



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Carson A. Pope	Project Number 34317
Project Title Fracking Earthquakes: Testing the Correlation between Deep Injection Wells and Earthquakes	
Objectives/Goals The objective of my experiment is to test the correlation between fracking waste water disposal wells and seismic activity. I hypothesize that I can show deep injection wells can cause earthquakes by simulating a deep injection well on a fault line at different angles and running water at selected pressures inducing the fault to slip (i.e. an earthquake). Abstract Methods/Materials I made a model of a deep injection well on a fault line by using 2 identical slabs of concrete, one directly on top of the other. One slab contained a piece of 1/4 inch copper tubing to inject water in between the slabs at six different water pressures (0lbs-50lbs at 10lb increments) causing the fault to slip, simulating an earthquake. For Test Series 1 and 2, I tested all six water pressures three times each with the apparatus set at six different angles of incline. At these angles and water pressures, I measured the time it took for the fault to slip and how far it slipped (mm) Results My results showed that as the water pressure increased, the fault slipped farther for five of the six angles tested in both Test Series 1 and 2. As the angle of incline of the fault line increased, the millimeters slipped increased for both Test Series 1 and 2. For every angle and water pressure the fault slipped a minimum of 2mm to a maximum of 25mm (due to stopper), except at 0lbs of water pressure where it did not slip at all. For Test Series 1 and 2, although there were fluctuations in the time it took for the fault to slip, the general trend was as the water pressure increased, the seconds it took for the fault to slip decreased or stayed constant in all angle categories. The less time it took for the fault to slip, the farther it slipped for both Test Series 1 and 2. Conclusions/Discussion In conclusion, my results support my hypothesis. My project shows that when water is injected into fracking waste water disposal wells under high pressures, a fault can slip abruptly and farther, causing a potentially greater magnitude earthquake. This experiment shows the correlation between fracking waste water disposal wells and seismic activity along fault lines. California is a highly seismic active area and if fracking waste water disposal wells were to be used, it could potentially increase the frequency and magnitude of earthquakes.	
Summary Statement Testing the correlation between fracking waste water disposal wells and earthquakes.	
Help Received Father helped build fault line apparatus and record data.	