

# Empire News

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## A whole lot of shaking going on

Anyone who has spent more than a few years in California knows the shake, rattle and roll of an earthquake. But folks living near The Geysers geothermal field know it intimately. For some, it's almost a daily ritual.

"It gets a little tiresome," says Dave Henderson, one of about 300 residents of Anderson Springs, on the eastern flank of the Mayacmas Mountains in Lake County.

Last year more than 500 earthquakes shook the otherwise bucolic community and its immediate surroundings.

"I used to get excited about them," says Joan Clay, who has lived in the area for five years. "Now it's like, 'Oh, there's another one.' You're more surprised when a day goes by without one."

Asked when the last quake rumbled beneath her house, Clay consulted her husband, then came back to the phone to report, "A couple of hours ago."

The vast majority of the shakers are small ones, registering less than 2.0 on the Richter scale. It's rare that any quake pushes the meter past 3, which is generally regarded as the threshold at which quakes can begin to be felt or do damage.

But don't tell Jeff Gospe that the quakes are "insignificant."

"We feel them very regularly," says Gospe, a Santa Rosa business consultant whose family has a weekend home in Anderson Springs. "And they take their toll, on your nerves and on your house."

Gospe has compiled data on thousands of quakes in the area, documenting not only the total of 517 last year but a pattern that shows a steady and significant increase in numbers since 1997, when Lake County began pumping treated wastewater into the steam field in an effort to "recharge" the geothermal source. Now, Gospe and other residents are concerned about what will happen when Santa Rosa completes its pipeline that will add up to 11 million gallons of wastewater each day into the porous ground beneath The Geysers.

Calpine Corp., which operates the majority of the steam-driven power plants at The Geysers, doesn't dispute Gospe's data and acknowledges that recharge activities seem to stimulate earthquakes.

"Definitely," says Mitch Stark, a senior geoscientist for Calpine. "When you inject, it triggers a lot of very small micro-earthquakes."

But while studies show a large increase in the number of small shakers, the number of larger quakes — magnitude 3 or higher — is down, Stark says.

He says the entire Geysers area — which stretches across the mountains between Cloverdale and Middletown — is "earthquake country, full of faults and stress."

When you add water, "small changes in pressure can cause those surfaces to slip." Thus the frequent quakes, says Stark, who feels them as he works in his office.

The addition of Santa Rosa's wastewater is expected to increase the shaking, but Stark says studies predict that the additional quakes will be of the "micro" variety.

That's not much comfort to rattled residents.

"You start to wonder about the cumulative impact," says Clay. "We remodeled our kitchen, but now the counters have an incline that wasn't there before. So when you spill something, it doesn't just sit there, it goes toward the creek."

Henderson, who retired after years as a pipefitter at The Geysers, says he spends his days pounding in loose nails and repairing sheetrock damaged by all the movement.

Like the others, he says he doesn't oppose Santa Rosa's project. But he worries about the future, when more wells pierce the mountains, when more water is pumped into the ground, when what is already shaky ground is further pestered by the tinkering of man.

"You can't help but wonder what's going to happen," Henderson says.

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