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# Principal Threats Facing Communities And Local Emergency Management Coordinators



**Federal Emergency Management Agency  
Office of Emergency Management**

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**PRINCIPAL THREATS FACING COMMUNITIES AND  
LOCAL EMERGENCY MANAGEMENT  
COORDINATORS**

**A Report to the United States Senate  
Committee on Appropriations**

**April 1992**



**Federal Emergency Management Agency  
Office of Emergency Management**

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## SUMMARY

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**U**nder the language of Senate Report 101-128, Department of Veterans Affairs and Housing and Urban Development and Independent Agencies Appropriation Bill, 1990, which accompanied the 1990 Federal Emergency Management Agency (FEMA) appropriations bill, FEMA was directed to:

*...prepare a study on the principal threats facing communities and local emergency management coordinators. ...The study should rank the principal threats to the population according to region and any other factors deemed appropriate.*

The Senate Report 101-900 on the FY 1991 appropriations includes directions for FEMA "to update the report annually." This revised version of the April 5, 1990, report to the United States Senate Committee on Appropriations is submitted in compliance with that mandate.

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### The Threats

The United States is vulnerable to a wide range of threats. Periodic and at times little publicized disasters resulting from floods, tornadoes, landslides and fires take scores of lives and cause hundreds of millions of dollars in property damage annually. The magnitude of major disasters such as Hurricane Hugo and the Loma Prieta earthquake in California serve to heighten the realization of the United States' vulnerability to such events when viewed in relationship to the loss of life, severity of property damage, disruption of services and long-term impact on the affected population.

These facts are further complicated by advancements in technology and the increased development and use over the past few decades of chemicals which have led to the rise of a new and wide range of technological threats virtually unknown 20 or 30 years ago.

Yet major disasters such as Hugo and Loma Prieta pale beside the damage that could be inflicted by a calculated, purposeful attack on the United States. While the most important threat to the United States-the Soviet Union-has now weakened and fallen apart, there are other aspects of the international scene that pose continuing threats

to the security of the United States. The republics of the Commonwealth of Independent States which succeeded the Soviet Union still retain strategic nuclear arsenals capable of widespread devastation if directed towards this country. The advancing technical prowess of Third World countries to develop ballistic missiles and chemical, biological and nuclear attack capabilities poses additional dangers to the United States.

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## Types Of Threats

The United States is faced with three primary types of threats: natural, technological and *national security*. Disasters caused by natural forces comprise the largest single category of repetitive threats to communities and emergency management coordinators. These *natural threats*, which pose problems in all areas of the country, can be localized or widespread, predictable or unpredictable. The damage resulting from natural disasters can range from minimal to major (depending on whether they strike major or minor population centers). The impact of extremely severe natural disasters can have a long-term effect on the infrastructure of any given location. Threats in this category include avalanche, dam failure, drought, earthquake, flood, hurricane/tropical storm, landslide, subsidence, tornado, tsunami, volcano, wildfire and winter storm.

Possessing much the same unpredictability as natural threats, *technological threats* represent a category of events that has expanded dramatically throughout this century with the advancement of modern technology. Technological threats include hazardous materials or radiological incidents that occur at fixed facilities or as the result of transportation accidents, power failure, structural fires, telecommunications failures and transportation accidents of all types.

The potential for damage from realized *national security threats* ranges from the relatively localized damage that could be expected to result from a terrorist incident to the catastrophic devastation that could be expected from a chemical, biological or nuclear attack on the United States. Like the other categories of threats, national security threats can be either predictable or unpredictable (e.g., an unexpected surprise attack *versus* an attack following a buildup of tensions). National security threats include ballistic missile attack, chemical and biological attack, civil disorder, and nuclear attack along with terrorism. (While terrorism is not a form of attack like the other national security threats,

it does represent an important national security threat that encompasses a number of different attack threats.)

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## Changing National Security Threat

Perhaps the greatest changes in hazards to the nation occurred in the area of national security. Recognizing this the Congress directed that:

*FEMA's next report assessing threats facing local communities (page 125, Senate Report 102-107) shall include an evaluation of the implications that the major political reformations taking place in the USSR and Eastern Europe have for FEMA's program emphases.*

A formal estimate of the security threat to the nation is the responsibility of intelligence agencies using classified sources of information. Statements in this report should not be construed as such an estimate. FEMA has used information in open, unclassified sources to outline how changes in the world situation could affect State and local emergency management. A review of potential national security threats from unclassified sources shows that, while there have been some favorable trends in the world, the Federal, State and local governments still need to build and maintain capabilities to respond to consequences of an attack, perhaps more limited in scope but potentially catastrophic nonetheless. This conclusion is based on the following factors:

- A traditional assumption guiding CD attack preparedness planning has been the threat of a massive, coordinated strategic nuclear attack by the Soviet Union following the start of a conventional conflict between NATO and the Warsaw Pact. The Warsaw Pact and Soviet Union have dissolved, and their total threat is no longer credible. However, devastating strategic capabilities will remain in the former Soviet Union for many years to come; control of those capabilities, and the possible intent to use them, will remain uncertain for the foreseeable future.
- While the nuclear capable republics of the Commonwealth of Independent States (CIS), which succeeded the Soviet Union, have expressed an interest in nuclear disarmament, it will take years to physically dismantle weapons. In the meantime, a radical change in political stability within the CIS could dramatically change the potential national security threat for the

U.S. As CIA Director Gates noted in his recent testimony before the House Foreign Affairs Committee, *“even a diminishing [CIS] strategic arsenal will still be capable of devastating the United States and other countries. Therefore, as long as there is any possibility that turmoil in the regime could stimulate the emergence of a new hostile regime, the remaining strategic weapons will constitute a danger to us.”*

- The international community is starting to recognize the importance of limiting the spread of high-level military technology, especially for ballistic missiles and weapons of mass destruction. The case of the Iraqi and North Korean nuclear programs shows that some nations will not forego developing highly lethal weapons if they believe that such weapons enhance their foreign policy options.
- Although the most devastating form of attack-massive, strategic nuclear attack-has dropped to lower probability, concern over other national security threats in more limited forms has not disappeared and, given the threat of weapons proliferation, may actually increase in the future. Therefore, the people and property of the U.S. remain subject to possible attack in various other forms from hostile nations or terrorists.

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## Losses Caused By Disasters

The magnitude of the losses caused by natural and technological disasters in the United States is staggering.

In the five-year period from 1983 to 1988, an average of 2,300,000 fires per year were reported in the United States. Average annual losses for the years of 1983-1988 included *5,900 civilian fire deaths, 29,000 civilian injuries and \$7.8 billion in property damage.*

During the period 1900-1989, more than 13,000 people lost their lives in hurricanes from Texas to the northeast; property losses from hurricanes during the same period exceeded *\$43 billion.*

From 1959 to 1988, 23,488 tornadoes struck the United States. In the southern States alone, from North Carolina due west to Texas, 11,343 tornadoes hit while 9,234 tornadoes struck the midwestern region (North Dakota, South Dakota, Nebraska, Iowa, Missouri, Kansas, Illinois, Indiana, Wisconsin, Minnesota, Michigan, Ohio and Kentucky). The Upper Northwestern States, including Alaska, Washington,



Oregon, Idaho, Montana and Wyoming-an area generally not associated with tornado activity-were struck by 583 tornadoes during the same period.

Average annual losses from landslides total \$1-2 billion; flood losses reach an estimated \$2.2 billion. Tornadoes result in average annual losses of \$590 million. Highway hazardous materials incidents have average annual losses of \$29 million.

In addition to the average annual fire deaths of 5,900 persons, the United States can expect the following average death rates from various threats: 146 from floods, 93 from winter storms, 83 from tornadoes, and 25-50 from landslides.

A number of specific disasters have caused extraordinary death rates. A hurricane in Galveston, Texas, in 1900 caused 6,000 deaths. Over 2,200 people died from a dam break and the resultant flooding in Johnstown, Pennsylvania, in 1889. A severe wildfire in Wisconsin in 1871 was responsible for the loss of 2,182 lives. Over 700 people died in the 1906 San Francisco earthquake.

These examples of life and property losses, whether taken in historical perspective or viewed in terms of annual or average annual losses, are indicative of not only the wide range of threats to the population but also the severity and magnitude of the impact such disasters can inflict on the population.

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## Rankings

An effort has been made to be responsive to the Committee's direction to "...rank the principal threats to the population according to region and any other factors deemed appropriate." However, it is important to note that any ranking of the threats to communities and emergency management coordinators is potentially misleading because of: (1) the wide variations that can occur with the application of different criteria to the same threat, (2) the significant differences the impact of a particular disaster may have on a region and the individual States within that region, (3) the fact that threats in one region are not necessarily applicable to another region, (4) variances in the types of data collected on each threat, and (5) the lack of available data in some cases with which to develop a reasoned ranking. The variances in or lack of available data were critical factors which hampered attempts to make viable rankings of threats by region.

Relative rankings of threats by regions were also difficult because of widely varied factors such as the frequency of disaster occurrence; the level of community preparedness in areas vulnerable to various threats; the degree to which disasters strike urban or largely rural, sparsely populated areas; the way local emergency managers perceive and rank the potential severity or magnitude of particular threats in their reports to FEMA; the impact “worst case” disasters have on considerations for ranking them as significant threats and the potential critical danger of a particular threat which, in fact, may occur only infrequently.

Floods, hurricanes, tornadoes, winter storms, earthquakes, landslides, fires and hazardous material incidents represent the primary threats facing communities and emergency management coordinators. This by no means diminishes the magnitude of the many other threats discussed in this report. The national security threat, for one, is recognized as a key responsibility of the nation’s emergency managers. All hazards must be addressed in the effort to adequately protect the nation’s people and property from the threats they face.

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## **FEMA’s Mission — Preparedness, Mitigation, Response & Recovery**

The Federal Emergency Management Agency is responsible for ensuring the establishment and development of policies and programs for emergency management at the Federal, State and local levels. This responsibility includes the development of a national capability to mitigate against, prepare for, respond to and recover from the full range of emergencies, i.e., natural and technological disasters and national security emergencies.

In view of the broad range of threats to the population and industry of the United States, the Federal Emergency Management Agency is also responsible for ensuring that plans are in place as part of an integrated, all-hazard emergency management program. While the nature of some emergencies (e.g., earthquakes, hurricanes, tornadoes, radiological emergencies, etc.) does require certain hazard-specific procedures and activities, the goal of the Agency is to ensure that an integrated, all-hazards emergency management capability is established at all levels of government.

The Agency has a wide range of programs that provide financial and technical assistance to State and local governments. It has also established new procedures, in the form of the Federal Response Plan, that will improve the provision of Federal resource assistance to States in the critical period during *or immediately after* a catastrophic event. The benefits from these programs help State and local emergency managers meet their responsibilities for coordinating the government activities that their communities need to cope with the numerous disasters that threaten them.

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## INTRODUCTION

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**A**s part of the review process for the Fiscal Year (FY) 1991 budget of the Federal Emergency Management Agency (FEMA), the Senate Appropriations Committee (hereinafter referred to as the "Committee") has directed FEMA to update annually the study on the principal threats facing communities and local emergency management coordinators. The specific task (originally assigned in FY 1990) was as follows:

*The Committee directs FEMA to prepare a study on the principal threats facing communities and local emergency management coordinators. The Committee understands that certain natural and man-made disasters threaten communities with a varying degree of severity and frequency. The study should rank the principal threats to the population according to region and any other factors deemed appropriate.*

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### Background

Every day, the population of the United States is at risk from a broad spectrum of threats. The scope of these threats ranges from the impact of a house fire in an individual home to a hazardous materials incident, perhaps on an Interstate highway, to the devastating effect a catastrophic natural disaster such as a major earthquake would have on many thousands of square miles. It also includes the single potentially most threatening event of all-nuclear attack.

What is the potential impact of these disasters on the population and the government of this country? The rapid technological growth in the United States during this century has resulted in an infrastructure, tightly interconnected by vast systems of sophisticated communications and transportation, integrating industry, government and even other nations. This infrastructure is continually exposed to disruption or destruction in a catastrophic event by the full range of disasters that threaten this country. The concurrent urbanization of the United States, particularly since World War II, has substantially increased the numbers of people exposed to a particular threat in a given area.

These points were brought home vividly in the Fall of 1989 with the impact of Hurricane Hugo on the Virgin Islands, Puerto Rico, and North and South Carolina and the Loma Prieta earthquake in the San

Francisco Bay area. Television brought the scenes of devastation into the homes of millions of people. In Hurricane Hugo, people were able to watch the landfall of Hugo and witness the tremendous winds and destruction as they occurred. In succeeding days, they saw the scope of the damage inflicted by the hurricane, including the disruption of governmental services, communications, transportation and industry. Minutes after the Loma Prieta earthquake rocked the San Francisco Bay area, millions of viewers were able to see the destruction on bridges, the major fire in the City of San Francisco and the rescue efforts on a major road system that had collapsed. The magnitude of the destruction in these incidents provided significant evidence of the continuing dangers posed by the variety of threats to this Nation.

In 1991, there were a number of examples of the need to prepare for all potential hazards, some identified, some newly recognized.

- In January 1991, after the beginning of the Desert Storm conflict, the nation's emergency managers went on alert to guard against the possibility of terrorist attacks. Using the procedures outlined in the *Federal Response Plan*, there was constant contact between the Federal, State and local levels of government in order to quickly react to any war-related incident that could occur within the US.
- On April 9, there was a power failure on the entire island of Oahu in Hawaii. While the most critical activities could rely on the backup generators for electricity, the 12 hour failure still resulted in costs of from 20 to 100 million dollars in damages from closed businesses and increases in traffic accidents.
- On July 14, a freight train derailed in California, dumping 13,000 gallons of metam sodium liquid, a weed killer, into the Sacramento River. The chemical dump caused a 11-mile spill that killed all aquatic life downriver. Contact with water also produced a toxic gas that affected residents in the area. Cleanup of the spill continued for months.
- Telephone service in the New York area failed for several hours after a switching station's emergency generator malfunctioned on September 17. Besides hindering commerce in a business region heavily dependent on telecommunications, the failure also affected the operation of three major area airports. There were cancellations of 458 flights along with other delays that affected an estimated 31,000 airline passengers.

- In October 1991, wildfire swept through an area of over 1,800 acres in the hills of Oakland and Berkeley, California. Because this once forested area now had a number of housing developments, fires killed 24 people and left 5,000 homeless. Financial losses are expected to reach between 1.5 and 2 billion dollars.

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## The Threats

For the purposes of this report, three major categories of threats will be discussed: natural, technological and national security.

**Natural threats**, the largest single category of repetitive threats to communities and emergency management coordinators, come from weather-, geological-, seismic- or oceanic-related events. They affect any area of the country. Their impact can be localized or widespread, predictable or unpredictable. The damage can range from minimal to major (depending on whether the disasters strike rural or urban population centers). If the damage from a disaster incident is severe enough, it can have long-term impact on the infrastructure of any given location. Natural threats include avalanche, dam failure, drought, earthquake, flood, hurricane/tropical storm, landslide, subsidence, tornado, tsunami, volcano, wildfire and winter storm.

**Technological/man-made threats** represent a category of events that has expanded dramatically throughout this century with the advancements in modern technology. Like natural threats, they can affect localized or widespread areas, are frequently unpredictable, can cause substantial loss of life (besides the potential for damage to property), and can pose a significant threat to the infrastructure of a given area. Technological/man-made threats include hazardous materials incidents at fixed facilities or in-transit accidents, power failures, radiological incidents at fixed facilities or in-transit accidents, structural fires, telecommunications failures and other types of transportation accidents.

**National security threats** are those threats that primarily come from actions by external, hostile forces against the land, population or infrastructure of the United States. The potential for damage from national security emergencies ranges from the relatively localized damage that could be expected to result from a terrorist incident to the catastrophic devastation that could be expected from a chemical, biological or nuclear attack on the United States. Like the other categories of threats, national security threats can be either predictable or unpredictable (e.g., an unexpected surprise attack *versus* an attack following a buildup of tensions). National security threats include ballistic missile

attack, chemical and biological attack, civil disorder, and nuclear attack along with terrorism. (While terrorism is not a form of attack like the other national security threats, it does represent an important national security threat that encompasses a number of different attack threats.)

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## The Nature of Threats

A single threat cannot be viewed as a constant, either in terms of the potential for damage to property, loss of lives or the preparedness measures that must be undertaken to protect the population and infrastructure. For example, the State of Texas experienced 4,110 tornadoes during the period from 1959 to 1989, a significantly higher number than registered for any other State. However, these tornadoes often touched down in rural or sparsely populated areas, causing very limited amounts of damage. Conversely, a single tornado or outbreak of tornadoes in a more urbanized area can cause tremendous losses of life and property, as shown in the following example.

Ohio sustained a significantly lower number of tornadoes than Texas during the same years of 1959 to 1989—a total of 467. Yet, in April 1974 during an unusually severe outbreak of 144 tornadoes in a two day period, the city of Xenia, Ohio, suffered 33 deaths, had 1,200 structures demolished, 1,500 structures damaged and total damage reaching an estimated \$70 to \$90 million (according to American Insurance Association estimates). If the same outbreak of tornadoes had occurred in an isolated area, the losses would probably have been negligible.

A disaster also cannot be viewed as an isolated event with a predictable kind of damage, i.e., each can trigger a series of other related incidents that can substantially increase the impact of the original disaster event. Such secondary events could, in fact, result in significantly higher death rates or increased damage. The following are some classic examples of the “secondary effects” of a variety of disasters:

- . In 1964, the Prince William Sound earthquake in Alaska generated a marine landslide that undermined the Valdez Delta. A total of 122 persons in Alaska, Washington, Oregon, California and Hawaii drowned in the tsunami resulting from the marine landslide.
- The Mount St. Helens eruption in 1980 generated the largest landslide in recorded history—2.8 million cubic feet of rock. This event has created three “natural” dams that, in the opinion of the US. Geological Survey, are extremely unstable,

presenting the possibility of a collapse and release of millions of gallons of water from the lakes that have formed behind the dams.

- The extensive and widespread blow-down of timber by the impact of Hurricane Hugo in 1989 created a potentially critical fire hazard in South Carolina.
- The Loma Prieta earthquake in 1989 caused or reactivated large-scale landslides, including the collapse of a sea cliff where one death was recorded. The U.S. Geological Survey has estimated that literally thousands of possible landslides have been formed to the south. The potential hazard of these landslides could be revealed if a severe coastal storm should occur.

Thus, communities and emergency management coordinators are faced with not only the threats themselves, but also with a wide variety of other factors that make the process of mitigating against, preparing for and responding to them far more complex.

The predictability of a hazardous event or the magnitude of its impact depends on the nature of the particular hazard itself. There is a seasonal association for certain types of natural threats such as tornadoes and hurricanes. Other threats such as earthquakes have no seasonal relationship and predictability is nearly impossible. Technology has simply not progressed to the point where the timing of an earthquake can be predicted with any degree of reliability.

There is also a significant variance in the potential impact of a disaster on a "prepared" jurisdiction *versus* an "unprepared" jurisdiction. For example, the earthquake preparedness and mitigation measures taken in San Francisco and Los Angeles have proven to be significantly effective in reducing the magnitude of losses from large earthquakes—high-rise structures in San Francisco built according to stringent earthquake building codes showed little to no damage during the Loma Prieta earthquake. Although the seismic risk in Charleston, South Carolina, and the New Madrid Seismic Zone (including Missouri, Arkansas, Tennessee, Kentucky and Illinois) is great, the lack of major seismic activity in these areas during this century has lessened the fear of the threat. Consequently, many of the jurisdictions in these areas have not implemented strong earthquake building codes like those in San Francisco and Los Angeles. Thus, the impact of a major earthquake in the New Madrid Seismic Zone or around Charleston, South Carolina, could result in tremendous losses of life and property that could possibly be avoided with more stringent measures for preparedness and mitigation.



The same is also true for other types of threats. The infrequent occurrence of severe storms or the erratic paths they sometimes take over areas not normally prepared to cope with such storms can result in reduced warning times and preparedness measures. For example, inland cities such as Charlotte, North Carolina, do not normally expect to sustain major hurricane damage. Based on the original path of Hurricane Hugo, it was predicted to pass far to the east of the city, primarily along coastal areas. Hugo, however, followed an extremely erratic course and shifted, causing significant damage in Charlotte. In another example, a major winter storm in the midwestern States could be disruptive but may not cause major damage since residents and communities in these areas are better prepared for such a storm. Conversely, a similar storm in the Deep South could result in higher death rates and major damage to roads, communications, transportation and utilities because of fewer preparedness measures taken due to the infrequency of major winter storms in that area.

There is also no unanimity among experts about how potential atmospheric and other environmental changes caused by the long-term effects of phenomena such as acid *ruin* and the *greenhouse* effect may impact upon the United States. There is, however, a growing consensus that weather trends on the African Continent, where most hurricanes that affect the continental United States form, could result in an increase in the frequency and severity of hurricanes hitting the United States mainland during the next decade.

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**The Changing  
National Security  
Threat**

Perhaps the greatest changes in hazards to the nation occurred in the area of national security. Recognizing this the Congress directed that:

*FEMA's next report assessing threats facing local communities (page 125, Senate Report 102-107) shall include an evaluation of the implications that the major political reformations taking place in the USSR and Eastern Europe have for FEMA's program emphases.*

A formal estimate of the security threat to the nation is the responsibility of intelligence agencies using classified sources of information. Statements in this report should not be construed as such an estimate. FEMA has used information in open, unclassified sources to outline how changes in the world situation could affect State and local emergency management. A review of potential national security threats

from unclassified sources shows that, while there have been some favorable trends in the world, the Federal, State and local governments still need to build and maintain capabilities to respond to consequences of an attack, perhaps more limited in scope but potentially catastrophic nonetheless.

On the positive side, the year 1991 saw favorable changes not only in Eastern Europe, but all over the world, in terms of the nature of the national security threat to the United States.

## **Conventional Forces**

Traditionally, defense planners envisioned that a nuclear attack against the United States would come as the result of a conventional conflict fought between NATO and the Warsaw Pact in Europe. Since the signing of the Conventional Forces in Europe (CFE) and German unification agreements last year, the probability of full-scale conventional conflict in Europe has diminished considerably.

- On April 1, 1991, the Warsaw Pact was formally abolished as a military alliance. July 1 marked its last meeting as a political organization.
- Soviet forces were entirely withdrawn from Czechoslovakia and Hungary by June 1991, with announced plans for a total withdrawal from Eastern European countries by 1994.
- Disagreements on aspects of the signed CFE Treaty that arose this year were resolved and the US Senate ratified the treaty in November.

## **Strategic Forces**

These favorable trends in the reduction of the possibility of a full-scale conventional war between the US and USSR were overshadowed, however by even more dramatic moves to reduce the risk of nuclear war.

- The last of the American and Soviet intermediate range nuclear missiles in Europe were destroyed by May under the provisions of the 1988 Intermediate Nuclear Force Treaty.
- The US and USSR successfully completed a Strategic Arms Reduction Treaty (START) in July 1991, which will eventually reduce strategic warhead inventories on both sides by a third from current levels.
- At the end of September, President Bush announced a unilateral move to withdraw and destroy all land-based tactical nuclear weapons in the US inventory, withdraw sea-based tactical weapons, and reduce the in alert levels for part of the US strategic nuclear force. Eight days later, USSR President Gorbachev

announced similar reductions in Soviet tactical weapon inventories, along with a unilateral 1,000-warhead cut in strategic weapons and a suspension of nuclear testing.

## **Nuclear Proliferation**

Other nations around the world have also started to make moves to limit the development and spread of nuclear weapons.

- In November 1990, the presidents of Argentina and Brazil signed a pact banning the production and testing of nuclear weapons in their countries. Both countries had previously been considered dedicated to developing a nuclear capability.
- India and Pakistan, two potential nuclear adversaries in Asia, have signed treaties that promise to prevent them from attacking each other's nuclear facilities and establishing a series of confidence building measures to reduce the risk of conflict on the sub-continent.
- In December, South Korea announced that it was free of nuclear weapons. Soon thereafter, North and South Korea started to work on negotiations to establish the Korean peninsula as a nuclear-free zone.
- Finally, China and South Africa, two long time holdouts to international controls of nuclear weapons, have pledged to accede to the provisions of the Nuclear Nonproliferation Treaty.

## **Security Problems**

All these signs of a reduction in the military threat to the nation's security, however, were tempered by one event: the dissolution of the Soviet Union. The breakup of one of the world's two military superpowers has complicated matters considerably. The uncertain control over the military hardware left after the demise of the Soviet Union presents a major problem. The end of the USSR also presents the possibility that other nations hostile to the United States could purchase advanced weapons expertise from former Soviet technicians.

The first big issue is the control of the strategic nuclear arsenal of the former Soviet Union. In forming the Commonwealth of Independent States (CIS) to replace the Soviet Union, the signatories agreed to adhere to treaties signed by the former USSR and establish a centralized command over the Soviet nuclear weapons inventory. Still, the varying statements by some CIS republic presidents regarding the decommissioning of weapons on their territories, continuing arguments over the control of conventional forces, and the failure to establish a workable system for the centralized control of CIS nuclear weapons causes

## Military Capabilities of CIS Republics

	Strategic Missiles	Missile Production	Aircraft Production	Uranium Production	Nuclear Reactors
Russia	●	●	✈ M	☒ M	●
Ukraine	●	● M	●		●
<b>Belarus</b>	●				
<b>Kazakhstan</b>	●			●	●
Tajikiin				a	
Kirghizia				●	
Uzbekistan			●	●	
Georgia			●		
Armenia					●

Source: Nuclear Weapons Databook: Vol IV, Soviet Nuclear Weapons, 1989

*Figure 1*

concern. *Figure 1* shows that a number of the republics of the former Soviet Union have a considerable ability to develop and use nuclear weapons.

The economic weakness of the CIS republics adds an additional complication. The effort for the republics to decommission the nuclear warheads in their possession will take a considerable amount of time and (now extremely scarce) money. One expert estimated that it would take ten years and \$2 billion just to destroy all the tactical nuclear weapons in the former Soviet inventory. In an even worse case, despite the desire expressed by the Soviet Union in its last months to destroy its inventory of chemical weapons, DOD reported that there was not "a facility capable of destroying their declared chemical agent stockpile of 40,000 tons."

Uncertainty about the military control and management of the large stockpile of high-tech military weapons left by the breakup of the Soviet Union brings up another critical issue. The potential for a breakdown in central control of the region's armaments could increase the possibility of high-tech weapons being stolen. While there are security measures that make it unlikely that stolen nuclear weapons could be easily used, they still could be profitably exploited for their enriched nuclear material. The end of 1991 saw a number of rumors of CIS-based smuggling rings offering enriched uranium for sale.

The most plausible concern, though, is that the technical expertise of ex-Soviet military scientists could be up for sale. In the last year of the Soviet Union, a chronic economic crisis led to some academies going

without funding for months. One former Soviet scientist described the situation as one where “everybody now worries about the same thing-surviving-and in which a skilled scientist may earn one-fourth to one-half the salary of a bus driver...” With the dim prospects for CIS military production, scientists may be willing to either emigrate or serve as “consultants” to the military establishments of less technically advanced countries. Vyacheslav Roszanov of the Kurchatov Institute of Atomic Energy has already reported that Libya has attempted to attract several Soviet nuclear specialists.

The former Soviet Union is not the only potential source of weapons technology for hire. CIA Director Robert M. Gates, in his February 25, 1992 testimony before the House Foreign Affairs Committee, noted that China, while paying lip service to international efforts to limit weapons proliferation, still was willing to sell nuclear reactors and ballistic missiles to less technically developed nations. Director Gates also pointed out that North Korea, despite its professed interest in arms control “constitutes one of the world’s largest proliferation threats.” Unwilling to admit the fact of its current effort to develop a nuclear weapons capability, North Korea could move from its current trade in ballistic missiles to the delivery of “nuclear materials on the world market for hard currency.”

One only has to refer to the 1991 Gulf War for an illustration of the danger that the United States still faces. Despite the breakdown of its communication infrastructure, Iraq was still able to use ballistic missiles to inflict casualties on American servicemen. Discoveries after the war, however, brought even more concerns. On its seventh post-war inspection trip, a UN inspection team discovered evidence of an extensive Iraqi nuclear weapons program. The discovery pointed out that almost any determined country could start the drive towards a nuclear capability without being detected.

## **Conclusion**

A review of potential national security threats from unclassified sources shows that, while there have been some favorable trends in the world, the Federal, State and local governments still need to build and maintain capabilities to respond to consequences of an attack, perhaps more limited in scope but potentially catastrophic nonetheless. This conclusion is based on the following factors:

- A traditional assumption guiding CD attack preparedness planning has been the threat of a massive, coordinated strategic nuclear attack by the Soviet Union following the start of a conventional conflict between NATO and the Warsaw Pact. The Warsaw Pact and Soviet Union have dissolved, and their total threat is no longer credible. However, devastating strategic

capabilities will remain in the former Soviet Union for many years to come; control of those capabilities, and the possible intent to use them, will remain uncertain for the foreseeable future.

- While the nuclear capable republics of the CIS, which succeeded the Soviet Union, have expressed an interest in nuclear disarmament, it will take years to physically dismantle weapons. In the meantime, a radical change in political stability within the CIS could dramatically change the potential national security threat for the US. As CIA Director Gates noted in his recent testimony before the House Foreign Affairs Committee, *“even a diminishing [CIS] strategic arsenal will still be capable of devastating the United States and other countries. Therefore, as long as there is any possibility that turmoil in the regime could stimulate the emergence of a new hostile regime, the remaining strategic weapons will constitute a danger to us.”*
- The international community is starting to recognize the importance of limiting the spread of high-level military technology, especially for ballistic missiles and weapons of mass destruction. The case of the Iraqi and North Korean nuclear programs shows that some nations will not forego developing highly lethal weapons if they believe that such weapons enhance their foreign policy options.
- Although the most devastating form of attack-massive, strategic nuclear attack-has dropped to lower probability, concern over other national security threats in more limited forms have not disappeared and, given the threat of weapons proliferation, may actually increase in the future. Therefore, the people and property of the U.S. remain subject to possible attack in various other forms from hostile nations or terrorists.

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**Preparedness  
Measures/  
Hazard Mitigation  
Activities**

Federal, State and local emergency managers must prepare their communities against the wide range of threats that they face daily, in spite of the many variables involved. Regardless of whether the emergency manager is preparing for the threat of a severe storm, a tornado, or the threat of conventional or nuclear attack there is one common denominator: *emergency management is like insurance-it may never have to be used, but if it is not available when needed the losses can be staggering.*

The civil defense program provides the primary means by which State and local governments can develop the infrastructure of emergency management personnel, facilities, communications, hardware and

systems to prepare for and respond to the full range of disasters that may threaten the population of the United States. State and local emergency management personnel, who are funded by the civil defense program, develop Emergency Operations Plans and procedures to prepare for, respond to and recover from natural and technological/man-made disasters and all forms of attack. The implementation in 1988 of a survivable crisis management effort by FEMA's civil defense program has initiated the means by which each State and local jurisdiction will have the ability to direct, control, manage and coordinate emergency operations, both within the jurisdictions and in cooperation with other State and local governments and the Federal government.

Modern technology has significantly enhanced our ability not only to forecast the impact of some disasters, regardless of whether they result from natural, technological/man-made or national security threats, but also to take measures to reduce the potential loss of life and damage to the infrastructure. Our predictive ability to forecast severe storm conditions or the possibility of tornadoes has enhanced the preventive and safety measures that can be taken by the population. The ability to project the path of hurricanes usually allows adequate time to undertake protective measures on structures and evacuations, thereby reducing the loss of life. Spring flooding can frequently be predicted based on the snowfall levels at higher elevations and forecast temperature levels.

However, the degree to which forecasting can contribute to predicting disasters varies. The flash flood in Shadyside, Ohio, that swept 26 people to their deaths on June 14, 1990, came without warning. Technology has not progressed to the point where the timing or severity of an earthquake can be predicted with any degree of reliability. In spite of the mitigation measures that can be taken, such as applying strict standards in the construction of buildings, highways and other structures, millions of residents in earthquake-prone areas throughout the country are still vulnerable to a sudden, unexpected occurrence.

Mitigation programs undertaken in response to a wide range of threats do, however, result in measurable numbers of lives saved and property protected, regardless of whether the event can be predicted. Mitigation efforts such as earthquake resistant engineering were critical in reducing the loss of life in the Loma Prieta earthquake. Bridges, roads and buildings that were built according to stringent earthquake standards stood up well during the earthquake. Other structures that had not been built according to strict standards did not fare so well, as was evident from the destruction of the Oakland freeway. Hurricane preparedness activities, including media announcements, the dissemination of printed information for residents in threatened areas prior to

impact and floodplain management initiatives have gone far in reducing the impact of water/wind-related disasters in coastal and inland areas.

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**Threats  
Affecting the  
United States**

The following sections describe the primary threats that the United States faces and provides general information concerning the dangers posed by them.

There are many threats facing the nation's population and infrastructure. Threats can be widespread or localized, affecting one or more States. Periodic and at times little publicized disasters resulting from floods, tornadoes, landslides and fires take scores of lives and cause hundreds of millions of dollars in property damage annually. The magnitude of the losses of major disasters, such as Hurricane Hugo and the Loma Prieta earthquake in California, when viewed in relationship to the loss of life, property damage, disruption of services and long-term impact on the affected population, serves to heighten the realization of the vulnerability of the United States to such events.

The vulnerability to threats is further magnified by the fact that analyses of future trends in disaster prevention and preparedness are complicated by the identification of newer threats, some of which were virtually unknown 20 or 30 years ago. Advancements in technology and the increased development and use of chemicals over the past decades have resulted in the rise of a new and wide range of threats. Estimates of the impact of some of these threats are often difficult because of a lack of experience with them or a thorough knowledge of the full range of their impact. However, the extent of their effects has been demonstrated in recent years by the tragedies of Bhopal and Chernobyl.

For the purposes of this study, three major categories of threats will be discussed: natural, technological and national security. Each class of threats is broken down further into specific incident types. For each type of incident, information is provided to define the hazard, its national frequency, regions at risk, season(s) in which it may occur, its effects, the worst recorded event and relevant statistical information and discussion.