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Thursday, November 10, 2005 - Page updated at 12:00 AM

## Early-warning plan for quakes studied

By Usha Lee McFarling  
*Los Angeles Times*

PASADENA, Calif. — Faint signals during the first moments of a large earthquake can be used to predict the severity of ground shaking before a fault has finished rupturing, potentially offering crucial seconds for early warning, according to a new study.

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A few seconds may not sound like much, but it could be enough to turn off natural gas to prevent fires, isolate electrical and phone systems to protect them from failure and order children to dive under desks.

"Fifteen seconds seems huge to me," said Lucy Jones, the scientist-in-charge at the U.S. Geological Survey office here. "We have engineers who say, 'If you could give me 100 nanoseconds, it would be useful.' "

In the study, Richard Allen, a seismologist at the University of California, Berkeley, and Erik Olson of the University of Wisconsin, Madison, analyzed 71 recent earthquakes. They found that the weak pressure waves that radiate out immediately from faults, called "P waves," give off distinct frequency information. Larger earthquakes were preceded with P waves of low frequency, they found. This allowed them to describe the size and location of an earthquake within four seconds and sometimes within two.

"We're not going to be able to predict earthquakes in the near future. The only other option is short-term warning of a few seconds," Allen said. The work is published in today's issue of the journal Nature.

If there were a system in place to transmit the information, notice of impending shaking could be disseminated in about five seconds, Allen estimated.

Very large quakes, such as the magnitude-7.9 earthquake that hit Alaska in November 2002, can last for more than a minute. Shaking begins almost immediately near an epicenter, but it can take seconds, or tens of seconds, for shaking to occur in areas farther away.

Allen is testing a system to create early-warning maps. Jones said her U.S. Geological Survey office is taking preliminary steps to test whether early information from quakes could provide rapid warnings without generating an

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unacceptable level of false alarms. Both scientists foresee the possibility of having early warnings go to sirens at schools, personal computers or cellphones.

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