PLANNING SCENARIOS
Executive Summaries

Created for Use in National, Federal, State,
and Local Homeland Security Preparedness Activities

The Homeland Security Council

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Contents

Introduction

The Homeland Security Council (HSC) – in partnership with the Department of Homeland Security (DHS), the federal interagency, and state and local homeland security agencies – has developed fifteen all-hazards planning scenarios for use in national, federal, state, and local homeland security preparedness activities. These scenarios are designed to be the foundational structure for the development of national preparedness standards from which homeland security capabilities can be measured. While these scenarios reflect a rigorous analytical effort by federal, state, and local homeland security experts, it is recognized that refinement and revision over time may be necessary to ensure the scenarios remain accurate, represent the evolving all-hazards threat picture, and embody the capabilities necessary to respond to domestic incidents.

This document includes executive summaries for the fifteen scenarios, and a separate document contains the complete scenario text.

General Considerations for the Scenarios:

The scenarios have been developed in a way that allows them to be adapted to local conditions throughout the country. Although certain areas have special concerns – continuity of government in Washington, D.C.; viability of financial markets in New York; and trade and commerce in other major cities – every part of the country is vulnerable to one or more major hazards.

Because the attacks could be caused by foreign terrorists; domestic radical groups; state-sponsored adversaries; or in some cases, disgruntled employees, the perpetrator has been named, the Universal Adversary (UA). The focus of the scenarios is on response capabilities and needs, not threat-based prevention activities.

Since these scenarios were compiled to be the minimum number necessary to test the range of response capabilities and resources, other hazards were inevitably omitted. Examples of other potentially high-impact scenarios include nuclear power plant incidents[1], industrial and transportation accidents, and frequently occurring natural disasters. These either have well-developed and tested response plans, and/or the response would be a subset of the requirements for scenarios contained in this set.

Detailed assumptions for each scenario are provided in the full-text of this document but are not provided in this executive summary.

Intelligence Disclaimer –

While the intelligence picture developed as part of each scenario generally reflects suspected terrorist capabilities and known tradecraft, the Federal Bureau of Investigation (FBI) is unaware

[1] A severe incident at a nuclear power plant, whether or not it is terrorist-initiated, could result in a release of radioactive materials to the environment with adverse consequences to public health. Scenarios for such severe incidents have not been included in this scenario set because: (a) current federal regulations from the Nuclear Regulatory Commission and the DHS Federal Emergency Management Agency (FEMA) mandate robust emergency planning and preparedness for each nuclear plant to include the full range of response organizations; and (b) scenarios for nuclear plants cannot be generically extrapolated to other types of facilities (e.g., chemical plants).

of any credible intelligence that indicates that such an attack is being planned, or that the agents or devices in question are in possession of any known terrorist group.

Ranking of Scenarios –

Various schemes have been used in the past to rank scenarios based on probability, number of casualties, extent of property damage, economic impact, and social disruption. Because the scenarios in this set were developed to test the full range of response capabilities and resources – and to assist federal, state, and local governments as well as the private sector in preparedness – they have not been ranked. Each jurisdiction or organization should apply its own priorities, based on its responsibilities within the domestic incident management structure.

Multiple Events –

There is a high probability that multiple incidents will occur simultaneously. When scoping resource requirements, organizations should always consider the need to respond to multiple incidents of the same type and multiple incidents of different types, at either the same or other geographic locations. These incidents will invariably require the coordination and cooperation of homeland security response organizations across multiple regional, state, and local jurisdictions.

The Homeland Security Advisory System –

The scenarios do not specify changes in the levels of the Homeland Security Advisory System (HSAS). However, in all scenarios other than natural disasters, it is anticipated that the alert level would increase. This increases the nation's ability to respond to the current attack, reduces the vulnerability to future attacks, and helps citizens prepare to protect themselves. At higher alert levels, the HSAS has increased resource demands and can also have national economic impacts.

The "Worried Well" –

In most incidents, citizens will seek medical treatment even though they may not be injured by the incident. For example, in the World Trade Center incident on 9/11/01, the uninjured who sought medical treatment was approximately fifteen times the number of people who presented for medical treatment due to smoke inhalation; and in the Tokyo subway attack it was five times the number of victims experiencing chemical poisoning. For planning purposes, most experts calculate a ratio of ten-to-one.

Infrastructure Impact –

The effect of disasters on national, state, and local transportation, communication, medical, and utility infrastructure will have a considerable effect on response strategies. As on 9/11, when the entire civilian air transportation system and much of the national telecommunications system were shut down or disabled, a terrorist incident may have repercussions that affect critical infrastructures necessary for coherent emergency response. These critical networks must be layered and properly coordinated across both civilian and military sectors to ensure the continuity of critical infrastructure support for responding jurisdictions.

Economic Impact –

Catastrophic disasters, depending upon the type, scope, and magnitude of the disaster incident, could threaten the economic sustainability of the communities affected and may cause severe

disruption and long-term economic damage. Extreme disaster incidents can generate cascading economic situations extending outside the immediate community. Even in moderate disasters, of all businesses that close following a disaster, more than 43% never reopen, and an additional 29% close permanently within 2 years[2]. The American Planning Association notes, "Economic recovery is quite likely the most serious issue facing most communities in the post-disaster period, and almost certainly the central issue in every major disaster."[3]

Environmental Impact –

Catastrophic natural and manmade disasters and terrorist attacks can result in extreme environmental impacts that challenge government and community recovery time. Long after the emergency phase subsides, contamination from disasters may remain, consisting of chemical, biological, or radiological materials. While decontamination technologies may be well established for some types of contamination, others are only moderately effective – some contaminants, especially radionuclides, are very difficult and costly to remediate. While some decontamination techniques may be effective in small sites, these techniques may not be suited for decontaminating expansive areas of varying physical characteristics. Evacuation and relocation during cleanup and restoration activities can result in significant business loss and failure, leading to local and regional economic downturn. In addition, agricultural and industrial products from an area contaminated, or thought to be contaminated, can generate impacts that extend within a region and beyond.

International Dimensions –

It is important to underline the significant international dimensions that arise in connection with some of the more damaging and devastating scenarios in which significant loss of life and property, together with the possibility of foreign-directed terrorism, are involved. First, there is the hemispheric dimension of effects on U.S. relations with Canada and Mexico in terms of cross-border trade, transit, law enforcement coordination, and other key issues. Second, there is the immediate treaty connection the United States has with other North Atlantic Treaty Organization (NATO) allies if the United States comes under attack. Third, there is the significant lobbying the United States will undertake at the United Nations (UN) to articulate American needs and interests. In addition to humanitarian and law enforcement assistance from NATO allies, other nations may contribute special equipment in order to meet other necessities. Instances where a disaster or terrorist attack has disrupted major urban centers and international transit/trade routes through U.S. cities will typically require significant coordination with the State Department to ensure all economic, trade, commercial, consular, military cooperative, and humanitarian assistance is rendered as needed.

The State Department plays several key roles in post-disaster situations. It assists foreign citizens affected by the incident. It identifies the specific needs of affected U.S. areas where foreign offers of assistance can be mediated and arranged. Moreover, in cases where explicit terrorist activities may have occurred, the State Department is a leader in facilitating the investigations abroad needed to determine the origins of the attack, in pursuing diplomatic and follow-up

[2] Institute for Business and Home Safety, at www.ibhs.org/business_protection.
[3] *Planning for Post-Disaster Recovery and Reconstruction* (1998), American Planning Association–Federal Emergency Management Agency, Planning Advisory Service Report No. 483/484, p. 53.

policies related to finding the guilty parties abroad, and in rendering coordinated international assistance to U.S. recovery efforts.

Common Response Threads:

Media Access and Support –

The support and cooperation of media in informing and protecting citizens is a critical aspect of emergency response. In many cases, media sources represent the best or only source of information available during the early stages of an incident. Cultivating good working relationships with the media provides opportunities to advise the public of important safety and health guidance and information and corrected misinformation, as well as to obtain critical information from news sources at the scene. Likewise, consistent public service guidance and information from emergency management officials to media sources are vital to reducing the probability of injury or illness and for alleviating citizen anxiety during the emergency.

The Importance of Planning for Continuity of Operations –

The scenarios reinforce the need for governments and the private sector to make preparations to continue their essential operations in an environment in which primary staff and facilities are unavailable. This includes the need to backup key records and systems.

The Need for Capability-Based Planning –

The scenarios emphasize the need for domestic incident preparedness to proceed through a capabilities-based approach. Although it is impossible to determine which major incident will occur next, examination of the scenarios leads to certain common functions that must be accomplished: the need for response organizations to move quickly and in a coordinated manner, the requirement to quickly treat mass casualties, and the need to temporarily house large numbers of people. Other considerations, such as treating infected animals or reconfiguring computer systems, are more incident-dependent.

Mission Areas:

The following Mission Areas were used to assist in scoping the response requirements generated by the scenarios.[4] The full-text document contains detailed information for each Mission Area, and this executive summaries document highlights actions to be taken under each Mission Area.

Prevention/Deterrence/Protection –	The ability to prevent, deter, or protect against terrorist actions
Emergency Assessment/Diagnosis –	The ability to detect an incident, determine its impact, classify the incident, conduct environmental monitoring, and make government-to-government notifications
Emergency Management/Response –	The ability to direct, control, and coordinate a response; provide emergency public information to the population at risk and the population at large; and manage resources – this outcome includes direction and control through the Incident Command System (ICS), Emergency Operations Center (EOC), and Joint Information Center (JIC)
Incident/Hazard Mitigation –	The ability to control, collect, and contain an incident at its source and to mitigate the magnitude of its impact; this outcome also includes all response tasks conducted at the incident scene except those specifically associated with victim care
Public Protection –	The ability to provide initial warnings to the population at large and the population at risk, notifying people to shelter-in-place or evacuate; provide evacuee support (e.g., transportation for evacuees, reception center, sand shelters); protect schools and special populations; and manage traffic flow and access to the affected area
Victim Care –	The ability to treat victims at the scene, transport patients, treat patients at a medical treatment facility, track patients, handle and track human remains, and provide tracking and security of patients' possessions and evidence
Investigation/Apprehension –	The ability to investigate the cause and source of the attack; prevent secondary attacks; and identify, apprehend, and prosecute those responsible
Recovery/Remediation –	The ability to restore essential services, restore businesses and commerce, cleanup the environment and render the affected area safe, compensate victims, provide long-term mental health and other services to victims and the public, and restore a sense of well-being in the community

[4] Department of Homeland Security, Office for Domestic Preparedness: *Homeland Security Exercise and Evaluation Program,* October 2003.

Scenario 1: Nuclear Detonation – 10-Kiloton Improvised Nuclear Device

Executive Summary

Casualties	Can vary widely
Infrastructure Damage	Total within radius of 0.5 to 1.0 mile
Evacuations/Displaced Persons	450,000 or more
Contamination	Approximately 3,000 square miles
Economic Impact	Hundreds of billions of dollars
Potential for Multiple Events	No
Recovery Timeline	Years

Scenario Overview:

General Description –

In this scenario, terrorist members of the Universal Adversary (UA) group assemble a gun-type nuclear device using highly enriched uranium (HEU) – used here to mean weapons-grade uranium – stolen from a nuclear facility located in the former Soviet Union. The nuclear device components are smuggled into the United States. The 10-kiloton nuclear device is assembled near a major metropolitan center. Using a delivery van, terrorists transport the device to the central business district of a large city and detonate it. Most buildings within 1,000 meters (~ 3,200 feet) of the detonation are severely damaged. Injuries from flying debris (missiles) may occur out to 6 kilometers (~ 3.7 miles). An Electromagnetic Pulse (EMP) damages many electronic devices within about 5 kilometers (~ 3 miles). A mushroom cloud rises above the city and begins to drift east-northeast.

Geographical Considerations/Description –

This scenario postulates a 10-kiloton nuclear detonation in a large metropolitan area. The effects of the damage from the blast, thermal radiation, prompt radiation, and the subsequent radioactive fallout have been calculated, based on a detonation in Washington, D.C. (details are not provided in this executive summary but are presented in the full-text version in Appendix 1-A). However, the calculation is general enough that most major cities in the United States can be substituted in a relatively straightforward manner. If the incident happened near the U.S. border, there would be a need for cooperation between the two border governments. Additionally, the IND attack may warrant the closure of U.S. borders for some period of time. If the detonation occurs in a coastal city, the fallout plume may be carried out over the water, causing a subsequent reduction in casualties. On the other hand, the surrounding water will likely restrict the zones that are suitable for evacuation. Bridges and tunnels that generally accompany coastal cities will restrict the evacuation, causing delay and an increase in the radioactive dose that evacuees receive. This delay may be substantial and the resulting dose increase may drive a decision to shelter-in-place or evacuate-in-stages.

Timeline/Event Dynamics –

The response timeline will begin the instant the detonation occurs. Initially, only survivors in the immediate area will conduct rescue and lifesaving activities. Later (minutes to hours), rescue teams will begin to arrive and provide assistance. With the current state of education, training, and equipment, it is likely that many of these responders will subject themselves to very large (perhaps incapacitating or fatal) doses of radiation. As various command posts are setup (which may take hours to days), the response will become more coordinated.

For a nuclear detonation, the actual occurrence of injuries does not stop when the immediate blast effects have subsided. The most critical components of the post-detonation response may not be the lifesaving efforts that assist the victims directly injured by the detonation. Instead, it is likely that the most effective lifesaving activities will be those that address the evacuation or sheltering-in-place decisions for the potential victims in the immediate fallout path, the effective communication of instructions to the affected population, and the efficient decontamination of the evacuated population.

Secondary Hazards/Events –

The detonation will cause many secondary hazards. The intense heat of the nuclear explosion and other subsequent causes will produce numerous fires located throughout the immediate blast zone. Damaged buildings, downed power and phone lines, leaking gas lines, broken water mains, and weakened bridges and tunnels are just some of the hazardous conditions that will need to be assessed. Depending on the type of industries present (such as chemical or petroleum production, industrial storage facilities, and manufacturing operations), there could be significant releases of hazardous materials.

Another secondary effect of a nuclear explosion is the EMP that will be produced by the ionization and subsequent acceleration of electrons from the air and other materials by the intense radiation of the detonation. This EMP is a sharp, high-voltage spike that radiates out from the detonation site. It has the potential to disrupt the communication network, other electronic equipment, and associated systems within approximately a 5-kilometer (~ 3-mile) range from the 10-kiloton ground blast.

There likely will be significant damage to the general public support infrastructure with potentially cascading effects. These systems include transportation lines and nodes (e.g., air, water, rail, highway); power generation and distribution systems; communications systems; food distribution; and fuel storage and distribution. There will be concerns about the safety and reliability of many structures (e.g., dams, levees, nuclear power plants, hazardous material storage facilities). Structures may be damaged that are used to provide essential services (e.g., hospitals, schools).

Key Implications:

A full description of the fatalities and injuries for a nuclear detonation is difficult and complicated. There will be casualties directly associated with the blast, which will cause “translation/tumbling” (the human body being thrown) and subsequent impacts of people and other objects. A nuclear detonation will also produce a great deal of thermal (heat) energy that

will cause burns to exposed skin (and eyes). There are two general "categories" of nuclear radiation produced in a detonation. First is the so-called "prompt" nuclear radiation, arbitrarily defined as being emitted within the first minute – it is actually produced as the device detonates or shortly thereafter. For a 10-kiloton blast, this radiation may expose unprotected people within a distance of a few kilometers (a couple of miles) to extremely large gamma ray and/or neutron doses. In addition, a detonation of a nuclear device near the surface of the ground will result in a great deal of fallout (in the form of dirt particles) that is radioactively contaminated. This fallout will settle out of the radioactive cloud over a period of minutes to weeks. By far, the most dangerously radioactive fallout will be deposited near the detonation site and will happen within the first couple of hours after detonation. Radioactive fallout will exponentially decay with time, but may expose many people to large doses and will certainly contaminate large areas of land for years. Many fatalities and injuries will result from a combination of these various effects.

The largest radiation concerns following an IND incident will be the "prompt" radiation (gamma ray and neutron) and the gamma dose received from the "ground shine" (radioactive particles deposited on the ground) as people are evacuated from the fallout areas. These effects are likely to have significantly larger impacts on the population than internal doses. Internal doses tend to expose the body to relatively small radiation doses over a long period of time, which produces different effects than large radiation doses received during a short period of time.

As the distance from ground zero increases past 20 kilometers (~ 12 miles), the injuries due to acute radiation exposure (from prompt radiation and the subsequent fallout) will decrease, and lower level contamination, evacuation, and sheltering issues will become the major concern. In general, at distances greater than 250 kilometers (~ 150 miles) from ground zero of a 10 kiloton nuclear detonation, acute health concerns will not be a significant issue. However, contamination of people and the environment will still be a concern.

Years later, there will still be health consequences in the form of increased probabilities of cancers in the exposed population. The number of these cancers will likely run into the thousands and will extract a large human, social, and financial cost.

It is likely that the blast and subsequent fires will destroy all buildings in the immediate area of the detonation. Historically, decontamination of sites involves the removal of all affected material, so most buildings in the immediate downwind fallout path will likely have to be destroyed in the decontamination effort. As the distance from the detonation site increases, the contamination level will decrease. At some distance, the buildings will not have to be destroyed and removed but will still require decontamination of all affected surfaces. This decontamination process will take years and will be extremely expensive. The decontamination will produce a far greater challenge and cost much more than the actual rebuilding of the destroyed structures. Approximately 8,000 square kilometers (~ 3,000 square miles) of land will have to undergo varying degrees of decontamination. This effort will last for many years and will cost many billions of dollars to complete.

Service disruption will be extensive in the area near ground zero and in the fallout path for several miles downwind. Services in these areas will not be restored for years because the land affected will not be returned to use until the decontamination is complete and the structures

rebuilt. Service disruption will be much less dramatic in areas that are less severely contaminated or not contaminated at all.

The electrical power grid is likely to be damaged by transients produced by the destruction of substations, as well as other power production and distribution installations, and perhaps by the EMP of the detonation. It is likely that the grid damage may cause power outages over wide areas, perhaps over several states, but these outages should be repaired within several days to a couple of weeks. The communication systems in the area will suffer similar damage and will likely be repaired within similar timeframes.

City water mains will likely survive without major damage. The city water supply is unlikely to become substantially contaminated with radiation via water main breaks, but it is possible that some small amount of radioactive and non-radioactive contamination may enter the lines.

To varying degrees, all government services will be impacted over some geographical area. The national economy will be significantly impacted. Decontamination, disposal, and replacement of lost infrastructure will cost many billions of dollars. Replacement of lost private property and goods could add billions more to the cost. Additionally, an overall national economic downturn, if not recession, is probable in the wake of the attack.

Mission Areas Activated:

Prevention/Deterrence/Protection – Law enforcement attempts will be made to prevent development and detonation of the device. Site boundaries must be protected and surveyed after the detonation. Officers must respond to any additional threats or looting/theft issues.

Emergency Assessment/Diagnosis – The detonation will be easily recognized as nuclear. Actions required include dispatching response units; making incident scene reports; detecting and identifying the source; establishing a perimeter; collecting information; making hazard assessments and predictions; coordinating hospital and urgent care facilities; coordinating county and state response requests; and coordinating monitoring, surveying, and sampling operations.

Emergency Management/Response – Evacuation/shelter-in-place decisions must be made immediately. Required actions include alerting the public, providing traffic and access control, protecting at-risk and special populations, supporting requests for assistance, directing and controlling critical infrastructure assets, and directing pubic information activities. Location and removal of injured and disabled people will be a significant undertaking that will be greatly complicated by the need to keep the radiation dose of the individual workers as low as reasonably achievable (ALARA). Initial emergency workers will likely receive high doses of radiation and must be trained on how to avoid as much as possible.

Incident/Hazard Mitigation – Self-evacuation should occur in the short-term, and the greatest factor impacting the reduction of the effects of the detonation on the general population will remain the speed and appropriateness of the decisions that are made and the effectiveness of the dissemination of this information (e.g., evacuation/shelter-in-place instructions).

	Evacuees must be promptly decontaminated.
Public Protection –	Actions should include making and communicating protective action decisions, monitoring and decontaminating evacuees, implementing decisions to administer prophylaxis to the affected populations, protecting special populations, protecting schools and day care facilities, and providing shelter/reception facilities.
Victim Care –	Tens of thousands will require decontamination and both short-term and long-term treatment. Due to a high number of casualties, the level of care may be significantly lower than normally expected. When overwhelmed with victims who need care, decisions must be made based on the fact that the sooner the onset of the symptoms, the higher the dose received and the less likely the victim is to survive (even with medical intervention).
Investigation/Apprehension –	Attribution activities at the detonation site will rely largely on scientific forensic techniques and will be provided by specialized national teams. Actions of incident-site personnel will include site control and criminal investigation. Federal authorities or the military will probably conduct "apprehension" activities.
Recovery/Remediation –	Expected radiation levels will limit the total time workers can spend in the affected area, quickly leading to a shortage of willing, qualified, and trained workers. The volume of contaminated material that will be removed will overwhelm the national hazardous waste disposal facilities and will severely challenge the nation's ability to transport the material. This effort will be the most expensive and time-consuming part of recovery and will likely cost many billions of dollars and take many years.

Note: For more information, there are two sections available only in the full-text version of this document that provide more detailed information regarding results. There is an *Estimated "Realistic" Results* section that reflects a set of possible results from the 10-kiloton detonation described in this scenario. The second section, Appendix 1-A, contains a consequence report for a 10-kiloton nuclear detonation in Washington, DC, that describes a set of possible consequences calculated for a 10-kiloton nuclear blast including its prompt effects (occurring within the first minute) and fallout. The results provided in Appendix 1-A are very conservative, and the results provided in the section, *Estimated "Realistic" Results* are less conservative and are intended to be more realistic.

Scenario 2: Biological Attack – Aerosol Anthrax

Executive Summary

Casualties	13,000 fatalities and injuries
Infrastructure Damage	Minimal, other than contamination
Evacuations/Displaced Persons	Possibly
Contamination	Extensive
Economic Impact	Billions of dollars
Potential for Multiple Events	Yes
Recovery Timeline	Months

Scenario Overview:

General Description –

Anthrax spores delivered by aerosol delivery results in inhalation anthrax, which develops when the bacterial organism, *Bacillus anthracis,* is inhaled into the lungs. A progressive infection follows. This scenario describes a single aerosol anthrax attack in one city delivered by a truck using a concealed improvised spraying device in a densely populated urban city with a significant commuter workforce. It does not, however, exclude the possibility of multiple attacks in disparate cities or time-phased attacks (i.e., "reload"). For federal planning purposes, it will be assumed that the Universal Adversary (UA) will attack five separate metropolitan areas in a sequential manner. Three cities will be attacked initially, followed by two additional cities 2 weeks later.

Timeline/Event Dynamics –

It is possible that a Bio-Watch signal would be received and processed, but this is not likely to occur until the day after the release. The first cases of anthrax would begin to present to Emergency Rooms (ERs) approximately 36 hours post-release, with rapid progression of symptoms and fatalities in untreated (or inappropriately treated) patients.

The situation in the hospitals will be complicated by the following facts: The release has occurred at the beginning of an unusually early influenza season and the prodromal symptoms of inhalation anthrax are relatively non-specific. Physician uncertainty will result in low thresholds for admission and administration of available countermeasures (e.g., antibiotics), producing severe strains on commercially available supplies of such medications as ciprofloxacin and doxycycline, and exacerbating the surge capacity problem.

Secondary Hazards/Events –

Social order questions will arise. The public will want to know very quickly if it is safe to remain in the affected city and surrounding regions. Many persons will flee regardless of the public health guidance that is provided. Pressure may be placed directly on pharmacies to dispense medical countermeasures directly, and it will be necessary to provide public health guidance in more than a dozen languages.

Key Implications:

This attack results in 328,484 exposures; 13,208 untreated fatalities; and 13,342 total casualties. Although property damage will be minimal, city services will be hampered by safety concerns.

There is the potential for a huge sell-off in the economic markets; moreover, the stock exchange and large businesses may be directly affected by the attack. There may also be a decline in consumer spending and a loss of revenue for the metropolitan area. An overall national economic downturn is possible in the wake of the attack due to loss of consumer confidence. The costs of the closure of a large section of the city and the decrease in revenue from tourism for an indeterminate period would be enormous, as would the costs of remediation and decontamination.

Mission Areas Activated:

Prevention/Deterrence/Protection –	This area requires knowledge of those with the ability to grow and aerosolize anthrax, reconnaissance of equipment and laboratories, and public health protection measures.
Emergency Assessment/Diagnosis –	It will be necessary to monitor attack impact, determine resource needs, classify the type of event, and identify other events (if any). Environmental sampling for exposure risk assessment, identification of anthrax strain, and determination of any drug resistance will also be required.
Emergency Management/Response –	Management and response will require public alerts, mobilization of the Strategic National Stockpile, activation of treatment sites, traffic/access control, special population protection, protective measures (e.g., shelter-in-place), requests for resources and assistance, and public information activities.
Incident/Hazard Mitigation –	Mitigation will require PEP and PPE provision, environmental testing/decontamination, care of ill persons, victim treatment, site remediation and monitoring, notification of airlines/transport providers, public information provision, and coordination with public health agencies.
Public Protection –	In order to protect the public, it will be necessary to provide symptom/exposure information, warnings, and shelter-in-place/evacuation notification, as well as to manage traffic/access flow and mobilize the Strategic National Stockpile.
Victim Care –	Care to the ill must be provided and should include disbursing PEP/vaccinations and establishing treatment/distribution centers.
Investigation/Apprehension –	Law enforcement will investigate the attack in collaboration with public health officials working to identify populations at risk of disease. This also requires epidemiological trace-back of victims, parallel criminal investigations, and laboratory analyses.
Recovery/Remediation –	The Environmental Protection Agency (EPA) and the CDC will coordinate this area. Extensive decontamination and cleanup will be required (anthrax is long-lived in the environment) costing billions of dollars. Remediation will also require environmental testing, highly contaminated area closures, and public information provision.

Scenario 3: Biological Disease Outbreak – Pandemic Influenza

Executive Summary

Casualties	At a 15% attack rate: 87,000 fatalities; 300,000 hospitalizations
Infrastructure Damage	None
Evacuations/Displaced Persons	Isolation of exposed persons
Contamination	None
Economic Impact	$70 to $160 billion
Potential for Multiple Events	Yes, would be worldwide nearly simultaneously
Recovery Timeline	Several months

Scenario Overview:[1]

General Description –

Influenza pandemics have occurred every 10 to 60 years, with three occurring in the twentieth century (1918, 1957-1958, and 1967-1968). Influenza pandemics occur when there is a notable genetic change (termed genetic shift) in the circulating strain of influenza. Because of this genetic shift, a large portion of the human population is entirely vulnerable to infection from the new pandemic strain.

This scenario hypothetically relates what could happen during the next influenza pandemic without an effective preplanned response. At least twenty-five cases occur first in a small village in south China. Over the next 2 months, outbreaks begin to appear in Hong Kong, Singapore, South Korea, and Japan. Although cases are reported in all age groups, young adults appear to be the most severely affected, and case-fatality rates approach 5%. Several weeks later, the virus appears in four major U.S. cities. By nature, pandemic influenza moves extremely rapidly, and the outbreaks continue.

Timeline/Event Dynamics –

When planning and preparing for the next influenza pandemic, there are two equally important timelines. Due to the rapid spread of the influenza pandemic and the time required to develop, test, produce, and distribute an effective vaccine, the disease will likely arrive in the United States before a "significant" number of people can be vaccinated. The implication of this is that, as part of any pandemic influenza preparation and response plan, there must be a mechanism for allocating the vaccine among the population.

Secondary Hazards/Events –

The greatest secondary hazard will be the problems caused by shortages of medical supplies (e.g., vaccines and antiviral drugs), equipment (e.g., mechanical ventilators), hospital beds, and

[1] Adapted from Patriarcia et al., *Pandemic influenza: A planning guide for state and local officials (draft 2.1)*. Available from http://www.cdc.gov/od/nvpo/pubs/pandemicflu.htm.

health care workers. Having a detailed system for allocating resources potentially can reduce such difficulties. This system ideally should be in place well before an influenza pandemic actually occurs. Also of particular concern is the real likelihood that health care systems, particularly hospitals, will be overwhelmed. Another important secondary hazard is the disruption that might occur in society. Institutions, such as schools and workplaces, may close because a large proportion of students or employees are ill. A large array of essential services may be limited because workers are off work due to pandemic influenza. Travel between cities and countries may be sharply reduced.

Key Implications:

Estimates of impact are provided in Table 3-1.

Health Outcomes	15% Gross Attack Rate* (5^{th}, 95^{th} percentiles)	15% Gross Attack Rate (5^{th}, 95^{th} percentiles)
Fatalities	87,000 (54,400; 122,200)	207,000 (127,200; 285,300)
Hospitalizations	314,400 (210,400; 417,200)	733,800 (491,000; 973,500)
Outpatient visits	18.1 million (17.5; 18.7)	42.2 million (40.8; 43.7)
Self-care ill	21.3 million (20.6; 21.9)	49.7 million (48.2; 51.2)
*Percent Gross Attack Rate refers to the percentage of the entire U.S. population that will have a clinical case of influenza.		

Note: *Assumptions* for these estimates are available in the full-text version of this scenario, which also includes an *Appendix 3-C* that provides graphs and additional estimates.

Table 3-1. *Mean estimates (5^{th}, 95^{th} percentiles) of the impact of the next influenza pandemic in the United States without any large-scale and/or effective interventions*

Property damage is minimal. Service disruption, however, could be severe due to worker illness. Health care systems will be severely stressed, if not overwhelmed, and first responders are also likely to be severely strained.

Based on the estimates in Table 3-1, the economic impact, in 1995 U.S. dollars, will range from $71 billion (15% gross attack rate) to $166 billion (35% gross attack rate). These estimates include a value for time lost from work but do not include any estimate due to economic disruption or long-term health care costs.

Mission Areas Activated:

Prevention/Deterrence/Protection – Prevention is currently impossible. Protection requires pre-pandemic preparedness, providing more vaccines and conducting more vaccine research and development, antiviral drug stockpiling, and increased surveillance capacity to track illness patterns.

Emergency Assessment/Diagnosis – U.S. influenza surveillance systems will be activated. However, more information is needed regarding attack rate measurements.

Emergency Management/Response – Preparedness plans should contain clear guidelines on setting priorities for the use of scarce resources such as vaccines, drugs, and hospital beds. Federal and state governments have such plans in progress but not all are complete.

Incident/Hazard Mitigation – Success depends on the availability of scarce resources and how well these resources are distributed. Timely, effective public information communication is also important.

Public Protection – Due to late-onset symptoms and the rapid rate at which the disease spreads, evacuation and quarantine are not recommended. Protection will rely on vaccines and antiviral drugs to prevent spread of the disease.

Victim Care – Will rely on the use of antiviral drugs for treatment. Hospitalization and mechanical ventilators will be necessary for many and likely be in short supply. However, at-home care and over-the-counter medications may be helpful for some. A large number of fatalities will likely occur, requiring mortuary and burial services.

Investigation/Apprehension – Investigation is dependent on disease surveillance, although the current system has distinct limitations.

Recovery/Remediation – Not required.

Scenario 4: Biological Attack – Plague

Executive Summary

Casualties	2,500 fatalities; 7,000 injuries
Infrastructure Damage	None
Evacuations/Displaced Persons	Possibly
Contamination	Lasts for hours
Economic Impact	Millions of dollars
Potential for Multiple Events	Yes
Recovery Timeline	Weeks

Scenario Overview:

General Description –

Plague is a bacterium that causes high mortality in untreated cases and has epidemic potential. It is best known as the cause of Justinian's Plague (in the middle sixth century) and the Black Death (in the middle fourteenth century), two pandemics that killed millions. In this scenario, members of the Universal Adversary (UA) release pneumonic plague into three main areas of a major metropolitan city – in the bathrooms of the city's major airport, at the city's main sports arena, and at the city's major train station.

Timeline/Event Dynamics –

Plague cases rapidly occur in the United States and Canada. As a result of foreign and domestic travel, rapid dissemination to distant locations occurs. By Day 3, the plague spreads across both the Pacific and Atlantic oceans and by Day 4, the plague is confirmed in eleven countries other than the United States and Canada.

Secondary Hazards/Events –

As the financial world in Major City and elsewhere begins to realize the likelihood of an epidemic, a huge sell-off occurs in the markets. There is a high absentee rate at banks, other financial institutions, and major corporations. Adding to these complications is the fact that bank and other financial customers may be staying home. As a result, the phone systems at financial institutions may become completely tied up, with far fewer transactions than normal occurring. The fear of plague has raised memories of the anthrax incidents of 2001, which may cause many citizens to be afraid to open their mail.

Key Implications:

Morbidity and mortality totals by the end of the fourth day are indicated in Table 4-1. Although the specific assumptions that underlie these totals are not generally available, nor can they be reliably recreated, the parameters affecting these figures include length of incubation period following primary exposure, rate of secondary transmission, incubation period following secondary exposure, and timing and effectiveness of the intervention.

Illnesses and Fatalities by Country		
	Illnesses	**Fatalities**
United States	7,348	2,287
Canada	787	246
Other Countries	33	10
Total	8,168	2,543

Table 4-1. *Total illnesses and fatalities by country by the end of the fourth day (end of the exercise)*

Although the actual physical damage to property will be negligible, there will be an associated negative impact of buildings and areas that were or could have been contaminated. Service disruption will be significant for call centers, pharmacies, and hospitals due to overwhelming casualty needs. It will be necessary to close or restrict certain transportation modes. The threat of reduced food supply will cause food prices to rise.

A huge sell-off in the economic markets is possible, and loss of life will result in a decline in consumer spending and subsequent loss of revenue in the metropolitan area. An overall national economic downturn is possible in the wake of the attack due to loss of consumer confidence.

Many people will be killed, permanently disabled, or sick as a result of the plague. The primary illness will be pneumonia, although the plague can also cause septicemia, circulatory complications, and other manifestations. The long-term effects of antimicrobial prophylaxis in large numbers will require follow-up study. The associated mental health issues relating to mass trauma and terrorism events will also require assessment.

Mission Areas Activated:

Prevention/Deterrence/Protection – This area requires knowledge of persons with the skills to grow and aerosolize plague, reconnaissance of supplies and laboratories, and public health protection measures.

Emergency Assessment/Diagnosis – Although health professionals should rapidly recognize the seriousness of the incident, diagnosis of the plague may be delayed. Detection of the plague should initiate laboratory identification of the strain and a determination of the potentially known antimicrobial drug resistance. Origin of the initial contaminant should be traced back to the source.

Emergency Management/Response – Identification of drug-resistant plague strains would require full utilization of personal protective equipment (PPE) and quarantine measures. Response will require provision of public alerts, mobilization of the National Strategic Stockpile, activation of treatment sites, traffic and access control, protection of special populations, potential quarantine measures including shelter-in-place recommendations, requests for resources and assistance, and public information activities. Effective communication between U.S. and Canadian governments is vital.

Incident/Hazard Mitigation – Victims must receive antibiotic therapy within 24 hours to prevent fatality. Exposed victims must be isolated and minimizing disease spread will require epidemiological assessments, including contact investigation and notification.

Public Protection – Victims must be evacuated and treated (and/or self-quarantined), and antimicrobial prophylaxis will be necessary for exposed persons, responders, and pertinent health care workers. Mobilization of the Strategic National Stockpile for additional critical supplies and antibiotics will be necessary. The public should be informed of signs and symptoms of plague.

Victim Care – Victims will require treatment or prophylaxis with ventilators and antibiotics, as well as information measures for preventing spread of the disease. Advanced hospital care will be required for those with pneumonia. The U.S. Department of State's Bureau of Consular Affairs will need to be involved in order to assist foreign populations residing in the United States, or U.S. citizens exposed or ill abroad.

Investigation/Apprehension – Point-of-source exposures and plague strain must be determined using victim trace-back, criminal investigation, and laboratory analyses.

Recovery/Remediation – Extensive decontamination and cleanup will not be necessary because plague cannot live long in the environment and is viable to heat and sunlight exposure. However, some efforts should be undertaken to support political/public confidence.

Scenario 5: Chemical Attack – Blister Agent

Executive Summary

Casualties	150 fatalities; 70,000 hospitalized
Infrastructure Damage	Minimal
Evacuations/Displaced Persons	More than 100,000
Contamination	Structures affected
Economic Impact	$500 million
Potential for Multiple Events	Yes
Recovery Timeline	Weeks; many long-term health affects

Scenario Overview:

General Description –

Agent YELLOW, which is a mixture of the blister agents sulfur Mustard and Lewisite, is a liquid with a garlic-like odor. Individuals who breathe this mixture may experience damage to the respiratory system. Contact with the skin or eye can result in serious burns. Lewisite or Mustard-Lewisite also can cause damage to bone marrow and blood vessels. Exposure to high levels may be fatal.

In this scenario, the Universal Adversary (UA) uses a light aircraft to spray chemical agent YELLOW into a packed college football stadium. The agent directly contaminates the stadium and the immediate surrounding area, and generates a downwind vapor hazard. The attack causes a large number of casualties that require urgent and long-term medical treatment, but few immediate fatalities occur. Of the total stadium attendance, 70% is exposed to the liquid at the time of the attack. The remaining 30% (i.e., those in the covered areas of the stadium), plus 10% of the total population in the vapor hazard area, are exposed to vapor contamination.

Timeline/Event Dynamics –

The total time of the attack, including the last mile of the plane's approach, is less than 5 minutes. The crowd will panic and immediately evacuate the stadium, which will require up to 30 minutes. First responders should begin arriving at the facility perimeter within 10 to 15 minutes of the attack. In order for the UA to succeed in this attack, certain meteorological conditions – wind speed, temperature, humidity, and precipitation – must be met.

Secondary Hazards/Events –

Numerous injuries will occur as a result of crowd panic, including those that result from falling and crushing. Further injuries are likely to occur due to motor vehicle accidents in the parking lot and surrounding roadways.

Key Implications:

In the case of a full, 100,000-seat stadium, 70,000 people (70%) may be contaminated in the attack. Of these, most will have only clothing and/or skin contamination, resulting in moderate-to-severe skin blisters that will appear in 2 to 12 hours. Expedient decontamination (i.e., clothing removal and heavy water spray) will avoid half of these injuries. Systemic arsenic poisoning will occur in highly contaminated individuals. However, many will inhale sufficient agent vapor to cause severe lung damage, and many more will sustain permanent damage to the eyes. Fatalities and major injuries will occur due to falling and crushing during the evacuation, and to vehicle accidents.

There will be little direct property damage due to the attack. However, the stadium site and other contaminated property will be a total loss due to decontamination measures and/or psychological impacts of future usability.

Loss of use of the stadium and adjacent athletic facilities is expected. Additionally, some public transportation and other facilities may be lost due to contamination carried by fleeing victims. Overwhelming demand will disrupt communications (landline telephone and cellular) in the local area. Finally, some victims may self-transport to health care facilities and contaminate those facilities.

Decontamination, destruction, disposal, and replacement of a major stadium could cost up to $500 million. Enrollment at the college will be negatively affected, and the local community will experience significant losses resulting from the attack. Additionally, an overall national economic downturn is possible in the wake of the attack due to a loss of consumer confidence.

Many will be permanently blinded and many more will carry lifetime scars. Many may suffer significant damage to the lungs. In addition, Mustard is a known carcinogen, and systemic poisoning from the arsenic in Lewisite is also a concern.

Mission Areas Activated:

Prevention/Deterrence/Protection – The ability to prevent the attack is contingent on the prevention of chemical warfare material (CWM) importation, weapon assembly, plane and pilot acquisition, and site reconnaissance.

Emergency Assessment/Diagnosis – Hazardous material (HazMat) teams should instantly recognize the attack. Liquid contamination and a downwind vapor hazard will be components of the hazard. Actions required include dispatch; agent detection; and hazard assessment, prediction, monitoring, and sampling.

Emergency Management/Response – Actions required include alerts, activation and notification, traffic and access control, protection of special populations, resource support and requests for assistance, and pubic information activities.

Incident/Hazard Mitigation – The spread of contamination by fleeing victims will be a major challenge. Actions required include isolating and defining the hazard; establishing, planning, and operating incident command; preserving the scene; conducting mitigation efforts; decontaminating responders; and conducting site remediation and monitoring.

Public Protection – Evacuation and/or sheltering of downwind populations in a 360-degree arc around the stadium will be required until the stadium is decontaminated.

Victim Care – Tens of thousands of people will require decontamination and both short- and long-term medical treatment.

Investigation/Apprehension – Actions required include aircraft tracking, dispatch, site control, criminal investigation, tactical deployment, and suspect apprehension.

Recovery/Remediation – The stadium and adjacent facilities must be decontaminated of liquid agent YELLOW. Decontamination waste disposal is complicated by the presence of arsenic. Environmental testing must be done. Although decontamination could technically restore the stadium, psychological impact will likely require the stadium to be rebuilt.

Scenario 6: Chemical Attack – Toxic Industrial Chemicals

Executive Summary

Casualties	350 fatalities; 1,000 hospitalizations
Infrastructure Damage	50% of structures in area of explosion
Evacuations/Displaced Persons	Up to 700,000
Contamination	Yes
Economic Impact	Billions of dollars
Potential for Multiple Events	Yes
Recovery Timeline	Months

Scenario Overview:

General Description –

In this scenario, terrorists from the Universal Adversary (UA) land in several helicopters at fixed facility petroleum refineries. They quickly launch rocket-propelled grenades (RPGs) and plant improvised explosive devices (IEDs) before re-boarding and departing, resulting in major fires. At the same time, multiple cargo containers at a nearby port explode aboard or near several cargo ships with resulting fires. Two of the ships contain flammable liquids or solids. The wind is headed in the north-northeast direction, and there is a large, heavy plume of smoke drifting into heavily populated areas and releasing various metals into the air. One of the burning ships in the port contains resins and coatings including isocyanates, nitriles, and epoxy resins. Some IEDs are set for delayed detonation. Casualties occur onsite due to explosive blast and fragmentation, fire, and vapor/liquid exposure to the toxic industrial chemical (TIC). Downwind casualties occur due to vapor exposure.

Timeline/Event Dynamics –

Total time to plan and prepare for the attack would be on the order of 2 years, including reconnaissance, pilot and weapons training, and accumulation of weapons. Time to execute the attack would be several weeks to coordinate the shipping and coincident arrival of the containers aboard separate ships at the port. Time to execute the airborne phase of the attack would be on the order of 1 to 2 hours from liftoff from the originating airport. Time over target for the helicopters would be about 10 minutes. Time on the ground would be 2 to 3 minutes at each site. Fires resulting from the attack would take many hours, possibly days, to extinguish. In order for the UA to succeed in this attack, certain meteorological conditions – wind speed, temperature, humidity, and precipitation – must be met.

Secondary Hazards/Events –

Once they grasp the situation, authorities will evacuate or order shelter-in-place for a significant area downwind of the refineries and the port. Numerous injuries will occur as a result of population panic once downwind casualties begin to occur. Further injuries are likely to occur due to motor vehicle accidents in the surrounding roadways. (The rule of thumb is one fatality

per 10,000 evacuated.) Significant contamination of the waterway may also result, including oil and cargo spills from sunk or burning ships.

Key Implications:

Assuming a densely populated area, 7,000 people may be in the actual downwind area. Of these, 5% (350) will receive lethal exposures, and half of these will die before or during treatment. An additional 15% will require hospitalization, and the remainder will be treated and released at the scene by Emergency Medical Service (EMS) personnel. However, approximately 70,000 "worried well" may seek treatment at local medical facilities.

All three refineries sustain significant damage, with 50% of the equipment and facilities requiring significant repairs or replacement. Two ships in the port sink at their moorings; the port sustains heavy damage near the ships and at a dozen points where IEDs were dropped. Depending on which chemicals are released, there may be significant property damage in the downwind area.

Refinery capacity on the west coast is significantly diminished, resulting in fuel shortages and price increases. The port is temporarily closed due to damage and contamination. Contamination in the waterway may also result. Some public transportation and other facilities may be lost. Overwhelming demand will disrupt communications (landline telephone and cellular) in the local area. Significant disruptions in health care occur due to the overwhelming demand of the injured and the "worried well."

Decontamination, destruction, disposal, and replacement of major portions of the refineries could cost billions of dollars. Similar costs could be expected at the port. Loss of the port will have a significant impact on U.S. trade with the Pacific Rim. An overall national economic downturn is possible in the wake of the attack due to a loss of consumer confidence.

In addition to their toxic effects, many TICs are known carcinogens. Long-term damage to internal organs and eyes is possible, depending on which TICs are present.

Mission Areas Activated:

Prevention/Deterrence/Protection – Avoiding an attack would require prevention of aircraft and weapons acquisition, IED assembly, and site reconnaissance.

Emergency Assessment/Diagnosis – The presence of multiple chemicals and exposure symptoms will greatly complicate assessment and identification efforts. Actions required include dispatch; TIC detection; and hazard assessment, prediction, monitoring, and sampling.

Emergency Management/Response – Actions required include alerts, activation and notification, traffic and access control, protection of special populations, resource support and requests for assistance, and pubic information activities.

Incident/Hazard Mitigation – Mitigation measures will be complicated by multiple TICs and secondary device concerns. Actions required include isolating and defining the hazard; establishing, planning, and operating incident command; firefighting; performing bomb disposal dispatch and IED render-safe procedures; preserving the scene; conducting mitigation efforts; decontaminating responders; and performing site remediation and monitoring.

Public Protection – Evacuation and/or sheltering of downwind populations will be required.

Victim Care – Injuries to be treated will include trauma, burns, smoke inhalation, severe respiratory distress, seizures, and/or comas. Short- and long-term treatment will be required as well as decontamination.

Investigation/Apprehension – Searching for suspects and evidence in an industrial area while wearing personal protective equipment (PPE) will be a significant challenge. Actions required include dispatch, site control, criminal investigation, pursuit and tactical deployment, and apprehension of suspects.

Recovery/Remediation – The extent of decontamination required will depend on the TIC. Regardless, monitoring and sampling a large industrial port facility and refineries will be a challenge. Site restoration will be a major challenge, particularly for the refineries. Environmental impact issues are likely to significantly delay rebuilding efforts.

Scenario 7: Chemical Attack – Nerve Agent

Executive Summary

Casualties	6,000 fatalities (95% of building occupants); 350 injuries
Infrastructure Damage	Minimal, other than contamination
Evacuations/Displaced Persons	Yes
Contamination	Extensive
Economic Impact	$300 million
Potential for Multiple Events	Extensive
Recovery Timeline	3 to 4 months

Scenario Overview:

General Description –

Sarin is a human-made chemical warfare agent classified as a nerve agent. Nerve agents are the most toxic and rapidly acting of the known chemical warfare agents. Sarin is a clear, colorless, and tasteless liquid that has no odor in its pure form. However, Sarin can evaporate into a vapor and spread into the environment. Sarin is also known as GB.

In this scenario, the Universal Adversary (UA) builds six spray dissemination devices and releases Sarin vapor into the ventilation systems of three large commercial office buildings in a metropolitan area. The agent kills 95% of the people in the buildings, and kills or sickens many of the first responders. In addition, some of the agent exits through rooftop ventilation stacks, creating a downwind hazard.

For purposes of estimating federal response requirements, each building is assumed to have an occupancy of 2,000 personnel (i.e., twenty-story buildings with 100 occupants per floor), and the outdoor/subway population density of the surrounding areas is 3,900 people per square mile (one-tenth of the total population density in the vicinity of Times Square, New York).

Timeline/Event Dynamics –

The attack will require 6 months to plan, including putting faux janitors in place, shipping the agent, and fabricating the spray devices. The actual attack will take less than 10 minutes. First responders should arrive at the facility within 10 to 15 minutes of the attack. In order for the UA to succeed in this attack, certain meteorological conditions – wind speed, temperature, humidity, and precipitation – must be met.

Secondary Hazards/Events –

Numerous injuries will occur as a result of panic on the street, including falling and crushing injuries. Further injuries are likely to occur due to motor vehicle accidents in the surrounding roadways.

Key Implications:

Assuming 2,000 occupants per building, the initial fatality count will be 5,700 (95%) and 300 injured, including the initial Emergency Medical Service (EMS) and fire personnel at each building. Patients who experience prolonged seizures may sustain permanent damage to the central nervous system – assume 350 patients in this category (300 inside plus 50 outside). Fatalities and major injuries will occur due to falling and crushing during the panic on the street, and due to vehicle accidents.

Little direct damage due to the attack, except the building interiors and contents, will be highly contaminated by agent condensing on surfaces. The three buildings and their contents will be a total loss due to decontamination measures and/or psychological impacts of future usability. However, airing and washing should decontaminate adjacent structures adequately.

Overwhelming demand will disrupt communications (landline telephone and cellular) in the local area. There will be large numbers of "worried well" swamping the medical system. Loss of three fire crews and three EMS crews will impact readiness for other events in the short term.

Decontamination, destruction, disposal, and replacement of three large commercial office buildings could cost up to $300 million. Business in the buildings may never reopen, and an overall national economic downturn is possible in the wake of the attack due to loss of consumer confidence.

Those who survive usually recover within 4 to 6 weeks, with full cholinesterase level restoration within 3 to 4 months. Patients who experience prolonged seizures may sustain permanent damage to the central nervous system.

Mission Areas Activated:

Prevention/Deterrence/Protection – The ability to prevent the attack is contingent on the prevention of CWM importation, weapons assembly, and site reconnaissance.

Emergency Assessment/Diagnosis – Rapid recognition of an attack will be key to avoiding first responder casualties. Actions required include dispatch; agent detection; and hazard assessment, prediction, monitoring, and sampling.

Emergency Management/Response – Actions required include alerts, activation and notification, traffic and access control, protection of special populations, resource support and requests for assistance, and pubic information activities.

Incident/Hazard Mitigation – Actions required include isolating and defining the hazard; establishing, planning, and operating incident command; preserving the scene; conducting mitigation efforts; decontaminating responders, and conducting site remediation and monitoring.

Public Protection – Evacuation and/or sheltering of downwind populations will be required.

Victim Care – Tens of thousands of persons will require monitoring and decontamination as they are allowed to leave their buildings. Hundreds will require hospital treatment.

Investigation/Apprehension – Tracking and apprehension of the suspects will be included. Actions required include suspect tracking and apprehension, dispatch, site control, criminal investigation, and tactical deployment.

Recovery/Remediation – Anything exposed to a high-vapor agent concentration will require decontamination, including bodies. There will be little damage to the building as a direct result of the attack. However, decontamination of some materials may be difficult or impossible. Even if structures and property could be technically decontaminated, the psychological impact on future usability would be significant.

Scenario 8: Chemical Attack – Chlorine Tank Explosion

Executive Summary

Casualties	17,500 fatalities; 10,000 severe injuries; 100,000 hospitalizations
Infrastructure Damage	In immediate explosions areas, and metal corrosion in areas of heavy exposure
Evacuations/Displaced Persons	Up to 70,000 (self evacuate)
Contamination	Primarily at explosion site, and if waterways are impacted
Economic Impact	Millions of dollars
Potential for Multiple Events	Yes
Recovery Timeline	Weeks

Scenario Overview:

General Description –

Chlorine gas is poisonous and can be pressurized and cooled to change it into a liquid form so that it can be shipped and stored. When released, it quickly turns into a gas and stays close to the ground and spreads rapidly. Chlorine gas is yellow-green in color and although not flammable alone, it can react explosively or form explosive compounds with other chemicals such as turpentine or ammonia.

In this scenario, the Universal Adversary (UA) infiltrates an industrial facility and stores a large quantity of chlorine gas (liquefied under pressure). Using a low-order explosive, UA ruptures a storage tank man-way, releasing a large quantity of chlorine gas downwind of the site. Secondary devices are set to impact first responders.

Timeline/Event Dynamics –

Total time to plan and prepare for the attack would be on the order of 2 years, including reconnaissance and weapons training, and accumulation of weapons. The actual infiltration, explosive charges setting, and ex-filtration would take less than 20 minutes. Except in very cold conditions, the release would be complete in less than an hour. The plume would travel downwind and be dispersed below the detection level in 6 hours. In order for the UA to succeed in this attack, certain meteorological conditions – wind speed, temperature, humidity, and precipitation – must be met.

Secondary Hazards/Events –
Authorities will shelter-in-place a significant area downwind of the site. Numerous injuries will result from population panic once downwind casualties begin to occur, and as many as 10% of the people will self-evacuate. Additional injuries are likely, due to motor vehicle accidents in the surrounding roadways. The rule of thumb is one fatality per 10,000 evacuated. Any local waterways or wetlands will absorb the chlorine gas, creating hydrochloric acid and lowering the acidity (potential of hydrogen, or pH) of the water.

Key Implications:

Assuming a high-density area, as many as 700,000 people may be in the actual downwind area, which could extend as far as 25 miles. Of these, 5% (35,000) will receive potentially lethal exposures, and half of these will die before or during treatment. An additional 15% will require hospitalization, and the remainder will be treated and released at the scene by Emergency Medical Service (EMS) personnel. However, approximately 450,000 "worried well" will seek treatment at local medical facilities.

The storage tank will be lost, along with some sensitive control systems damaged by the freezing liquefied gas. The secondary devices will cause damage to other plant facilities and equipment in a 20-meter radius of the blasts as well. There will be hundreds, if not thousands, of auto accidents during the evacuation. In areas of heavy chlorine exposure, there will also be heavy corrosion of metal objects.

The plant will be temporarily closed due to bomb damage. Overwhelming demand will disrupt communications (landline telephone and cellular) in the local area. Significant disruptions in health care occur due to the overwhelming demand of the injured and the "worried well."

Decontamination, destruction, disposal, and replacement of major portions of the plant could cost millions. The local economy will be impacted by a loss of jobs at the facility if it is unable to reopen. An overall national economic downturn is possible in the wake of the attack due to a loss of consumer confidence.

Most of the injured will recover in 7 to 14 days, except for those with severe lung damage. These individuals will require long-term monitoring and treatment.

Mission Areas Activated:

Prevention/Deterrence/Protection – The ability to prevent the attack is contingent on the prevention of weapons acquisition, specifically IEDS, and site reconnaissance.

Emergency Assessment/Diagnosis – The presence of secondary devices will complicate assessment and identification efforts. Actions required include dispatch; chlorine detection; and hazard assessment, prediction, monitoring, and sampling.

Emergency Management/Response – Actions required include alerts, activation and notification, traffic and access control, protection of special populations, resource support and requests for assistance, and pubic information activities.

Incident/Hazard Mitigation – Mitigation measures will be complicated by secondary device concerns (i.e., delayed detonation of IEDs). Actions required include isolating and defining the hazard; establishing, planning, and operating incident command; firefighting; conducting bomb disposal dispatch and IED render-safe procedures; preserving the scene; performing mitigation efforts; decontaminating responders; and conducting site remediation and monitoring.

Public Protection – Evacuation and/or sheltering of downwind populations will be required.

Victim Care – Injuries to be treated will include respiratory difficulty or severe distress and/or vehicular accident trauma. Short- and long-term treatment may be required.

Investigation/Apprehension – Searching for suspects and evidence in an industrial area while wearing personal protective equipment (PPE) will be a significant challenge. Actions required include dispatch, site control, criminal investigation, pursuit and tactical deployment, and apprehension of suspects.

Recovery/Remediation – Since chlorine is a gas, the extent of decontamination required will be minor and largely related to any releases generated by secondary devices. Regardless, monitoring and sampling a large industrial facility will be a challenge. There will be significant damage to the plant as a direct result of the attack. Decontamination of waterways may present a significant challenge as well. Environmental impacts, especially public safety concerns, are likely to significantly delay rebuilding efforts.

Scenario 9: Natural Disaster – Major Earthquake

Executive Summary

Casualties	1,400 fatalities; 100,000 hospitalizations
Infrastructure Damage	150,000 buildings destroyed, 1 million buildings damaged
Evacuations/Displaced Persons	300,000 households
Contamination	From hazardous materials, in some areas
Economic Impact	Hundreds of billions
Potential for Multiple Events	Yes, aftershocks
Recovery Timeline	Months to years

Scenario Overview:

General Description –

Earthquakes occur when the plates that form under the Earth's surface suddenly shift, and most earthquakes occur at the boundaries where the plates meet. A fault is a fracture in the Earth's crust along which two blocks of the crust have slipped with respect to each other. The magnitude of an earthquake, usually expressed by the Richter Scale, is a measure of the amplitude of the seismic waves. The intensity, as expressed by the Modified Mercalli Scale, is a subjective measure that describes how strong a shock was felt at a particular location.

The Richter Scale is logarithmic so that a recording of 7, for example, indicates a disturbance with ground motion ten times as large as a recording of 6. A quake of magnitude 2 is the smallest quake normally felt by people. Earthquakes with a Richter value of 6 or more are commonly considered major; great earthquakes have magnitude of 8 or more. The Modified Mercalli (MM) Scale expresses the intensity of an earthquake's effects in a given locality in values ranging from I to XII. The most commonly used adaptation covers the range of intensity from the condition of "I – Not felt except by a very few under especially favorable conditions," to "XII – Damage total. Lines of sight and level are distorted. Objects thrown upward into the air."

In this scenario, a 7.2-magnitude earthquake occurs along a fault zone in a major metropolitan area (MMA) of a city. MM Scale VIII or greater intensity ground shaking extends throughout large sections of the metropolitan area, greatly impacting a six-county region with a population of approximately 10 million people. Subsurface faulting occurs along 45 miles of the fault zone, extending along a large portion of highly populated local jurisdictions, creating a large swath of destruction. Soil liquefaction occurs in some areas, creating quicksand-like conditions.

Timeline/Event Dynamics –

While scientists have been predicting a moderate to catastrophic earthquake in the region sometime in the future, there were no specific indications that an earthquake was imminent in the days and weeks prior to this event.

Damage includes a large multi-state area of several hundred square miles. Rapid horizontal movements associated with the earthquake shift homes off their foundations and cause some tall buildings to collapse or "pancake" as floors collapse down onto one another. Shaking is exaggerated in areas where the underlying sediment is weak or saturated with water. (Note: In the central and eastern United States, earthquake waves travel more efficiently than in the western United States. An earthquake of a given size in the central and eastern United States may cause damage over a much broader area than the same size earthquake in California.)

Several hours later, an aftershock of magnitude 8.0 occurs. Based on past events, additional aftershocks are possible. Sizeable aftershocks (7.0 to 8.0 in magnitude) may occur for months after the original jolt.

Secondary Hazards/Events –

As a result of the earthquake, hazardous contamination impacts of concern include natural gas compression stations and processing plants, oil refineries and major tank farms, and natural gas/crude oil pipelines. In addition, more than 2,000 spot fires occur and widespread debris results. Flooding may occur due to levee failures and breaks in water mains and sewage systems.

Transportation lines and nodes; power generation and distribution; communications lines; fuel storage and distribution; and various structures (ranging from dams to hospitals) may be damaged and will require damage assessment in order to continue operating. Reduced availability of services will be disruptive and costly.

Ground shaking from the earthquake has generated massive amounts of debris (more than 120 million tons) from collapsed structures. In addition, fuel pumps in several gas stations have sustained damages, leaking thousands of gallons of gasoline into the streets. There are numerous reports of toxic chemical fires, plumes with noxious fumes, and spills. Several other local waste treatment facilities have reported wastewater and sewage discharges. A large refining spill has contaminated the port facility and is spilling into the harbor. Significant concern for spilled hazardous materials from storage, overturned railcars, and chemical stockpiles make progress very slow as triage is conducted.

Key Implications:

Approximately 1,400 fatalities occur as a direct result of the earthquake. More than 100,000 people are injured and continue to overwhelm area hospitals and medical facilities, most of which have sustained considerable damage. Approximately 18,000 of the injured require hospitalization. As many as 20,000 people are missing and may be trapped under collapsed buildings and underground commuter tunnels.

More than 1 million buildings were at least moderately damaged (40% of the buildings) and more than 150,000 buildings have been completely destroyed

Service disruptions are numerous to households, businesses, and military facilities. Medical services are overwhelmed and functioning hospitals are limited. Fire and Emergency Medical Services (EMS) stations and trucks were also damaged. Bridges and major highways are down or blocked and damaged runways have caused flight cancellations. There are widespread power

outages and ruptures to underground fuel, oil, and natural gas lines. Water mains are broken. Wastewater primary receptors have broken, closing down systems and leaking raw sewage into the streets. As a result, public health is threatened.

More than 300,000 households have been displaced, and many businesses have lost employees and customers. The port has been adversely affected in its capacity to provide export/import and loading/unloading capabilities, and damage to vital parts of the communications infrastructure has resulted in limited communications capabilities.

The disruption to the nation's economy could be severe because the earthquake impacts major supply and transportation centers. Reconstruction, repairs, disposal, and replacement of lost infrastructure will cost billions of dollars. Replacement of lost private property and goods could also cost billions. An overall national economic downturn is probable in the wake of this event.

Mission Areas Activated:

Prevention/Deterrence/Protection –	After the earthquake occurs, actions should be taken to protect critical facilities from terrorist attacks and to maintain civil order.
Emergency Assessment/Diagnosis –	Disaster assessments and aerial reconnaissance are necessary. Using real-time seismic data, the Federal Emergency Management Agency (FEMA) runs an earthquake model to provide a preliminary "best guess" at the level of expected damage, subject to confirmation or modification through remote sensing and field assessments. Assessment teams must be deployed and remote sensing initiated.
Emergency Management/Response –	Hazardous material spills must be managed. Emergency medical treatment, shelters, and food must be provided. A Joint Information Center (JIC) is established, and search and rescue teams must be place don alert, some of which should be activated and deployed. Public utilities and other basic-needs services must be repaired as quickly as possible, and damage assessments should be conducted.
Incident/Hazard Mitigation –	Federal support will be required to coordinate the development of plans to execute mitigation efforts to lessen the effects of future disasters. Mitigation to minimize or avoid future impacts would largely be an issue for recovery and restoration.
Public Protection –	Structural engineers are inspecting critical building, bridge, freeway, waste facilities, etc., and inspection teams are deployed to inspect hundreds of homes for safe habitability.
Victim Care –	The massive number of injured and displaced persons requires a warning order for the activation of Task Forces for the delivery of mass care and health and medical services. Temporary housing strategies must be considered.
Investigation/Apprehension –	Not applicable (natural disaster).
Recovery/Remediation –	Hazardous materials will contaminate many areas, and decontamination and site restoration will be a major challenge.

Scenario 10: Natural Disaster – Major Hurricane

Executive Summary

Casualties	1,000 fatalities, 5,000 hospitalizations
Infrastructure Damage	Buildings destroyed, large debris
Evacuations/Displaced Persons	1 million evacuated; 100,000 homes seriously damaged
Contamination	From hazardous materials, in some areas
Economic Impact	Millions of dollars
Potential for Multiple Events	Yes, seasonal
Recovery Timeline	Months

Scenario Overview:

General Description –

Hurricanes are intense tropical weather systems consisting of dangerous winds and torrential rains. Hurricanes often spawn tornadoes and can produce a storm surge of ocean water that can be up to 24 feet at its peak and 50 to 100 miles wide. The most destructive companion of hurricanes is the storm surge.

A typical hurricane is 400 miles in diameter and has an average forward speed of 15 miles per hour (mph) in a range of 0 to 60 mph. The average life span of a hurricane is 9 days in a range of less than 1 day to more than 12 days. Hurricanes' highest wind speeds are 20 to 30 miles from the center. Hurricane force winds cover almost 100 miles, and gale-force winds of 40 mph or more may cover 400 miles in diameter. A fully developed hurricane may tower 10 miles into the atmosphere.

A hurricane is categorized by its sustained wind intensity on a Saffir-Simpson Hurricane Scale that is used to estimate the potential for property damage and flooding. "Major" hurricanes are placed in Categories 3, 4, or 5 with sustained wind intensities between 111 mph to greater than 155 mph. The most dangerous potential storm would be a slow-moving Category 5 hurricane, making landfall in a highly populated area.

In this scenario, a Category 5 hurricane hits a Major Metropolitan Area (MMA). Sustained winds are at 160 mph with a storm surge greater than 20 feet above normal. As the storm moves closer to land, massive evacuations are required. Certain low-lying escape routes are inundated by water anywhere from 5 hours before the eye of the hurricane reaches land.

Timelines/Event Dynamics –

A tropical storm develops in the Atlantic and is upgraded to a hurricane after 5 days in the open waters. After 4 days, the hurricane has steadied at dangerous Category 4 level on the Safir-Simson Hurricane Scale and models indicate a track that includes a possible landfall along the coast adjacent to the MMA within 2 more days. The hurricane reaches its peak as predicted and makes landfall with a direct hit on the MMA and coastal resort towns. The next day the hurricane

moves out. The rain associated with the storm has caused rivers to overflow their banks, and several rivers systems are experiencing record flood levels.

Secondary Hazards/ Events –

In addition to the massive destruction caused by the hurricane itself, there are also areas within the MMA and scattered inland areas that have sustained severe damage from tornadoes that were generated by the storm. Storm surges and heavy rains cause catastrophic flooding to low lying areas. Rainfall from the hurricane, in combination with earlier storms, causes significant flooding in multiple states along the coast.

Flooded and damaged petrochemical facilities, chemical plants, sewage treatment plants, and other facilities threaten the health of citizens, create a hazardous operating environment, and require cleanup and remediation. An oil tanker is blown off course during the storm and sustains serious damage and leaks oil into the waters adjacent to the MMA.

Key Implications:

The hurricane results in more than 1,000 fatalities, and 5,000 thousand people have sustained injuries requiring professional treatment. Tourists and residents in low-lying areas were ordered to evacuate 48 hours prior to projected landfall. Twenty-four hours prior to predicted landfall massive evacuations were ordered, and evacuation routes have been overwhelmed.

Major portions of the MMA become flooded. Structures in the low-lying areas are inundated when storm surges reach their peak. Many older facilities suffer structural collapse due to the swift influx of water and degradation of the supporting structural base. Newer facilities and structures survive the influx of water, but sustain heavy damage to contents on the lower levels.

Most all shrubbery and trees within the storm's path are damaged or destroyed, generating massive amounts of debris. Debris is also generated from structures destroyed from tornadoes and structures that have been destroyed or damaged by the hurricane. Many structures will need to be demolished.

Service disruptions are numerous. Shelters throughout the region are also filled to capacity. Hundreds of people are trapped and require search and rescue. Until debris is cleared, rescue operations are difficult because much of the area is reachable only by helicopters and boats. Wind and downed trees have damaged nearly all of the electric transmission lines within the MMA. Most communications systems within the impacted area are not functioning due to damage and lack of power.

Thousands are homeless, and all areas are in serious need of drinking water, and food is in short supply and spoiling due to lack of refrigeration. Sewage treatment plants in the region have been flooded and sustained damaged from the storm. Factories, chemical plants, sewage treatment plants and other facilities in the MMA have suffered severe damage. Hundreds of thousands of gallons of extremely hazardous substances have spilled into the floodwaters. There is also gasoline, diesel fuel, and oil leaking from underground storage tanks. A 95,000-ton tanker struck a bridge, breaching the hull of the vessel, which then began to leak oil into waters adjacent to the MMA. All of these issues threaten public health.

Many businesses have experienced damage to buildings and infrastructure as well as lost employees and customers. Military facilities are damaged, and assistance is needed to provide for the military community and to reconstitute the facilities. The 20-foot storm surge has breached and overtopped flood control and hurricane protection works. All transportation routes are damaged to some degree, and the port facility has also been adversely affected. Many hospitals have sustained severe damage and those that are open are overwhelmed. Schools that are not severely damaged are being used as shelters for the disaster victims. Thousands of pets, domesticated animals, and wild animals have been killed or injured, and officials have been overwhelmed with requests for assistance in finding lost pets.

There are severe economic repercussions for the whole state and region. The impact of closing the port ripples through the country. The loss of the petro-chemical supplies could raise prices and increase demand on foreign sources.

Mission Areas Activated:

Prevention/Deterrence/Protection –	As the storm approaches, state and local governments are given increasingly accurate forecasts and assessments of possible impacts. Forecasters have difficulty predicting the intensity of the storm prior to landfall, but urge officials to prepare for the worst. State and locals have time to execute evacuation plans.
Emergency Assessment/Diagnosis –	Assessment is required for infrastructure, rapid needs, search and rescue, health and medical, and navigation. Remote sensing and modeling help determine the extent of the damages.
Emergency Management/Response –	Some of the response actions require include search and rescue operations, mortuary services and victim identification, medical system support, debris clearance and management, temporary emergency power, transportation infrastructure support, infrastructure restoration, and temporary roofing.
Incident/Hazard Mitigation –	Support is required to coordinate the development of plans to execute mitigation efforts that lessen the effects of future disasters. This includes studies to assess flood and coastal erosion and intergovernmental plans to mitigate future damages.
Public Protection –	Measures need to be taken to control vectors that may thrive in the areas after a catastrophic hurricane. Support will be required to maintain law and order and to protect private property. Support will be required to test and analyze health and safety hazards and implement measures to protect the public.
Victim Care –	Care must include medical assistance; shelter and temporary housing assistance; emergency food, water, and ice provision; and sanitary facility provision.
Investigation/Apprehension –	Not applicable (natural disaster).
Recovery/Remediation –	Hazardous materials will contaminate many areas, and decontamination and site restoration will be a major challenge.

Scenario 11:
Radiological Attack – Radiological Dispersal Devices

Executive Summary

Casualties	180 fatalities; 270 injuries; 20,000 detectible contaminations (at each site)
Infrastructure Damage	Near the explosion
Evacuations/Displaced Persons	Yes
Contamination	36 city blocks (at each site)
Economic Impact	Up to billions of dollars
Potential for Multiple Events	Yes
Recovery Timeline	Months to years

Scenario Overview:

General Description –

Cesium-137 (^{137}Cs) has a half-life of 33 years. It decays by both beta and gamma radiation. It is one of several known radioactive isotopes that stand out as being highly suitable for radiological terror. This isotope causes skin damage similar to burns, but the injury may be as deep within the body as on the skin. Cesium would be particularly dangerous if accidentally ingested or inhaled, even in small quantities. Cesium mimics potassium in the body. It binds to concrete and other masonry, making decontamination of such buildings extremely difficult and possibly economically infeasible. Use of ^{137}Cs in an urban setting would seriously raise the cost of cleanup.

^{137}Cs is mostly used in the form of cesium chloride (CsCl), because it is easy to precipitate. CsCl is a fairly fine, light powder with typical particle size median at about 300 microns. Fractions below 10 microns are typically less than 1%. In a Radiological Dispersal Device (RDD), most will fall out within approximately 1 to 2,000 feet (although many variables exist), but a small amount may be carried great distances, even hundreds of miles.

In this scenario, the Universal Adversary (UA) purchases stolen CsCl to make an RDD or "dirty bomb." The explosive and the shielded ^{137}Cs sources are smuggled into the country. Detonator cord is stolen from a mining operation, and all other materials are obtained legally in the United States. Devices are detonated in three separate, but regionally close, moderate-to-large cities. The cities are physically similar with geographic topography that is flat. The results in each city are essentially the same. The contaminated region covers approximately thirty-six blocks in each city and includes the business district (high-rise street canyons), residential row houses, crowded shopping areas, and a high school. Buildings in the affected areas are principally made of concrete and brick; some are stone faced.

The entire scene is contaminated with ^{137}Cs, though not at levels causing immediate concern to first responders. Due to the size of the explosion, the radioactive contamination is blown widely

such that the ground zero area is not as radioactive as might have been expected. The detonation aerosol contains 90% of the original ^{137}Cs source with radioactive particles whose sizes range from 1 micron (or micro-meter, μm) to 150 microns – the size of most of the particles is approximately 100 microns. Larger particles either penetrate building materials in the blast zone, or drop quickly to the ground as fall-out within about 500 feet.

Variable winds of 3 to 8 miles per hour carry the radioactively contaminated aerosol throughout an area of approximately thirty-six blocks (the primary deposition zone). Complex urban wind patterns carry the contamination in unpredictable directions, leaving highly variable contamination deposition with numerous hot spots created by wind eddies and vortices. Radioactivity concentrations in this zone are on the order of 5-50 microμi/m^2, with hot spots measuring 100-500 microμi/m^2; however, traces of the ^{137}Cs plume carry more than 3.5 kilometers (~ 2.2 miles) on prevailing winds. Air intakes contaminate interiors of larger buildings, and negative indoor building pressure draws contaminated aerosol into buildings via cracks around windows and doors. In city one, the subway air intakes contaminate the subway system.

Timeline/Event Dynamics –

The attacks have no advance notice or intelligence that indicates their possibility. The explosions are instantaneous, but plume dispersion continues for 20 minutes while breezes navigate the complex environments before particles have fully settled. First responders do not recognize radioactive contamination for 15 minutes in city one. The explosions in cities two and three are promptly identified as "dirty bombs" – this provides some advantage to first responders and government officials in managing contamination on-scene, and in communicating with the public concerning topical contamination and spread of contamination.

Secondary Hazards/Events –

Small fires from ruptured gas lines occur in the vicinity of the blasts. Unstable building facades, rubble, and broken glass create physical hazards for rescue workers. Small amounts of lead, asbestos, and Polychlorinated Biphenyls (PCBs) are present in the air and on surfaces. Human remains present a biohazard, and some of these are very radioactive.

Key Implications:

At each site, the blast results in 180 fatalities and about 270 injured requiring medical care. In addition, up to 20,000 individuals in each primary deposition zone potentially have detectable superficial radioactive contamination.

In each blast, one building and twenty vehicles are destroyed, and eight other buildings suffer varying degrees of damage, such as minor structural damage and broken windows. Radioactive contamination is found inside and outside of buildings over an area of approximately thirty-six blocks in each city. Minor contamination may be an issue further downwind as investigators perform more thorough surveys. Most of the subway system in city one is contaminated.

Over the long term, decontamination efforts are expected to be effective, but some property owners choose demolition and rebuilding. Many square blocks will be unavailable to businesses and residents for several years until remediation is completed.

Transportation is severely hampered in each city. Bus, rail, and air transport routes are altered, and officials build highway checkpoints to monitor incoming traffic for contamination. The subway system in city one is completely closed for an extended period. Hospitals in each region, already at maximum capacity with injuries from the blasts, are inundated with up 50,000 "worried well."

The sewage treatment plant is quickly contaminated. Seventy-five businesses are closed for an extended duration while radioactive contamination is remediated. Local tax revenues plummet, and people discover that insurance claims are rejected. The schools in the contamination zones are closed and students meet in alternate locations. Nearby towns and cities close their doors to residents of the impacted cities for fear of contamination spread.

Decontamination, destruction, disposal, and replacement of lost infrastructure will be costly (i.e., hundreds of millions of dollars per site). The entire contaminated area may be economically depressed for years. An overall national economic downturn may occur in the wake of the attack due to a loss of consumer confidence.

In the long term, no one will suffer acute radiation syndrome, but approximately 20,000 individuals are likely to become externally contaminated at each site. Low-level contamination may enter food and water supplies. The sum of the cumulative exposures results in an increased lifetime cancer risk proportionate to the dose. Mental health services will be required.

Mission Areas Activated:

Prevention/Deterrence/Protection – Efforts should include prevention of trafficking and importation of CsCl and weapon components, detection of the plot, reconnaissance of the site, protection, and deterrence measures.

Emergency Assessment/Diagnosis – First responders are likely to be contaminated. The downwind aerosol dispersion will be a significant component of the hazard. Assessment and coordination efforts required are numerous.

Emergency Management/Response – Actions required include mobilizing and operating incident command; overseeing victim triage; stabilizing the site; cordoning the site and managing and controlling the perimeter; providing notification and activation of special teams; providing traffic and access control; providing protection of at-risk and special populations; providing resource support and requests for assistance; providing public works coordination; providing direction and control of critical infrastructure mitigation; and providing pubic information, outreach, and communication activities.

Incident/Hazard Mitigation – Actions required include isolating the incident scene and defining the hazard areas, building stabilization, providing fire suppression, conducting debris management and radioactive and hazardous contamination mitigation, decontaminating responders and equipment as well as local citizens, and conducting local site contamination control.

Public Protection – Sheltering and/or evacuation of downwind populations will be required and must occur quickly. Protection actions required range from developing protective action recommendations and communicating them to the public to making radio-protective pharmaceutical decisions and efficiently distributing drugs.

Victim Care – Injured people will require some decontamination in the course of medical treatment and, if possible, prior to hospital admission. Thousands more will likely need superficial decontamination, and both short-term and long-term medical follow-ups.

Investigation/Apprehension – Actions required include dispatching personnel, conducting site cordoning and control, collecting field data and witness interviews, and performing tactical deployment and apprehension of suspects. Reconstruction of the attack should occur.

Recovery/Remediation – The extent of contamination will be a major challenge because ^{137}Cs is highly water-soluble and is chemically reactive with a wide variety of materials, including common building materials such as concrete and stone. Several buildings (those most damaged) will be torn down and eventually rebuilt. Decontamination activities are undertaken for building exteriors and interiors, streets, sidewalks, and other areas.

Scenario 12: Explosives Attack – Bombing Using Improvised Explosive Device

Executive Summary

Casualties	100 fatalities; 450 hospitalizations
Infrastructure Damage	Structures affected by blast and fire
Evacuations/Displaced Persons	Minimal
Contamination	None
Economic Impact	Local
Potential for Multiple Events	Yes
Recovery Timeline	Weeks to months

Scenario Overview:

General Description –

In this scenario, agents of the Universal Adversary (UA) use improvised explosive devices (IEDs) to detonate bombs inside a sports arena and create a large vehicle bomb (LVB). They also use suicide bombers in an underground public transportation concourse and detonate another bomb in a parking facility near the entertainment complex. An additional series of devices is detonated in the lobby of the nearest hospital emergency room (ER).

The event is primarily designed for an urban environment, but could be adapted for more rural area events such as county fairs and other large gatherings. Casualty estimates would be reduced as a function of a reduced target population and less population density at target points.

Timeline/Event Dynamics–

The fire is ignited approximately 1 hour after the start of the entertainment event. The detonation of explosives is delayed approximately 10 to 15 minutes after the ignition of the fire in order to allow for detection, evacuation, and response of emergency services providers. The detonation of explosives at the hospital site will be the hardest to time for maximum effect and may need to be coordinated by some communication among cell members. In any case, the hospital device should be detonated before the arrival of casualties from the entertainment venue.

The timing of some of these events, with the exception of the evacuation stimulus, is not critical. The more people who evacuate the venue, the more potential explosives-related casualties are produced. If evacuation of the venue is delayed, the fire and detonation of the LVB near the venue can be expected to produce increased casualties inside the structure due to collapse, secondary and tertiary blast effects, increased exposure to products of combustion, thermal effects, and crowd surge.

Secondary Hazards/Events –

Secondary hazards include the disruption of electric power, natural gas lines, and water mains – the disruption will cause undermining of streets and flooding of underground transit ways. There

may be toxic smoke resulting from fires and explosions. There will be loss of traffic controls in the area, and fleeing citizens would likely cause traffic accidents. Media response to the area may affect responders. Since one of the bombs was disguised as an emergency response vehicle, other "legitimate" vehicles may be impeded in their response to the scene and hospitals.

Key Implications:

Casualties will result at all five incident sites and will include civilians, emergency personnel, and the suicide bombers. The LVB detonation outside the venue can be expected to result in the largest number of fatalities and injuries due to the "population density" expected. Fatalities and injuries are summarized in Table 12-1.

Incident or Location	Fatalities	Serious Injuries
Fire	8	150
Large Vehicle Bomb	35	200
Car bomb	7	40
Transportation center (subway)	8	50
Hospital	8	40

Table 12-1. *Summary of fatalities and serious injuries as a result of the bombings*

Property damage would include severe fire and blast damage to the entertainment venue, blast damage to buildings across from the entertainment venue, moderate damage to the transportation center, severe damage to vehicles and nearby buildings at the parking facility, and severe damage to the hospital ER.

Service disruption would be severe in the impacted city and would include traffic (especially the subway), public transportation, emergency services, and hospitals. The local economic impact includes loss of use of the entertainment venue for a period of 1 year during the repair of fire and blast damage.

Major health issues include severe burn treatment and therapy for the victims; permanent hearing loss; long-term tinnitus; vertigo for some exposed to the blast; and post-traumatic stress for victims, first responders, and nearby residents.

Mission Areas Activated:

Prevention/Deterrence/Protection – The planning and execution of this event would require a significant level of relatively unsophisticated coordination. As such, the potential for detection in the pre-event planning stages exists.

Emergency Assessment/Diagnosis – The fire would be the first recognizable indication that the attack was under way. Actions required include dispatch; agent detection; and hazard assessment, prediction, monitoring, and sampling.

Emergency Management/Response – Actions required include search and rescue, alerts, activation and notification, traffic and access control, protection of special populations, resource support, requests for assistance, and public information. Establishment of a Joint Operations Center (JOC) is required.

Incident/Hazard Mitigation – Primary hazards include fire; toxic atmosphere/smoke; un-detonated explosives; unstable structures; electrical hazards; and low visibility. Hospital personnel must ensure that arriving vehicles are not delivery systems for additional weapons.

Public Protection – Evacuation is required as well as additional threat assessment. The area must be cordoned.

Victim Care – Injuries range from "walking wounded" to multiple systems trauma, burns, and obvious fatalities. Elimination of the ER facility at the target hospital will force other facilities to receive all patients from the entertainment venue blasts.

Investigation/Apprehension – Investigation can begin during the rescue phase with photo documentation of the immediate scene, victim locations, and injury patterns. Coordination of federal, state, and local investigative resources will begin early in the incident management.

Recovery/Remediation – Decontamination is necessary for blood-borne pathogens at all sites. Debris removal must occur after evidence search and recovery. Restoration of the main venue could take more than 1 year (depending on the extent of the fire damage). Repair and restoration of the transportation center can be estimated at 4 months.

Note: The full-text version of this document contains overpressure templates and calculations, as well as tables outlining human injury and property damage criteria for various levels of blast overpressure.

Scenario 13: Biological Attack – Food Contamination

Executive Summary

Casualties	300 fatalities; 400 hospitalizations
Infrastructure Damage	None
Evacuations/Displaced Persons	None
Contamination	Sites where contamination was dispersed
Economic Impact	Millions of dollars
Potential for Multiple Events	Yes
Recovery Timeline	Weeks

Scenario Overview:

General Description –

The U.S. food industry has significantly increased its physical and personnel security since 2001. A successful attack could only occur following the illegal acquisition of sensitive information revealing detailed vulnerabilities of a specific production site. However, in this scenario the Universal Adversary (UA) is able to acquire these restricted documents due to a security lapse. The UA uses these sensitive documents and a high degree of careful planning to avoid apprehension and conduct a serious attack.

The UA delivers liquid anthrax bacteria to pre-selected plant workers. At a beef plant in a west coast state, two batches of ground beef are contaminated with anthrax, with distribution to a city on the west coast, a southwest state, and a state in the northwest. At an orange juice plant in a southwestern state, three batches of orange juice are contaminated with anthrax, with distribution to a west coast city, a southwest city, and a northwest city.

Timeline/Event Dynamics –

- November: The biological agent is delivered to terrorists (plant workers).
- December 3: The biological agent is inserted into ground beef and orange juice at production facilities, and the packages are shipped to affected cities.
- December 5: The first signs of patients with unknown illness appear.
- December 5-15: There is a significant influx of affected individuals into hospitals with 1,200 sick, 300 dead, and 400 hospitalized in ICU.
- December 8: Health departments, the CDC, the FDA, and the USDA begin pursuing epidemiological investigations.
- December 30: A contaminated product trace is made to ground beef and orange juice production plants. Decontamination of plants commences.
- January 5: No new cases of illness are reported.

Secondary Hazards/Events –

As a result of news of the contaminated food products, there is general public concern regarding food safety, and the "worried well" are taxing medical and laboratory facilities. The public floods into medical facilities seeking prescription drugs to prevent or recover from sickness. In addition, ground beef and orange juice sales plummet, and unemployment in these two industries rises dramatically.

Key Implications:

The attack results in 300 fatalities, 400 hospitalizations, and 1,200 illnesses. Overall property damage is moderate, and due only to decontamination of affected facilities. However, property and facility disruption (downtime) are significant due to decontamination of affected facilities.

Service disruption is significant in ground beef and orange juice industries, and some moderate disruption occurs in other food industries due to the public's concern about food safety in general.

Although direct financial impact is significant, initial economic impact on the general economy is relatively low. However, the long-term financial impact on the beef and orange juice marketplace and associated businesses could be significant, and other food industries' income is likely to be negatively affected by the public's overall perception of unsafe food. The societal impact of attacks on the food supply generates demands for increased, costly, federally directed food security programs and other measures to reduce the possibility of future attacks.

Anthrax may result in fatality and serious long-term illness.

Mission Areas Activated:

Prevention/Deterrence/Protection – Avoiding the attack is contingent on the prevention of infiltration of two different food production systems. Deterrence and protection require rapid disease diagnosis, and protective measures to assure food safety.

Emergency Assessment/Diagnosis – Determining cause of illness and tracking the contaminated source is critical.

Emergency Management/Response – Disease outbreaks in three cities spread throughout the country, which tests coordination of resources.

Incident/Hazard Mitigation – Once disease outbreak occurs, decisions must be made regarding meat and juice supplies and production.

Public Protection – Public protection will require testing alert and warning mechanisms, providing public information and education, and coordinating human and veterinary services.

Victim Care – Victim care will require diagnosis and treatment of affected population and distribution of prophylaxis for potentially exposed populations.

Investigation/Apprehension – Epidemiology will be critical to trace the source of contamination. Investigation of crime and apprehension of suspects will be needed.

Recovery/Remediation – Contaminated foodstuffs require disposal. Plants and sites where anthrax was dispersed may need to be decontaminated.

Scenario 14: Biological Attack – Foreign Animal Disease (Foot & Mouth Disease)

Executive Summary

Casualties	None
Infrastructure Damage	Huge loss of livestock
Evacuations/Displaced Persons	None
Contamination	None
Economic Impact	Hundreds of millions of dollars
Potential for Multiple Events	Yes
Recovery Timeline	Months

Although this scenario depicts an intentional attack on the U.S. livestock industry, the accidental importation of certain diseases is also a hazard.

Scenario Overview:

General Description –

Foot and mouth disease is an acute infectious viral disease that causes blisters, fever, and lameness in cloven-hoofed animals such as cattle and swine. Pregnant animals often abort and dairy cattle may dry up. It spreads rapidly among such animals and can be fatal in young animals. The disease is not considered a human threat.

In this scenario, members of the Universal Adversary (UA) enter the United States to survey large operations in the livestock industries. The UA targets several locations for a coordinated bioterrorism attack on the agricultural industry. Approximately two months later, UA teams enter the United States and infect farm animals at specific locations.

The U.S. livestock transportation system is highly efficient and movements are rapid and frequent. Although the initial event will be localized at transportation facilities in several states, as the biological agent matures and the livestock are transported, the geographical area will widen to include surrounding states where the livestock are delivered.

Timelines/Event Dynamics –

The foreign animal disease (FAD) is initially detected using clinical signs and veterinary medical detection and identification. Over a period of approximately 2 weeks, federal, state, and local animal health professionals put in place surveillance, detection, containment, remediation, and disposal protocols. This is followed by surveillance, detection, containment, remediation, and disposal protocols continue until testing confirms the FAD is eradicated.

Secondary Hazards/Events –

Environmental issues regarding contaminated land and equipment must be seriously considered and addressed. Disposal of carcasses of culled animals must be done in an environmentally conscious and expeditious manner.

Key Implications:

There are no human fatalities or injuries. However, massive numbers of affected livestock are disposed of because the United States has a national policy not to vaccinate. Property damage will be limited to land mass required for disposal of euthanized livestock (burial).

All transportation into and out of the affected areas will be severely limited to prevent further dispersion of the FAD to unaffected areas. Both commercial and private/personal travel will be limited.

The extent of economic impact will depend on the ability to limit the geographical spread of the outbreak. A great economic impact will be realized in many sectors of the economy, including but not limited to agriculture. Long-term issues will be centered mostly on foreign trade.

Economic factors will include the value of the affected livestock that must be disposed of; the cost of federal, state, and local governments to identify, contain, and eradicate the FAD; the cost of disposal and remediation; the loss of revenue suffered by the commercial transportation industry; the loss of revenue suffered by the retail industry due to public perception that the FAD poses a disease risk; the loss of export markets immediately upon confirmation that the FAD exists; and the cost to renew the livestock lost to euthanasia.

The inevitable development and utilization of new technologies to include rapid detection, improved traditional vaccines/advanced molecular vaccines, and new therapeutics (including antiviral agents and other novel biomedical approaches) will lead to a physiological “hardening” of the U.S. farm animal population against FADs, thereby making them unattractive targets of bioterrorism. Although psychological impacts will be realized, human health issues will not be a consideration if a farm animal disease-causing agent is used.

Mission Areas Activated:

Prevention/Deterrence/Protection – The full force of the agricultural disease protection system will be challenged in order to prevent or detect further attacks.

Emergency Assessment/Diagnosis – Investigations using epidemiological trace-back, microbial forensics, and other approaches will be utilized to determine the source of the agent and identity of the perpetrators.

Emergency Management/Response – If the scope of the outbreak grows, the ability to effectively conduct intrastate and interstate command and control activities, as well as the ability to successfully allocate resources, will be a challenge. States would have a need for containment, federal funding and personnel, and the use and availability of the National Guard. Federal mobilization based on the National Response Plan. Evoking the Stafford Act would be considered.

Incident/Hazard Mitigation – The halt of national movement of susceptible animals may be necessary. Equitable indemnification and when to begin reconstitution of the herds leading to economic recovery will be a major consideration.

Public Protection – Information must be provided in order to combat the public's fear and the spread of misinformation about the disease.

Victim Care – It will be necessary to euthanize and dispose of infected and exposed animals.

Investigation/Apprehension – Investigation and apprehension will entail a criminal investigation, involving law enforcement and agricultural experts.

Recovery/Remediation – Ranches, feedlots, transportation modes, and other locations will require decontamination and cleanup. Cleaning and disinfecting are tools used to impede the spread of pathogenic microorganisms. All premises should be cleaned and disinfected under supervision of a regulatory animal health employee.

Scenario 15: Cyber Attack

Executive Summary

Casualties	None directly
Infrastructure Damage	Cyber
Evacuations/Displaced Persons	None
Contamination	None
Economic Impact	Millions of dollars
Potential for Multiple Events	Yes
Recovery Timeline	Weeks

Scenario Overview:

General Description –

In this scenario, the Universal Adversary conducts cyber attacks that affect several parts of the nation's financial infrastructure over the course of several weeks. Specifically, credit-card processing facilities are hacked and numbers are released to the Internet, causing 20 million cards to be cancelled; automated teller machines (ATMs) fail nearly simultaneously across the nation; major companies report payroll checks are not being received by workers; and several large pension and mutual fund companies have computer malfunctions so severe that they are unable to operate for more than a week. Individually, these attacks are not dangerous – but combined, they shatter faith in the stability of the system. Citizens no longer trust any part of the U.S. financial system and foreign speculators make a run on the dollar.

Timelines/Event Dynamics –

Several years are needed for preparation. The attack is executed over a few weeks to ensure extended press coverage and undermine confidence in the financial system. However, there are no secondary hazards/events.

Key Implications:

No fatalities, significant injuries, or property damage are expected. However, significant disruptions across many or most sectors of the financial industry do occur. The greatest impact of this event will be on the economy.

Mission Areas Activated:

Prevention/Deterrence/Protection – The strength of private sector finance companies will be tested in regard to prevention, deterrence, and protection.

Emergency Assessment/Diagnosis – The attack will be difficult to recognize. Initially, failures may be mistaken for normal malfunctions, and analysis will have to be performed to link failures across many parts of the financial sector.

Emergency Management/Response – Emergency response will be split between (1) technically bringing systems back online and instituting business continuity process, and (2) controlling the public perception of the situation to restore confidence and prevent panic.

Incident/Hazard Mitigation – None.

Public Protection – None.

Victim Care – Citizens and investors will look for government assurances that their losses will be made whole.

Investigation/Apprehension – Using intelligence and law enforcement sources and methods, the investigators will need to determine the likely technical source and the identity of the perpetrators.

APPENDIX: Scenario Working Group Members

The Homeland Security Council receives interagency guidance via a number of Policy Coordinating Committees (PCCs). One of them is the Domestic Threat, Response, and Incident Management (DTRIM) PCC; the Scenarios Working Group (SWG) supports the DTRIM. The members of the SWG are as follows:

CHAIR: Janet K. Benini, Director of Response and Planning, White House Homeland Security Council

Arkin, Richard	Department of Energy
Avato, Steven	Department of Justice, ATF
Bar-shalom, Tali	White House Office of Science and Technology Policy
Biersack, Walter	Department of Energy
Broun, Laurence	Department of the Interior
Companion, Tod	National Aeronautics and Space Administration
Conklin, Craig	Department of Homeland Security, FEMA
Daly, Kevin	Department of Justice, FBI
Dickson, Howard	Department of Homeland Security
Dolce, Robert	Department of State
Edelman, Phil	Department of Health & Human Services
Fancher, Raymond	Department of Justice, FBI
Finan, William	Environmental Protection Agency
Fuller, Gordon	Department of Justice, FBI
Gillin, MAJ Jeff	Department of Defense
Gosnell, William	Department of Defense, USACE
Gruber, Corey	Department of Homeland Security, Integration Staff
Guffanti, Marianne	Department of the Interior, USGS
Hastings, Thomas	Department of State
Hatchett, Richard	Department of Health & Human Services
Havens, Kathryn	National Aeronautics & Space Administration
Ippoliito, David	Department of Labor, OSHA
Irwin, William	Department of Defense, USACE
Jones, Gregg	Department of Defense
Jorgensen, Andy	Department of Defense
Kadlec, Robert	White House Homeland Security Council
Kerr, Larry	White House Office of Science and Technology Policy
Kevern, Thomas	Nuclear Regulatory Commission
Krueger, Steve	Department of Justice, FBI
Landry, Steve	Department of Homeland Security, ODP
Lim, Kent	Department of Commerce
Lowe, Tom	Department of State
Lustig, Teresa	Department of Homeland Security
Lystra, Clark	Department of Defense
MacKinney, John	Environmental Protection Agency
Maddox, Justin	Department of Energy
Malak, Patricia	Department of Homeland Security, ODP

Martin, Mark	Department of Justice, ATF
McClenney, Lucretia	Department of Veterans Administration
McCreight, Robert	Department of State
McGarry, Sherri	Department of Health & Human Services, FDA
Metzler, John	Department of Energy
Michling, Suzanne	Department of Defense
Mjoness, Mark	Environmental Protection Agency
Mize, W. Keith	Department of Energy
Morzinski, Gregory	Department of Defense
Mullin, Jonathan	National Aeronautic and Space Administration
Newton, Robert	Terrorist Threat Analysis Center
Nicholas, Paul	White House Homeland Security Council
Noji, Eric	Department of Health & Human Services, CDC
Park, Tom	Department of Homeland Security, FEMA
Pavetto, Carl	Environmental Protection Agency
Peluso, Francis	Department of Transportation, FAA
Pond, Robert	Department of Homeland Security, USCG
Pratt, Britt	Department of Agriculture
Siebert, Mark	Department of Justice, ATF
Sizemore, R. Tom	Department of Veterans Administration
Smith, Alan	Department of Agriculture, APHIS
Steele, Scott	Department of Justice, FBI
Stephens, David	White House National Security Council
Taborn, Michael	Department of Transportation, FTA
Thomas, Lori	Department of Agriculture
Tupin, Edward	Environmental Protection Agency
Venkayya, Rajeev	White House Homeland Security Council
Webster, James	Department of State
Weidner, John	Department of Homeland Security
Williams, John	Department of Agriculture
Williamson, Suzanne	Department of Justice, FBI
Winters, Stephen	Department of Defense
Young, Bruce	Department of Veterans Administration