



CUSEC NEWS

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FEMA & CUSEC Kickoff the New Madrid Catastrophic Planning Initiative



Photo by Alisa Nave

William Burke addressed conference attendees about state expectations of the New Madrid Catastrophic Planning Initiative.

BRANSON, MO—More than 140 representatives from government agencies met in Branson, Missouri from March 13 to 15 to discuss planning and preparation for a major earthquake in the Central United States. This is the first of several workshops that will kickoff the *New Madrid Catastrophic Planning Initiative* effort and brought together key partners including: the *Central United Earthquake Consortium (CUSEC)* and its member states, the *Federal Emergency Management Agency (FEMA)*, *Innovative Emergency Management (IEM)*, the *Mid-America Earthquake Center (MAE)* and *George Washington University*. FEMA's Chief Incident Response Section Director, Mike Pawlowski, was on hand with words of encouragement about the conference for the coordination team at the pre-planning meeting. "I think this conference is a significant

milestone. We are all people here and we all have a stake in this. Now is the time for us to pull together as a team and move forward." William Burke, former chairman of the CUSEC Board of Directors and former

State Director of the Illinois Emergency Management Agency, also had words of wisdom. "If we do this planning process like we should, we will come away with the knowledge of preparedness that can minimize what could be the impact at both the local and state levels." Burke also recognized that each CUSEC state has its own needs but urged collaboration and the sharing of ideas and expertise to create a consistent regional approach to response and recovery. While talking about the country's latest natural disaster, Brian Jamison, Deputy Director of Missouri Public Safety, expressed a concern that we can no longer take a relaxed approach to the sleeping giant we call the *New Madrid Seismic Zone (NMSZ)*. Because like many natural disasters, a catastrophic earthquake could compromise the safety of residents in the region by opening doors to terrorists and all other criminal elements. "Katrina reminded us that the true power of danger is housed in the back of our lots. All hazard planning cannot take a backseat to terrorism planning. We must be totally prepared for anything and everything that can occur.



Photo by Alisa Nave

SEMA State Director Ron Reynolds and CUSEC Executive Director Jim Wilkinson discussed conference goals.

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James Bassham

CUSEC Board Chairman and State Director of the Tennessee Emergency Management Agency



After his appointment to Director of the Tennessee Emergency Management Agency (TEMA) by Governor Phil Bredesen in August of 2003, **James Bassham** joined the CUSEC Board and has served in the positions of secretary treasurer and vice chairman. He was elected chairman of the board in April of 2007, when Illinois Director William Burke announced his retirement in March of 2007.

He previously served in state government as the Assistant Adjutant General of the Tennessee Air National Guard with the rank of Major General and then as Budget Officer for the Military Department of Tennessee.

Since his appointment, TEMA has sought national accreditation in the Emergency Management Accreditation Program (EMAP) in which only 11 states are fully or conditionally accredited. Tennessee has also been nationally recognized by the Federal Emergency Management Agency (FEMA) as one of only ten states capable of implementing its plans in a catastrophic emergency.

He was commander of the National Guard Air Base in Memphis from 1993 to 1995 after serving as Deputy or Vice Commander and Commander of a series of units in Memphis for more than 11 years. After almost 40 years of service, he retired in 2002 from the military with the Legion of Merit and a host of other medals and recognitions.

Bassham is an Arkansas native and received his Bachelor's of Science in Business Administration and Accounting from the University of Arkansas. He and his wife, Judy, live in Franklin, Tennessee. They have two daughters and three grandchildren.



Cecil Whaley TN EQ Program Manager

Cecil Whaley is the Director of Operations and Response Directorate for TEMA and has 18 years of experience in Emergency Management. He is also the State Earthquake Program Manager.

As Director, Whaley supervises the writing and updating of the Tennessee Emergency Management Plan and oversees the development of all Tennessee department and agency Continuation of Operations Plans (COOP). He makes decisions about the development of the Tennessee Catastrophic Disaster Annex (CAT) to the TEMP and the State Disaster Operating Guides (DOG). He also manages all emergency management training courses, serves as director of all technological and natural hazard exercises and is in charge of the development and execution of the Homeland Security Training and exercise program for the state. Whaley served two years in Vietnam as a Special Warfare Electronic Intelligence Surveillance Combat Evaluator in the United States Army and spends some of his time as an instructor on various aspects of emergency management. He is also a member of several organizations including the National Emergency Management Association. He has a Bachelors of Science Degree in Education and Journalism and later attended the University of Tennessee at Nashville with a concentration in Public Administration.

Whaley and his wife, Frances, live in Nashville, Tennessee. They have a son, Wes, who is the Director of Athletic Video Production for Vanderbilt University.

Catastrophic Planning Initiative Kickoff

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And if it affects the security of our homeland, then it must be addressed.” He also asked conference attendees two important questions. “How would we respond with the processes we currently have in place. But more importantly, how do we try to protect and save lives of citizens?” Several emergency management representatives along with members of Innovative Emergency Management (IEM), talked about scenario-driven catastrophic planning from the federal and states perspective. They spoke in detail about the lessons that were learned from Southeast Louisiana and how to apply them to the planning process for the NMSZ.

David Rogers with the University of Missouri at Rolla presented information about critical infrastructure and the assessment of economic loss. Eugene Schweig with USGS also talked about the preliminary risk assessment results of a earthquake hazard scenario. Rex Coble with IEM, Jim Wilkinson with CUSEC and Amr Elnashai from the Mid-America Earthquake Center (MAE) all presented updates as to where we are now in the planning process. Coble emphasized our capabilities and assessments while Wilkinson talked about scenario development, identifying the CUSEC eight state planning priorities—(1) Direction and Control (2) Communications (3) Damage Assessment (4) Search and Rescue (5) Emergency Medical (6) Transportation (7) Short and Long Term Housing and (8) Evacuation. Elnashai stressed the importance of interim contingency planning, a joint project development plan and public information. Jerry Thompson with INDOT explained the function of the CUSEC Transportation Task Force, and Pete Johnson, the Federal Co-Chairman of the Delta Regional Authority (DRA) talked about that organization’s role. Representatives from emergency management to geologists for each state got the chance to work on their own workshop execution plan as Public Information Officers (PIOs) discussed the idea forming of an official communications group and their role in the planning process.

Preparing for the 2007 Summer Exercises

Earthquake Communications Workshop conducted to Support Functional Exercise Scheduled for June

MEMPHIS, TN—State emergency management officials, geological survey officials and representatives from CUSEC, the *Center for Earthquake Research and Information (CERI)* and the *United States Geological Survey (USGS)* participated in an earthquake communications exercise lead-up workshop on April 10 at the FedEx Institute of Technology at the University of Memphis. The workshop was based around a tabletop exercise using messages that were sent via amateur radio and satellite phone to state EOC's in Arkansas, Tennessee and Missouri in a communications exercise on June 19. CUSEC Training and Exercise Officer and workshop facilitator, Paul Hogue talked about the main reason that inspired the workshop.



Photo by Alisa Nave

Eugene Schweig, USGS Central & Eastern U.S. Coordinator for Earthquake Hazards, presented an overview of the clearinghouse aspect of the upcoming June exercise.

“The state geological survey representatives expressed a need to learn more about their new role working in the state EOC during an earthquake response. This workshop gave them the opportunity to work with those EOC personnel and get a taste of the process.” In the workshop, participants worked through scenarios that could actually happen as a result of a catastrophic earthquake in the central U.S. Participants talked about updated web capabilities, raised questions about possible concerns and gaps in the process and the current draft of an operations response plan written to support the National Earthquake Hazards Reduction Program (NEHRP) plan. They also discussed the concept of creating a clearinghouse as the source of information, coordinating activities and promoting the safety of all field parties during initial post earthquake reconnaissance. Also in preparation for the June exercises, Representatives from various federal and state agencies, including members of CUSEC met in Memphis, Tennessee from March 27 to 29 for the 2007 Spills of National Significance (SONS07) Final Planning Conference. The objectives of this conference included discussion of the final status of and requirements for the exercise, reviewing the exercise planning process and actions to date, and discussion on control and evaluation for the exercise. Read summaries about the CUSEC Member States Functional Exercises and the SONS07 Exercise on pages five thru seven.



Workshop attendants listened to presentations about updated software USGS website used to track seismic activity.



CUSEC Training & Exercise Officer, Paul Hogue showed examples of messages for the June Communication Exercise.

CUSEC and its Member States Conduct Functional Exercises

CUSEC and CERI participated in a communications exercise with state emergency management agencies in **Arkansas, Missouri and Tennessee**. The communication exercise coincided with the states earthquake exercises and the SONS07 Exercise—a full-scale exercise to test the national response resulting from a major oil hazardous substance release in the New Madrid Seismic Zone. Volunteers from the Shelby County Amateur Radio Emergency Services (ARES) and the Military Affiliate Radio Services (MARS) sent messages from the CUSEC and CERI offices to each state's Emergency Operations Centers (EOC) via amateur radio (also known as ham radio). The three participating state emergency operation centers (EOC) received the messages through the Winlink System, a system that allows emails to be passed via amateur radio. In addition to amateur radio, The Tennessee Emergency Management Agency's (TEMA) operations center received messages via voice and satellite phone. The Tennessee National Guard in Memphis also participated. Air Force and Army officers monitored radios and computers as they worked to establish communications with other units across the state.

In a follow-up clearinghouse workshop in Memphis on June 22, all three states reported that this was the first time that their geological survey members were involved in this process and the exercise went well, but they also talked about their challenges. Workshop attendants from Arkansas stated they initially had no terminal in the EOC and there was lag time on the survey members receiving their messages because they were not sure if they were the intended recipients. It was later decided that changes to the subject line formatting would improve survey members response time. Representatives from Missouri said shakemaps were helpful but also cited software and access problems causing delays in their response. Workshop participants from Tennessee stated they received their messages as planned, however, Gary Patterson from CERI noted that it would have been beneficial to incorporate shakemap into Tennessee's WebEOC operational software.

Workshop attendants also discussed the concept of the Post Earthquake Technical Investigation Clearinghouse and the Regional Clearinghouse Coordination Plan.

- The *Post Earthquake Technical Investigation Clearinghouse (PETIC)* for each CUSEC member state will serve as a single point of contact that will provide for effective exchange of information among emergency managers, researchers and practitioners. Its primary purpose will be to facilitate coherent and methodical investigations of the physical impacts of an earthquake, the gathering of perishable data, the tracking of field investigations and will help ensure that all areas have been thoroughly surveyed for structural damage and ground failure.
- The *Regional Clearinghouse Coordination Plan (RCCP)* has the primary purpose of addressing the interaction between and among the various state clearinghouses and the regional clearinghouse.

Topics discussed surrounding the Clearinghouse concept included:

- A discussion of the goals of the Central US Research Clearinghouse Working Group
- A discussion for a future Earthquake Program Manager/ Researcher Workshop
- A review of the Post Earthquake Technical Investigation Clearinghouse (PETIC)

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CUSEC and its Member States Conduct Functional Exercises

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-A discussion of accountability of resources, regional and satellite clearinghouse coordination and coordination of public information post-earthquake

Kentucky participated SONS07 as well as conducted earthquake exercises in the Bowling Green and Somerset areas with emphasizes on staging, mass care and resource management issues. Lori King, Kentucky Earthquake Program Manager, reported that they successfully stood up an area command for the first time but indicated more training of emergency management was needed for a catastrophic event such as an earthquake. **Illinois** Earthquake Program Manager, Keith Chambers, said around 28 counties in the state conducted table top exercises with focuses on patient tracking and public health. He said emergency management officials and public health officials worked together and gained insight into what information each agency would need while responding to the needs of the public in the event of a major earthquake. Chambers indicated that emergency management officials are planning to conduct a full-scale exercise in late 2008. Roger Lauder with IL EPA said EPA officials also worked well with officials from the public water supply in the SONS07 portion of the exercises but expressed concern about the limited amount of satellite phones available for use. **Indiana** also participated in SONS07.



Photos by Alisa Nave

1.) CUSEC Exercise & Training Officer and communications exercise facilitator sends messages to participating EOCs via email using the Winlink System. 2.) ARES & MARS volunteers send radio messages to participating EOCs in communications exercise 3.) Army Colonel Green with the TN National Guard checks email and satellite links. 4.) Army Sgt. Lewis with the TN National Guard responds to radio messages. 5.) CUSEC Executive Director Jim Wilkinson addressed workshop attendants at the post communications exercise clearinghouse workshop. 6.) Workshop attendants talked about the post earthquake response plan at the post communications exercise clearinghouse workshop.

SONS07 Conducted in Conjunction with Earthquake and Communications Exercises

By Paul Hogue
Exercise & Training Officer
Central US Earthquake Consortium (CUSEC)

The SONS07 exercise was conducted in three phases. The first phase was conducted June 19-21, 2007. The exercise was part of the SONS Exercise Program, established by federal law after the Exxon Valdez incident. SONS is defined on the www.sons-program.com website:

The *Spill of National Significance (SONS)* Exercise Program is designed to increase the preparedness of the entire response organization from the field level to agency heads in Washington, D.C. The program is focused on exercising the National Response System at the local, regional and national levels using large-scale, high probability oil and hazardous material incidents that result from unintentional causes such as maritime casualties and natural disasters.

The disaster in this case was a series of major earthquakes in the New Madrid Seismic Zone (NMSZ). The earthquakes in the exercise scenario were loosely modeled on the 1811-1812 series of earthquakes that occurred during that period. SONS07 was designed to allow the US Coast Guard and the Environmental Protection Agency (EPA), the primary federal agencies in the exercise, to focus their efforts using the National Contingency Plan (NCP) within the context of the National Response Plan (NRP). CUSEC participated in planning the exercise, and served as a conduit for information on earthquakes.

Although all CUSEC member states participated in varying degrees in SONS07, only four states, Arkansas, Kentucky, Missouri, and Tennessee, conducted a concurrent earthquake exercise. All four activated their Emergency Operations Centers (EOC's) and had local full-scale participation in parts of their states. Three of the states, Arkansas, Missouri, and Tennessee, also participated in a communications exercise with CUSEC and the Center for Earthquake Research and Information (CERI). Messages were sent using amateur radio to the state EOC's using voice and Winlink, and system that allows email messages to be sent via radio.

The second phase of the exercise was a Response and Recovery Workshop held in Chicago from June 26 to 28. This portion looked at long-term efforts at various periods after the event up to two years. The third phase was a Senior Leaders Seminar for senior federal agency officials and members of Congress on August 1.

This exercise was the first to be held on inland waterways and the first to be triggered by a natural disaster. Four SONS exercises have been held since the legislation requiring them was passed in 1990.

CUSEC States Begin State Workshops to Support the Catastrophic Planning Initiative

CUSEC states have begun scenario-driven workshops in order to be better prepared to respond to the public in the event of a major earthquake. The goal of these workshops is to identify challenges that emergency management officials will encounter during the response effort and talk about possible solutions. Topics of discussion include: Mass Care, Transportation, Communications and Medical Care. These workshops started in June and will last until March of 2008. See pictures of the workshops below.

Photos by Alisa Nave



Workshop attendees in Batesville, AR listened to a presentation about the central US earthquake hazard.



IEM's, Rex Coble presented the New Madrid CAT Planning Initiative to workshop attendees in Paducah, KY.



Workshop participants talked about first responder challenges in Forrest City, AR.



Workshop attendees in Batesville, AR listened to a presentation about the goals of the meeting.



Facilitator, Harry James pointed out transportation routes that could be compromised in the state after an earthquake in the Henderson, KY workshop.



Forrest City, AR workshop participants talked about damage assessment after an earthquake.

Around the Region Updates



Andrew Velasquez III

Newly Appointed State Director of the Illinois Emergency Management Agency

Andrew Velasquez III was appointed Director of the Illinois Emergency Management Agency (IEMA) by Governor Rod R. Blagojevich on March 16, 2007. He replaced former Illinois State Director and CUSEC Board Chairman William Burke, who retired March 12.

Prior to his appointment, Velasquez served as the Managing Deputy Director of Operations for the Office of Emergency Management and Communications (OEMC). In this position, he was responsible for overseeing the staff and operations of the City of Chicago's 9-1-1 Center. His 9-1-1 floor operation handled a daily emergency call volume averaging 18,000 requests. Before joining the OEMC team, he served the Chicago Police Department in various capacities since 1995. Velasquez is a Chicago native and earned his Bachelor's and Master's of Science Degree in Criminal Justice from Illinois State University. He also received a Master of Business Administration in management from Saint Xavier University.

Pam Chase

Newly Appointed Indiana Earthquake Program Manager

With 20 years of experience in federal, regional and state grant/contract project management, **Pam Chase** recently joined the Strategic Planning Section of the Indiana Department of Homeland Security (IDHS). Her current projects include earthquake planning, transportation and evacuation planning, mass care planning, and her participation on the WebEOC Implementation Planning Committee and the UASI Grant Committee. She is a graduate of the University of Oklahoma who deploys nationally as a volunteer with the American Red Cross as an ESF #6 Mass Care and Government Liaison. She is also a volunteer for the Indianapolis/Marion County EOC. Chase has been a resident of Indiana for one year and has a son and two granddaughters in Oklahoma.

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Lori King Newly Appointed Kentucky Earthquake Program Manager

Lori King joined the Kentucky Division of Emergency Management (KYEM) as Area Manager in January 2006 and as earthquake program manager in March of 2007. Her duties are to assist local cities and counties with preparedness and response to various emergencies. Prior to joining KYEM, King worked with the Marshall County Purchase District and the Pennyrile District Health Departments as a Bioterrorism Training Coordinator. As Earthquake Program Manager, her responsibilities include coordinating February Earthquake Preparedness Month, responding to media inquiries regarding earthquake preparedness and responding to earthquake and tremor reports in Kentucky.

CUSEC Board Chairman and Illinois Emergency Management Director Steps Down

CUSEC Board Chairman **William Burke** retired from his position as State Director of the Illinois Emergency Management Agency (IEMA) in March of 2007. Burke has served on the CUSEC Board since 2003 and was elected Board Chairman in December of 2005. He was honored with a plaque for his dedicated service at the New Madrid Catastrophic Planning Initiative reception in Branson, Missouri. Under his leadership, the Illinois state earthquake program was strengthened. After many years in public service, Burke is embarking on new endeavors in the private sector.



Indiana Earthquake Program Manager Says Goodbye to CUSEC

John Steel, Earthquake Program Manager for Indiana Department of Homeland Security, transitioned to a different position within IDHS in January. Steel is now the Indiana Emergency Response Commission (IERC) Coordinator and Local Emergency Planning Commission (LEPC) Coordinator. He has served in State Emergency Management as the Earthquake Program Manager since 1996.

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Indiana Earthquake Program Manager Says Goodbye to CUSEC

During the past ten years, Steel has been active not only within Indiana, but also as a part of the CUSEC Earthquake Program Managers working group. In Indiana, he has helped raise the level of earthquake awareness and also has been involved with numerous mitigation projects, including structural retrofits of fire stations in southwest Indiana. More recently, Steel helped develop a DVD for Indiana residents entitled "Preparing for Indiana's Earthquake Risk". The DVD was a partnership of IDHS and the Indiana Geological Survey. His expertise and knowledge of the earthquake program has made him a valuable asset to CUSEC over the years, and we wish him luck in his new position.

Kentucky Earthquake Program Manager Bids CUSEC Farewell



After three years of service, **Steve Oglesby**, is passing on his earthquake program manager's hat to fellow KYEM colleague Lori King in order to assist local emergency managers to prepare for emergencies within their community. Oglesby helped to raise the level of earthquake awareness throughout the state of Kentucky through increased participation in Earthquake Awareness Week. He also served as the liaison to state agencies during emergencies. As Oglesby settles into his new job, he said even though he is no longer earthquake program manager; he looks forward to seeing new initiatives for the earthquake program come to fruition.

Tennessee Earthquake Program Manager Receives Presidential Award

Cecil Whaley, CUSEC Earthquake Program Manager and Director of Operations and Response Directorate for TEMA, received a Presidential Award for Partnership for his role in the 150 disaster preparedness training program at the President's Luncheon for the Tennessee Chapter of the American Institute for Architects (AIA) on July 27.

Whaley has worked with AIA for a year to establish a permanent trained Corps of ATC-20 post disaster building inspectors who are to be organized into five member teams located throughout the state. The goal of this program is to train two hundred architects and issue them certified accreditation ID's as team members. The first class of team members were trained on July 25 in Nashville. AIA plans to hold two or three training sessions in East and West Tennessee in the next eight months. AIA is also building a database with information about team members that will automatically re-schedule them for re-certification in a three year cycle. With this process in place, TEMA will be able to rely on these team members to respond to any disaster site as needed with just one call to the Architect Disaster Coordinator. TEMA also partnered with Wal-Mart and Lowes to provide the team members with deployment kits.

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The National Earthquake Program Managers Meet in Tennessee

PIGEON FORGE, TN—More than 20 State Earthquake Program Managers from around the country assembled in Pigeon Forge, Tennessee from April 24 to 26 for the 2007 National Earthquake Program Managers Meeting. The meeting was sponsored in partnership with DHS/FEMA and the NEHRP supported consortia, CUSEC, the Northeast States Emergency Consortium (NESEC), the Western States Seismic Policy Council (WSSPC) and the Cascadia Region Earthquake Workgroup (CREW). CUSEC Board Chairman TEMA State Director, James Bassham opened the meeting on a positive note. "I want to say thank you to FEMA and Homeland Security for the CAT Planning effort going on in our area. You (earthquake program managers) have the opportunity right now to find out what someone else is doing and apply it to your state to help your program to be the best it can be." Patti Such, WSSPC Executive Director, talked about what it takes to make a successful earthquake program and urged program managers to present their governor—on paper—with a list explaining their needs. The Earthquake Program Managers reported the status of their programs, shared ideas about what worked well in their state. They also expressed concerns about fund-

about promoting earthquake awareness to motivate the public to become more prepared. FEMA's Chief Incident Response Section Director, Mike Pawlowski, presented the goals of the New Madrid Catastrophic Planning Initiative and IEM's Rex Coble outlined the scenario driven functional exercises taking place in June. Earthquake Program Managers talked about the importance of mitigation, the HAZUS Project and using shakemaps. Mark Kiem from the Center for Disease Control (CDC) also explained the public health related issues when working a natural disaster.



Photo by Alisa Nave

State Mitigation Officers Brent Nichols & Ervin Petty present information about Alaska's Earthquake Program.

Operations Chiefs & Regional Coordinators Workgroup Meet in Memphis

MEMPHIS, TN—Along with representatives of CUSEC and FEMA, nearly 40 state operations chiefs and regional coordinators from the eight CUSEC member states gathered together in Memphis, Tennessee on May 23



Mike Calvert & Jim Riley discuss Jim's presentation on the layout & operations of the electrical grid in the central U.S.

and 24 to discuss multi-state planning for a major earthquake in the NMSZ. In addition to a briefing about the FEMA/CUSEC Catastrophic Planning Initiative by FEMA's Mike Pawlowski, Electrical Engineering Consultant, Jim Riley presented information about critical infrastructures like the Mid-West Electric Grid vulnerable to damage. CUSEC Executive Director, Jim Wilkinson, talked about Response Planning, which includes State Geological Survey Earthquake Plans and the Post Earthquake Clearinghouse. Also, CUSEC Emergency Planners, Roger Arango and Mike Calvert talked about the goals of the current CUSEC Board approved state priorities, ideas on additions to that list and an annex to each state's plan to include a multi-state response approach after a catastrophic event.

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Wal-Mart Executives are Briefed About the Seismic Risk in the Central U.S.

JEFFERSON CITY, MO—CUSEC Executive Director, Jim Wilkinson presented an overview of the New Madrid Seismic Zone (NMSZ) earthquake threat to Wal-Mart headquarter executives during a briefing at Missouri's State Emergency Management Agency (SEMA) office in Jefferson City on January 26.

The purpose of the briefing was to give Wal-Mart executives interested in developing a closer relationship with SEMA information on what the agency is doing to address the different hazards in the state. As a part of his presentation, Wilkinson talked about CUSEC and its role. After the overview, the focus shifted to Wal-Mart's ability to assist the community after a disaster. Executives talked about the store's capabilities - just in-time delivery. Executives also explained the store's current emergency operations structure and disaster response priorities, which are to help Wal-Mart employees and customers, to reopen stores that are damaged and to assist other local stores with their disaster requests for donated water in the local area.



The Media Learns about the Earthquake Hazard and How They Can Help Promote Awareness



Photo by Alisa Nave

Workshop attendees listen to presentations about the earthquake hazard and awareness effort.

CAPE GIRARDEAU, MO—The State Emergency Management Agency (SEMA)-Missouri and the Mid-America Earthquake Center (MAE) hosted an earthquake media facility workshop in Cape Girardeau, Missouri on August 1. The purpose of the workshop was to educate the media about the New Madrid earthquake hazard and the

outreach/education effort. As members of the local Missouri media mingled in the lobby of the Show-Me Center, they collected various pieces of information and looked at pictures of earthquake damage from the CUSEC, SEMA, FEMA and CERI displays. While in the meeting, reporters took notes as presenters poured out facts about the New Madrid Seismic Zone (NMSZ), and the earthquake risk associated with the fault area. CUSEC Earthquake Program Manager, Steve Besemer talked about how SEMA is addressing the seismic risk through various programs like the SAVE Coalition and showed reporters how vital their role is in getting the awareness/preparedness message out to the public. Gary Patterson with the MAE Center explained the central U.S. earthquake hazard and infrastructure vulnerability; as Dave Overhoff, Geologist with the Missouri Department of Natural Resources, discussed the role that near-surface soils play in determining earthquake ground motions. Finally, Structural Engineer, Chad Schrand talked about the costs associated with non-structural damage.

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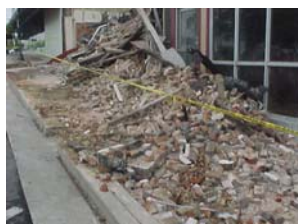
Buildings Collapse in Downtown Mayfield, Kentucky

According to WPSD- News Channel 6, three buildings—two vacant, one a body building gym— located on the east side of Mayfield, Kentucky's city court square collapsed just before 10:00 p.m. on Wednesday, May 9. No one was hurt, but residents are cautious when they are in the area on North Sixth Street between Broadway and South Street. The cause of the collapse indicated by the city says owner neglect and age—not an earthquake. Noah Bond, WPSD Reporter, mentioned that he learned from a Mayfield code enforcement officer that it has been 50 years since the city's building codes were enforced. Bond also said the code enforcement officer stated his concerns about the instability of other buildings in town. CUSEC Earthquake Program Manager, Lori King pointed out in a recent meeting that the buildings were not seismically retrofitted. See pictures below of the buildings before and after the collapse.

Before



After



“Earthquake Insight Field Trip” for Non-Scientists

**By Phyllis J. Steckel
Registered Geologist
Earthquake Insight
and Alisa Nave
CUSEC Public Outreach Coordinator**

CUSEC Executive Director Jim Wilkinson gave a brief overview about the CUSEC organization and its planning effort during an intensive two-day field trip that was planned to show key leaders in business and policy makers exactly what they need to know about earthquakes – and the risks they pose – in the central U.S. CUSEC became involved with this project to provide information about what its eight member states are doing to support public awareness about the New Madrid Seismic Zone (NMSZ) earthquake hazard and the multi-state planning effort.

This field trip was especially designed for non-scientists who have a leadership role in business operations, finance, land-use planning, equity development, logistics and distribution, portfolio management, business continuity, energy, strategic planning, insurance, infrastructure, business or news media, or public policy. The US Geological Survey recently authorized geologist Phyllis Steckel, a Registered Geologist for Earthquake Insight, to develop a field trip for private-sector executives and policy-makers.

“Participants use information learned from this trip to develop action plans for their organizations and communities. About six weeks after the 2005 Earthquake Insight Field Trip, 30 participants were surveyed and reported a cumulative savings estimation of more than \$2 billion.”

The field trip started and ended in Memphis, Tennessee and was from Thursday, May 31, to Friday, June 1, 2007. One key purpose of the field trip was to show how communities, transportation systems, commercial networks, business operations, and communications will be affected by future earthquakes. More than a dozen active researchers in geoscience and earthquake engineering made presentations along the route. The field trip also offered an opportunity for exchange between the research community and real practice. Participants also gained insight into earthquake-risk management solutions that are currently available, but not often used, in the central U.S.

For example, earthquake-resistant design is often omitted from new construction in the region because of widespread misconception that it adds cost to development. Field trip participants learned that prudent earthquake-resistant design actually offers a key benefit: a positive change from a “cost item” to “value added.” This paradigm shift is a key issue that has been addressed.

The field trip route included the Memphis metro area, northeast Arkansas, southeast Missouri, southernmost Illinois, and western Kentucky and Tennessee. Participants saw evidence of the 1811-12 New Madrid earthquakes that is still visible. Those earthquakes, estimated to be around magnitude 7.5 to 8.0, were felt throughout the eastern two-thirds of the country. They did damage in Georgia, the Carolinas and Washington, DC. A similar event today would be devastating to the region affected as well as disrupt the national economy and negatively affect worldwide trade.

The Earthquake Insight field trip is generously subsidized by the US Geological Survey. A summary report to the US Geological Survey about the May 2005 field trip is available at <http://erp-web.er.usgs.gov/reports/abstract/2005/cu/05HQGR0014.pdf>

See pictures of the 2007 Earthquake Insight Field Trip on page 16.

“Earthquake Insight Field Trip” for Non-Scientists

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Photos by Alisa Nave



Registered Geologist for Earthquake Insight, Phyllis Steckel, addressed field trip participants about the purpose of Earthquake Insight and what they will see during the field trip.



Earthquake Insight participants dug through the soil in Arkansas to find evidence of past earthquakes.



Greg Hempen with URS Corporation stood on a pier in New Madrid, Missouri and talked to other participants about the Mississippi River's activity during the 1811/1812 New Madrid Earthquakes.



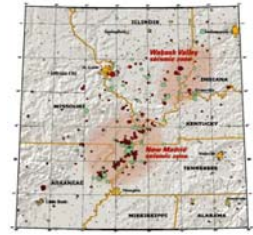
The Immaculate Conception School in New Madrid, Missouri was seismically retrofitted in 1990. It is only one of two buildings in New Madrid that is seismically retrofitted. The picture on the right shows the bolts placed between the windows of the building.



Seismic Activity Across the Region

According to Gary Patterson, Director of Education and Outreach for the *Center for Earthquake Research and Information (CERI)* at the University of Memphis, the ground in the New Madrid Seismic Zone shakes around 16 times a month, totaling 200 earthquakes a year. This is unknown to the average person living in the central U.S. Ninety percent or more of these earthquakes are not felt. According to folkworm.ceri.memphis.edu,—a website used to track seismic activity in the central U.S.—there have been 161 earthquakes recorded in this area in the last six months. Out of 161,

seven were felt and reported to the USGS. Below is a list of those earthquakes.



USGS Photo

DATE	LOCATION	MAGNITUDE	REPORTS
2/12/07	Del City, OK	2.8	61
3/12/07	Solon, OH	3.6	1181
4/5/07	Dyersburg, TN	2.7	18
5/16/07	El Dorado, AR	3.0	144
5/27/07	Okmulgee, OK	3.6	94
6/19/07	Cookville, TN	3.3	96
8/4/07	Asheville, NC	2.8	176

Other News from CUSEC

Medical Community Holds its 2007 Conference



NASHVILLE, TN—Recognizing their key role as the primary provider of medical treatment for victims in any catastrophic event, more than 1000 healthcare professionals attended the *National Disaster Medical System (NDMS)* annual conference in Nashville, TN from March 17 to 21. One of the main topics on the conference's agenda was *Using NDMS in Response to a Major Earthquake*. It was a dedicated panel discussion about the roles and responsibilities of NDMS in patient evacuation and movement in response to a major earthquake. The main goals of the conference included, delivery of an understanding of the health and medical requirements generated by disasters of any origin, making provisions for access to authorities responsible for managing these requirements and providing opportunities for the delivery of education and the exchange of ideas necessary to the development of capabilities at the local, state, regional, national and international levels. For more information about the 2007 NDMS Conference visit www.ndms.chepinc.org/about_the_conference.shtml

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Other News from CUSEC

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Earthquake Information Providers Group

The *Earthquake Information Providers Group (EQIP)* is a working group made up of state, regional and national organizations that gather, prepare and disseminate information about earthquakes and related topics. The primary funding to support EQNET, EQIP's web site, comes from the *Federal Emergency Management Agency (FEMA)*. The group's vision is to provide and promote efficient access to quality earthquake information through active collaboration, and their mission is to facilitate and improve access to earthquake information through collaboration and minimize duplication of effort by sharing information through individual personal contact, joint activities and projects, group annual meetings and biennial forums and electronic communication. EQIP's annual meetings are held in mid-July in conjunction with the *Natural Hazards Research and Applications Information Center (NHRAIC)* Annual Workshop. Each member organization donates staff time in support of EQIP's vision and mission. For information about EQIP visit the EQNET website at www.eqnet.org

GeoCachers Comment on the CUSEC GeoCache Site

Since CUSEC officially joined the high tech game of GeoCaching in February, the site has received some enthusiastic visitors. Read a sampling of those reviews below.

Saturday, February 10, 2007 - CGEEK - Thank you so much for placing this cache and for educating me on this topic.

Monday, February 12, 2007 - TEAM SPROUT - Thanks for the great educational hide. We discussed earthquakes and safety precautions all the way home!

Sunday, March 11, 2007 - WINDKNOT 7 - Great informational cache!

Sunday, March 11, 2007 - NATURE LOVER 62 - Thank you for putting an earthquake survival information cache. What a great idea!

Sunday, April 15, 2007 - SEARCHINGFORIT - What a great way to get information about earthquakes out.

Friday, May 18, 2007 - WYSEONES - Thanks for the info! I've always been interested in the effects of the New Madrid earthquake area.

Saturday, August 4, 2007 - FAMILYINFILM - Thought this was a neat and educational idea for a geocache.

GeoCachers Jimmie (Windknot 7) and Annie (Nature Lover 62) take a trip from Heber Springs, Arkansas on March 11 to visit the CUSEC GeoCache site.



For more information on GeoCaching visit www.geocaching.org

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Other News from CUSEC

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West Tennessee Forms Seismic Safety Commission

The West Tennessee Seismic Safety Commission held a meeting at CERI located on the University of Memphis campus.

The newly formed commission is a 12 member appointed group with representatives from the following professional areas: architecture, fire protection, public utilities, engineering, geology or seismology, local government, insurance, business, emergency health services, nonprofit emergency assistance, local education and emergency management. Members are chosen by the senate, the house of representatives and the governor. In the meeting presentations ranged from the earthquake hazard and infrastructure vulnerability in the NMSZ to earthquake hazard mitigation and response and recovery efforts in Tennessee.

The commission's purpose is to design a program to prepare the state for a major earthquake through the Tennessee Code Annotated, Title 58, Section Four.

For more information about the West Tennessee Seismic Safety Commission, visit <http://itmattersareyouprepared.org/>



Photo by Alisa Nave

CUSEC Board Chairman and TEMA State Director James Bassham gave a presentation on Earthquake Hazard Mitigation and Response and Recovery efforts in Tennessee.



The Center for Earthquake Research and Information

CERI located on the University of Memphis plays a pivotal role in earthquake research in the central United States. CERI hosted several activities promoting earthquake hazards during the region's 2007 Earthquake Awareness Week in February. Many current research projects ranging from tectonic evolution—the changing of the earth's crust—to understanding why earthquakes occur in the continental intraplate seismic zones center on the New Madrid Seismic Zone (NMSZ). CERI faculty member, Steve Horton, is involved in a seismic risk study of West Tennessee Water Utilities and a study of the Seismotectonics of the NMSZ. He also chairs a committee that participated in the Central US Clearinghouse Workshop in April that preceded the Regional Earthquake and SONS07 Exercises in June.

According to their annual report, CERI's 2007 goals include:

- to convene a workshop to foster a collaborative effort to drill a deep borehole in the NMSZ
- to identify and secure external funding to sustain the New Madrid GPS network
- to develop a coordinated response plan for felt earthquakes

For more information about CERI, visit www.ceri.memphis.edu

A Look Back at Earthquake Awareness Week 2007

Five of the eight CUSEC states—Arkansas, Indiana, Kentucky, Missouri and Tennessee—observed Earthquake Awareness Week. Each state held various activities to help remind the public of earthquake hazards in the central U.S. New Madrid Seismic Zone (NMSZ) and the importance of mitigation and preparedness.

CUSEC supported the states with participation in several events. The Central United States Seismic Advisory Council also met in St. Louis, Mo. on February 1. The council's purpose is to help CUSEC accomplish its mission—the reduction of deaths, injuries, property damage and economic losses resulting from earthquakes in the Central United States—and outreach goals—multi-state planning, public awareness and education, mitigation and research. Membership includes individuals from various federal, state and local agencies along with business and volunteer organizations. CUSEC Executive Director, Jim Wilkinson presided over the meeting and briefly talked about the joint earthquake awareness activities and the value of having a common awareness effort. “This is a shared hazard that warrants a unified approach to the awareness. Our states share the same media market and it is important to send a concise earthquake awareness message from one state to the next.” He also presented an update to members about (1) Hurricane Katrina and its impact on the NMSZ Catastrophic Planning Initiative, (2) SONS07/State Earthquake Exercise Preparations (3) Review of Regional/State HAZUS Scenarios (4) National Earthquake Program Managers Meeting (5) New Madrid Earthquake Scenario—Seattle Model (6) 2008 National Earthquake Conference and (7) the formation of a committee for the 200th Anniversary of the 1811/1812 earthquakes. Council members gave updates on their organization's initiatives, goals and projects—such as meetings and workshops. They also expressed some concern about the challenges of funding to the states. The Central U.S. Seismic Advisory Council meets yearly during *Earthquake Awareness Week*.

All five states held various events. With support from representatives from state, federal and non-governmental agencies, Department of **Arkansas** Emergency Management (ADEM) representatives observed the week with several earthquake drills at Marion County Schools, a Post Earthquake Safety Evaluation of Buildings Train the Trainer workshop and started its new program, *Arkansas Seniors Are Prepared (ASAP)*,—specifically designed to provide senior adults in Arkansas with disaster preparedness information. Local **Indiana** earthquake experts traveled around to local news stations answering frequently asked questions about earthquakes as **Kentucky** emergency management conducted earthquake hazard training courses and a statewide duck, cover and hold drill. **Missouri** residents asked questions and expressed concerns about the earthquake threat in their state at town hall meetings and took the opportunity to destroy model buildings, turn off utilities and generally learn more about earthquake preparedness at a hands-on exhibit at the St. Louis Science Center. Representatives in **Tennessee** talked to small businesses about continuity planning, hosted a health and hospital planning workshop and a Post Earthquake Safety Evaluation of Buildings Train the Trainer workshop, coordinated by CUSEC. Also, as a part of the Tennessee Earthquake Awareness Week campaign, the Center for Earthquake Research and Information at the University of Memphis organized an Earthquake Preparedness poster contest for students in fifth and sixth grades in public and private schools in several West Tennessee counties. The poster contest, sponsored by State Farm Insurance, served as a learning experience to help students understand the value and importance of earthquake awareness and preparedness. Representatives from CUSEC, American Red Cross—Memphis Chapter—and other organizations judged the final entries. Take a look at the winning posters on page 21.

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A Look Back at Earthquake Awareness Week 2007

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Picture highlights of *Earthquake Awareness Week 2007*



1.



2.



3.



4.



5.

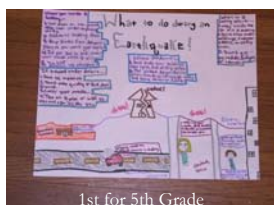


6.

Photos 1,3,4 & 5 taken by Alisa Nave. Photos 2 & 6 taken by Myra Jane Biggers.

1.) Visitors look at information on the CUSEC display table while attending the “Earthquakes Mean Business” Seminar at the AT&T Center in St. Louis, Mo. On February 2. 2.) Arkansas Department of Emergency Management State Director, David Maxwell talks about the New Madrid Earthquake Hazard at a town hall meeting on February 5. 3.) Missouri Earthquake Program Manager, Steve Besemer addresses the audience at a town hall meeting in New Madrid on February 8. 4.) CUSEC Executive Director, Jim Wilkinson talks to an exhibit visitor about why a family disaster plan is important at the hands-on exhibit at the St. Louis Science Center on February 3. 5.) Gary Patterson of CERI talks to Memphis, Tenn. Veteran Hospital employees about the New Madrid Earthquake Hazard on February 12. 6.) Marion Elementary School 2nd graders practice the duck, cover and hold drill on February 5.

Winning Posters from the CERI 2007 Earthquake Preparedness Poster Contest



1st for 5th Grade



1st for 5th Grade



1st for 6th Grade



2nd for 5th Grade



2nd for 6th Grade



3rd for 5th Grade



3rd for 6th Grade

NEHRP NEWS



NEHRP Establishes Advisory Council

**By Jim Wilkinson, Executive Director
Central United States Earthquake Consortium (CUSEC)**

After long anticipation William Jeffrey, Director of the *National Institute of Standards and Technology (NIST)* in the Department of Commerce, has named 15 distinguished academic, industry and government experts to serve on the *National Earthquake Hazards Reduction Program (NEHRP) Advisory Committee on Earthquake Hazards Reduction (ACEHR)*. The responsibilities of the new independent advisory committee include assessing (1) trends and developments, (2) NEHRP's effectiveness and whether it needs revising, and (3) NEHRP's management, coordination, implementation, and activities. The initial terms for the advisory committee will be staggered, with appointed members listed below serving one, two, or three years, with a possible full three-year second term. Members Include -

- Walter J. Arabasz, University of Utah, Salt Lake City
- Jonathan D. Bray, University of California, Berkeley
- David E. Cook, Boeing Co., Seattle, Washington
- Lloyd S. Cluff, Pacific Gas and Electric Co., San Francisco, California
- Richard K. Eisner, regional administrator and manager (retired), California Governor's Office of Emergency Services, Oakland
- James R. Harris, J.R. Harris and Co., Denver, Colorado
- Ronald O. Hamburger, Simpson Gumpertz and Heger Inc., San Francisco, California
- Howard Kunreuther, Wharton Risk Management and Decision Processes Center, University of Pennsylvania, Philadelphia
- Thomas D. O'Rourke, Cornell University, Ithaca, New York
- Chris D. Poland (chair), Degenkolb Engineers, San Francisco, California
- Paul Somerville, URS Corp., Pasadena, California
- Kathleen J. Tierney, Natural Hazards Research and Applications Information Center, University of Colorado at Boulder
- Anne R. vonWeller, Murray City Corp., Utah
- Yumei Wang, Oregon Department of Geology and Mineral Industries, Portland
- Sharon L. Wood, University of Texas, Austin

The chairperson of the USGS Scientific Earthquake Studies Advisory Committee (SESAC) will serve in an ex officio capacity on the new committee. While CUSEC and other NEHRP related organizations from around the central US fully support the creation of the ACEHR and the good work that will come from it, there is considerable concern with the lack of representation in its membership for the central US. CUSEC, working with other organizations and persons throughout the central US, is seeking to find an amenable solution to this issue. For more information on NEHRP, including biographical information on the advisory committee members, visit www.nehrp.gov

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NEHRP NEWS



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FEMA 547 & SRCE Now Available On-line

Techniques for the Seismic Rehabilitation of Existing Buildings (FEMA 547) has just become part of the National Earthquake Hazards Reduction Program (NEHRP) family of publications. This document describes common seismic rehabilitation techniques used for buildings represented in the set of standard building types in FEMA seismic publications.

The *Seismic Rehabilitation Cost Estimator* (SRCE), a new on-line program from FEMA, is now available to calculate cost estimates for the seismic rehabilitation of buildings. For best results, learn about the two cost estimation methods - *limited* and *detailed*. To view other NEHRP information and publications visit www.nehrp.gov



FEMA

News From FEMA

What to do Before an Earthquake

From the FEMA Website

- | | |
|---|--------------------------------|
| Check for Hazards in the Home | Identify Safe Places |
| Educate Yourself and Family Members | Have Disaster Supplies on Hand |
| Develop an Emergency Communication Plan Help Your Community Get Ready | |

For more information about the six ways listed above on how you can prepare for an earthquake, visit www.fema.gov

How to Protect Your Property from an Earthquake

From the FEMA Website

- | | |
|---|--|
| Anchor Large Equipment Properly | Anchor Tall Bookcases and File Cabinets |
| Brace Cripple Walls | Bolt Sill Plates to Foundation |
| Mount Framed Picture & Mirrors Securely | Install Latches on Drawers & Cabinet Doors |
| Anchor/Brace Propane Tanks & Gas Cylinders | Restrain Desktop Computers & Appliances |
| Use Flexible Connections on Gas & Water Lines | |

For more information about the nine ways listed above on how you can protect your property from an earthquake, visit www.fema.gov

Articles of Interest Related to Central and Eastern U.S. Earthquake Hazards

Atkinson, G. and Beresnev, I., 2002, Ground motions from large earthquakes in the New Madrid Seismic Zone: Bulletin of the Seismological Society of America, v. 92, pp. 1015-1024.

Cox, R.T., Hill, A.A., Larsen, D., Holzer, T., Forman, S.L., Noce, T., Gardner, C., Morat, J., 2007, Seismotectonic implications of sand blows in the southern Mississippi Embayment: Engineering Geology, v. 89, p. 278-299.

Newman, A., 2007, Earthquake risk from strain rates on slipping faults, EOS, Transactions, American Geophysical Union, v. 88, p. 60.

Pujol, J., Pezeshk, S., Zhang, Y., Zhao, C., 2002, Unexpected values of Q_s in the unconsolidated sediments of the Mississippi embayment: Bulletin of the Seismological Society of America, v. 92, pp. 111-1128.

Rydelek, P., 2007, New Madrid strain and post-seismic transients: EOS, Transactions, American Geophysical Union, v. 88, p. 60-61.

Stein, S., 2007, New Madrid GPS: Much ado about nothing?: EOS, Transactions, American Geophysical Union, v. 88, p. 59.

Tavakoli, B. and Pezeshk, S., 2005, Empirical-Stochastic Ground-Motion Prediction for Eastern North America: Bulletin of the Seismological Society of America, v. 95(6), pp. 2283-2296, doi:10.1785/0120050030.

Wang, Zhenming, 2006, Understanding Seismic Hazard and Risk Assessments: An Example in the New Madrid Seismic Zone of the Central United States: Proceedings of the 8th U.S. National Conference on Earthquakes Engineering, Paper No. 416.

Wolf, L. W., M. P. Tuttle, S. Browning, and S. Park, 2006, Geophysical surveys of earthquake-induced liquefaction deposits in the New Madrid seismic zone: Geophysics, v. 71, p. B223-B270.

Forte, A. M., Mitrovica, J. X., Moucha, R., Simmons, N. A., and Grand, S. P., 2007, Descent of the ancient Farallon slab drives localized mantle flow below the New Madrid Seismic Zone: Geophysical Research Letters, v. 34, L04308, doi:10.1029/2006GL027895.

If you publish any articles related to the earthquake hazard in the central U.S. please send it to
Natasha McCallister at nramsey@memphis.edu.

Below are a list of events and training opportunities for the New Madrid Seismic Zone Catastrophic Planning Initiative. For more information, visit the CUSEC website at www.cusec.org, and if you would like to comment on our newsletter or present a story idea, email CUSEC Public Outreach Coordinator and newsletter writer and editor Alisa Nave at anave@cusec.org.

Calendar of Events for 2007

WHEN	WHAT	WHERE
September 4-6	IEMA Annual Conference	Springfield, Illinois
September 17-18	CUSEC Board of Directors Meeting	Nashville, Tennessee
September 18-19	AAEM Summer Conference	Clanton, Alabama
September 18-19	CUSEC Earthquake Program Managers Meeting	Nashville, Tennessee
September 30-October 3	WSSPC Annual Conference	Reno, Nevada
October 12	Earthquake Insight Field Trip	St. Louis, Missouri
November 11-14	IAEM Annual Conference	Reno, Nevada

Training & Exercise Opportunities for 2007

WHEN	WHAT	WHERE
September 11-13	Arkansas Statewide Earthquake Scenario Planning Workshop	Little Rock, Arkansas
September 24-25	Indiana Earthquake Topic Workshop	Indianapolis, Indiana
October 11-12	Missouri Area Earthquake Workshop	Poplar Bluff, Missouri
October 15-16	Missouri Area Earthquake Workshop	Sullivan, Missouri
October 24-25	Indiana Earthquake Topic Workshop	Indianapolis, Indiana
October 29-November 2	Alabama Statewide Post Earthquake Scenario Workshop	Florence, Alabama
October 30-31	Indiana Earthquake Topic Workshop	Indianapolis, Indiana
November 5-6	Illinois Statewide Earthquake Scenario Planning Workshop	Carbondale, Illinois
November 7-8	Mississippi Earthquake Topic Workshop	Tunica, Mississippi
January 8-9	Illinois Statewide Earthquake Scenario Planning Workshop	Carbondale, Illinois

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2007 Training & Exercise Opportunities

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WHEN	WHAT	WHERE
November 26-30	Tennessee Statewide Earthquake Scenario Planning Workshop	Buchanan, Tennessee
December 12-13	Mississippi Earthquake Topic Workshop	Tunica, Mississippi

What's Happening in 2008!

Training & Exercise Opportunities

WHEN	WHAT	WHERE
January 16-17	Mississippi Earthquake Topic Workshop	Tupelo, Mississippi
February 5	Illinois Statewide Earthquake Scenario Planning Workshop	Carbondale, Illinois
February 12-14	Mississippi Statewide Earthquake Scenario Planning Workshop	Tunica, Mississippi
March 11-14	Kentucky Statewide Earthquake Scenario Planning Workshop	Paducah, Kentucky

Workshop dates are subject to change.



**Missouri Emergency
Management Conference**
March 25-28, 2008
Branson, Missouri
www.sema.dps.mo.gov

NATIONAL
EARTHQUAKE
 CONFERENCE

Understanding Earthquakes: From Research to Resilience

APRIL 22-26, 2008

WESTIN HOTEL, SEATTLE
www.earthquakeconference.org

Save the Date!

CUSEC NEWS

Central United States Earthquake Consortium
2630 East Holmes Road
Memphis, TN 38118-8001
Tel: 901-544-3570 Fax: 901-544-0544
Web: www.cusec.org
Email: cusec@cusec.org

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