



JAMI COOK
SECRETARY

**STATE OF ARKANSAS
GOVERNOR ASA HUTCHINSON
DEPARTMENT OF PUBLIC SAFETY
DIVISION OF EMERGENCY MANAGEMENT**



A.J. GARY
DIRECTOR

October 21, 2020

The Honorable Cecile Bledsoe, State Senator
The Honorable Jeff Wardlaw, State Representative
Co-Chairs, Arkansas Legislative Council
c/o Bureau of Legislative Research
Room 315, State Capitol Building
Little Rock, AR 72201

Dear Senator and Representative:

Enclosed is the annual Arkansas Earthquake Program report as required per ACA 12-77-107. We are providing this report in an electronic version and can provide a print version upon request.

Please do not hesitate to contact me if I, or my staff, may be of further assistance.

Sincerely,

A.J. Gary
Director and State Homeland Security Advisor

To the Co-chairs of the Legislative Council:

In accordance with the House Bill 2032 amending Act 711, the Arkansas Division of Emergency Management (ADEM) hereby reports the following activities of the Arkansas Earthquake Program as they relate to specific requirements of the bill:

A. Continued assessment from proper scientific authorities of the seismic risk to the state:

In 2020, ADEM maintained its relationship with the Arkansas Department of Energy and Environment, Division of Geological Survey (AGS) and the State Fire Marshall through meetings, email, phone correspondence, and educational events.

- ADEM and AGS share responsibilities for the Arkansas Governor's Earthquake Advisory Council (ARGEAC) meetings.
- ADEM reaches out to the State Fire Marshall for subject matter expertise – most often to answer questions about the Arkansas Building Code.
- The ADEM and AGS continue to interact frequently. Activities that have involved both agencies were INSPECT ARKANSAS (INSPARK) trainings, educational/ STEM events, and the regular discussion of possible projects that might be undertaken with the funding available from the National Earthquake Hazard Reduction Program (NEHRP). ADEM and AGS work together to spread earthquake awareness and mitigation throughout the state, cooperatively staffing booths at preparedness events.

Earthquake Hazard Study for Pulaski and Lonoke Counties

AGS has applied for grant funding in collaboration with the University of Memphis through the United States Geological Survey (USGS.) The grant will fund a project focusing on an Earthquake Hazard Study for all of Pulaski and parts of Lonoke Counties. The purpose of the study is to collect and analyze geologic and geotechnical data, to determine the potential for liquefiable soils in the area of interest. Analysis of the information will offer insight into how specific areas – beginning in central Arkansas – will be affected by strong earthquakes. Grant award notification will be announced in mid to late November 2020. Stakeholder meetings will be held throughout the study timeframe to educate stakeholders on the details of the project, why it should be undertaken, how it will be funded, etc. The project is phased and will be completed over multiple years. It will use existing soil data available from various state and federal agencies such as the Arkansas Department of Transportation (ARDOT), utility companies (Entergy), private geotechnical firms and the USGS. It will collect data first hand in areas where there are data gaps.

The AGS is also working with the USGS Lower-Mississippi Gulf Water Science Center and other stakeholders on an Arkansas - Mississippi Alluvial Plain (MAP) study. The study will focus on the geophysics, groundwater modeling, and water quality in the region and will be completed in phases over the next few years.

B. Training and education of the state and local government officials, employees, and citizens of Arkansas regarding preparation and protective measures that can be taken before, during, and after an earthquake:

In 2020, ADEM hosted courses focused on building capabilities to support response to earthquakes. Below is a list of classes offered by the state to all citizens, government officials and employees.

- November 15, 2019-ATC 20, Rapid Visual Inspection Training at the University of Arkansas, Fayetteville, AR
- December 10, 2019-Train the Trainer Training, Little Rock, AR
- June 25, 2020-ATC 20, Rapid Visual Inspection Training, Virtual
- September 10, 2020-ATC 20, Rapid Visual Inspection Training, Virtual
- October 15, 2020-FEMA E74, Earthquake Hazard Mitigation for Nonstructural Elements, Virtual
- October 20, 2020-FEMA P154, Rapid Visual Screening of Buildings for Potential Seismic Hazards, Virtual

C. Planning coordination, guidance, and assistance to all state and local government officials in preparation for, response to, and recovery from earthquakes:

INSPECT ARKANSAS (INSPARK)

Arkansas has had a training program for building inspection in place for over twenty years. In October 2014, the earthquake program began working to better organize and utilize these trained building inspectors after a catastrophic earthquake. This included the creation of a new database, the execution of multiple classes to help certify building inspectors and the creation of a standard operating guide to document how Arkansas will identify and deploy teams of inspectors after an earthquake.

An INSPARK website has been developed (inspectarkansas.org) that allows members to access information, take reassessment tests, and learn more about mitigating damage from earthquakes in the state. The Collector App, the primary means of data collection during trainings and real-life events, has been successfully integrated into the INSPARK Program. The Collector App information can be conveyed to the State Emergency Operations Center (SEOC) in real time during a disaster.

INSPARK leaders have been working to build a stronger relationship with the American Institute of Architects Arkansas Chapter (AIAAR). AIAAR has established a Disaster Assistance Committee (DAC) whose roll it will be to support ADEM and the INSPARK program. The committee will be looking at means to support members and member firms that suffer a loss from a disaster. DAC will also be working toward recruiting architects to join INSPARK and educating the architecture profession about natural and man-made hazards and what these architects can do to protect themselves, their families, and their offices from risks.

D. Coordination of earthquake program activities with comparable agencies of the federal government and other states:

Arkansas Governor's Earthquake Advisory Council

The Arkansas Governor's Earthquake Advisory Council (ARGEAC) meets bi-annually:

January 17, 2020 in Newport, Arkansas

- Chairperson Martha Kopper (AGS) discussed recent earthquakes, specifically the 2019 Magnitude (M) 7.1 and M6.4 Earthquakes in Ridgecrest California. From July 4, 2019-July 16, 2019 there were 631 M3+ Earthquakes, 5 M5+ and during that time over 50,000 registered with the United States Geological Survey (USGS) Did You Feel It site. Ms. Kopper updated the group on the Puerto Rico Earthquakes where a M4.7 Earthquake occurred on December 28, 2019 followed by over 500 M2+ earthquakes in the region, 32 of which were M4+, and on January 6, 2020, a M5.9 and a M6.4 occurred.

Ms. Kopper described how ARGEAC would work with ADEM's Director Gary, STEM Coordinator Michelle Snyder of Department of Elementary and Secondary Education, and Dr. Cheryl May, Director of the Criminal Justice Institute. This group is, as of this report, promoting legislation that would mandate Earthquake drills in Arkansas' K-12 schools. This legislation will be an amendment to the Safe Schools Acts ACA 6-15-1303 and ACA 6 legislation. This will bring Arkansas schools in line with TN, MO, KY, and IL, which all have mandated earthquake drills.

- Update: Jim Wilkinson, Executive Director of the Central United States Earthquake Consortium (CUSEC) updated us on the State Earthquake Program Assistance-National Earthquake Hazards Reduction Program (NEHRP), discussing the changes the program underwent in 2019.

Invitations were extended to the March 2-6, 2020 National Earthquake Conference which was held in San Diego, CA. The meeting combined the annual National Earthquake Program Managers Meeting (NEPM) and the joint consortia/National Earthquake Managers Association (NEMA) meeting.

The Association of CUSEC State Geologists, under the leadership of Bekki White, Arkansas State Geologist, worked with the Federal Emergency Management Agency's (FEMA) National Incident Management Systems (NIMS) to establish the first NIMS typed resources in support of State Geological Surveys for areas of Geology Field Reconnaissance Team, Geology Field Reconnaissance and Geological Support Specialist. This step is a follow-on to previously created Mission Ready Packages (MRP) established by the Association and used as a template by the National Emergency Management Association's (NEMA) Emergency Management Assistance Compact (EMAC) to create the first national MRP resources within EMAC. On October 13, 2020, the National Integration Center (NIC) released these NIMS typed resources, marking this project as a success. These resources will facilitate the sharing of deployable resources at all jurisdictional levels and will augment the FEMA workforce during disaster operations.

- Hilda Booth, the state Earthquake Program Manager, gave an update on the state's earthquake program. Ms. Booth gave a brief description of some of the projects she was involved in in 2019. The State will use 2019's NEHRP funding to purchase a portable Earthquake Kiosk that can be taken to schools and even left in the schools' Media Centers or Science Labs so that students can spend time learning about earthquakes from the videos and interactive games. Another innovative preparedness tool purchased with the 2019 funding is the Without Warning comic book series that the State of Arkansas, in partnership with five other central US states, revised to make it specific to the New Madrid Seismic Zone (NMSZ.)
- COL Bobby Allison of Civil Air Patrol (CAP) gave a presentation titled: CAPabilities in which he gave a brief history of CAP. They are a volunteer organization with over 63,000 members who serve in capacities from emergency services, cadet programs, and aerospace education, to support for STEM programs.

There are 1400 units nationwide. Arkansas' CAP has 4 remotely controlled aircraft which recorded amazing footage of the levee breaches in the 2019 Arkansas River flooding. They also utilized photos from privately owned drones to display real time data and damage. CAP has the largest fleet of drones in the nation.

July 10, 2020 Virtual

- Chairperson Martha Kopper (AGS) discussed the favorable data down to about 400 meters that was acquired as a result of the USGS's aeromagnetic and radiometric geophysical surveys in Arkansas, Missouri's Bootheel, and along the Mississippi River Embayment. The USGS is hoping that they will be able to image faults near the surface with a data release set for summer 2020. Update: The last round of flights were completed in March of 2020. The USGS is working towards a release of all of the data and report by the end of calendar year 2020.

Working with the University of Memphis' Center for Earthquake Information and Research, the AGS submitted a proposal to the National Earthquake Hazards Reduction Program titled *Mississippi Embayment Liquefaction Model Improvement*, which is collaborative research from the University of Memphis and the Arkansas Department of Energy and Environment, Division of Geological Survey.

AGS continues their work with the Reservoir Induced Seismicity Collaborative (RISC), funded through Department of Energy, Groundwater Protection Council and Texas Bureau of Economic Geology. RISC funding is used by AGS for research on potential induced seismicity with a focus near El Dorado, Arkansas. This grant funding helps facilitate different research groups at different institutions to allow better collaboration and to avoid data gaps and overlaps. RISC also improves the sharing of data across multiple state-geological surveys and adds value to research.

- David Johnston from AGS discussed the recent earthquakes. There were 31 total earthquakes in Arkansas in 2019, 17 of which were in the NMSZ. The number of felt events was five. As of July 9, 2020, Arkansas had already experienced 29 earthquakes, 10 in the NMSZ, and 12 of those 29 were felt. Mr. Johnston showed the group teleseisms, which are records made by a seismograph at a great distance from the epicenter, showing

the difference in different magnitudes and strengths compared to where they were recorded.

- Central United States Earthquake Consortium (CUSEC) Director Jim Wilkinson discussed the changes in the National Earthquake Hazard Reduction Program (NEHRP), which included removing several states (TX, VA, GA, NC, and OH) that were deemed low to moderate risk from the program. The remaining states in the NMSZ, like AR, will receive increased funding, but the consensus is that the loss of the collaborative effort is not worth the increased funding.

The State of Arkansas, in partnership with CUSEC states, began planning a Regional Safety Assessment Workshop for states with Safety Assessment programs (currently AR, IL, IN, KY, MO, & TN) in the spring of 2021. The focus of this workshop will be to develop regional strategies and plans for safety assessment outreach to local governments, develop a coordinated EMAC strategy, and determine rapid visual screening integration possibilities.

- Hilda Booth, the state Earthquake Program Manager, gave an update on the state's earthquake program. Ms. Booth gave a brief description of some of the projects she was involved in in 2019 and the plans for 2020 and 2021. She discussed both the National Earthquake Program Managers Meeting (NEPM) that was held in San Diego in March, and the success of the learning tools purchased the previous year with NEHRP funds. The State will use 2020's NEHRP funding for items that will improve understanding of earthquake processes and impacts while supporting multi-state earthquake programs. Funds were used to purchase a portable hydraulic lift that will be used to transport the Shake Table to events and schools throughout the state as well as several multistate preparedness projects.

GEAC members were able to see the public service announcement (PSA) (<https://vimeo.com/463234662> password is AGS) developed from the November 5, 2019 paleoliquefaction field trip. The video, funded by State Farm Insurance, The United States Geological Survey (USGS), RISC, and AGS, will be used by ADEM's Earthquake Program Manager to promote the Great ShakeOut that takes place every October.

National Earthquake Program Manager's Meeting and National Earthquake Conference

The Arkansas Division of Emergency Management participated in the National Earthquake Program Manager's (NEPM) Meeting in conjunction with the National Earthquake Conference held March 1-7, 2020 in San Diego, CA. The meeting provided an opportunity for FEMA, at both the national and regional levels, to brief the states and territories about funding streams and other national developments that will influence state and territorial earthquake preparedness. The states were able to exchange information about their individual education and awareness campaigns. The meeting also provided an opportunity for various partners, such as CUSEC, to share their capabilities and activities to help the state earthquake programs.

A significant amount of time was also set aside for training, including training on the National Earthquake Hazard Reduction Program (NEHRP) funding, the National Earthquake Technical Assistance Program (NETAP), Earthquake Early Warning technology (EEW), Grants

Management, and the Earthquake Performance Assessment Tool (EPAT). The next NEPM meeting is scheduled for June 15-17, 2021 in Memphis, TN.

Emergency Management Assistance Compact

On May 15, 2020 ADEM Operations Branch participated in the annual All Hazards Resource Allocation Workshop with the National Guard. This workshop virtually brought together Guard representatives from every state to discuss their most catastrophic events and to allocate resources through “hand-shake” agreements. In the event of an earthquake, these Guard resources will be requested and sent through EMAC. ADEM participates because all EMAC missions, by law, must be coordinated by state emergency management.

ShakeOut

The Arkansas Earthquake Program actively promoted the Central United States ShakeOut in 2020. This yearly drill encourages people in homes, schools, businesses, and other organizations to practice what to do during an earthquake and improve preparedness using the “Drop, Cover and Hold On” methodology. A ShakeOut Social Media campaign was developed, utilizing NEHRP funds, encouraging people to register for this international drill. The videos and PSA can be used across a variety of platforms, are specifically NMSZ oriented, and can be used indefinitely.

ShakeOut was held on October 15, 2020 at 10:15 am, there were 62,028 registered participants in the state of Arkansas, less than previous years because COVID-19 restrictions on large groups prevented large group registration and participation. The pandemic also limited activities to promote awareness of the event. ShakeOut.org offered many innovative ideas and approaches for participating in the drill and adapting it to a pandemic. Participation across different groups was as follows.

• Individuals/Families	115
• Childcare and Pre-Schools	1,040
• K-12 Schools and Districts	30,005
• Colleges and Universities	18,300
• Local Government	174
• State Government	9,012
• Federal Government (Including Military)	40
• Businesses	125
• Healthcare	2,146
• Senior Facilities/Communities	61
• Disability/AFN Organizations	700
• Non-Profit Organizations	120
• Faith-based Organizations	45
• Animal Shelter/Service Providers	7
• Media Organizations	20
• Other	110

Conference calls, presentations, and meetings

- November 5, 2019-AGS Earthquake Field Trip, Marianna, AR
- November 13, 2019-GEAC planning meeting with Martha Kopper, Little Rock, AR
- November 15, 2019-Arkansas Legislative Council Meeting, Little Rock, AR
- January 3, 2020-Meeting with Dr. May, Criminal Justice Institute
- January 7, & February 4, 2020-NEQPM planning Meetings, Little Rock, AR
- January 9, 2020 (and continuing on the second Thursday of each month)- Monthly Central United States Earthquake Consortium (CUSEC) conference call
- January 9, 2020-Meeting with ADEM director, AGS, and the Arkansas Department of Secondary Education (DES), Little Rock, AR
- January 13, 2020-Meeting with Dr. Cheryl May, Director of the Criminal Justice Institute, Little Rock, AR
- January 16, 2020-and continuing on the third Tuesday of each month) Central and Eastern United States (CEUS) Earthquake Coordination Committee conference call
- January 22, 2020-Distribution Management Meeting with Department of Human Services (DHS), North Little Rock, AR
- February 20, 2020-Earthquake Summit, Poplar Bluff, MO
- March 1-7, 2020-National Earthquake Program Managers (NEQPM) meeting and the National Earthquake Conference, San Diego, CA
- March 11, 2020-Safe School committee Meeting with DESE, Little Rock, AR
- March 12, 2020-INSPARK ATC-20 Planning Meeting, Virtual
- May 1 & 15, 2020- Meeting between AIA and INSPARK, Virtual
- May 7, 2020- INSPARK/ATC-20 meeting for virtual learning, Virtual
- May 12, 2020-Planning meeting with David Johnston and Martha Kopper, AGS
- June 4, 2020-Annual NEHRP Comprehensive Cooperative Agreement (CCA) call
- June 9, 2020-CUSEC/Regional NEHRP call

E. The dissemination of information to the public pertaining to earthquake hazards, especially to Arkansans living near the New Madrid Fault, protective measures, seismic resistance in building construction, and appropriate actions to be taken before, during and after an earthquake and other matters the Arkansas Division of Emergency Management shall determine to be necessary or appropriate to educate, inform, and equip citizens in this state to deal with an earthquake:

- February 12, 2020-Presentation, Arkansas Archeological Survey (AAS), Parkin State Park, Parkin, AR
- February 19, 2020-Robotics Club presentation, Manilla Elementary School, Manilla, AR
- March 11, 2020-Presentation to Division of Secondary Education, Little Rock

Recommendation for Improvement

Due in large part to the efforts put forward by the Arkansas Earthquake Program, in conjunction with the CUSEC and FEMA, many Arkansas citizens have become aware of the potential threat posed by the New Madrid Seismic Zone (NMSZ). However, there is still room for improvement. The recommendation of the ADEM is to increase public outreach to promote citizen involvement

in mitigation of the NMSZ peril. The Arkansas Earthquake Program requires additional funding toward education and awareness activities that will build and maintain interest in preparedness against this hazard.

Recent events around Maynard, in Randolph County, underscore the seismic potential of the earth beneath NE Arkansas. October 5-9, 2020, a cluster of twelve earthquakes that ranged in magnitude from M2.4 to M2.6 were recorded at depths of 5 to 8 miles. This activity occurred in a seismically active area west of the New Madrid Seismic Zone known as the Ozark Dome. Arkansas Geological Survey and the State Earthquake Program Manager will continue to monitor this situation.