

Final Technical Report  
G10AP00152

CERI Education and Outreach (formerly PERC, Public Earthquake  
Resource Center)

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**Abstract**

This proposal combined funding to support ongoing outreach activities at the Public Earthquake Resource Center at CERI and funding for specific outreach activities related to the New Madrid Bicentennial Plan as developed by the USGS/Geologic Hazards Team. Loss of life, destruction of property and the social, and economic disruption caused by earthquakes can be substantially reduced through the involvement of the public in earthquake education and outreach programs. Recent high-consequence, low-recurrence disaster in the US and abroad (i.e., 2004 Indonesia Earthquake and tsunami, 2005 Hurricane Katrina, 2010 Haitian Earthquake) reinforce the need for sustained programs that increase earthquake hazard awareness at the grass roots and regional levels, especially those segments of the population that are socially vulnerable. Memphis, Tennessee and is characterized by a significant population living below the poverty level that is largely unaware of the earthquake risk. It is pivotal to leverage the available resources to develop, implement, and maintain high-impact Education and Outreach programs for Memphis and the region to decrease losses from future earthquakes. The Center for Earthquake Research and Information (CERI) at the University of Memphis opened the Public Earthquake Resource Center in 2002 under Award # 03HQAG0103, Requisition # 03-7904-0607 with the US Geological Survey. The annual USGS award for \$20,000 was used to partially support staff that will manage the facility. Since its inception in 1978, CERI has developed many strong relationships that have shaped its role as a tributary and distributary of earthquake information for the region. As a physical presence, the PERC is a 1300 square foot building that houses a variety of interactive exhibits and information to increase public understanding of Earth Science, earthquake hazards, seismology, and some basic principles of earthquake engineering. The facility has often been used as a media resource and press conference area following felt earthquakes in the New Madrid seismic zone and to announce major research initiatives. However the PERC is more than just a facility. It is a system of information transfer in direct

partnership with the US Geological Survey that effectively functions at local and regional levels by providing technical and non-technical earthquake information using all forms of written, electronic, and oral communication. Information ranges from basic information on earthquake preparedness to technical input on the seismic building code adoption process. The PERC facility has hosted over 10,000 visitors since 2004 and is currently in the process of upgrading displays and hardcopy information. Thousands of information requests are processed each year at the CERI. In addition to support for general information transfer strategies, this proposal also seeks seed funding to support a scientifically based documentary, "New Madrid: The earthquakes of 1811-1812".

### **Report**

Building on CERI's established network of users, the PERC is a destination point for the general public and students to experience interactive displays, schedule earthquake awareness/education presentations, and access multidisciplinary earthquake information. In 2013, the facility is currently advertised on the web and through the Memphis Convention and Visitors Bureau, which distributes brochures to various visitor and tourist welcome centers. Presentation/tour requests are processed primarily through the PERC website. Prominent signage with USGS recognition is located on highly traveled Central Avenue. The PERC manager participated in monthly USGS staff meetings of the Central region staff and is listed as a USGS staff member at

<http://earthquake.usgs.gov/regional/ceus/contacts/index.php>.

The PERC is located at a high visibility location on the University of Memphis campus with handicap access and a dedicated visitor's parking area and USGS staff parking area. The facility is managed by CERI with direct input from USGS staff. The facility is currently open to the public from 10:00 AM to 2:00 PM, Monday – Friday. Michelle Dry was hired in consultation with USGS staff to manage project development, marketing, and operations. A student worker, funded by the Mid America Earthquake Center, is on staff to help with presentations and tours. CERI technical staff and University of Memphis Physical Plant provide routine maintenance of the facility and its displays. CERI and the MAE Center provided over \$25k in 2004 funding to renovate sections the facility, replace all windows, build displays, handicap ramp, interior painting, and install museum-grade track lighting. This does not include the hundreds of labor hours from CERI staff to design and build displays.

The PERC is more than just a museum, it is a system of information transfer that incorporates web-based, hard copy, and person to person communication strategies that are informed by interactive displays in order to explain very complex scientific topics such as liquefaction, building resonance, earthquake monitoring, earth processes, and rapid earthquake information processing. Special emphasis is placed on reaching out to underserved K-12 students, who are typically located in highly vulnerable unreinforced masonry structures. Earthquake loss estimates for the area indicate thousands of students and teachers

could be injured severely, or die, in the event of an infrequent, but possible, magnitude 7.7 in the NMSZ during work hours. Most of the public school systems in the region are characterized by students who are also socially vulnerable to disasters. Socially vulnerable people who spend a lot of time in structurally vulnerable environments present an important target for basic education and outreach programs.

The front two offices at 3918 Central were used for PERC displays and the additional space was used for offices of the Memphis-based USGS employees. Displays at the PERC included a helicorder/Seismic Monitor display, “make you own earthquake “ display with Lehman seismometer and oscilloscope, liquefaction shake table, real time earthquake displays from CERI (regional) and the USGS (global), and a touch sensitive monitor with embedded PowerPoint presentations covering a variety of earthquake-related topics. Room 101 housed static a full-scale model of a liquefaction trench, a static display about historical Central US earthquakes, and a building resonance shake table display. All of these displays have proven extremely useful in effective information transfer to with non-technical users, including engineers, the media, politicians, and emergency managers.

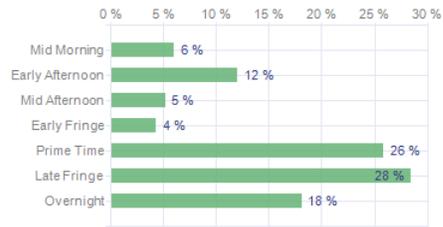
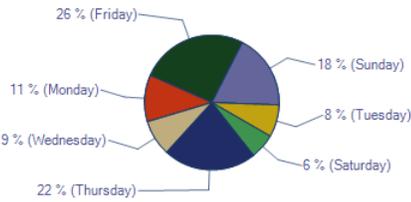
As proposed, this grant also supplied seed funding for a documentary to support earthquake preparedness activities related to the New Madrid Bicentennial and the Great Central US Shakeout. This was achieved through funded partnership with State Farm Insurance, The Tennessee Emergency Management Agency, the West TN Seismic Safety Commission, and Pale Moon Media. The documentary was also developed in coordination with the National Educational Television Association, which provides a distribution framework for approved educational films. Educators and public television stations rely on NETA-approved documentaries as recommended programming. Between June 2012 and April 2013, the documentary, “New Madrid: The earthquakes of 1811-1812” (<http://vimeo.com/38864818>) was shown 116 times on 59 stations in 18 states with a potential viewing audience of over 21 million (see below).



## Carriage Summary New Madrid: The Earthquakes of 1811-1812 6/1/2012 - 4/25/2013

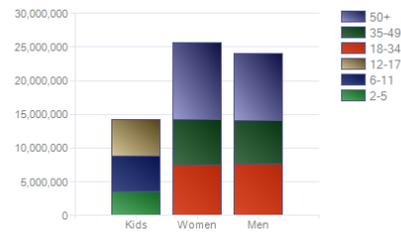
	Telecasts	Channels	Markets	States	% Coverage
All Channels	116	59	38	18	21.73 %
Main Channels	55	31	25	12	14.15 %
Primary Channels	29	17	17	10	6.05 %
Metered Channels	41	16	13	12	16.07 %
Sub Channels	61	28	22	11	9.95 %
Secondary Channels	87	42	30	15	18.22 %

### Distribution of Airings by Day and Daypart



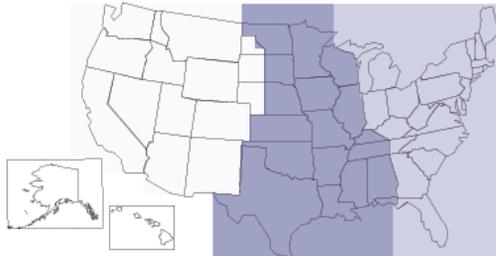
### Demographic Information of Potential Audience

Demo Group	Men	Women	Total
People 2+			63,996,673
DMA Households			24,806,790
Kids 2-5			3,575,860
Kids 6-11			5,272,940
Kids 12-17			5,414,677
Adults 18-34	7,629,438	7,583,918	15,213,356
Adults 35-49	6,407,801	6,638,050	13,045,851
Adults 50+	9,975,040	11,498,949	21,473,989



### Distribution of Airings by Time Zone

Other	Pacific	Mountain	Central	Eastern
0 %	3 %	3 %	62 %	31 %



### Penetration by Market Rank

Rank	Percent
Top 25	16 %
26 to 50	28 %
51 to 100	24 %
101+	14 %

### Episodes

Century	Percent
Unknown	100 %

The documentary went on to win a 2012 Bronze Telly Award in the documentary class (see below).



Telly Awards

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## 34th Annual Telly Awards

Congratulations!

Judging has been completed for your submissions to the 34th Annual Telly Awards, and your work has been selected by The Telly Awards and our Silver Telly Council to receive a 2013 Telly Award. If your work was submitted for a People's Telly Award, the online community has spoken and rated your work a Telly Award Winner. This is a tremendous honor. The enclosed "yellow sheet" lists your entries that are being recognized for excellence.

The Silver Telly Council, our judging and oversight body, is comprised of top industry professionals that are past winners of a Silver Telly, our highest honor. The Telly Awards receives over 13,000 entries annually from the finest ad agencies, production companies, TV stations, cable companies, interactive agencies and corporations in the world. It is a remarkable achievement to be selected for recognition.

Over the period of this grant several other video products were also produced to promote earthquake awareness activities through the PERC System:

1. 2011 Shakeout PSA (CERI, TEMA, State Farm, WTSSC)  
<https://www.youtube.com/watch?v=BVDVf5JTV1c>
2. 2011 Shakeout PSA for children (CERI, TEMA, State Farm, WTSSC)  
<https://www.youtube.com/watch?v=n2pCGzcDu7U>
3. Digital Animation Visualization: Liquefaction Susceptibility in Shelby County (CERI: Gary Patterson and Kathy Tucker) <https://www.youtube.com/watch?v=ovXvk9Vqd3U>
4. Digital Animation: New Madrid Earthquake Hazard, Seismicity, and the USGS/CERI Seismic Network (CERI: Gary Patterson and Kathy Tucker)  
[https://www.youtube.com/watch?v=q\\_7dOPUizIk](https://www.youtube.com/watch?v=q_7dOPUizIk)

### Conclusion

Although the relationships are difficult to measure in terms of NEHRP specifications, the PERC project had a substantial impact preparedness plans and the public perception of earthquake hazard in low-probability, high consequence seismic zones in the Central US. The active participation of key policy makers and agency leaders in funding, producing, narrating, and distributing PERC/CERI video products is a direct reflection on the level of "buy-in" this project has received in the past from all levels of government. Senator Lamar Alexander, Shelby County Mayor A.C. Wharton, and TEMA Director James Bassham have contributed significant time and influence as narrators of past CERI-produced PSA's. These products have also been shown directly to the TN State Legislature through special meetings arranged by the West TN Seismic Safety

Commission. The PI of this project also serves as Executive Director of the WTSSC.

The continuous and significant leveraged support of key partners in PERC was a direct reflection on the success of the program in promoting earthquake preparedness, especially participation in Shakeout activities. The West TN Structural Engineer's Association, WTSSC, TEMA, the Tennessee State Fire Marshall's Office, CUSEC, and the private sector consistently supported production and distribution of earthquake awareness videos produced through the PERC.

NEHRP has struggled for decades to convince policy makers and engineers that strong commercial seismic building codes should be adopted in West Tennessee without waiver or provision. The effectiveness of seismic building codes that were adopted in the past was rendered less effectiveness through legal provisions and waivers. As supported by the State Fire Marshall's Office, Shelby County Tennessee adopted the 2012 IBC in December 2014 without provision or waiver (<https://shelbycountyttn.gov/DocumentCenter/View/12154>). It is certain that project videos have reached a significant portion of the Shelby County population since 2004. It is also certain that public input and concern has a significant influence on government activities.