

SIGNIFICANT INCREASES IN INDUCED SEISMICITY BEFORE AND AFTER INJECTION FROM THE SOUTHEAST GEYSERS PIPELINE

	Pre-SEGEP*	Post-SEGEP		
1-Mile Radius of Anderson Springs	1995-1997	2002-2004	Var.	% Var.
Earthquakes ≥ M1.5	44	194	150	341%
Earthquakes ≥ M2.0	6	45	39	650%
Earthquakes ≥ M2.85 [Unocal M2.0]	0	3	3	N/A
Earthquakes ≥ M3.0	0	1	1	N/A
Earthquakes ≥ M4.0	0	0	0	N/A
Southeast Geysers Quadrangle	1995-1997	2002-2004	Var.	% Var.
Earthquakes ≥ M1.5	239	565	326	136%
Earthquakes ≥ M2.0	63	137	74	117%
Earthquakes ≥ M2.85 [Unocal M2.0]	12	14	2	17%
Earthquakes ≥ M3.0	7	9	2	29%
Earthquakes ≥ M4.0	0	1	1	N/A
Geysers Geothermal Field	1995-1997	2002-2004	Var.	% Var.
Earthquakes ≥ M1.5	2,149	2,810	661	31%
Earthquakes ≥ M2.0	493	697	204	41%
Earthquakes ≥ M2.85 [Unocal M2.0]	55	73	18	33%
Earthquakes ≥ M3.0	36	50	14	39%
Earthquakes ≥ M4.0	0	4	4	N/A

Source: Northern California Earthquake Data Center at <http://quake.geo.berkeley.edu/ncedc/catalog-search.html> with data from the Northern California Seismic Network (US Geological Survey, Menlo Park) and the Berkeley Seismological Laboratory (University of California, Berkeley).

1. 1-Mile Radius of Anderson Springs query based upon coordinates of original hot springs at Anderson Springs, using the delta parameter for the springs as centerpoint of a 1-mile radius circle (where "delta=38.77235,-122.70625,0,1.6").
2. Southeast Geysers query based upon coordinates of Southeast Geysers Quadrangle (min. lat.=38.7370, max. lat.=38.7820, min. long.=-122.7510, max. long.=-122.6900).
3. Geysers Geothermal Field query where polygon=38.85,-122.89,38.89,-122.83,38.89,-122.79,38.76,-122.67,38.72,-122.70,38.78,-122.86,38.85,-122.89.

* The Southeast Geysers Effluent Pipeline began injection in Sep. 1997, with 1998 representing the first full year of wastewater injection in the Southeast Geysers.

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1-Mile Radius of Anderson Springs	1997	2004	Var.	% Var.
Earthquakes ≥ M1.5	11	72	61	555%
Earthquakes ≥ M2.0	2	18	16	800%
Earthquakes ≥ M2.85 [Unocal M2.0]	0	2	2	N/A
Earthquakes ≥ M3.0	0	0	0	N/A
Earthquakes ≥ M4.0	0	0	0	N/A
Southeast Geysers Quadrangle	1997	2004	Var.	% Var.
Earthquakes ≥ M1.5	92	218	126	137%
Earthquakes ≥ M2.0	22	54	32	145%
Earthquakes ≥ M2.85 [Unocal M2.0]	4	6	2	50%
Earthquakes ≥ M3.0	2	3	1	50%
Earthquakes ≥ M4.0	0	1	1	N/A
Geysers Geothermal Field	1997	2004	Var.	% Var.
Earthquakes ≥ M1.5	708	1,206	498	70%
Earthquakes ≥ M2.0	150	289	139	93%
Earthquakes ≥ M2.85 [Unocal M2.0]	14	28	14	100%
Earthquakes ≥ M3.0	9	17	8	89%
Earthquakes ≥ M4.0	0	2	2	N/A

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