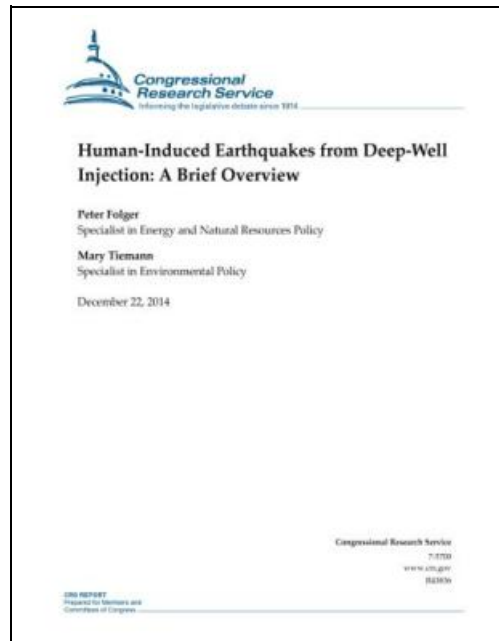


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Createspace, United States, 2014. Paperback. Book Condition: New. 279 x 216 mm. Language: English . Brand New Book \*\*\*\*\* Print on Demand \*\*\*\*\*.The development of unconventional oil and natural gas resources using horizontal drilling and hydraulic fracturing (fracking) has created new demand for wastewater disposal wells that inject waste fluids into deep geologic strata. An increasing concern in the United States is that injection of these fluids may be responsible for increasing rates of seismic activity. The number of earthquakes of magnitude 3.0 or greater in the central and eastern United States has increased dramatically since about 2009, from an average of approximately 20 per year between 1970 and 2000 to over 100 per year in the period 2010-2013. Some of these earthquakes may be felt at the surface. For example, 20 earthquakes of magnitudes 4.0 to 4.8 have struck central Oklahoma since 2009. The largest earthquake in Oklahoma history (magnitude 5.6) occurred on November 5, 2011, near Prague, causing damage to several structures nearby. Central and northern Oklahoma were seismically active regions before the recent increase in the volume of waste fluid injection through deep wells. However, the recent earthquake swarm does not seem to be due to typical, random, changes in the rate of seismicity, according to the U.S. Geological Survey. The relationship between earthquake activity and the timing of injection, the amount and rate of fluid injected, and other factors are still uncertain and are current research topics. Despite increasing evidence linking some deep-well disposal activities with human-induced earthquakes, only a small fraction of the more than 30,000 U.S. wastewater disposal wells appears to be associated with damaging earthquakes. The potential for damaging earthquakes caused by hydraulic fracturing itself, as opposed to deep-well injection of wastewater from oil and gas activities, appears to be much smaller. Hydraulic...



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