



Anderson Springs

Community Alliance

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Murray Grande, Manager
NCPA Geothermal Office
PO Box 663
Middletown, CA 95461

Richard Estabrook, Ukiah Field Office
Bureau of Land Management
2550 North State Street
Ukiah, CA 95482

Dear Murray & Rich,

Our community supports responsible geothermal development, and we acknowledge that NCPA has undertaken numerous activities in recent years to become the most responsible geothermal operator at The Geysers.

Nevertheless, neither the Environmental Assessment and Initial Study/Proposed Mitigated Negative Declaration, nor the Alta Rock Engineered Geothermal System Demonstration Project as proposed, comply with the stringent requirements of environmental review under NEPA & CEQA, nor do they adequately mitigate against both existing and potentially substantial environmental impacts already affecting the residents & property of Anderson Springs.

With the exception of the Induced Seismicity Report dated November 17, 2008, the Environmental Assessment/Initial Study relies almost exclusively on outdated NEPA/CEQA documents (i.e., the 1994 EIS/EIR for the Southeast Geysers Effluent Pipeline Project [SEGEP] and the 2002 SEGEP Pump Station Upgrade Project Supplemental EIR). The Environmental Assessment/Initial Study is seriously and substantially flawed, excluding significant, cumulative environmental impacts that have been occurring within the project area and adjacent community of Anderson Springs for more than ten years, both as a result of geothermal production & injection.

SUBSTANTIAL FACTS ABOUT ACTUAL IMPACTS ON RESIDENTS AND THEIR PROPERTY HAVE BEEN IGNORED OR EXCLUDED—despite these ongoing, cumulative impacts being widely discussed and documented in the local media and through community participation in countless public meetings, committees, planning sessions, updating the Geothermal Element of Lake County's General Plan, written comments to various environmental studies, and participation for almost 15 years in the Southeast Geysers Seismic Monitoring Advisory Committee—on which both NCPA and the BLM have been participating members since its inception.

The Environmental Assessment/Initial Study and its Induced Seismicity Report go to great lengths to explain in theory with elaborate “scientific” detail why the many problems our community has repeatedly experienced either do not exist, cannot be related to geothermal development, or simply result in “less-than-significant impacts” on residents and their property. Far more effective studies and mitigation measures can be developed through empirical, onsite analysis of actual structures, interviewing actual residents about their actual experiences with impacts from actual seismic events, corresponding to actually recorded magnitudes, epicenters, hypocenters, and ground accelerations in the community.

Despite years of presenting and discussing extensively documented reports with the Southeast Geysers Seismic Monitoring Advisory Committee, inclusive of both NCPA and BLM, there is NO mention in the Environmental Assessment/Initial Study of the significant body of evidence for dramatic increases in the frequency and magnitudes of seismicity, its associated ground-shaking documented by peak ground accelerations in the community, and resulting damage to property that is detrimental to the health, well-being, and property rights of those in Anderson Springs.

There is NO mention of Geothermal Impact Mitigation Funds established in December 2004 for the communities of Anderson Springs and Cobb, in which NCPA actively participates and has already paid \$55,264 for damage repairs to 17 properties in Anderson Springs.

The Southeast Geysers Seismic Monitoring Advisory Committee and its member participants, including the County of Lake, NCPA, Lawrence Berkeley Labs, the US Geological Survey, the California Department of Conservation/Division of Oil, Gas & Geothermal Resources, and the BLM, among numerous others, have received copies of results from comprehensive community surveys conducted in 2002, 2003, 2004, and 2005, along with scores of photos and cases of specific earthquakes causing damage to many residents in Anderson Springs AND geothermal facilities on both Calpine’s and NCPA’s leaseholds.

Similarly, these same agencies have been presented on numerous occasions with detailed analyses of local seismicity, corresponding ground accelerations, photos of property damage, and countless anecdotes of actual impacts on local residents. These facts and evidence are highly relevant to the Environmental Assessment/Initial Study, are widely available and known, and are hereby incorporated by reference to include all documentation and testimony submitted over the past 15 years to the Southeast Geysers Seismic Monitoring Advisory Committee, along with the public records and testimony for numerous Lake County & Sonoma County geothermal projects, including but not limited to the Southeast Geysers Effluent Pipeline Project, the SEGEP Pump Station Upgrade Project, the Lake County Full Circle Project, the East Ford Flat Project, the Sprouse Drilling Project, Units 13 & 16 Powerplant Projects, the Bear Canyon Powerplant Project, the Lake County Geothermal Impact Mitigation Fund, our Public Records Act Request on Lake County’s Use of AB-1905 Funds, and the Santa Rosa Geysers/Incremental Recycled Water Programs, as well as found on www.AndersonSprings.org.

In order to comply with NEPA/CEQA and avoid legal challenges, we recommend the following changes to the Environmental Assessment/Initial Study, including its Induced Seismicity Report:

1. Acknowledge that since the 1994 and 2002 environmental documents there have been significant environmental changes, new impacts, and new information about induced seismicity affecting the project site, nearby geothermal facilities, and adjacent community of Anderson Springs.
2. Identify the reality of negative environmental impacts on nearby residents and their property, including the establishment of a geothermal mitigation committee and funds to repair damage associated with geothermal operations and seismicity. To date, NCPA's funds have been approved for repairs to 19 properties totaling \$63,299, of which \$55,264 have already been disbursed for repairs at 17 properties (three additional claims totaling \$62,875 have been denied). Similarly, Calpine has disbursed \$123,077 of Community Investment Funds, with another \$32,629 approved but not spent. Lake County has also spent tens of thousands of dollars of Geothermal Mitigation Funds on behalf of the communities of Anderson Springs and Cobb.
3. Recognize that there are real impacts, both individually and cumulatively, from micro-seismicity, with the following eight factors influencing the impact geothermal earthquakes have on residents and property:
 - Magnitude of the earthquakes;
 - Frequency of the earthquakes;
 - Proximity to the earthquakes' epicenter;
 - Proximity to the earthquakes' hypocenter;
 - Directionality & nature of the earthquakes' seismic waves;
 - Characteristics of the underlying faults, soils, and geology;
 - Design & construction of the homes and other structures; and,
 - Individual sensitivities & perceptions about earthquakes.
4. Analyses of 402 significant geothermal earthquakes over 58 months (i.e., generating strong Peak Ground Accelerations $\geq 1.4\%$ g for Modified Mercalli Intensities of IV or higher), along with geospatial plots of these earthquakes relative to our community, prove that 86% of problem earthquakes are smaller than M3.0 (60% are M2.0s and 26% are M1.0s). A majority of these earthquakes (57%) are located within less than 2 miles, another 23% are within 2 to less than 4 miles, and the remaining 20% are located 4 miles to more than 7 miles away.
 - We are impacted by these field-wide, low-magnitude earthquakes an average of 7 times per month in Anderson Springs, which generate unexpectedly strong ground-shaking (i.e., Modified Mercalli Intensities of IV to VII)—likely due to their proximity, shallow depth (especially relative to the community's much lower elevation), and local site conditions (being situated in a steep river canyon on ancient landslides/alluvial soils).

- Of these earthquakes, we are impacted an average of about 2 times per month by events generating Modified Mercalli Intensities of V to VII.
 - These empirical facts are contrary to the seismic hazards risk analyses & conclusions of the Induced Seismicity Report and the prior EIS/EIR, which speculates that “the probably maximum annual seismic event shaking expected in Anderson Springs corresponds to MMI=III-IV due an EGS-induced event of M<3.0.” [Page 2 of 88]
 - In reality, we experience 72 such events per year [i.e., MMI=IV-VII] from earthquakes with M<3.0, of which an annual average of 14 events generate MMI=V-VII [where M<3.0].
 - Of the 102 earthquakes generating MMI=V-VII, only 30% were ≥M3.0s whereas 67% were M2.0s and 3% were M1.0s.
 - Average Peak Ground Accelerations for these earthquakes are relatively comparable at different distances from the strong ground motion station, with the strongest ground motion being generated by seismicity within 1 to 4 miles, then decreasing beyond 4 miles.
 - There is a direct correlation that higher earthquake magnitudes are required at greater distances to generate the same or lesser amount of ground-shaking—an average M3.0 at more than 6 miles away, compared to an average of only M1.9 within 1 mile.
 - Dramatically higher maximum peak ground accelerations are experienced within 4 miles.
 - Despite 6 years of continuous strong ground motion data for Anderson Springs, the Induced Seismicity Report did not analyze or include any data after October 2004!
5. Address that while the greatest increases in seismicity have been for M3.0 events or smaller (which remain a problem for local residents), there have been significant field-wide increases to earthquakes ≥M4.0s, which generated prolonged ground-shaking and raise concerns for larger, more damaging earthquakes (fortunately, M3.0s have been relatively stable).
- We strenuously disagree with the assertion on page 4-20, paragraph 2 of the Environmental Assessment/Initial Study that “the largest seismic events of the past 12 years in the NCPA area occurred...outside of the areas of water injection and steam production...and are also considered to be tectonic and unrelated to past injection activities.”
 - We have attached photos & documentation of the M4.3 earthquake on 12/27/2004, for which the epicenter was located within 0.19 miles of the top of NCPA’s CA-950 “A” Site where well “A-1” serves as one of NCPA’s largest injection wells. The epicenter was also within 0.44 miles of NCPA Powerplant 1.
 - This event generated 15.0%g of Peak Ground Acceleration on the Anderson Springs’ strong ground motion station (MMI=VI), and caused damage to numerous properties in Anderson Springs, as well as geothermal facilities on Calpine’s and NCPA’s leasehold.

6. Establish reasonable measures to study and learn from the proposed Alta Rock EGS Project, while protecting the safety & property of adjacent residents with adequate project mitigations:

- Install a second strong ground motion station at the Anderson Springs Homeowners' Association Recreation Center.
- Monitor seismic and strong ground motion station readings on a monthly basis, and more frequently if a significant seismic or other event occurs within 3 miles of the project site or is reported by nearby residents.
- Alter or adjust geothermal project activities as needed to reduce and minimize induced seismicity where its impact exceeds 1.4% g Peak Ground Acceleration in Anderson Springs.
- Increase contributions to Geothermal Impact Mitigation Fund to repair property damage proportionate to any increase in current seismicity with Peak Ground Accelerations $\geq 1.4\%$ g.
- Identify the threshold at which the project must be halted for excessive increases in frequency and/or magnitude of induced seismicity, including Peak Ground Accelerations $\geq 9.2\%$ g.

It remains our continued hope that these comments will assist geothermal operators and their municipal partners in better understanding induced seismicity and impacts on nearby communities.

We support responsible growth of NCPA's geothermal power generation, and we believe that the appropriate studies, monitoring, and mitigations can safeguard our community while still resulting in profitable field operations.

Respectfully submitted,



Jeffrey D. Gospe, President
Anderson Springs Community Alliance