/or attempts to sell or smuggle nuclear material or radioactive sources. Sixty-one additional incidents involved the theft or loss of nuclear or other radioactive material. In 58 percent of these cases, the materials were not recovered.

Urban Areas as Targets

Urban areas may be at higher risk for a nuclear terrorist attack than other jurisdictions across the United States. Terrorists may target these areas because they are densely populated and have a high concentration of critical infrastructure and key resources (CI/KR), including major ports; national icons and monuments; sites housing a significant amount of hazardous materials, fuels, or chemical catalysts; prominent commercial centers; transportation systems; and sports stadiums.

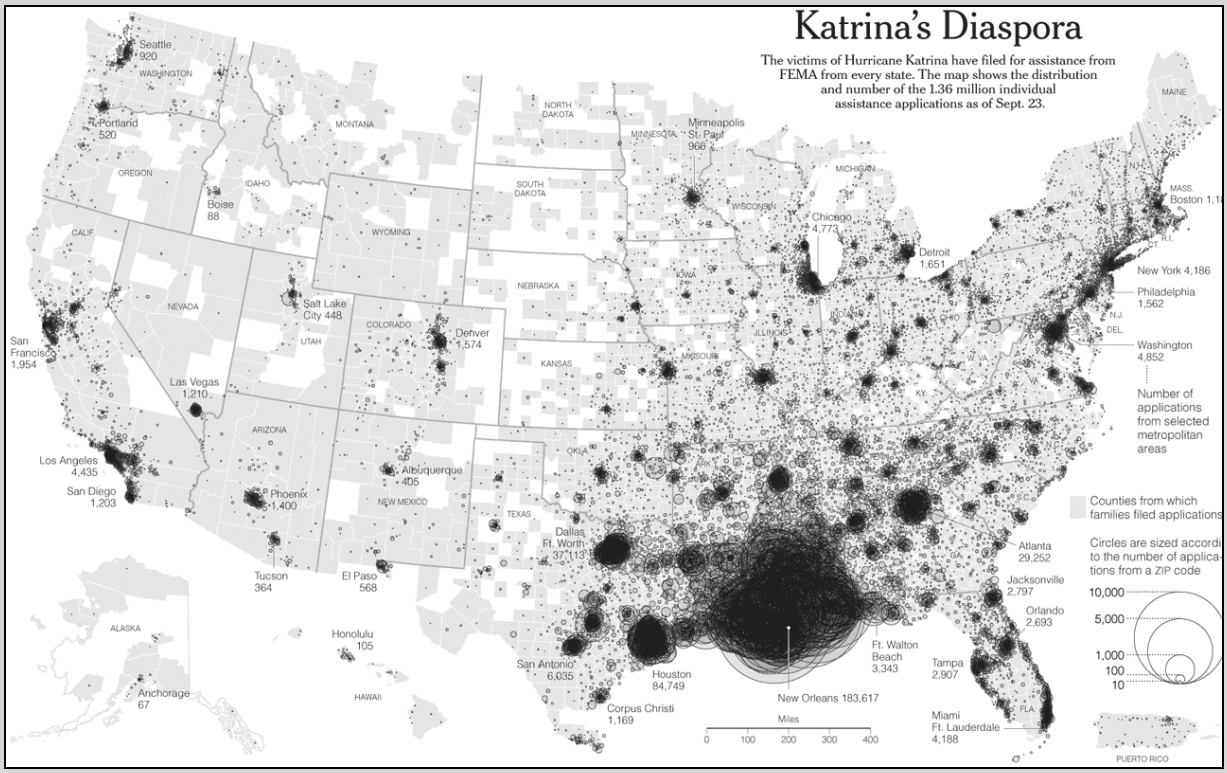
Experts believe that a nuclear detonation in any urban area would have enormous local, national, and international repercussions. Such an attack could devastate a large section of the incident area and cause significant disruption to surrounding jurisdictions. In addition, experts anticipate that the impact of a nuclear detonation could exceed typical regional constructs such as Urban Area Security Initiative (UASI) areas. However, many jurisdictions adjacent to UASI areas may not be routinely included in regional UASI emergency plans and planning processes, yet these jurisdictions could receive a significant number of evacuees soon after a nuclear incident in an urban area.

The DHS FEMA Urban Areas Security Initiative (UASI) Grant Program supports the planning, equipment, training, and exercise needs of high-threat, high-density urban areas. FEMA determines eligible urban areas through a risk analysis based on measures of threat, vulnerability, and consequences. Funding is allocated based upon the potential risk of terrorist attacks. Tier I areas are considered the highest risk areas. In 2010, Tier I and II UASI areas included:

- **Tier I:** California Bay Area; Boston Area; Chicago Area; Dallas, Fort Worth, and Arlington Area; Houston Area; Jersey City and Newark Area; Los Angeles and Long Beach Area; National Capital Region; New York City Area; and Philadelphia Area
- **Tier II:** 54 additional areas

Mass Evacuation Following Hurricane Katrina

Hurricane Katrina caused one of the largest mass evacuations in U.S. history. Two weeks after the hurricane made landfall, the American Red Cross reported operating 707 temporary shelters for evacuees in 24 states and the District of Columbia. The following *New York Times* map shows the distribution of 1.36 million Hurricane Katrina evacuees who filed for FEMA assistance as of September 23, 2005.

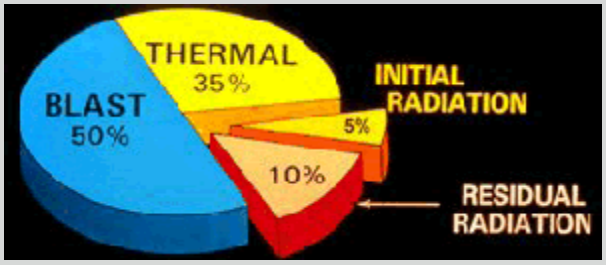


Diaspora Relocation Map

Nuclear Incident Response Plans

Some jurisdictions across the United States have developed nuclear incident response plans since the September 11, 2001, terrorist attacks. These jurisdictions range from urban areas to rural counties. Most of these plans anticipate that survivors will self-evacuate or will receive instructions to evacuate following a nuclear detonation in their jurisdiction. However, these plans often do not address the reception issues that adjacent jurisdictions will likely encounter. Many jurisdictions adjacent to urban areas also have developed plans focusing on the effects of a nuclear detonation within their boundaries, yet these plans typically do not detail reception guidelines, strategies, procedures, and/or practices for emergency management and response

The U.S. Department of Health and Human Services Radiation Emergency Medical Management (REMM) Web site describes the effects of a nuclear weapon explosion.



Effects of a Nuclear Weapon Explosion

For additional information, readers may also refer to *The Effects of Nuclear Weapons*, third edition, by Samuel Glasstone and Philip J. Dolan. This is considered one of the definitive studies on the effects of nuclear weapons.

personnel following a nuclear attack in the adjacent urban area.

Overview of Reception Plans

Many jurisdictions across the United States have developed reception plans and/or annexes that can help jurisdictions manage population surges after natural disasters such as hurricanes or flooding. Some of these reception plans and annexes provide guidance for reception operations. In addition, many jurisdictions surrounding nuclear power plants have developed plans and annexes detailing response, evacuation, and reception operations following a nuclear power plant accident. The FEMA Radiological Emergency Preparedness Program is responsible for reviewing state, tribal, and local radiological emergency preparedness plans according to the provisions of Title 44—Emergency Management and Assistance, Chapter I—Federal Emergency Management Agency, Department of Homeland Security, Subchapter F—Preparedness, Part 350—Review and Approval of State and Local Radiological Emergency Plans and Preparedness. Title 44 Part 350 establishes review and approval policy and procedures for these radiological emergency preparedness plans.

> The FEMA 2009 Evacuee Support Concept of Operations Template assists states and localities in creating an evacuee support concept of operations (ConOps). This ConOps identifies specific emergency support function roles and responsibilities and provides task lists and checklists for evacuee support operations.

A nuclear detonation in an urban area will present many severe, unique reception-related challenges for emergency responders and receivers in adjacent jurisdictions. Most jurisdictions will likely be unprepared to manage the influx of evacuees and could be overwhelmed in the aftermath of a nuclear incident. As a result, planners in jurisdictions adjacent to urban areas should consider developing nuclear incident reception plans or annexes tailored to this specific nuclear scenario. Developing a nuclear incident reception plan or annex can help alert these jurisdictions to the range of issues that they will confront after such an event. A nuclear incident reception plan or annex can also help jurisdictions understand the consequences of such an event, identify and address foreseeable hazards, train and prepare emergency personnel, coordinate procedures with other communities, and expedite recovery operations.

Nuclear Terrorist Attack Planning Scenario

A 10-KT nuclear detonation in a large urban area is a standard planning scenario. For example, the Executive Office of the President, Office of Science and Technology Policy's Planning Guidance for Response to a Nuclear Detonation, Second Edition states, "A nominal 10 KT yield, ground detonated nuclear device is assumed for purposes of estimating impacts in high-density urban areas." A number of studies, analyses, and guidelines describe the effects of this type of scenario, including the following:

- Scenario 1 of the National Planning Scenarios (Final Version 21.3) describes the effects of a 10-KT IND detonation in a large metropolitan area. Appendix 1-A of Scenario 1 illustrates the consequences of such a detonation in Washington, D.C.
- The Lawrence Livermore National Laboratory's Modeling Improvised Nuclear Device (IND) Impacts to Tier I UASI Cities presentation outlines the effects of a 10-KT suitcase nuclear device detonation in Los Angeles, California.
- A 2006 RAND study describes a 10-KT nuclear detonation at the Port of Long Beach in Long Beach, California.
- The Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University Nuclear Terrorism Blast Map models the effects of a 10-KT nuclear detonation in a variety of locations across the United States. Users can enter a specific address, a zone improvement plan code, or the name of a state or locality to view the expected detonation site's map. This system also provides models for many Canadian cities.

Consequences of a Nuclear Detonation for Adjacent Jurisdictions: Planning Assumptions

This section defines key concepts that planners should consider when developing nuclear reception plans and/or annexes for jurisdictions adjacent to an urban area. These concepts are meant to familiarize emergency management and response agencies with the unique issues and challenges of a nuclear incident in an urban area and its consequences for adjacent jurisdictions. Planners might find it helpful to consider these as core assumptions meant to frame their nuclear incident reception planning effort. In addition, planners should consider that these concepts apply mainly to the initial response period after a nuclear attack.

Responding to a Nuclear Detonation Will Not Be "Business as Usual"

A nuclear incident in a large urban area will have devastating consequences, will impact the infrastructure, and will strain the resources of all the jurisdictions across a region. Reception operations after such an incident will likely exceed the capacities and capabilities of most adjacent jurisdictions. More than in any other type of incident, emergency managers, responders, and receivers will have to improvise and adapt rapidly to the changing environment. They will need to make critical decisions in the absence of vital information. Planners are strongly encouraged to consider this assumption as their key framing concept throughout the reception planning process.

> The University of Chicago, National Opinion Research Center, Walsh Center for Rural Health Analysis Urban-to-Rural Evacuation: Planning for Population Surge report states: "Whenever evacuation occurs, the resources of receiving communities can be overwhelmed by the ensuing population increase. In smaller communities with limited resources, even small numbers of evacuees can represent sizeable increases in population, and can jeopardize the integrity of resources and infrastructure."

Experts believe that routine response procedures and practices will be rendered ineffective or impracticable after a nuclear incident. Emergency responders and receivers in jurisdictions adjacent to a nuclear incident will likely be overwhelmed by the number of people entering their jurisdictions. These emergency personnel should expect mass confusion, anxiety, and panic among evacuees and residents as well as widespread environmental and victim contamination. In addition, emergency responders and receivers will likely lack critical resources and expertise at the onset of operations.

> The City of Lewes, Delaware, Emergency Operations Plan states that Lewes could expect to receive relatively heavy concentrations of radioactive fallout following a nuclear weapon detonation in the Washington, D.C.; Baltimore, Maryland; or Philadelphia, Pennsylvania, areas.

Planners must consider that it may be virtually impossible for agencies and organizations in adjacent jurisdictions to address all the requests for assistance after a nuclear incident. Damage to the regional critical infrastructure systems could compromise delivery of essential services. For instance, damage to the regional power grid could cause widespread power failures. Incident conditions could quickly change and negatively affect adjacent jurisdictions. Radiation fallout could contaminate a previously uncontaminated area if the prevailing wind's direction changes. As a result, residents and incoming evacuees could become contaminated hours after a nuclear incident.

Assistance to and from Jurisdictions Adjacent to a Nuclear Incident Site May Not Be Available or May Be Delayed After an Incident

Assistance to and from adjacent jurisdictions may be limited or delayed following a nuclear detonation in an urban environment. Neighboring response units could be the only assets available to provide assistance to jurisdictions adjacent to an urban area following a nuclear incident. Federal and state assistance to the region could be limited for days after a nuclear incident. The Executive Office of the President, Office of Science and Technology Policy 2009 Planning Guidance for Response to a Nuclear Detonation, First Edition and 2010 Planning Guidance for Response to a Nuclear Detonation, Second Edition both state: "There will be no significant Federal response at the scene for 24 hours and the full extent of Federal assets will not be available for up to 72 hours." In addition, available resources and personnel from adjacent jurisdictions will be engaged primarily in managing the mass exodus from the incident area. As a result, these jurisdictions might not be able to provide immediate assistance to the incident area or other jurisdictions following a nuclear incident.

> The 1986 Nuclear Crisis Relocation: Issues for a Host Community—the Case of Greenfield, Massachusetts, USA study analyzes the potential effects that the host community of Greenfield would experience following a nuclear attack in an adjacent jurisdiction. This study concluded that Greenfield would face "…impossible burdens in attempting to provide fallout protection, water, food, medical care, and civil order (to its population and incoming evacuees). Additional pressures would arise from adjoining communities which are functionally dependent upon Greenfield for normal goods and services, but which would receive their own allotment of relocatees." These core findings can help frame mass relocation planning.

Responders, Receivers, and Other Essential Personnel May Be Unwilling to Perform Critical Functions

Experts believe that some personnel tasked with performing critical tasks after a nuclear incident may be reluctant or unwilling to perform these essential tasks for fear of exposure and/or contamination. For instance:

- The Transportation Research Board of the National Academies 2008 report The Role of Transit in Emergency Evacuation states that "transit operators would likely have a far more difficult time handling a nuclear or even a major biological or chemical incident than a storm, for example. In the former incidents, bus drivers might be more reluctant to work. If buses were needed to help evacuate the affected area, identifying and handling those who had been exposed to nuclear fallout or a biological or chemical agent would require special coordination with experts in hazardous materials as well as training and expertise that few transit operating personnel are likely to possess. In the case of storms and flooding, such concerns do not arise."
- The Improving Hospital Preparedness for Radiological Terrorism: Perspectives from Emergency Department Physicians and Nurses study presents the results of 10 focus groups of emergency department physicians and nurses that researchers at the University of Alabama at Birmingham conducted in 2008. This study analyzes perceptions, concerns, and information needs of focus group participants and lists some of the staffing challenges that hospitals would experience following a radiological emergency. The study concludes, "Participants expressed deep concerns about a range of specific issues. Topping the list was the expectation that the hospital would be overwhelmed by a combination of injured people, contaminated people, and people fearful that they had been exposed or contaminated. … The second highest ranked concern for focus group participants related to the safety and well-being of loved ones. Clinicians expressed a powerful commitment to professional duties and responsibilities, but often also indicated that family came first.

Furthermore, many participants suggested that family concerns and family needs had a real potential to affect staffing levels. Indeed, some participants, particularly nurses, stated explicitly that they may have to leave the hospital or stay home."

- The 2009 study Health Implications of Radiological Terrorism: Perspectives from Israel concludes that "Health care providers who do not have a clear understanding of the risks posed by radiation or the necessary precautions may experience fear and anxiety, resulting in absenteeism, refusal to see patients, and dereliction of duty." Planners in adjacent jurisdictions must be aware that this can deplete already scarce resources and hinder their emergency operations.

Situational Awareness, Information Sharing, and Communications May Be Limited

Experts anticipate that regional communication infrastructure could be out of service and/or severely impacted after a nuclear incident in an adjacent urban area. As a result, emergency management and response agencies in jurisdictions adjacent to a nuclear incident site will likely lack the capability to collect, access, and/or distribute essential information. This can hinder the ability of emergency managers and responders to maintain situational awareness. In addition, response agencies may find it difficult to provide the public with essential emergency information in the immediate aftermath of a nuclear incident. Jurisdictions adjacent to an urban area should consider that redundant communication mechanisms and channels will be critical after a nuclear incident.

Pre-Incident Planning Activities

Pre-incident planning is essential to assist jurisdictions in preparing for a nuclear incident in an adjacent urban area. Planners should consider the following issues, among others, when planning for such an event in an adjacent jurisdiction:

Educate a Jurisdiction's Residents

A 2010 Stanford University study concludes, "The government should initiate an aggressive outreach program to educate citizens and the private sector about the importance of sheltering in place in a basement for at least 12 hours after a terrorist nuclear detonation." This study refers largely to residents of urban areas. However, jurisdictions adjacent to these urban areas should also consider educating their residents on sheltering and other protective actions that they will likely be asked to implement following a nuclear incident in the adjacent urban area. Educating a jurisdiction's residents can help limit the impact on infrastructure and scarce resources in a jurisdiction. In addition, this can help ensure that emergency managers and responders in jurisdictions adjacent to the nuclear incident site have the time and the resources to implement their reception plans.

Determine if a Jurisdiction Could Be Located Within a Hypothetical Life-Threatening Fallout Region

Recent studies show that levels of fallout from outdoor exposure that can induce radiation sickness may extend 20 miles or more downwind of a 10-KT nuclear detonation site. As a result, planners should determine if the boundaries of their jurisdictions could be within a potential life-threatening fallout region after a nuclear detonation in a nearby urban area. However, planners also must be aware that fallout will not be contained within an easily delineated area. Weather and wind direction have a significant effect on fallout patterns. As a result, planners must recognize that distance from a potential nuclear detonation site alone may not determine if a jurisdiction will receive life-threatening levels of contamination. Some jurisdictions that are relatively close to a detonation site may not receive life-threatening levels of contamination following an incident.

Determining if the jurisdiction could be located within a hypothetical life-threatening fallout region can help planners identify protective actions that might need to be implemented rapidly after a nuclear incident in an adjacent urban area. For instance, planners located in a hypothetical life-threatening fallout region could consider pre-identifying an adequate number of shelters for incoming evacuees in case the plume's direction changes and radiation fallout contaminates a previously uncontaminated or relatively uncontaminated area.

The White House, National Security Council, Disaster Resilience Group Nuclear Detonation Preparedness Communicating in the Immediate Aftermath 2010 report can help emergency management and response agencies and federal, state, and local officials communicate with the public and the media during the immediate aftermath of a nuclear attack. This report includes key messages for the impacted communities and the nation as well as potential questions and answers.

Develop Public Messages

Providing evacuees and residents with credible, timely instructions and information can help agencies manage the consequences of a nuclear incident in an adjacent urban area. Some organizations have developed public messages tailored to a nuclear detonation scenario within their jurisdiction's boundaries. However, these organizations have typically not developed public messages addressing a nuclear incident taking place in an adjacent urban area. Jurisdictions adjacent to an urban area are encouraged to develop public messages tailored to this scenario.

For more information on this topic, please refer to the *Lessons Learned Information Sharing* Public Communications page. This page includes original research, after-action reports, templates, and plans that can help planners establish new, effective public communications systems and strategies and/or refine existing ones.

Expand Existing Regional Planning and Response Coordination Efforts

Many jurisdictions across the United States are engaged in regional partnerships for emergency management and response. These partnerships help participating jurisdictions develop all-hazards plans, share resources and information, coordinate response and recovery efforts, and share educational and training opportunities. However, experts anticipate that a nuclear detonation in a U.S. urban area will likely overwhelm many existing regional partnerships. Planners in jurisdictions adjacent to urban areas should consider including urban areas that routinely do not participate in regional planning into their nuclear reception planning efforts. Expanding existing partnerships can facilitate, expedite, and streamline the development of reception plans tailored to a nuclear incident in an adjacent urban area.

Planners in jurisdictions adjacent to urban areas also are encouraged to establish appropriate mutual aid agreements and response protocols with other neighboring jurisdictions. These mutual aid agreements and response protocols are essential to help responders and receivers manage reception operations after a nuclear incident. However, planners should recognize that many jurisdictions could be unable to activate their mutual aid agreements or implement their reception plans effectively after a nuclear incident. As a result, even jurisdictions relatively distant from the nuclear incident area may be incapable of managing the influx of evacuees or providing assistance to localities adjacent to the incident site for days after an event.

The 2009 Lawrence Livermore National Laboratory study Key Response Planning Factors for the Aftermath of Nuclear Terrorism found that "…no communities have a coordinated regional plan for responding to a low-yield (<10-kilotons) nuclear detonation."

Prepare for Mass Screening and Decontamination Operations

Experts anticipate that many evacuees could leave the incident area before significant emergency response resources arrive onsite. As a result, some evacuees could arrive in or transit though jurisdictions adjacent to a nuclear incident area without having received any radiation screening or decontamination. In addition, some evacuees could select to bypass reception and assessment centers located near the incident site in an effort to move away from the contaminated area. These evacuees could travel significant distances before reaching reception centers where they could be assessed and/or decontaminated. Planners in jurisdictions adjacent to a nuclear incident area should consider developing mass decontamination guidelines or annexes tailored to this particular scenario. In particular, emergency managers and response agencies should consider that reception, assessment, and decontamination center personnel should have radiation detection systems available to screen evacuees at all times after a nuclear incident in an adjacent urban area.

Many pet owners may decide to take their pets with them during evacuation. For information on pet-sheltering procedures and practices, please refer to the *Lessons Learned Information Sharing* Best Practice Shelter Operations: Pet-Friendly Shelters. This document outlines the essential issues that jurisdictions should consider when developing plans to provide pet-friendly sheltering for people before, during, or after an emergency that requires a large-scale evacuation.

The Centers for Disease Control and Prevention Virtual Community Reception Center (vCRC) is a Web-based training tool that can help emergency response agencies manage population monitoring services after a mass casualty radiation emergency. Population monitoring services include:

- Screening members of the public for radioactive contamination;
- Monitoring people for acute health effects from radiation exposure;
- Coordinating medical services for internally contaminated or highly exposed individuals; and
- Establishing an exposure registry to track long-term health effects.

Immediate Response Issues and Priorities for Adjacent Jurisdictions

This section describes a jurisdiction's unique needs and requirements after a nuclear incident in an adjacent urban area. Readers should refer to the *Lessons Learned Information Sharing* network (*LLIS.gov*) for additional information about any of the emergency response concepts, functions, procedures, and practices that do not specifically apply to this nuclear incident scenario. Finally, planners should consider that this list of concepts is not exhaustive.

Coordination of Response Operations

Coordination between federal, state, regional, tribal, and local agencies will be essential after a nuclear incident in an urban environment. In particular, jurisdictions adjacent to a nuclear incident area should consider coordinating, when appropriate, with the National Weather Service (NWS) local office or regional support center for forecast and weather information. NWS staff members could provide jurisdictions with information on current weather conditions and wind speed and direction at the blast site as well as across the region. In addition, NWS could provide jurisdictions with the weather forecast for an operational period. Finally, emergency response organizations in jurisdictions adjacent to a nuclear incident site should consider coordinating as soon as possible with the disaster area's incident command; other adjacent jurisdictions; and all appropriate

The Ventura County Nuclear Explosion Response Plan details coordination activities among agencies following a nuclear incident in Los Angeles, California. These activities include coordination and information-sharing with, among others, the Los Angeles County Emergency Operations Center (EOC), the California State EOC, the California Highway Patrol, the NWS, the Federal Bureau of Investigation, the Federal Aviation Administration, and the Department of Energy.

federal, state, regional, tribal, and local agencies and organizations. Coordination will help emergency managers and response agencies in jurisdictions adjacent to a nuclear incident site manage the consequences of such an event.

The Nuclear Energy Institute's Emergency Preparedness at Nuclear Power Plants found that in some instances, local officials have used coordination and communications mechanisms established to respond to nuclear power plant emergencies to respond to non-nuclear emergencies. For instance:

- "In October 2007, wildfires ravaged 380,000 acres of California, causing more than $1 billion in damage. Fire destroyed 1,300 homes and prompted the evacuation of 300,000 people in various parts of the state. Emergency responders in the communities around the San Onofre nuclear power plant drew on the relationships and communications links established through their experience in nuclear plant emergency preparedness."
- "The evacuation of 10,000 people from Cedar Rapids, Iowa, in 1985, following a fire at a city-operated sewage treatment plant that dispersed a cloud of toxic fumes over the city. State and local officials used a draft plan developed for the Duane Arnold nuclear plant."
- "The evacuation of 17,000 residents of St. Charles Parish, L.A., following a leak from a nearby chemical plant in December 1982. State and local officials worked from a draft plan for Entergy's Waterford 3 nuclear plant, which was not yet operating."

Planners might wish to consider that many local plans and/or annexes, including nuclear power plant emergency preparedness plans, may include mechanisms, procedures, and practices that could help jurisdictions coordinate effectively after a nuclear incident in an urban environment.

Situational Awareness

Emergency managers and response agencies will lack critical information immediately after a nuclear detonation in an adjacent urban area. As a result, these personnel will likely have to make protective action decisions without a full understanding of the incident conditions. For instance, responders may be unable to collect the data needed to make an informed decision about fallout boundaries immediately after an attack. However, experts anticipate that the danger of radiation exposure will be particularly high minutes after a detonation. As a result, they advise responders to issue a shelter-in-place recommendation for the public as soon as possible after an attack. Responders should issue evacuation recommendations taking into consideration the exposure level in and around the areas to be evacuated. If responders estimate contamination boundaries or evacuation routes incorrectly, an erroneous protective action recommendation could result in high exposure levels for evacuees.

The Lawrence Livermore National Laboratory Key Response Planning Factors for the Aftermath of Nuclear Terrorism study states that local emergency response agencies should consider regional situational assessment as one of their priorities. As a result, responders should: "Designate a regional situational assessment center that will collect information from observations, instrument readings, and weather."

Activities that could help increase situational awareness immediately after a nuclear attack in an adjacent jurisdiction could include, among others, deployment of:

- Available air support assets, which could help responders evaluate road conditions and evacuation patterns to and from the county;
- Field units tasked with evaluating road usage at strategic entry points;
- Field units tasked with measuring radiation levels throughout a jurisdiction; and
- Personnel assigned to draw plume models over county street maps.

Best Practice Series Sources

This series of Best Practices draws on several documents. However, the following documents can be particularly helpful when planning for reception in a jurisdiction adjacent to a potential nuclear incident area:

- The Ventura County, California, Nuclear Explosion Response Plan Version 3.0 details response operations in Ventura County, California, after a nuclear detonation in the neighboring county of Los Angeles. The Ventura County Department of Public Health developed this plan in collaboration with the Ventura County Sheriff's Department and the Ventura County Office of Emergency Services.
- The Lawrence Livermore National Laboratory Key Response Planning Factors for the Aftermath of Nuclear Terrorism report identifies critical issues and provides guidelines to support response planning for a low-yield, ground-level nuclear detonation in a large urban area. This document lists public protection strategy principles and key planning considerations, describes fallout effects, shows how weather can change the shape and direction of a plume, and provides essential protective action guidelines. Although this document focuses on the effect of a nuclear incident in an urban area, planners in adjacent jurisdictions are encouraged to consider this study as a valuable resource throughout their planning process.

Planning for a Nuclear Detonation in an Adjacent Jurisdiction: The Ventura County, California, Nuclear Explosion Response Plan

In 2007, Ventura County, California, developed a plan detailing response operations in the county after a nuclear detonation in the neighboring county of Los Angeles. The Ventura County, California, Nuclear Explosion Response Plan Version 3.0 helps the county's emergency managers, responders, and receivers understand and manage the consequences of a nuclear detonation in Los Angeles. The Ventura County Department of Public Health developed the plan in collaboration with the Ventura County Sheriff's Department and the Ventura County Office of Emergency Services. Ventura County planners used many of the assumptions and concepts of National Planning Scenario 1 to develop their scenario.

Los Angeles as a Terrorist Target

Intelligence agencies consider Los Angeles to be one of the nation's top targets for terrorists. Los Angeles's CI/KR include the ports of Long Beach and Los Angeles and the Los Angeles International Airport. On December 14, 1999, law enforcement personnel apprehended Ahmed Ressam in Port Angeles, Washington. Ressam, an Algerian national living in Canada, had a cache containing more than 100 pounds of explosive hidden in the wheel well of a rental car and was planning to bomb the Los Angeles International Airport on December 31, 1999. Explosives experts later determined that these explosive materials could produce a blast 40 times greater than that of a car bomb.

The U.S. Court of Appeals for the Ninth Circuit U.S. v. Ressam report states, "the following items were found in Ressam's car: two lozenge bottles filled with primary explosives, one of which contained hexamethylene triperoxide diamine and the other of which contained cyclotrimethylene trinitramine; 10 plastic bags of approximately 118 pounds total of urea in fine white powder form, which is a fertilizer that, when nitrated, can be used as a fuel in explosives; 2 plastic bags of about 14 pounds total of a crystalline powder determined to be aluminum sulfate; two 22-ounce olive jars each filled approximately 3/4 full of a golden brown liquid covered with a sawdust like substance, which liquified was determined to be an explosive, etheylene glycol dinitrate. Also discovered with these chemicals were four timing devices, comprised of small black boxes which each contained a circuit board connected to a Casio watch and nine volt battery connector. Tests later confirmed that the timing devices were operational."

The Ventura County Planning Scenario

The Ventura County Nuclear Explosion Response Plan outlines the effects of a 10-KT suitcase nuclear device detonation at the Los Angeles Civic Center. The device could have the dimensions of 24 by 16 by 18 inches. Terrorists would transport this device to the detonation site by van. In this scenario, the nuclear detonation is part of a simultaneous, coordinated attack on three other U.S. cities. However, the Ventura County plan does not detail the consequences of the other attacks.

Former U.S. Representative Curt Weldon, then-Chairman of the House Subcommittee on Military Research and Development, shows a mockup suitcase bomb, made from a U.S. nuclear artillery shell, during a 1999 hearing.

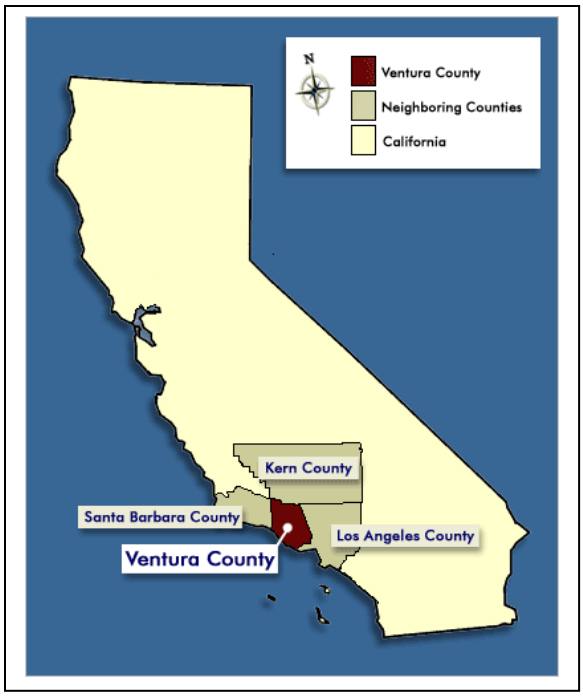
Ventura County planners employ scenario parameters intended to cause the maximum number of possible casualties in Los Angeles. Specifically, they assume that the attack would occur in February, at a time when many tourists are in California. In addition, the attack would take place after the December holiday season and before school spring break, when the majority of Los Angeles residents are in the area. Finally, planners assume that terrorists would conduct the attack on a Friday morning because emergency response organizations would be the least prepared over a weekend.

Ventura County is located in the southern part of the State of California. The county has a population of more than 850,000 residents and a total area of 2,200 square miles. Adjacent counties include Santa Barbara County to the west, Kern County to the north, and Los Angeles County to the east and southeast.

The scenario assumes that Los Angeles would have a population density of approximately 2,500 people per square block at the time of the attack. Ninety-five percent of people within four and three quarters blocks of the incident site, twenty-eight percent from five to ten blocks, and one percent from ten to sixteen blocks would die as a result of this ground-level detonation. Overall, this attack would cause at least 9,000 immediate deaths and injure 131,000 people in downtown Los Angeles. Forty-five thousand people would die within twenty-four hours, and ninety-nine thousand would die within eight weeks due to injuries and/or radiation exposure.

Consequences for Ventura County

Ventura County planners anticipate that Ventura County would not experience direct blast damage as a consequence of the nuclear detonation in Los Angeles, but parts of the county might become contaminated with radioactive fallout. Under either circumstance, planners expect the county to experience major disruption as an indirect result of this attack. In particular, planners expect that the county would be a critical evacuation route for Los Angeles residents following a disaster. They anticipate that up to 2 million people would attempt to transit though Ventura County following



Ventura County Map

a nuclear detonation in Los Angeles. This mass evacuation is expected to cause extensive economic disruption, environmental and property damage, critical resource depletion, mass panic and social unrest, and transportation gridlocks.

Planners believe that many of the incoming evacuees will have been exposed to radiation or will be contaminated. Depending on their level of exposure, some of these evacuees could start experiencing radiation sickness symptoms within minutes, while others could experience symptoms after hours or days. Further, planners anticipate that 40,000 people injured in the Los Angeles metropolitan area will enter Ventura County. Many evacuees who had left the incident area unharmed also could become injured or contaminated during the evacuation.

Definitions and Terminology

This Best Practice relies on definitions derived from the Web sites of the Department of Homeland Security and the Department of Energy. Full citations can be found in the "Resources" section of this document.

Critical Infrastructure: "Critical infrastructure are the assets, systems, and networks, whether physical or virtual, so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, public health or safety, or any combination thereof." (DHS, Critical Infrastructure)

Improvised Nuclear Device: "An illicit nuclear weapon bought, stolen, or otherwise originating from a nuclear State, or a weapon fabricated by a terrorist group from illegally obtained fissile nuclear weapons material that produces a nuclear explosion." (FEMA, Planning Guidance for Protection and Recovery Following Radiological Dispersal Device and Improvised Nuclear Device Incidents)

Key Resources: "Key Resources are publicly or privately controlled resources essential to the minimal operations of the economy and government." (DHS, Critical Infrastructure)

Mass Evacuation: "The expedited movement of a large number of people and their household pets or service animals from an area threatened or affected by a large-scale hazard." (FEMA, Evacuee Support Planning Guide)

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