

St. Louis Regional Disaster Preparedness September 11, 2007

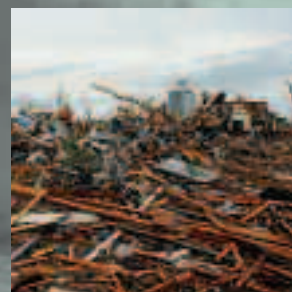


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Summary

It happens when we least expect it and often occurs with little or no warning. A natural or man-made disaster has the potential to strike the bi-state region at any time. From a deadly tornado to a large-scale earthquake to a chemical spill, there are a variety of incidents that pose severe threats to our area.

Bi-state residents have seen other regions cope with major disruptions—at times with success and at other times with disastrous results. The consequences of an inability to cope are potentially immense. But are we ready for a “mega-disaster”? Are we prepared to handle a broad-based disaster that will cause immense widespread economic loss and loss of life? Our preparation for and ability to respond effectively may not eliminate the devastation but could significantly reduce the loss of life and suffering.

Mega-disasters have a widespread effect on a region and significant adverse impacts on economic activity, property, and/or human life. A major earthquake, a severe tornado, a chemical spill (intentional or accidental), or a deadly virus infecting the metropolitan area can cause extensive damage. Experts estimate that in any given year a mega-disaster in the bi-state region could surpass \$1.7 billion in economic loss and cause more than 1,700 deaths. These are only predictions—the reality could actually be far worse.

The severity of casualties and economic losses will depend on the bi-state region’s level of preparation and the related financial investment. The cost of preparedness is not cheap. While initial federal funding after 9/11 provided opportunities for communities and organizations to be better prepared, cutbacks and reallocation of funding have placed organizations and communities at risk. The bi-state region must continue to fund preparedness effectively and efficiently. Difficult choices are necessary about how to

allocate and sustain funds. Funding for preparation serves as an insurance policy, one that we cannot let expire. The potential loss of life and economic impact is too great not to financially invest in disaster preparedness.

Fortunately, St. Louis has made some progress in recent years with regard to disaster preparation. More than \$30 million in federal dollars has been received, initiatives are underway, and an organization, the St. Louis Area Regional Response System (STARRS), was created in 2003 to guide the region’s efforts. STARRS has made great strides in organizing disaster preparedness efforts.

Unfortunately, the process of assessing the bi-state region’s preparedness is a difficult task. Analyzing levels of preparedness against basic readiness checklists cannot easily be accomplished. The region’s disjointed government structure creates many questions about whether or not a single entity will emerge as “in charge” and be able to effectively direct resources to those most in need. Health institutions have some plans in place, but staffing levels and overall coordination between institutions still needs further clarification. Local business disaster plans are not easily tracked nor is the level of education that companies have provided to their employees regarding disaster response.

Ultimately, though, in the event of a disaster regardless of its size, it will be up to the individual to be trained and prepared. The general public needs to understand its own critical role in the face of a disaster. In a widespread disaster, there will be an immediate shortage of emergency responders. The public’s expectation of emergency responder support is beyond the capabilities of the present system. Emergency responders simply cannot be in all places at once and individuals cannot depend on assistance from responders as soon as the disaster unfolds. **The public mindset of “waiting for help” must be replaced with an ability to self-sustain for a minimum of three days.**

Also of grave concern are populations within the bi-state area that cannot adequately prepare for a disaster due to health or economic reasons. This is not an excuse but a reality. Communities in economically challenged areas will depend on assistance from community organizations and the government to sustain them during a mega-disaster. The ability of social and community organizations to sustain these communities will be crucial in minimizing the impact. If they cannot effectively respond to those in need, the impact of the mega-disaster will be exacerbated, creating another internal crisis in the midst of the mega-disaster. Coordination to maximize efforts between community organizations and government officials will be necessary to help those individuals who simply will not be prepared because of poverty, a disability, mental illness, or old age.

There are three main elements that must be addressed to ensure that the bi-state region, as a whole, can be better prepared for a disaster—communication, advance organizational preparation, and individual preparedness.

When a mega-disaster strikes, **communication** will be critical to response efforts. While municipalities and other local governing structures may have disaster preparedness plans and procedures in place, an overall official governing entity is necessary to manage the disaster response and aid. This entity must be established prior to a disaster. Emergency responders and hospital personnel along with community organizations will need to communicate with each other about the situation, needs assessment, and immediate assistance required. Although costly, a standardized communication system must be established that enables all necessary entities to communicate with each other even if telephone services and electrical grids have been compromised. Accurate communication to the public is also a necessary component of disaster management. Before a disaster strikes, a structured public information plan must be in place at every level of government to reduce the risk of confusion, rumor mills, and misinformation.

Advance **organizational preparation** can significantly reduce the impact and likelihood of a mega-disaster. Effective communication channels and collaboration efforts can be maximized through drills and exercises with all emergency responding entities including community and social service organizations. Working together to anticipate possible threats and conducting drills to test emergency preparedness plans will enable the bi-state region to assess the extent of capabilities, identify gaps, and work to fill those gaps.

There are three main elements that will ensure that the bi-state region, as a whole, can be better prepared for a disaster—communication, advance organizational preparation, and individual preparedness.

Everyone including government officials, community organizations, businesses, and neighborhood groups have a vital role to play in disasters. The better these roles are understood, coordinated, and practiced, the better the potential outcome. Training is necessary to prepare all groups for disasters. There are several training programs available to ensure that our government and community leaders know how to judiciously handle a disaster and are as prepared as possible. We must require that all key stakeholders are receiving the necessary training enabling them to make the right decisions during a crisis situation.

Individual preparedness will be critical in the initial aftermath of a mega-disaster. Unfortunately, when FOCUS conducted several polls to test individual preparedness, the results were worrisome. When the *St. Louis Business Journal* polled its readers, only 50 percent indicated that they have adequate supplies of food, water, and medications for a minimum of three days. When FOCUS polled its own membership, 71 percent of the respondents admitted that

they had not developed a family emergency plan and only 21 percent of FOCUS membership could correctly identify the local emergency broadcasting radio station. When FOCUS surveyed those in the poorest communities in our area, only 23 percent had developed a family emergency plan and only half of the respondents had a three-day supply of food on hand.

A public education campaign is necessary to educate individuals to prepare their family for a disaster and to recognize those around them in need. There are a variety of avenues that can be utilized to coordinate these efforts including a “Disaster Awareness Day”; public service announcements; and educational materials distributed through schools, community organizations, neighborhoods, and local business. The simple reality represents a critical message for citizens: **Individual and family preparedness and action are crucial to survival.**

There are serious risks out there for which we are not prepared.

It is imperative that the bi-state region exercise all possible avenues to educate, fund, plan, and practice measures deemed necessary to sustain our communities and the bi-state region prior, during, and after a disaster. Success will require a partnership among government, citizens, emergency personnel, community organizations, and businesses—all of which have critical roles to play in disaster prevention and response.

The region is not prepared. We can never be completely prepared but we can be **BETTER** prepared. We owe it to ourselves, our children, and our communities to heed the warnings in this report and take action.

Methodology

In the fall of 2005, the FOCUS St. Louis Community Policy Committee and staff conducted interviews with key regional civic and community stakeholders to hear their views on pressing topics FOCUS should address. An issue of concern that surfaced repeatedly was disaster preparedness.

FOCUS staff conducted interviews with key stakeholders from emergency preparedness organizations, relief groups, community service organizations, and the healthcare community. Staff also attended meetings concerning recovery issues for the St. Louis area and a STARRS Advisory Committee meeting. All stakeholders agreed that FOCUS should commence an emergency readiness assessment of the region. Many felt that with FOCUS’ reputation for thorough data collection and neutrality, it was the ideal entity to further investigate this issue and propose recommendations to the bi-state region. The publicity from the aftermath of Hurricane Katrina further elevated the urgency of this topic.

In January 2006, the FOCUS Board of Directors decided to convene a citizen task force to answer key questions facing the bi-state region regarding disaster preparedness and make recommendations. Questions included:

- How ready is the region for a mega-disaster?
- How do we ensure an effective communications process and a technological system that will disseminate region-wide information?
- Who will be in charge if a disaster crosses jurisdictions?
- Are we using the existing resources to the best of our ability? How should we allocate resources?
- How do we improve individual and family preparedness?

Co-chairs who would command respect on the issue and lead the task force were identified and asked to serve. Barrett Toan, retired CEO of Express-Scripts, and Richard Mark, Senior Vice President of Energy Delivery at AmerenUE, agreed to serve as chairs. A diverse group of 29 committed citizens were assembled to form the FOCUS St. Louis Regional Disaster Preparedness Task Force. The task force met over a ten-month period analyzing specific disaster events and researching key issues and preparedness indicators. The task force heard from a wide variety of emergency professionals from throughout the St. Louis region. Members collected and analyzed a significant amount of data and engaged in extensive dialogue about the issues of preparedness, rescue, and recovery.

The task force engaged Dr. Douglas Owens, Professor of Medicine and Health Research and Policy Director at Stanford University, to conduct two focus groups with regional emergency professionals. The goal of the interviews and focus groups was to assess the likelihood and potential damages that could occur from man-made and natural disasters.

The task force broke into seven working groups to assess risk and preparedness in specific areas that would be impacted if a disaster occurred. These groups met over several months to collect additional research and reach a consensus on recommendations in their specific area of concentration. The areas of assessment included:

1. Transportation
2. Utilities
3. Public Safety
4. Healthcare
5. Social Service
6. Business Interruption
7. Communications/Governance

In July 2007, the FOCUS Board of Directors received the final recommendations from the task force and unanimously gave its support to this report.

Disaster Definitions/ Scenarios

There are many types of disasters of varying magnitude that could occur in the bi-state area. Generally, the causes of those events can be classified into two broad categories—natural disasters and disasters caused by accidental or intentional human activities. To ensure this publication was relevant to the bi-state region, experts narrowed these two broad categories to focus on only those disasters they thought were most likely to endanger local residents. Potential disasters addressed in this report are as follows:

1. Natural
 - a. Severe Tornado
 - b. Earthquake
 - c. Influenza Pandemic
 - d. 50-year Flood
2. Accidental/Intentional including terrorist acts:
 - a. Chemical Release
 - b. Internet Cyberattack
 - c. Terrorism
 - d. Bioterrorism
 - e. Nuclear/Radioactive Release

Furthermore, only those disasters considered as “mega-disasters” were analyzed for the purposes of this report. For assessing potential damage preparedness, disaster scenarios were devised so all individuals envisioned the mega-disaster with the same parameters. Outlined in this next section are descriptions and regional damage estimates for the most likely mega-disasters to damage the bi-state region. The estimates for loss of life and economic damage were consensus estimates provided by local regional experts.

SEVERE TORNADO

A tornado is a violently rotating column of air extending from a thunderstorm to the ground. Damage paths can be in excess of one mile wide and 50 miles long. Tornadoes in the winter and early spring are often associated with strong frontal systems that form in the central states and move east. Tornadoes are rated on a Fujita scale from F0 through F5. F5 is the most severe tornado.

Potential Scenario:

An F4 tornado strikes St. Louis. An F4 tornado is capable of causing devastating damage, with wind speeds of 207-260 mph. Well-constructed houses are leveled, structures with weak foundations are blown away some distance, and cars are thrown, becoming large missiles traveling through the air. Structures in the direct path of the tornado are extensively damaged or destroyed. Substantial damage to utility infrastructure occurs within the path of the tornado. Only about 1 percent of tornadoes are rated at the F4 level.

Estimated Damages: \$1 billion in economic loss and 250 deaths

One of the most deadly and destructive tornado events in U.S. history was the East St. Louis Tornado of 1896. The tornado was rated as F4 of the Fujita scale (F0 through F5). Adjusted for wealth and inflation, this tornado was estimated to cause \$2.9 billion in damage. Other severe tornadoes struck St. Louis in 1871, 1890, 1904, 1927 (the second most costly

tornado in U.S. history), and 1959, making St. Louis the most tornado-afflicted urban area in the United States.



EARTHQUAKE

Earthquake severity is measured by the Richter scale, which is logarithmic, so a 7.0 earthquake has 10 times the energy of a 6.0 earthquake. Range of Richter scale readings include a 2.0 being the smallest magnitude, typically felt by people, to a 6.0 or more magnitude, considered to be a major earthquake. An earthquake above 8.0 is a significant earthquake. During a major earthquake, cracks can open in the earth's surface, the ground can roll in visible waves, and large areas can sink or rise. According to the Center of earthquake research and information at the University of Memphis, a magnitude 6.0 or greater earthquake has a 40 percent to 60 percent chance of reoccurring in the next fifty years.

Potential Scenario:

A 7.2 magnitude earthquake occurs along the New Madrid Fault area. It takes thirty seconds for affects to hit the St. Louis area. Ground shaking extends throughout large sections of the bi-state area and subsurface displacement occurs along 45 miles of the fault zone, extending along a large portion of highly populated local jurisdictions. Soil liquefaction occurs in some areas, creating quicksand-like conditions. Damage in the bi-state area includes several hundred square miles. Rapid horizontal movements shift homes off their foundations and cause some tall buildings to collapse or "pancake" as floors collapse down onto one another. Brick-clad buildings in downtown St. Louis lose their facing as bricks tumble down from the exterior of the building. Hospital services are compromised as on-going surgeries are suspended and efforts are made to stabilize the emergency areas for casualties. Several hours and several days later, multiple aftershocks, ranging in magnitudes up to that of the main shock, and capable of causing additional or compounding damages, occur throughout the region. Secondary hazards include contamination and fires from ruptured and broken

◀ Wreckage of the Ottenad Furniture Company in St. Louis City after the tornado of 1896. Broadway at Soulard Street. Missouri Historical Society, St. Louis. Julius Gross.

natural gas lines and ruptured containers at chemical plants. Transportation lines and nodes, power generation and distribution centers, and communication lines are damaged. There are numerous reports of toxic chemical fires and plumes with noxious fumes. A large chemical spill contaminates the river.

Estimated Damages: \$8 billion in economic damages and 500 deaths

On December 16, 1811, pressures in the New Madrid Fault created the most powerful earthquake in U.S. history. The earthquake caused the Mississippi River to run backwards before starting downstream in a wave 30 feet high. In addition, the quake leveled most homes within 250 miles of New Madrid and temporarily redirected the path of the river.

INFLUENZA PANDEMIC

Influenza pandemics occur every 10 to 60 years when a new and markedly different genetic strain of influenza virus replaces the predominant existing circulating virus. This genetic shift (or large change) is different than the usual and much smaller changes in the virus that occur each year (called genetic drift). Due to this genetic shift, a large portion of the population is vulnerable because their immune system has never encountered this new genetic form of the virus. The most devastating recent pandemic occurred in 1918 and killed 50 to 100 million people or more worldwide, including many healthy young people.

Potential Scenario:

The avian influenza virus is highly lethal to humans, with a 65 percent mortality rate. The virus changes and begins to be transmitted from human to human. (Whether the virus would retain its high

lethality is unknown, but even at a much lower mortality rate, a pandemic could cause extensive deaths worldwide and could spread globally within months or faster.) Vaccines take many months to develop, so a vaccine for this influenza is in very short supply. The pandemic overwhelms the healthcare system in the United States, creating severe disruption and shortages of medical supplies (e.g., vaccines and antiviral drugs), equipment (e.g., mechanical ventilators), hospital beds, and shortages of medical personnel and first responders. Schools, daycares, and workplaces are closed. Significant disruption in community life and businesses occurs. Many essential services (e.g., police, fire protection, trash collection, gas, and electric services) are disrupted and there is extensive economic damage. Secondary damage occurs from civil unrest. Response to this disaster is different from other disaster responses. Instead of many traveling to aid those affected, movement of those affected (and those not affected) is limited to prevent further spreading of the pandemic. The entire United States is affected and aid is not available from other regions because all regions are affected simultaneously. Therefore, disaster response in each metropolitan area is completed primarily with local resources.

Estimated Damages: \$10 billion in economic loss and 25,000 deaths



▲ An improvised sleeping area filled with influenza victims in the main barracks of the Naval Training Station in San Francisco during World War I. Signs on the wall at left forbade spitting on the floor to prevent the spread of disease. U.S. Naval Historical Center Photograph.

CHEMICAL SPILL—CHLORINE TANK EXPLOSION

Chlorine gas is highly poisonous and can be pressurized and cooled for transportation and storage as a liquid. When released, it turns into a gas, stays close to the ground, and spreads quickly.

Potential Scenario:

A storage tank for liquid chlorine ruptures, either because of an industrial accident, terrorist attack, or damage from a weather-related problem (e.g., tornado damage to a storage facility.) Once the tank ruptures, chlorine gas expands quickly and spreads as it is moved by the wind. Assuming a high-density urban area, as many as 700,000 people are in the downwind area, which extends as far as 25 miles. Of these, 5 percent (35,000) receive potentially lethal

exposures and about half of these die before or during treatment. An additional 15 percent require hospitalization, and the remainder receive treatment by Emergency Management Services. However, approximately 450,000 “worried” citizens seek medical attention. Most of the injured recover in 7 to 14 days, but people with severe lung damage require long-term monitoring and treatment. Secondary hazards include panic and motor vehicle accidents and deaths as the population self-evacuates. Local waterways or wetlands absorb chlorine gas, creating hydrochloric acid and lowering the acidity of the water.

Estimated Damages: \$500 million in economic loss and 5,000 deaths



▲ The explosion of cylinders containing gases led to concern over storage of such materials in the residential Lafayette Square neighborhood of St. Louis City. KSDK.com

On June 24, 2005, St. Louis was experiencing a heat wave with temperatures reaching 97 degrees. Around 3:20 p.m., a technician at a local facility saw a ten-foot-high flame coming from a cylinder and activated the fire alarm. A security camera video from the facility showed the release and ignition of gas from a cylinder in the propylene return area. As workers and customers evacuated, the fire spread to adjacent cylinders. Cylinders ignited in the first minute and within two minutes, cylinders began exploding, flying into other areas of the facility and spreading the fire. After four minutes, the fire covered most of the facility’s flammable gas cylinder area and explosions were frequent. The St. Louis Fire Department arrived at the scene about 3:35 p.m. With explosions propelling cylinders in all directions inside and outside the facility, firefighters evacuated local residents within a five-block perimeter. The fire was controlled around 8:30 p.m. but dozens of cylinders and cylinder parts were propelled into the community and found on sidewalks, yards, parking lots, and under cars. Damage included a burned-out empty commercial building, fire-damaged cars, a three-foot hole in the wall of one residential building, broken windows, and other destruction to residential and commercial buildings. The death of one St. Louis resident was attributed to an asthma attack triggered by the noxious smoke and fumes from the incident. Cylinder parts traveled as far as 800 feet from the area of the explosions, and fire plumes spread asbestos from ruptured acetylene cylinders over a one-third-mile-wide and one-mile-long area.

INTERNET CYBERATTACK

Cyberattack is the use of computer network tools to shut down critical national infrastructure (e.g., energy, transportation, government operations) or to coerce or intimidate a government or civilian population. Many experts consider cyberattacks the new kind of terrorism. Cyber terrorists prefer using cyberattack methods because it's cheap, difficult to track, can be done from anywhere in the world, and can affect a large number of people.

A breakdown of the financial system itself will immediately affect the whole economy because economic activity depends on the efficient functioning of the distribution of checks. If one cannot be assured that one will be paid, then there is little incentive to work.

Potential Scenario:

A cyberattack occurs in several parts of the nation's financial infrastructure over several weeks. Credit card processing facilities are hacked and 20 million card numbers are released on the internet and are cancelled. Automatic teller machines (ATMs) fail across the nation, major companies report that workers are not receiving paychecks, and several large pension and mutual fund companies are unable to operate for more than a week. Significant disruption of the financial system occurs.

Estimated Damages: \$200 billion in economic loss and 75 deaths

50-YEAR FLOOD

A 50-year flood occurs with a probability of 2 percent per year. A 50-year flood is more severe than a 10-year flood (which has a 10 percent per year probability of occurrence), but less severe than a 100-year flood (1 percent per year probability of occurrence). Flooding may occur either with warning or relatively rapidly and can cause severe property damage as well as loss of life. The damage from a flood

depends on both the extent of flooding and the duration. The St. Louis region lies at the confluence of two large rivers, placing it at particular risk for flooding.

Scenario:

It's not necessary to create a potential flooding scenario as the St. Louis region has experienced first-hand the devastation of a wide-spread flood within the last 15 years. The fall of 1992 was a wet one and the winter that followed left a normal to above normal snow pack in the central United States. Heavy rainfall in late March on top of a melting snow pack, fed the headwaters of the Mississippi River. Then an unusually persistent weather pattern prevailed from June into early August. There were numerous smaller scale and shorter duration thunderstorm events that were more widespread and longer lasting than normal. Many locations were above flood stage for three to five months straight. The Mississippi River at Cape Girardeau was above its 32 foot flood stage for 126 days. Transportation was severely impacted. Barge traffic was halted on the Missouri and Mississippi Rivers for nearly two months. Railroad traffic came to a standstill in the Midwest. Ten commercial airports were flooded. Truck traffic was either stopped or had to be rerouted due to closed bridges and flooded roadways.

Estimated Damages: During the Flood of 1993, the state of Missouri's losses outside of agriculture totaled \$1.25 billion. Damage estimates to public facilities in 75 of Missouri's counties totaled more than \$122 million. Missouri highways sustained approximately \$60 million in damage and 300 sections were closed for some period of time. Damages to sewer and water systems totaled almost \$24 million, water control facilities sustained \$20 million in damages, and losses to public buildings exceeded \$3 million. Almost 3,200 businesses in Missouri suffered physical and/or economic damage. Over 46,000 employees lost wages

for one or more days due to flooding or flood-related problems. Approximately 25,000 employees were laid off. Approximately 3,000 homes were destroyed and 12,000 were damaged or made inaccessible.

The Great Flood of 1993 constituted the most costly and devastating flood to ravage the United States in modern history. Levees were broken; farmland, town, and transportation routes were destroyed; thousands of people were forced to abandon their homes; and 47 people died as a direct result of the flood. At least 75 towns were completely inundated, some of which have not been rebuilt. The flood inundated more than 20 million acres in nine states. Approximately 54,000 people had to be evacuated from flooded areas at some time during the flood and approximately 50,000 homes were destroyed or damaged. Losses were estimated at 15 to 20 billion dollars.



▲ July 19, 1993—An aerial view of water from the River DePeres rushing into south St. Louis just after sandbags on top of a levee collapsed. Photo copyright St. Louis Post-Dispatch

TERRORISM

There are many types of terrorism. And although no one can predict all forms of terrorism that may occur, many experts predict that biological or chemical terrorism is far more likely to occur and would have a larger impact on the region than conventional acts of terrorism such as car bombings or shootings.

Biological terrorism is the use of biological agents to intentionally produce disease, intoxication, or immediate incapacity and/or death in susceptible populations—humans, animals, or plants—to meet terrorist aims.

Potential Scenario:

A terrorist militia group releases a highly refined grade of anthrax spores in the Lambert Airport air conditioning system during mid-morning rush. Exposed passengers board airplanes and travel throughout the country and internationally. Airport personnel are equally exposed. Within a short period of time the exposed passengers and airport workers begin to have symptoms of dizziness, breathing disorders, coughing, and vomiting. While most victims recover, others die.

Estimated damages: \$48 million in economic loss and 100 deaths

Biological, Chemical And Toxin Terrorism

A listing of the more common biological, chemical, and toxic agents includes:

Biological Agents:

- **Anthrax:** Bacterium produced by spores which can sicken people through inhalation, entering a wound on the skin or by ingestion.
- **Smallpox:** Variola viruses still exist; spread by infected saliva.
- **Ebola:** Virus that causes an infection which is spread by blood and body fluids.

- **Botulism:** Bacteria works like a chemical toxin but is classified as a biological weapon because it is made by a living organism.

Neurological Agents:

- **Sarin Gas:** Colorless, odorless liquid; developed as a chemical weapon, it shuts down transmission between the nerves.
- **VX:** Thick, colorless, odorless liquid resembling motor oil. Allows acetylcholine to accumulate in the spaces between nerves and shuts down communication.

Chemical Agents:

- **Phosgene:** A poisonous gas that appears as a white cloud and smells of newly made hay. It is heavier than air and tends to accumulate in low-lying areas.
- **Chlorine:** A yellow-green gas with an aroma that has been described as a mixture of pineapple and pepper. Considered obsolete as a military chemical weapon.
- **Cyanide:** Found in common industrial chemicals such as hydrogen, cyanide, cyanogen, and chloride. These compounds poison red blood cells and keep them from using oxygen.

Nuclear/Radioactive Threats:

- A radiological attack could come in the form of detonating a stolen nuclear reactor device, causing a nuclear reactor to explode, or detonating a “dirty bomb.”

Potential Scenario:

A terrorist group detonates a bomb hidden inside a panel truck, causing a 10-kiloton nuclear blast in a metropolitan area. Most buildings within a radius of one-half to one mile are damaged or destroyed. Injuries from flying debris occur up to approximately three miles away. An electromagnetic pulse damages many electronic devices within a radius of three

miles. Damage occurs from the immediate blast, immediate radiation exposure, and radioactive fallout. Secondary damages occur from numerous fires, radiation exposure, and destruction of infrastructure. A critical component of the response is evacuation and decontamination of the population at risk from fallout. As the distance from ground zero increases to about 12 miles, injuries due to acute radiation exposure decrease but protection from fallout is a significant concern. Even up to nine miles downwind, as many as 50 percent of exposed people die from acute radiation poisoning. Areas up to 3,000 square miles may require some type of decontamination, a process which could take many years. There is widespread disruption of the power grid and communications.

Estimated Damages: \$6 billion in economic loss and 13,000 deaths

Risk Of Incident

Several regional disaster experts were consulted and asked to assess the likelihood of the different disasters detailed on the previous pages and estimate the damages that would result in the bi-state region.

Initial interviews were conducted over the telephone by Dr. Doug Owens, who recorded each individual’s response. Dr. Owens asked the experts to estimate the probability of each disaster by using the 50-year flood probability as a bench mark. By definition, a 50-year flood has an expected recurrence interval of 50 years with a probability of 2 percent per year. Respondents were provided a potential scenario and asked to give their high and low estimates of chance of occurrence and then to pinpoint their best prediction on chance of occurrence. Respondents were asked to give the high/low estimate before they gave a definitive answer to prevent premature estimates of chance of occurrence.

Then the experts met in a focus group in December 2006 to further discuss disaster occur-

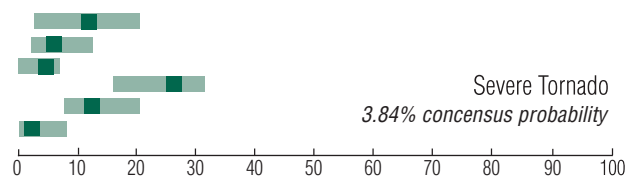
rences, effects of disasters on the community, and potential losses. Information gathered from the phone interviews and the focus group meeting was compiled.

The experts met a second time and reviewed the individual predictions and assessments of other focus group members. After discussing each disaster's potential scenario and the probability estimates, these experts were invited to contact Dr. Owens to readjust their initial estimates if they felt it was necessary and provide any additional information that they felt was missing from the data.

The following tables summarize the results of these interviews and group meetings.

For instance, if you review the probability estimates for a severe tornado, the first respondent guessed approximately 4 percent probability per year as the low and approximately 24 percent probability as the high, with a final prediction of 10 percent probability of occurrence.

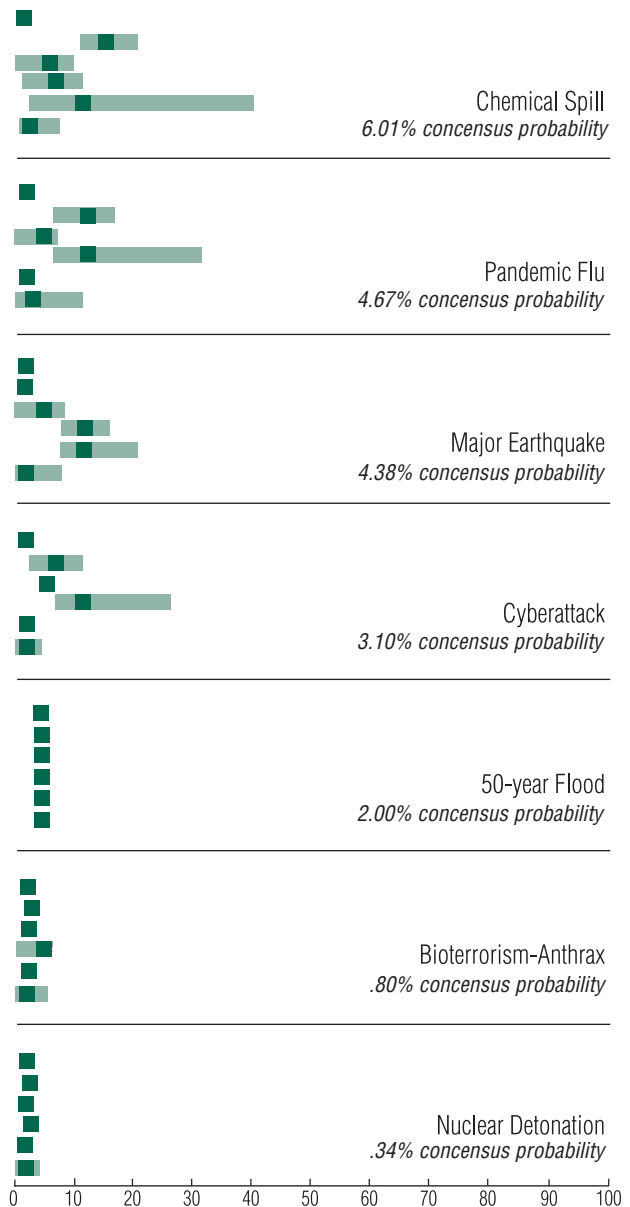
Assessing the Likelihood of a Severe Tornado



The following table documents the experts' final assessments for annual probability of each disaster described in the previous section. Each square represents the best estimate of one person for the probability of a disaster, and the end of each bar that goes through the square represents that person's high and low estimate of the probability.

Assessing the Likelihood of Mega-disasters and Potential Damages

Annual Probability of Mega-disaster



After determining the likelihood of each disaster, the group was asked to estimate economic damages and loss of life for the region. These were the estimates accompanying each disaster scenario in the previous section. The probabilities below represent the average of assessments from the participants after review and discussion during the focus group. The estimates of economic damages and loss of life are consensus estimates.

Table 1. Probability Estimates and Estimated Damages of Mega-disasters, Ranked by Annual Probability of Occurrence

	Annual Probability	Economic Damages (Millions)	Loss of Life per event
Chemical Spill	6.01%	\$500	5,000
Pandemic Flu	4.67%	\$10,000	25,000
Major Earthquake	4.38%	\$8,000	500
Severe Tornado	3.84%	\$1,000	250
Cyberattack	3.10%	\$200,000	75
50-year Flood	2.00%	\$530	13
Bioterrorism-Anthrax	0.80%	\$6,000	13,000
Nuclear Detonation	0.34%	\$200,000	35,000

As funding for disaster preparedness continues to be cut or redirected to other places, ongoing investment in disaster preparedness will constantly be re-evaluated. The potential of billion dollar losses and mass casualties will have to be considered when evaluating the most effective use of our preparedness dollars. Therefore, the potential loss of life and economic losses were estimated annually. The Expected Annual Economic Loss and the Expected Annual Loss of Life were calculated by taking the estimated economic loss and loss of life multiplied by the annual probability. The tables below show these estimates, with the disasters ranked in order first by expected loss of life and then by economic loss.

Table 2. Expected Annual Loss of Life and Economic Loss for Mega-disasters, Ranked by Loss of Life

	Annual Expected Loss of Life	Annual Expected Economic Loss (Millions)
Pandemic Flu	1167	\$467
Chemical Spill	300	\$30
Nuclear Detonation	119	\$680
Bioterrorism-Anthrax	104	\$48
Major Earthquake	22	\$350
Severe Tornado	10	\$38
Cyberattack	2	\$6,201
50-year Flood	< 1	\$11

Table 3. Expected Annual Loss of Life and Economic Loss for Mega-disasters, Ranked by Economic Loss

	Annual Expected Loss of Life	Annual Expected Economic Loss (Millions)
Cyberattack	2	\$6,201
Nuclear Detonation	119	\$680
Pandemic Flu	1167	\$467
Major Earthquake	22	\$350
Bioterrorism-Anthrax	104	\$48
Severe Tornado	10	\$38
Chemical Spill	300	\$30
50-year Flood	< 1	\$11

Assessment Of Preparedness

The focus group then evaluated the following preparedness checklists and the level of preparedness within the region. As the experts began to review these lists it became clear that the region's progress in certain areas was not always evident or easily assessed. The checklists in this section capture the feedback from the focus group.

The following questions were discussed and analyzed:

1. Using the checklist as a guide, how prepared is St. Louis for disasters?

For the items that the group could analyze, the level of preparedness was assessed in each category. "High" indicates that substantial efforts have been made; "Medium" indicates that some work is occurring; and "Low" indicates that there is considerable work to be done in that area.

2. How should the checklists be modified or amended to capture the important elements of preparedness? Input was requested concerning any resources that may be useful.

The checklists were developed from various sources, including material from the Centers for Disease Control (CDC) and lists published in disaster-related books and publications.

Common to all of the potential disasters described in this report are key preparedness activities that include:

- Delineate key roles and responsibilities and legal authority for all agencies that play a role in the response;
- Formalize agreements with neighboring jurisdictions regarding regional response;

- Create a process for establishing regional leadership to manage disaster response;
- Establish mechanisms for communicating with all agencies, organizations, and individuals that will participate in a response; and
- Establish mechanisms for risk communication with the public.

INDIVIDUAL PREPAREDNESS

Individual and family preparedness continues to be of concern, especially since there may be periods of self-sustainment required for a minimum of three days. Even though FOCUS conducted several surveys to test preparedness (see detailed results in "Citizen Survey Results" section), it is hard to determine the true level of preparedness of individuals in the area.

The survey results, however, demonstrated a community that is not adequately prepared if a disaster should occur. Of those who responded, 71 percent of FOCUS' own membership does not have a family emergency plan in place and 76 percent of disadvantaged citizens (those in our poorest communities) also indicated that they do not have a plan. Results were a bit better when inquiring about adequate supply of food and water for three days—84 percent of FOCUS membership and community group respondents indicated that they have enough food and about 64 percent to 67 percent of these two groups have an adequate supply of water on hand. Only half of the respondents in economically challenged areas had an adequate supply of food on hand.

Education is critical in preparing the community for disasters. Very few respondents could correctly identify the emergency broadcasting stations on the radio—21 percent of FOCUS membership, 15 percent of community group respondents, and 9 percent in economically challenged areas. In St. Louis, there are two radio stations, KMOX and KTRS, and one television station, KMOV-Channel 4, designated

as the primary sources for emergency information. However, during a disaster all stations may broadcast emergency messages generated through the Emergency Alert System.

Only about a third of each respondent group has up-to-date training in first-aid and CPR. Many experts agree that in times of disaster, the first responders will be neighbors in our community and not emergency personnel. These statistics indicate our community is not prepared and requires additional education on basic emergency preparedness.

Below is a checklist that every citizen should utilize to ensure that they are prepared for a disaster:

Individual and Family Preparedness

- Trained in CPR and First Aid
- Trained through a community program that educates citizens on disasters
- Develop family emergency plans including responsibility for elderly relatives and neighbors who need help, rapid evacuation plans, meeting locations, and contact information for children and family members
- Develop a family communication plan, including contingencies for loss of local phone service
- Have adequate emergency supplies: first aid kit, battery operated radio, flashlights/lanterns and spare batteries
- Know how to locate the emergency broadcasting station on the radio
- Have adequate supplies of food, water, and medications
- Know how to turn off the gas and water
- Have a plan for the needs of your pets
- Become familiar with your children's disaster recovery plan at school
- Become familiar with your disaster preparedness plan at your workplace

This checklist was developed from various sources, including material from the Centers for Disease Control (CDC) and lists published in disaster-related books and publications.

Portions of the street sank and collapsed during the ► Nisqually Earthquake in Washington State during 2001.

U.S. Geological Survey

SEVERE TORNADOES

In general, adequate preparedness plans are in place throughout the local metropolitan area; however improvements in regional coordination are needed. There are many concerns about the lack of an effective warning system in place in rural areas. Currently, the warning system in many counties consists of police cars driving through neighborhoods warning of an approaching tornado. This method proves to be highly ineffective in warning residents of a potential hazard. Improvement is also required in educating all of the region's citizens—engaging the public more broadly and more often. Serious concerns remain about vulnerable populations and their safety (e.g., disabled, elderly, and poor).

Because a tornado would most likely affect a specific area, utility damages would be limited in scope and the region's utility services are well-prepared to respond to outages of limited size and localized nature. Public safety could be maintained through assistance and support from other disciplines in the area which are well-accustomed to working together. Social service agencies and community groups currently have sufficient capacity to help with the needs of those affected—providing food, clothing, and some form of shelter.

Lambert Airport is adequately prepared for severe weather. Damage to buildings and terminals is always a possibility, though continued renovations will improve terminal survivability.



Tornado Preparedness

	Level of Preparedness		
	High	Medium	Low
Government & Public Health Preparedness			
Delineate accountability, responsibility, and leadership for response		✓	
Assess citizen preparedness and train public for citizen response teams		✓	
Ensure plans are in place for special needs population evacuation, sheltering, and transportation			✓
Promote NOAA weather radio in residential homes, schools, long-term care facilities, jails, government buildings, and businesses			✓
Build relationships with the local media to ensure that public information is fluent before, during, and after an event takes place			✓
Assess agency capabilities to recall and deploy resources into effected area			✓
Healthcare Sector			
Assess trauma capacity		✓	
Develop mass casualty plans		✓	
Identify alternate sites for care if health care facilities are damaged		✓	
Develop recall and deployment plans for resources			✓
Coordinate plans with local EMA			✓
Exercise severe weather plans internally to ensure employee preparedness			✓

This checklist was developed from various sources, including material from the Centers for Disease Control (CDC) and lists published in disaster-related books and publications.

EARTHQUAKES

Overall, there is a degree of complacency about earthquakes in the St. Louis region. Local government and community level efforts are needed to inform citizens and businesses about the hazard and their responsibilities in emergency planning and risk reduction. Individuals need to be prepared to self-sustain in this type of emergency as an earthquake will affect a broad area. Utilities will likely be disrupted for a longer than normal period, which will impact the health and safety of the region's communities and business continuity.

Since the disaster will affect a large area, normal procedures would not apply in public safety, and the local area will rely on the state and nation to offer assistance and support. Communication is critical to

determine the areas most in need and identify the assistance required. Social service agencies—such as the United Way, the Red Cross, and the Salvation Army—will need to fill in the gaps and to help those individuals with limited ability to take care of themselves due to economic, health, or age reasons.

Building codes are making new and renovated buildings more earthquake resistant. Areas that will suffer extensive damage because of soil conditions include East Lindbergh/Highway 67 area; areas around Lambert Airport and areas north of Lambert Airport; north of the Meramec River; areas in St. Charles County; and areas in the Metro East.

Airports could be subject to runway damage due to cracking of pavement and some joint distress. However, newer runways at Lambert and Mid America are

Earthquake Preparedness

	Level of Preparedness		
	High	Medium	Low
Government & Public Health Preparedness			
Ensure monitoring for earthquakes with plan for communication with responders and citizens		✓	
Address how building codes can reduce damage to buildings and infrastructure		✓	
Develop and exercise plans for schools in case of large earthquakes			✓
Map ground soil to assess which areas will have most severe damage		✓	
Develop plan to turn off natural gas lines	✓		
Establish a seismic safety board (state level) to coordinate in case of an earthquake	✓		
Have “seismically safe” facilities (hospital, police, etc.)			✓
Retrofit key structures		✓	
Develop public education program about earthquake risks		✓	
Healthcare Sector			
Develop plan for triage and care of injured, including the use of alternative care sites if hospital is unsafe or unavailable		✓	
Develop plans for transferring patients if hospital or other health-care facility becomes unsafe		✓	

This checklist was developed from various sources, including material from the Centers for Disease Control (CDC) and lists published in disaster-related books and publications.

less susceptible to damage. Lambert Airport terminals could see significant impact with possible collapse due to column failure.

There could be long term damage to roads and bridges but little impact to rail or river traffic. Even though newer bridges are less susceptible to damage or a full-scale collapse, the catastrophic Minneapolis bridge collapse in August 2007 serves as a “wake up call” for the bi-state region to be more vigilant. Efforts to inspect and repair bridges must be evaluated and strengthened to ensure that the region’s bridges, especially those most heavily traveled, are as structurally sound as possible. Bridge approaches may be especially prone to collapse depending upon the type of soil where the foundations rest, and this structural damage could shut down access to bridges. Immediately following an earthquake, all major bridges and overpasses would be closed until they are properly inspected. Manchester Road would become the main route for required personnel and equipment and citizens to move east and west throughout the area.

There would also be a long-term impact on businesses as they struggle to regain services and functionality. If a significant percentage of businesses were damaged and unable to function day-to-day, there would be a cascading impact on individuals and the community.

INFLUENZA PANDEMICS

Many experts are concerned about the lack of coordination throughout the region, lack of knowledge regarding existing plans at local hospitals, and the concern that not all relevant groups are being integrated in the planning process and exercises.

Day-to-day communication between public health agencies, hospitals, and other medical care outlets is poor. Early pilot efforts to improve linkage have been successful, but there is more improvement required, and long-term funding will be an issue. Funding for preparedness is limited, and therefore conducting planned exercises and testing the systems of various responders has not been adequately accomplished.

Influenza Pandemic Preparedness

	Level of Preparedness		
	High	Medium	Low
Government & Public Health Preparedness			
Establish a pandemic preparedness coordinating mechanism that includes relevant stakeholders			✓
Understand community preparedness & response by doing scenario planning. Delineate accountability and responsibility, capabilities, and resources for key stakeholders engaged in planning and executing specific components of the operational plan		✓	
Clarify by means of exercises which activities will be performed at state, regional, or local level		✓	
Assure that the operational plan for pandemic influenza response is an integral element of the overall state, regional, and local emergency response plan		✓	
Address integration of state, regional, and local plans across jurisdictional boundaries			✓
Formalize agreements with neighboring jurisdictions and address communication, mutual aid, and other cross-jurisdictional needs		✓	
Identify the legal authority necessary to execute the operational plan at local, state, and federal level	✓		
Ensure existence of demographic profile of the community, including special needs populations and language minorities		✓	
Create an Incident Command System based on the National Incident Management System and exercise the system	✓		
Identify the authority responsible for declaring a public health emergency at state, regional, and local levels for activating the influenza plan	✓		
Address provision of food, water, medical, and psychosocial needs for community members		✓	
Ensure the plan provides for real-time situational awareness of patient visits, hospital beds, intensive care needs, and medical staffing and the ability to provide relevant information to providers		✓	
Test the operational plans through planned exercises during influenza season		✓	
Develop security plans and resources for security measures to address civil disorder			✓
Conduct year-round influenza surveillance, improve capacity for identifying unusual strains, and develop plans to implant enhanced surveillance once a pandemic is detected	✓		
Develop and exercise plans to investigate and contain local outbreaks, including isolation, quarantine, other social distancing (school closures, etc.), and restriction of movement		✓	
Develop and exercise a plan for mass prophylaxis and vaccination		✓	
Develop plans with business community for business response to pandemic including how businesses will respond to reductions in workforce, policies for exposed and infected individuals, tracking annual flu vaccination status, and limiting spread of influenza with the workplace		✓	
Develop plans and educational materials to promote preparedness for individuals and families, and how to limit the spread of influenza within the family		✓	
Determine how to enhance public health diagnostic laboratory capacity for high volumes of tests		✓	
Provide education on how to become knowledgeable about reducing transmission (e.g., use of face masks, principles of hygiene, and transportation of patients)		✓	
Plan for food, water, and other essentials for special needs populations		✓	

This checklist was developed from various sources, including material from the Centers for Disease Control (CDC) and lists published in disaster-related books and publications.

Influenza Pandemic Preparedness (continued)

	Level of Preparedness		
	High	Medium	Low
Healthcare Sector Preparedness			
Develop and test operational plans for the healthcare system that address healthcare of persons with influenza; legal issues that affect staffing and patient care; alternative standards of care; continuity of service for other patients; protection of healthcare workforce; and medical supply contingency plans		✓	
Develop a plan for surge capacity of healthcare services, workforce, and supplies to meet needs during a pandemic. Determine who will pay for care of uninsured		✓	
Hospitals should develop a written pandemic influenza plan		✓	
Develop and test plans for isolation and cohorting of patients with known or suspected influenza and quarantine of exposed healthcare personnel		✓	
Develop plans to respond to critical shortages of personnel for essential services due to absenteeism		✓	
Determine how to enhance clinical diagnostic laboratory capacity for high volumes of tests		✓	

This checklist was developed from various sources, including material from the Centers for Disease Control (CDC) and lists published in disaster-related books and publications.

Social service providers will be critical in helping to identify a pandemic and limit its scope as they are often the first to come in contact with those with limited resources who may not seek medical help immediately. These providers will also be instrumental in distributing information and critical supplies to minimize the scope of a pandemic.

Lambert Airport has a plan for pandemic disease control with effective communication of infectious persons or conditions aboard an aircraft. Also in place is a scripted process to quarantine infected aircraft. However, there is not a long-term holding area for infected persons at Lambert Airport.

It should be noted that the response for pandemics may require limiting the mobility of citizens and responders to certain areas. There may be a need

to quarantine certain areas or minimize mobility to reduce the risk of spreading the influenza to other areas. This could greatly limit the ability of first responders and social service agencies to provide assistance to affected areas.

The checklist for influenza pandemic is more detailed than the others but is still abbreviated from the full Centers for Disease Control (CDC) checklists. The CDC has additional and more detailed checklists for influenza preparedness for individuals, businesses, schools, community organizations, and healthcare facilities (including lists for home healthcare services, medical offices and clinics, emergency medical services, hospitals, and long-term care facilities) available at www.pandemicflu.gov.

CHEMICAL SPILLS & TERRORISM

The scope and intent of these disasters will greatly affect the power of readiness. If the chemical spill is small, limited in size, and accidental, then our ability to respond is greater than if it is a strategic terrorist attack that would most likely be more lethal and widespread.

As mentioned in previous disaster categories, the healthcare system is not adequately prepared for a terrorist-induced chemical spill mainly due to lack of communication and funding to prepare for potential disasters. A localized accidental chemical spill may only require help from one or two local healthcare facilities; however, communication to other facilities will be necessary to help support other medical needs while these institutions focus on chemical spill casualties.

The biggest overall concern is the visibility of hazardous cargos transiting the waterways. The Coast Guard has limited visibility and communication with vessels carrying hazardous materials (HAZMAT). Fortunately, Lambert Airport practices HAZMAT control and has good visibility over HAZMATs coming through the facility.

Rail corridors also pose a threat as hazardous materials are moved through the St. Louis metropolitan area. The federal government has instituted regulations to ensure that local officials receive reports of hazardous cargo moving through the bi-state region. However, many trains pass through neighborhoods and highly populated areas within the region, posing significant threats, regardless of knowledge of shipments.

Chemical Spills & Terrorism	Level of Preparedness		
	High	Medium	Low
Government & Public Health Preparedness			
Establish/enforce right-to-know laws: burden on chemical handler and transporters to provide information on risks to workers and the public			✓
Assess and determine the worst-case scenarios for chemical accidents and terrorism to aid in planning prevention and response			✓
Reroute hazardous materials away from sensitive locations (schools, high-density residential areas)			✓
Plan for evacuation of population at risk and provide shelter		✓	
Enhance epidemiologic capacity for detecting and responding to chemical accidents or attacks			✓
Enhance awareness of chemical terrorism among emergency medical service personnel, police officers, firefighters, physicians, and nurses			✓
Stockpile chemical antidotes			✓
Develop and provide bioassays for detection and diagnosis of chemical injuries			✓
Prepare educational materials to inform the public during and after a chemical attack		✓	
Develop a plan for risk communication			
Develop plans for decontamination and training of personnel in decontamination procedures		✓	
Healthcare Sector			
Develop plans for treating mass casualties from chemical accidents or terrorism, including training of health care personnel		✓	
Develop capacity for decontamination of patients before they enter health-care facilities		✓	
Ensure plan for notification and communication is in place for a chemical emergency			✓

This checklist was developed from various sources, including material from the Centers for Disease Control (CDC) and lists published in disaster-related books and publications.

The Department of Transportation has established numerous regulations to ensure that hazardous materials and wastes are transported along highways with little or no risk to the public. Carriers of these materials are subjected to inspection and to review of their hiring practices; special licenses are issued to transport hazardous materials. However, accidents can and do occur on our roadways, and caution is always imperative when these accidents involve carriers of hazardous materials.

Social service agencies in the bi-state region would be prepared to assist in a limited chemical spill but will be critical in a large-scale chemical attack, filling the gap until emergency personnel and health-care agencies can respond to all those affected.

NUCLEAR TERRORISM AND RADIOLOGICAL ACCIDENTS

These disasters will most likely have widespread affects throughout the region and prove to be challenging to public safety officials, emergency responders, public health agencies, and social services.

Collaboration and communication will be essential. **The biggest challenge will be to determine who is in charge of making decisions** about where to direct resources and emergency response. Assistance on the public safety and social service levels will be required from the state and the nation. Our public safety capacity cannot handle a widespread attack, and some of the emergency responders may be affected by the attack and unable to report to work.

It should also be noted that in a real world incident, contaminated individuals will leave the disaster scene prior to emergency responders' arrival. This is an expected outcome, so the hospitals should be notified to prepare for self-referring patients and the signs and symptoms that they may be presenting.

Individuals will be required to be self-sustaining and help those who can not take care of themselves due to economic or health reasons. Social service agencies will be necessary to help areas that do not receive immediate attention from emergency responders or supplies.

	Level of Preparedness		
	High	Medium	Low
Government & Public Health Preparedness			
Develop a plan for managing incident response and coordinating and communicating among agencies involved in the response. Define roles and authority			✓
Develop plans for population monitoring for exposure, contamination, and radiation illness			✓
Develop plans for containment and control of radioactivity			✓
Develop plans for medical evaluation and treatment of potentially very large numbers of exposed, contaminated, or ill individuals		✓	
Risk communication: Develop plans for communicating with the public, particularly with respect to monitoring procedures; how to protect individuals and family; how to conduct decontamination; and where to get information		✓	
Training: Ensure appropriate training in radiological emergencies for key responders		✓	
Assess the need for equipment and laboratory capacity that would be used in a radiological incident (e.g., for detection and medical evaluation)		✓	
Develop plans for evacuation and shelter-in-place		✓	
Develop plans for decontamination		✓	
Develop plans to protect responders and laboratory personnel		✓	
Ensure Public Information is in place and coordinated with the region and state responders			✓

This checklist was developed from various sources, including material from the Centers for Disease Control (CDC) and lists published in disaster-related books and publications.

Businesses will be greatly impacted as the local workforce will be compromised. However, businesses that provide essential services must continue immediately following an attack. It is unknown the type or extent of emergency preparedness plans currently in place in the business community.

ANTHRAX BIOTERRORISM

There has been progress preparing against this threat; however, there are areas of concern, including lack of a voluntary vaccination program for emergency responders and the potential lack of medical staffing during a crisis. There has not been adequate preparation and organization between area health providers. As mentioned in earlier assessments, limited funding for preparedness greatly limits the ability of planned exercises and training.

Communication with public safety officials will be critical depending on the scope of the attack. If the attack is broad and widespread, decisions on where to direct resources and support from the state will be necessary. If the attack is limited in scope, public safety entities have a long-standing agreement to support each other in times of crisis.

As mentioned in previous sections, healthcare entities may not be adequately prepared to respond to a wide-spread anthrax attack. Social service agencies will be required to fill the gap left by healthcare facilities and public safety officials.

It is unknown whether or not businesses are prepared to respond to an anthrax attack, especially if it should occur on-site. Businesses will feel the impact of a compromised workforce.

Anthrax Bioterrorism	Level of Preparedness		
	High	Medium	Low
Government & Public Health Preparedness			
Develop a plan for managing incident response and coordinating and communicating among agencies involved in the response. Define roles and authority		✓	
Develop plans and capacity for mass vaccination and prophylaxis		✓	
Develop a voluntary vaccination program for emergency responders			✓
Develop ability to perform surveillance for illness		✓	
Ensure public health laboratory capacity to test environmental samples and act as reference laboratory for clinical specimens			✓
Develop alternate levels of care plan and exercise these plans			✓
Ensure that employee education includes personal protective equipment (PPE) and safety precautions			✓
Healthcare Sector			
Train health care personnel to diagnose and treat anthrax-related illness (cutaneous anthrax, gastrointestinal anthrax, and inhalation anthrax)		✓	
Develop a plan to provide surge capacity for mass casualties		✓	
Ensure employee education includes PPE and safety precautions			✓
Develop employee support networks for those employees that are casualties or fatalities of the event			✓

This checklist was developed from various sources, including material from the Centers for Disease Control (CDC) and lists published in disaster-related books and publications.

Recommendations

The task force recommendations on the next few pages may seem daunting. However, with a cooperative community effort, the suggestions can and must be accomplished if the bi-state region is to be truly prepared for a large-scale disaster.

Progress has been made in certain areas of disaster preparedness and there are community organizations conducting substantial work in this area. However, the biggest need remains in establishing distinct and smooth lines of communication and pre-established lines of authority. Effective communication channels and chain of command established prior to a disaster are imperative to ensure that a disaster is handled effectively and efficiently. The three top recommendations to address this need are:

- **Develop a Regional Emergency Coordination Plan.** Determination of who is in charge in the event of a mega-disaster that crosses jurisdictional boundaries will be difficult. A regional emergency coordination plan should contain a process for establishing leadership in regional emergencies. Key leaders would consist of chief elected officials in the region and their principal staff from subject matter areas pertinent to the disaster. The regional plan should contain procedures for naming who is in charge, methods on how to obtain access to regional resources, and protocols for deciding where shelters and other support services should be established.
- **Establish a communication and coordination system for secondary responders.** Planning is necessary to ensure that utility companies, the American Red Cross, the United Way of Greater St. Louis, and other secondary service providers know how to coordinate services during a disaster. One possibility is the development of a “go to” website that fil-

ters information to be used in advance, during, and after a disaster. The United Way of Greater St. Louis’ 211 website and the Missouri Department of Transportation’s 511 system are potential models.

- **Strengthen grassroots networks for communication and assistance at the local level.** Because there will likely be a shortage of first responders in a mega-disaster, it is critical to strengthen existing groups and support the development of new ones to help communicate with and assist citizens at the local level. These can take a variety of forms. One model is the Community Emergency Response Team or CERT, which has begun earnest development in the St. Louis area with recent federal funding. Another model could be developed among local businesses, churches, employers, or schools. To be effective, these grassroots organizations will need to connect with the existing emergency response community (e.g., the local emergency management agency, the Red Cross) in their areas for information and training in advance so they are prepared when a disaster hits.

For ease of implementation, the remaining recommendations have been categorized according to four key areas: communication/governance, ongoing preparation, individual/business responsibility, and funding.

COMMUNICATION/GOVERNANCE

In any disaster, small or large, communication is critical. Success in times of disaster is achieved through an effective communications system that is utilized to its fullest capacity. Not only do emergency personnel and government officials need to communicate with each other, it is also imperative that two-way communication is occurring between the people in charge and private citizens. For example, informa-

tion about resources, infrastructure status, and central disaster locations must be disseminated to the community. It is equally important that private citizens have the ability to communicate with emergency personnel about current conditions and assistance required. This two-way communication will enable emergency responders and government officials to make the best decisions for the community as a whole and direct emergency assistance to those most in need. The bi-state region is challenged by the fact that authority and responsibility for disaster preparedness and response are fragmented among more than 860 governmental units in two states.

- **Coordinate efforts among regional public, private, and civic organizations for a sustained public awareness campaign.** In order to achieve wide-spread public awareness at a level that will impact the behavior of residents and increase their level of preparedness, it is imperative that the public awareness campaign is high-profile, comprehensive, educational, and sustained. This campaign should build off of existing materials and resources, such as the American Red Cross' "Be Ready Initiative" and the State of Missouri Department of Health and Senior Service's "Ready in 3" program, in order to maximize the resources that have already been invested in preparedness education. The awareness campaign will need additional financial and in-kind support in order to fully reach the general public and impact their actions.
- **Establish a sophisticated and all-encompassing public emergency communication system.** While certain arrangements are already in place with local media outlets, regional leadership needs to do more to ensure adequate communication with the region's citizens if landlines and wireless phone systems are non-functional. Detailed arrangements with local broadcast media (television and radio) should be considered in advance of disaster situations so that proper procedures and points of contact

are in place to facilitate the consistent distribution of information with minimal speculation.

- **Standardize communication between public safety units and government entities.** Acknowledging significant cost considerations, every effort should be made to standardize the emergency responder communications systems among different municipalities so that the ability to communicate across the metropolitan region is not impaired.
- **Educate the public on how the region's emergency communication system functions.** Regional leadership should take the lead in engaging regional media outlets and Emergency Planning Committees (EPCs) to consistently publicize how citizens can access the public emergency communication system during a regional disaster. EPCs are civic preparedness groups that already exist in many local communities.
- **Establish communication systems for high-risk/disadvantaged populations.** The disabled, senior citizens, and other high risk populations residing in high rises, nursing homes, state facilities, etc. should be located and pre-surveyed and a database developed with the pertinent information to assist during response efforts. Facilities serving these populations must develop plans and stockpiles for sheltering-in-place. A "call in" system should be formalized where each high-risk site calls into an identified central location and provides information in order to speed data collection and planning of response efforts during a disaster.

ONGOING PREPARATION

Preparation is critical to disaster readiness. Advance preparation can significantly reduce the impact and likelihood of a mega-disaster.

Training, role-playing and other exercises are

necessary to prepare the region for natural and man-made disasters. However, it is essential that these efforts are coordinated with all stakeholders (including government, social service agencies, and faith and community centers) to ensure that efforts aren't duplicated and resources are distributed and used most effectively.

Emergency management and personnel, elected officials, and government department heads need to be trained. They should follow the existing recognized standards, rules, and regulations. A broad, educated, and well-trained leadership ensures that the right decisions are made at critical times.

Social service and community based organizations need to be included in regional disaster preparation plans. Labeled "second responders," these groups often serve as "first responders" in large disasters and are required to assess needs and administer assistance. A plan that does not recognize their critical role in preparation, response, and follow-up to disasters will be inadequate.

- **Require mandatory training of all officials (elected, appointed, and appropriate staff) in an emergency decision-making position.** All elected officials should complete the required courses per the National Incident Management Systems (NIMS) so that they may be supportive in local emergency planning and execution efforts. An annual refresher training seminar should be established, required, and monitored at a minimum. Additionally, local elected officials should be required to participate in annual emergency response drills.
- **Identify and protect the critical transportation infrastructure.** Pinpoint critical choke points, designate emergency routes that are robust and essential, and maintain a reliable communication system for reporting condition of transportation systems during a disaster.

- **Develop a plan and process to support the needs of families at or below poverty level.** Families with limited resources do not have the means to prepare an emergency kit or have a reserve of food and water for emergency use. Elected officials must work with community and social service organizations to assemble the necessities to sustain those at the poverty level and develop a method to quickly distribute these items when a disaster strikes.
- **Establish a team of social service organizations and volunteers to train local groups using a common curriculum.** St. Louis Area Regional Response System (STARRS) or another organization needs to prepare a standard set of training programs that can be given to social service and community-based organizations. The Red Cross, the Community Emergency Response Team (CERT), and other volunteer groups should be assembled to offer training seminars to members of the healthcare system, businesses, community organizations, schools, local governments, and the media. STARRS or another organization must be responsible for keeping track of social service and community based organizations that have received training.
- **Support law enforcement agencies to continue vigorous anti-terrorism activities.** The existence of terrorists increases the likelihood of many disasters: chemical, biological, and cyberattacks as well as nuclear detonation. The success, training, and activism of law enforcement representatives reduce the likelihood of these incidents. Federal, state, and local government should actively support anti-terrorism activities.

INDIVIDUAL/BUSINESS RESPONSIBILITY

It is generally thought that the first responders are police, fire, HAZMAT teams, or similar groups. In fact, the first responders during many disasters such as tornadoes or chemical spills are individuals and their neighbors who are affected. Knowing what to do in these early minutes can save lives. There is still a significant need to educate the public about what they can do to get ready for disasters and protect themselves and their families.

During mega-disasters, emergency responders will not be able to instantly administer aid and relief to all affected areas. It will become the responsibility of individuals in waiting areas to sustain themselves until assistance arrives. *It is imperative that individuals have the essentials that enable them to survive a minimum of three days on their own.* (See Individual and Family Preparedness list, p.16)

Businesses have a dual role in disaster preparedness. First, they must have a comprehensive disaster plan in place and proactively provide information to employees about the company's plan for responding to disasters. Businesses can also play a key role in educating their employees on the necessity of disaster preparedness. They provide a natural network to disseminate checklists and other educational materials regarding individual and family preparedness.

- **Establish a “Disaster Preparedness Day.”**

Establishing a “Disaster Preparedness Day” is a great route to educate the bi-state region on the importance of disaster preparedness and steps for achieving individual preparedness. This yearly event would be a regular reminder, keeping disaster preparedness in the forefront of people's consciousness. The day would also be an opportunity for the media to focus on the region's current preparedness needs and a chance for businesses to educate their employees.

- **Educate residents about being prepared for emergencies.** Educational materials should be developed at a fourth grade level of comprehension to ensure wide-spread comprehension. The content should be available free of charge and stress the necessity for self-sustainment for a variety of audiences including non-English speakers. Materials should be reviewed regularly, updated, and re-distributed as needed. Prime candidates to receive materials include local neighborhood associations, veterans groups, PTOs/PTAs, fraternal organizations, faith groups, and elementary and secondary school children.
- **Educate businesses on the need to have disaster plans and a business continuity plan in place.** A focused education effort must be undertaken to encourage businesses to develop these critical disaster preparedness plans. A series of workshops and seminars [in partnership with other organizations such as the Regional Chamber and Growth Association (RCGA) and the Regional Business Council (RBC)] should be conducted to assist businesses with development of plans and provide the expertise required to implement plans.
- **Ask every major business to commit to promoting individual preparedness education within their company.** Working with an entity to standardize the training and the information, utilize companies to educate their employees on how to effectively prepare their homes and families for disasters.

FUNDING

The cost of preparedness is not cheap. With the initial acquisition of emergency response equipment, HAZMAT gear, etc., communities also acquired the

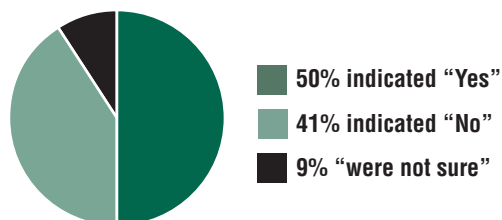
need to fund the operation, repair, calibration, and replacement costs. This does not even account for the ongoing expense of personnel training in the use of the equipment. Federal funds, while available at the outset, are not guaranteed to continue. Initial cut-backs in funding or reallocation of funding to other communities/risk scenarios has placed responder organizations in a position of cutting from other (previous) operations in order to afford the new ones.

- **Establish or identify a regional mechanism to pursue continued funding of emergency preparedness operations.** Alternative funding sources need to be identified so that development efforts continue in the areas of disaster preparedness.

Citizen Survey Results

Assessing and strengthening individual preparedness is a critical component of readying the bi-state region for disasters. The task force queried citizens their level of preparedness using survey formats.

First, the *St. Louis Business Journal* ran a poll in its newspaper and on its website the week of April 3–10, 2007 asking readers “Do you have adequate supplies of food, water, and medications for a minimum of three days?” (342 readers responded to this survey)



Second, FOCUS conducted surveys of its members; the members of two community churches and a local Boys and Girls Club; and citizens in economically challenged areas (in some of the region’s poorest communities). Please note that some of the questions

were skipped by participants. That is documented in each question.

(Completed surveys by 341 FOCUS members, 77 community organizations or church members, and 21 disadvantaged citizens)

Have you developed a family emergency/disaster response plan?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	28.6%	66.2%	23.8%
No	71.5%	26.0%	76.2%

Does your family’s emergency/disaster response plan include:

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Responsibility for elderly relatives	36.2%	36.0%	80.0%
Neighbors who might need help	31.8%	36.0%	80.0%
Rapid evacuation plans	68.1%	60.0%	60.0%
Family meeting locations	78.0%	36.0%	80.0%
Contact information for children and family members	72.5%	68.0%	80.0%

(250 FOCUS members, 52 community respondents, and 16 disadvantaged citizens skipped this question.)

Check off each of the following items for which you have adequate supplies for a minimum of three days

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Food	84.2%	83.1%	50.0%
Water	64.4%	67.7%	72.2%
Essential medication	85.8%	83.1%	61.1%

(29 FOCUS members, 12 community respondents, and 3 disadvantaged citizens skipped this question.)

Check off which of the following emergency hardware items are available at your home

	FOCUS Membership	Community Groups	Disadvantaged Citizens
First aid kit	75.3%	62.0%	26.3%
Generator	6.2%	9.9%	0.0%
Battery-operated radio	70.3%	70.4%	79.0%
Flashlights/lantern	97.8%	91.5%	89.5%
Two-week supply of spare batteries	23.9%		52.6%

(21 FOCUS members, 6 community respondents, and 3 disadvantaged citizens skipped this question.)

Do you know how to find the emergency broadcasting station on the radio?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	34.9%	29.9%	19.1%
No	65.0%	70.1%	81.0%

(18 FOCUS members skipped this question.)

What is the local emergency broadcasting radio station on the radio?

Total Respondents that identified the radio station correctly:

- 73 out of 88 FOCUS Members
- 12 out of 22 community respondents
- 2 out of 4 disadvantaged citizen respondents

(233 FOCUS members, 55 community respondents, and 17 disadvantaged citizens skipped this question.)

Do you know how to turn off the gas line into your home?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	55.2%	35.1%	33.3%
No	44.7%	64.9%	66.7%

(28 FOCUS members skipped this question.)

Do you know how to turn off the water line into your home?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	76.6%	67.5%	52.4%
No	23.3%	32.5%	47.6%

(28 FOCUS members skipped this question.)

Do you have up-to-date training in first aid and CPR?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	31.9%	39.0%	28.6%
No	68.0%	61.0%	71.4%

(28 FOCUS members skipped this question.)

Do you have a plan for the needs of your pet(s)?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	15.3%	10.4%	26.6%
No	35.1%	19.5%	33.3%
Not applicable	49.5%	70.1%	38.1%

(28 FOCUS members skipped this question.)

Has your workplace formed a disaster preparedness plan?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	52.3%	40.3%	19.1%
No	23.0%	22.1%	9.5%
Not Sure	24.6%	37.7%	71.4%

(includes retired or unemployed)

(28 FOCUS members skipped this question.)

Does the disaster preparedness plan at your workplace include:

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Staffing arrangements—team leaders to monitor building evacuation	87.6%	79.3%	75.0%
Staffing assignments to monitor who is off/on site at any given time	14.3%	62.1%	75.0%
Gathering of emergency supplies at an accessible place	65.0%	62.1%	75.0%
A list of those trained in CPR	39.5%	48.3%	50.0%
A crisis communication plan	78.7%	62.1%	50.0%
A rally point to gather in the event of a building evacuation	84.2%	6.2%	75.0%

(195 FOCUS members, 48 community respondents, and 17 disadvantaged citizens skipped this question.)

Do you have emergency supplies in your car?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	26.1%	55.8%	0.0%
No	73.8%	28.0%	42.9%
Don't own a car		7.8%	57.1%

(35 FOCUS members skipped this question.)

Do the supplies kept in your car include:

	FOCUS Membership	Community Groups	Disadvantaged Citizens
First Aid Kit	77.5%	67.9%	
Flashlight	76.2%	82.1%	
Batteries	36.2%	50.0%	
Blanket	15.0%	71.4%	
Bottled Water	45.0%	53.6%	

(261 FOCUS members and 49 community respondents skipped this question. None of the disadvantaged citizens responded to this question.)

Are you aware of the disaster recovery plan currently in use at your children's school(s)?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	35.3%	65.6%	33.3%
No	64.7%	34.4%	66.7%

(255 FOCUS members, 45 community respondents, and 12 disadvantaged citizens skipped this question.)

Do the school recovery plans specify that only people authorized by you in advance will be able to take your child from the school premises?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	64.8%	71.4%	66.7%
No	0.0%	9.5%	0.0%
Not Sure	31.5%	19.0%	33.3%

(322 FOCUS members, 56 community respondents, and 18 disadvantaged citizens skipped this question.)

Does your school maintain emergency supplies including gallons of water and nonperishable food?

	FOCUS Membership	Community Groups	Disadvantaged Citizens
Yes	72.7%	52.4%	66.7%
No	0.0%	4.8%	0.0%
Not Sure	57.8%	42.9%	33.3%

(322 FOCUS members, 56 community respondents, and 18 disadvantaged citizens skipped this question.)

Please see page 15 for an overview and analysis of the key survey findings.

Additional Resources

A GUIDE TO ST. LOUIS DISASTER PREPARATION RESOURCES

Many organizations, partnerships, and collaborations are involved in preparing for future disasters likely to impact the bi-state region. This partial list begins with STARRS, the lead organization for regional disaster preparation planning, and proceeds in alphabetical order by agency/organization name.

ST. LOUIS AREA REGIONAL RESPONSE SYSTEM (STARRS):

Created in 2003 as an outgrowth of the St. Louis Regional Medical Response System, STARRS coordinates the receipt and allocation of grant funds from the Urban Area Security Initiative (UASI) at the Department of Homeland Security, Health Resource Services Administration (HRSA) at the Department of Health and Human Services, and the Cities Readiness Initiative at the Center for Disease Control. The 20-person board is assisted by a six-person staff and a large advisory committee. STARRS oversees an impressive number of planning, training, communication, information exchange, and coordination activities.

Receipt of more than 30 million dollars in the last four years has made possible a number of initiatives: purchase of equipment (e.g., heavy rescue strike teams, HAZMAT and ordinance disposal teams, mass casualty incident trailers, and medical surge trailers); establishing a mutual aid understanding between approximately 50 hospitals; implementing a patient tracking system; and reconfiguring the board of directors to include representatives from key political leaders.

STARRS will face critical challenges in the coming years such as:

- Developing a regional emergency plan that can effectively address disasters which cross political jurisdictions.

- Prioritizing needs to account for a currently declining level of federal financial support
- Enhancing the region's Virtual Emergency Operations Center (VEOC).
- Adopting a feasible improvement plan for interoperable communications.
- Implementing a Healthcare Hotline in cooperation with the United Way 211 System and the Poison Control Center System.
- Implementing an Early Warning Disease Surveillance system using ESSENCE software customized for the bi-state region.
- Continuing professional training and exercises for all those likely to be involved in future disasters.
- Building a public awareness campaign that alerts all citizens to their family and neighborhood responsibilities in a disaster.

Contact: Nick Gragnani, Executive Director,
Phone: 314/244-9602;
Email: nick.gragnani@ewgateway.org;
website: www.stl-starrs.org

OTHER RELEVANT ORGANIZATIONS:

- **American Red Cross, St. Louis Area Chapter:** The Red Cross has a long history both locally and nationally of preparing for and dealing with disasters. They offer an active program designed to promote citizen preparation—contingency plan, disaster kit, CPR, etc.—and hope to double annual citizen contacts (70,000 is this year's goal). There is a new on-line preparedness course currently able to handle a 250-person disaster. The Red Cross intends to build the capacity to handle 600 people in an incident. This will involve recruiting more volunteers and expanding their list of 600 potential shelters in the region. The St. Louis Red Cross is the 13th largest chapter in the country, with a budget of more than 9 million dollars and a staff of approximately 140 people.

Contact Nancy Bates; phone: 314/516-2800;
Disaster Preparedness hotline: 314/516-2838;
website: www.redcrossstl.org

- **Americorp—St. Louis Emergency Response Team:** A member of the Community Inter-Agency Disaster Organization (CIDO) formed by the Missouri Disaster Recovery Partnership. The mission of the Emergency Response Team (ERT) is to be “a multi-functional rapid deployment group capable of assisting with urban and wilderness search and rescue, disaster preparation, and response and recovery.” Contact Bruce Bailey, Safety Service Corps Director, phone: 314/772-9002; website: www.americorps-stl.org
- **Anti-Terrorism Advisory Council (ATAC):** The U.S. Attorney in St. Louis chairs a monthly Anti-Terrorism Advisory Council. The council includes representatives of Customs, Secret Service, FBI, TSA, and a variety of additional federal, state, and local organizations. Sub-committees include Civil Preparedness, Cyber-terrorism, Domestic Terrorism, International Terrorism, Security and Infrastructure Protection, and Weapons of Mass Destruction. Contact: Michael K. Fagan, Coordinator, phone: 314/539-6890; website: www.usdoj.gov/usao/moe
- **Association of Contingency Planners:** This national organization is devoted to business contingency planning on the part of “every business—large and small, public and private, for-profit and non-profit.” It is devoted to the exchange of information about the identification of hazards, determining the risks that they pose to each organization, developing plans and procedures, and refining those plans through on-going exercises and evaluations. Contact: Angelique O'Donnell, Director of Membership Services, phone: 215/863-5220; website: www.acp-international.com

- **Central United States Earthquake Consortium (CUSEC):** With support from FEMA, this partnership promotes earthquake mitigation and prepares for earthquake response. The consortium is led by eight state directors of emergency management, including Missouri. Among its many programs are Risk Assessment, Mitigation Marketing, Building Code Adoption and Enforcement, Mitigation for Critical Facilities, Mitigation through Incentives, Interstate Mutual Aid, Housing and Human Services, Post Disaster Building Safety Assessment, Geographic Information Systems, and Health and Medical Services. Contact: Phone: 901/544-3570; email: cusec@cusec.org; website: www.cusec.org
- **Community Emergency Response Team (CERT):** Communities, neighborhoods, or subdivisions form teams of individuals who are prepared to help their neighbors in a disaster before the first responders can arrive. CERT members are also a great source of volunteers to assist the Red Cross, Salvation Army, and others in helping with food, shelter, and related support. In St. Louis, Tim Bonno (AT&T) and Randy Gabel (Eureka Fire Department) are working with STARRS to promote comprehensive emergency response training. A typical training program is offered one night a week for eight weeks. The State Directory www.citizencorps.gov/cert lists 122 teams in Missouri, among the highest number of teams in the nation. Contact: Tim Bonno; email: tb8851@att.com
- **Community Organizations Active in Disasters (COAD):** The United Way and American Red Cross have recognized the need to create a more formal organization to coordinate non-profit services to assist in a major disaster. Among the groups invited to participate

in a symposium held in June 2007 to promote this initiative were Lutheran Disaster Response, United Way, American Red Cross, Salvation Army, St. Patrick's Center, Lessie Bates Neighborhood, and St. Joachim and Anne. There is some interest in making the COAD one of the sub-committees on the STARRS Advisory Committee. Contact: Kay Archer, email: archerk@stl.unitedway.org or Nicole Holtgreffe, email: nholtgreffe@redcrossstl.org

- **Gateway Coalition of Citizen Councils:** In 2002, the President announced a program whereby cities and counties across the country would create Citizen Corps designed to help their respective communities in a terrorist or natural disaster incident. In St. Louis, a coalition of councils is being formed to coordinate the efforts of individual councils and Community Emergency Response Teams (CERTs). The national Citizens Corps provides a national conference and various support services. Contact Tim Bonno; email: tb8851@att.com. website: www.gatewayccc.us
- **Federal Emergency Management Agency (FEMA):** The agency operates the National Incident Management System (NIMS), which is designed to coordinate preparation, operations, and post-disaster activity between federal, state, and local jurisdictions. The effort is overseen by the NIMS Incident Center (NIC). Of special interest to all state and local communities is the disaster declaration process. The FEMA Regional Operations Command and central office recommends that the President make a declaration, upon recommendation and appropriate documentation from the State Emergency Management Agency. During the last fifty years, Missouri has had 38 major disaster declarations. website: www.fema.gov

- **Humane Society of Missouri:** Staff associated with the Humane Society of Missouri helped in the aftermath of Hurricane Katrina. The society now has the immediate capacity to handle up to 500 additional animals at any given time. With a fleet of rescue vehicles, a tactical rescue team, rescue equipment, and volunteers, the Society is prepared for a moderately sized disaster. Its disaster recovery plan would allow it to operate if one or more of its shelters were damaged in a disaster. The society is part of a national coalition of large professional animal welfare organizations across the country and national organizations who can respond at their request when a large scale or sustained response is necessary. Contact Debbie Hill, Vice President of Operations; phone: 314/951-1512; email: Debbie.hill@hsmo.org or 24-hour Hotline: 314/647-4400; website: www.hsmo.org
- **Mid-America Contingency Planning Forum:** This group was formed in 1994 in order to facilitate the exchange and dissemination of information regarding all aspects of disaster contingency planning in both the private and public sectors. The focus is on avoiding business interruption, planning for business resumption, contingency operations, and planning for disaster recovery. The group hosts monthly sessions. Their website has a set of links to organizations that support business continuity planning. Contact Ray Jaeger, phone: 314/973-0715; email: rayjaer@yahoo.com. website: www.drj.com/groups/mcpcf
- **Mid-America Earthquake Center:** Located in Champaign-Urbana, this is one of three earthquake centers funded by the National Science Foundation. Eight core institutions are involved including Washington University (Dr. Phil Gould) that contribute around 40

faculty members to work on approximately 25 projects. A special interest is “component based risk management.” Contact MAE; phone: 217/244-6302; website: www.mae.ce.uiuc.edu

- **Midwest Regional Center of Excellence (MRCE):** This network of scientists in five Midwestern states is one of 10 regional centers dedicated to improving the nation’s defenses against bioterrorism and infectious diseases. The goal is to develop the “next generation of diagnostics, vaccines, and therapeutics against selected biologic threats.” Funding comes from the National Institutes of Health and the National Institute of Allergy and Infectious Disease. Staff Support is provided by Washington University. Contact Samuel L. Stanley, Jr., MD, Director, Principal Investigator; phone: 314/362-7010; email: stanleys@msnotes.wustl.edu; website: www.mrce.wustl.edu
- **Missouri Disaster Recovery Partnership:** Created in 1993, after the flood, and reaffirmed by a Governor’s Executive Order in 2003, this partnership meets on a quarterly basis to examine disaster review and recovery methods; improve human service responses in a disaster; improve data collection about disaster victims; improve communications with disaster victims; promote community citizen councils; and focus as a state-wide Missouri Citizens Council, with support of the Homeland Security Council, for post-disaster human service issues. Contact: Dante Gliniecki, State Emergency Management Agency’s Statewide Volunteer Coordinator, phone: 573/526-9132 or Matthew Nutt, Citizen Corps Coordinator; phone: 573/526-9223; email: matthew.nutt@sema.dps.mo.gov; website: www.sema.dps.mo.gov/semepage
- **Missouri Emergency Response Commission:** This commission exists to “protect public

health and the environment by assisting communities with chemical incident prevention, preparedness, response, and recovery; and by receiving, processing, and reporting on chemical information received under the community right-to-know laws.” (RSMO 292.600-292-625) Companies in possession of chemicals above specific thresholds must submit annual Tier II reports. Contact: Bob Drop, Executive Director; phone: 573/526-9239 or 800-780-1014. website: www.sema.dps.mo.gov/mercc

- **Missouri Office of Homeland Security:** Situated within the Department of Public Safety, this office works with the Governor’s Homeland Security Advisory Council (HASC) and the Regional Homeland Security Oversight Committees (RHSOC). Current initiatives include the Missouri Information Analysis Center (MIAC); the State Interoperability Executive Committee (SIEC); working groups on Safe Schools, Higher Education, Pandemics, Geographic Information; and the Missouri Emergency Resource and Information System (MERIS). Contact: Paul Fennewald, MO Homeland Security Coordinator; phone: 573-522-3007; email: homelandsecurity@dps.mo.gov; website: www.dps.mo.gov/HomelandSecurity/index
- **Missouri State Emergency Management Agency (SEMA):** Located within the Department of Public Safety, this agency coordinates disaster preparation, response, and post-disaster activity on behalf of the state and governor. Derek Lohner (314/527-8362) is assigned as a coordinator to the St. Louis area (Area C) where he meets with local officials, evaluates local jurisdictional contingency plans, and provides update assistance. The state plays a critical role during a disaster incident, especially in the process of obtaining a federal declaration from FEMA and calling out the National Guard.

Contact: Susie Stonner, Public Information Office; phone: 573/526-9136; website: www.sema.dps.mo.gov/semapage

- **Missouri Voluntary Agencies Active in Disasters (MOVOAD):** This partnership is open to any non-profit organization that supports disaster response programs. Goals include encouraging effective disaster relief legislation, increasing mutual awareness, disseminating information, and related activities that lead to mitigation and response to those impacted by disaster. Contact: Dante Gliniecki; email: Dante.Gliniecki@sema.dps.mo.gov
- **Public Health Departments:** Most of the public health departments at the county level of government in St. Louis offer disaster awareness and training services. Their particular concerns are first the vulnerable populations that live in shelters, half-way houses, senior citizen complexes, and a host of other locations; and second, steps necessary to handle pandemic flu or bio-terrorism. The directors of these departments typically have leadership roles in their respective County Emergency Operating Center during an incident. They work closely with the American Public Health Association. website: www.apha.org
- **St. Louis Area Pandemic Planning:** A group of businesses interested in learning more about the dangers of pandemic flu and how best to prepare for it. Contact: Tim Woerther; email: tw5848@att.com or St. Louis Metropolitan Medical Society. Contact: Tom Waters; phone: 314.989.1014; email: twaters@slmms.org; website: www.slmms.org
- **St. Louis Emergency Management Agency:** A division of the Department of Public Safety in the City of St. Louis with responsibilities for coordinating mitigation, preparedness, disaster

response, and disaster recovery. CEMA operates the City's Emergency Operations Center. Gary Christmann, Director; phone: 314/622-3501; website: www.stlouis.missouri.org/citygov/cema

- **St. Louis County Police—Office of Emergency Management:** With one commissioned officer and ten civilian employees, this office provides a variety of services: coordinating disaster exercises, radio communications, severe weather warning, support for the County's Local emergency Planning Committee (LEPC) and the County's Hazardous Materials Emergency Response Team (HMERT), maintenance of the mobile command center (MCC), and the Structural Assessment Visual Evaluation Coalition (SAVE), which uses volunteers to help determine habitability of structures after a disaster. Contact: Captain Robert Young; phone: 314/628-5400; email: ryoung@st.louisco.com; website: www.co.st-louis.mo.us/police/oem/index
- **St. Louis Emergency Planning Commission:** Counties in Missouri have local emergency planning commissions (LEPCs) to keep track of the storage and transportation of chemical and related hazardous materials. The City of St. Louis LEPC meets bi-monthly in open meetings. In addition to an Executive Committee, the Commission has an Incident Review, Hazard Analysis, and Training and Education committees. Contact Rose Perkins, Administrative Assistant and Recording Secretary; phone: 314/613-7233; website: www.stlouiscitylepc.com
- **St. Louis Terrorism Early Warning (TWE) Group:** Established in 2006, this public/private partnership strives to integrate intelligence needs for combating terrorism and protecting critical infrastructure in St. Louis. A critical infrastructure protection coordinator has been

hired with STARRS resources to assist with the development of a prioritized database of critical resources and to assist with implementation of the National Infrastructure Protection Plan for the St. Louis Area. phone: 314/615-4TEW (4839); email: info@sltew.org; website: www.sltew.org

● **St. Louis University Earthquake Center:**

Located within the Department of Earth and Atmospheric Sciences, the Earthquake Center at St. Louis University is involved with a mix of research projects focusing especially on earthquakes in the central United States. The Center engages in a mix of collaborative efforts—the Cooperative New Madrid Seismic Network, Missouri Seismic Safety Commission, Mid-American Earthquake Center, and the Advanced National Seismic System. Phone: 314/977-2236; email: rbh@eas.slu.edu; website: www.eas.slu.edu/EarthquakeCenter

● **St. Louis University Institute for Biosecurity:**

Formerly the Center for the Study of Bioterrorism and Emerging Infections, the Institute offers two courses within the School of Public Health. A 35-credit hour Master in Science program is offered, using distance technology, and a 15-credit hour Graduate Certificate Program. The focus of each is on skills needed by public health and homeland security professionals, including the management of pandemics. Contact: R. Gregory Evans, PhD, MPH, Director; email: evansrg@slu.edu.

- **Salvation Army:** The Salvation Army has both a short-term role providing food, shelter, and other help to victims in a disaster and a longer-term commitment to help victims as they strive to get back on their feet. The Army locally serves the same regional catchments area as the United Way. Within this area there are 11 Corps centers that are both church congregations and providers of services to those in need.

The local region is part of the Midland Division, whose offices are in St. Louis. The Salvation Army is committed to working in close collaboration with other social service providers. Contact: Vicky Poff, Divisional Disaster Services Coordinator; phone: 314/646-3255; email: Vicki_Poff@usc.salvationarmy.org.

● **Upper Mississippi River Basin Association**

(UMBRA): This Association has provided staff support for the Upper Mississippi River Hazardous Spills Coordination Group (UMR Spills Group) since 1989. The Spills Group provides a forum for interagency coordination, contingency planning and training, and serves as a voice for the region's spill responders. The Greater St. Louis Sub-Area Contingency Plan (GSL-SACP) can be found on their website at www.umrba.org. Contact: Margie Daniels, phone: 651/224-2880; email: mdaniels@umrba.org

- **United States Geologic Survey:** The USGS supports the St. Louis Area Earthquake Hazards Mapping Project, working in concert with a range of partners. Four urban seismic hazard maps are currently in preparation for parts of the St. Louis region. The Memphis office has examined the dangers of liquefaction in St. Louis if and when there is another earthquake associated with the New Madrid Fault. Based on the analysis of “sand blasts” created by past earthquakes, they estimate a 25–40 percent probability of magnitude 6 earthquake in the next 50 years. They judge that earthquakes in the 7.5–8 magnitude range occur only around every 500 years. Contact: Eugene (Buddy) Schweig; phone: 901/678-4974; email: schweig@usgs.gov or the USGS Mid-Continent Geographic Science Center; phone: 573/308-3550

- **United Way of Greater St. Louis:** The United Way manages an Information and Referral Center that has handled huge volumes of calls from citizens during past storms and power outages. It has a major, multi-year grant from the Missouri Health Foundation to establish a 211 information and referral system. This system will serve most of Missouri (all but the Kansas City area). It will have the ability to handle calls in a disaster, as well as everyday settings. A website will also provide disaster preparation information. The United Way also provides leadership of the Long Term Recovery Team, a coalition of 11 non-profits that provide case management services to Katrina victims that are still living in St. Louis. Contact Kay Archer; email: archerk@stl.unitedway.org and/or Deborah Fagin; email: fagind@stl.unitedway.org

- **University of Missouri–Rolla:** Professor J. David Rogers is an earthquake expert who has examined the likely impacts of medium or large scale earthquake in the Mississippi Valley. He has an impressive presentation that illustrates the kinds of problems that can be anticipated, especially on areas with around 50 feet of alluvial soils and on bluffs where flood plains connect with higher ground. Contact: David Rogers; email: rogersda@umr.edu. website: www.web.UMR.edu/~rogersda

ADDITIONAL RESOURCES:

- The National Fire Academy offers training which is very effective. Individuals who enroll in the National Fire Academy participate in multiple-target disaster role-play events. www.nfaonline.dhs.gov
- Heartland Center new Introduction to Public Health Incident Command Training program is free and online. This program has been approved by Missouri SEMA (State Emergency Management Agency) and St. Louis City

CEMA (City Emergency Management Agency) as compliant NIMS training. It has approved links to the FEMA website so that participants can take the FEMA 700 level ICS test and become NIMS certified. The completion certificates are issued directly to the participants by FEMA once they pass the test. www.heartlandcenters.com

- Eureka Police Department: Emergency training for citizens. www.eureka.mo.us//index.htm
- “What You Need to Know in Case the Power Goes Out Unexpectedly,” distributed by the CDC. www.bt.cdc.gov/disasters/poweroutage/needtoknow.asp
- A comprehensive government-wide information on pandemic influenza and avian influenza. www.pandemicflu.gov
- The Roundtable on Population Monitoring following a nuclear incident is a report that has been prepared for the Centers for Disease Control (CDC) in order to develop effective response methods. www.dhs.gov/xprepresp
- St. Lucie County provides service, infrastructure and leadership necessary to advance a safe community. www.stlucieco.gov/index
- The CERT course is delivered in the community by a team of first responders who have the requisite knowledge and skills to instruct the sessions. The program educates people about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. www.citizencorps.gov/cert
- Emergency preparedness resources, including special information for pet owners, senior citizens, and individuals with disabilities and special needs. Also provides increased state and local information to learn about the types of emergencies more likely to occur in a particular

area and the plans that have been established to deal with these emergencies. www.ready.gov

- *Disaster Preparedness and Recovery: A Guide for Nonprofit Board Members and Executives* by Andrew S. Lang, CPA and Richard F. Larkin, BDO Siedman's Institute for Nonprofit Excellence, Bethesda, Maryland. www.alliance1.org/library/emergency.htm
- Website for citizens to take a Public Readiness Index (PRI) survey to find their readiness quotient and tips and links to information and resources to raise their scores. The report *"Are We Ready? Introducing the Public Readiness Index: A Survey-Based Tool to Measure the Preparedness of Individuals, Families, and Communities"* can also be found on the website at www.WhatsYourRQ.org

Glossary Of Terms

- **CERT**, Community Emergency Response Team: The CERT program educates people about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills such as fire safety, light search and rescue, team organization, and disaster medical operations. Using the training learned in the classroom and during exercises, CERT members can assist others in their neighborhood or workplace following an event when professional responders are not immediately available to help. CERT members are encouraged to support emergency response agencies by taking a more active role in emergency preparedness projects in their community. www.citizencorps.gov
- **COAD**, Community Organizations Active in Disaster: A group of local organizations able to assist in times of disaster.
- **EOC**, Emergency Operations Center: To provide service, infrastructure, and leadership necessary to advance a safe community, maintain a high quality of life, and protect the natural environment for all our citizens. The St. Louis Area Regional Response System (STARRS) is a regional organization developed to coordinate planning and response for large-scale critical incidents in the bi-state metropolitan region. www.davislogic.com
- **FEMA**, Federal Emergency Management Agency: On March 1, 2003, the Federal Emergency Management Agency (FEMA) became part of the U.S. Department of Homeland Security (DHS). FEMA's continuing mission within the new department is to lead the effort to prepare the nation for all hazards and effectively manage federal response and recovery efforts following any national incident. FEMA also initiates proactive mitigation activities, trains first responders, and manages the National Flood Insurance Program. www.fema.gov
- **Mega-disaster**: It strikes anytime, anywhere. It takes many forms—a hurricane, an earthquake, a tornado, a flood, a fire or a hazardous spill, an act of nature, or an act of terrorism. It builds over days or weeks, or hits suddenly without warning. Every year, millions of Americans face a disaster and its terrifying consequences. www.fema.gov/about/index.shtm
- **NIMS**, National Incident Management System: NIMS was developed so responders from different jurisdictions and disciplines can work together better to respond to natural disasters and emergencies, including acts of terrorism. NIMS' benefits include a unified approach to

incident management; standard command and management structures; and emphasis on preparedness, mutual aid, and resource management. The NIMS Integration Center (NIC) was established by the Secretary of Homeland Security to provide “strategic direction for and oversight of the National Incident Management System (NIMS)... supporting both routine maintenance and the continuous refinement of the system and its components over the long term.” The Center oversees all aspects of NIMS including the development of compliance criteria and implementation activities at federal, state, and local levels. It provides guidance and support to jurisdictions and incident management and responder organizations as they adopt the system.

www.fema.gov/emergency/nims

- **PPE**, Personal Protective Equipment: Occupational Safety and Health Administration requires the use of PPE to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective in reducing these exposures to acceptable levels. Employers are required to determine if PPE should be used to protect their workers. If PPE is to be used, a PPE program should be implemented. This program should address the hazards present; the selection, maintenance, and use of PPE; the training of employees; and monitoring of the program to ensure its ongoing effectiveness. www.osha.gov/SLTC/personalprotectiveequipment
- **SEMA**, Missouri State Emergency Management Agency: According to RSMO Chapter 44.020: The State Emergency Management Agency is created for “assisting in (the) coordination of national, state, and local activities related to...disaster response, recovery, planning, and mitigation” and “This agency shall

serve as the statewide coordinator for...the National Flood Insurance Program.” SEMA responds to two types of disasters—natural and manmade. Natural disasters include floods, tornadoes, severe storms, ice and/or snowstorms, fires, as well as earthquakes along the New Madrid Seismic Zone. Manmade disasters, also known as technological emergencies, may include hazardous material incidents, nuclear power plant accidents, other radiological hazards, and terrorism. SEMA is responsible for developing the State Emergency Operations Plan (SEOP), which includes a Catastrophic Event (earthquake) Annex. The SEOP coordinates the actions of Missouri State Departments and Agencies in the event of any emergency requiring the use of State resources and personnel. SEMA planners work with Missouri’s state departments to develop and maintain Department Emergency Operation Plans. Additionally, SEMA planners participate in planning committees associated with agriculture, terrorism, special needs, schools, and pets in disaster issues. www.sema.dps.mo.gov

- **St. Louis City EMA**, City of St. Louis Emergency Management Agency: To coordinate, cooperate, and communicate with all agencies that have a responsibility in the area of emergency management and homeland security for the City of St. Louis. This includes but is not limited to the mitigation, prevention, preparedness, response, and recovery from any man-made/national disaster that takes place in the City of St. Louis. To work as a region to protect the citizens of St. Louis and the surrounding communities from all hazards. www.stlouiscityema.com
- **United States Department of Homeland Security**: In the event of a terrorist attack, natural disaster, or other large-scale emergency, the

Department of Homeland Security will provide a coordinated, comprehensive federal response and mount a swift and effective recovery effort. The department assumes primary responsibility for ensuring that emergency response professionals are prepared for any situation.
www.dhs.gov

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Developing Leadership | Influencing Policy | Promoting Community Connections



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