AMARGOSA CONSERVANCY

Protecting the land, water, and beauty of the Amargosa

December 28, 2011

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To; Presiding Member, Commissioner Karen Douglas
Associate Member, Commissioner Carla Peterman
HHSEGS Siting Committee
California Energy Commission

From: Amargosa Conservancy

Re: The Application for Certification and Approval of
BrightSource Energy's
Hidden Hills Solar Electric Generating System, HHSEGS (11-AFC-2)

The Amargosa Conservancy, a 501(C)(3) California non-profit, is dedicated to protecting the land, water and beauty of the bi-state Amargosa region. We are the principal community-based conservation organization for the Amargosa area, with headquarters in Shoshone, California. Formed in 2005, The Conservancy has been actively involved in Amargosa region land use and water issues, including a significant role in the 2009 Congressional enactment that declared 26 miles of the Amargosa in California a "Wild and Scenic River" under Section 7 of the Wild and Scenic Rivers Act of 2004. We have co-funded recent studies to define the groundwater sources of the Amargosa River and its spring tributaries, as the hydrology of this area is not well known. Our organization has also taken an active interest in, and commented on, renewable energy facility permitting and federal land use planning in the region.

The bi-state Amargosa watershed (which overlies the Death Valley Regional Groundwater Flow System--DVRFS), is exceptionally rich in ecological resources, including extensive aquatic, riparian and phreatophytic communities. The region's biodiversity is unparalleled, with an array of endemic species exceeded in only one other place in North America. These natural resources—as well as the area's small local human communities—are entirely dependent on maintaining the currently robust groundwater flows that sustain perennial flow in the Amargosa River and its stream, spring and seep tributaries. The Wild and Scenic designation legally protects existing flow and water quality in the Amargosa River and its spring tributaries as of the date of enactment. If groundwater pumping based on rights acquired after that date adversely affects the river, that pumping is subject to abatement.

The HHSEGS facilities would be located in the Pahrump Valley Basin, which is included within, and hydrologically connected to, other basins that comprise the DVRFS, including the lower Amargosa. As you already may know, the project proposes to pump a minimum amount of 140 acre-feet/year of groundwater from wells in a basin-fill aquifer. As detailed below, we believe that pumping, over time, may adversely affect sensitive water-dependent ecological resources in the lower Amargosa, including several listed and special status species. In our view, it is critically important that the California Energy Commission's approval process for the HHSEGS facilities investigate and take steps to reasonably assure that proposed project's water use will not adversely affect the existing Amargosa region surface flows—quantitatively or qualitatively—in perpetuity. Understanding the impacts of this pumping and its significance will require an extensive level of knowledge regarding the regional and local geology and

hydrogeology. The acquisition of this knowledge must occur through an investigational analysis aided by the construction of, and reliance on, a fine scale groundwater model, with appropriate monitoring and mitigation actions to follow.

We applaud the Energy Commission's early expressed concern for the project's groundwater pumping impacts in the already vastly over-appropriated Pahrump Valley Basin, and, more importantly, in Data Requests posed by Energy Commission technical staff to the Applicant, Brightsource Energy, regarding the effects of groundwater pumping on the Amargosa system, and in several recent hearings and workshops in part devoted to water issues.

We credit the Applicant's apparent willingness to mitigate for its groundwater usage by acquiring and retiring existing Nevada water rights, although we would like more details on how acquisition of senior water rights in Nevada can be made meaningful in the future given the great excess of existing groundwater rights in this over-drafted basin. Limitations on future groundwater pumping in Nevada will be difficult to insure as junior rights holders step into the shoes of the senior rights owners. Moreover, limits on pumping from California locations in the basin cannot be assured given the state's lack of regulatory oversite and authority on groundwater pumping in unadjudicated basins.

By restricting the area of concern relevant to groundwater pumping to a short radius around the project, and to effects projected to occur during the initial 25-30 year life of the proposed HHSEGS project, the Applicant's project analysis has unduly limited inquiry into potentially broader effects on the crucial groundwater flow system that supports the Amargosa River and its tributaries. Even in situations where groundwater pumping is proposed to end, the effects of that pumping can propagate over much longer intervals of time, so that phenomenon must be analyzed and accounted for accordingly. Also, we note that the applicant has stated that its property lease does not end at 30 years, but has claimed the lease terms as "proprietary" and business confidential, and has thus refused to release its conditions. Under that circumstance, the Energy Commission must assume (in accordance with the common business understanding that an enormous investment in infrastructure will likely result in permanent generation facilities on this site) that groundwater pumping will continue, indefinitely.

Unfortunately, the geohydrology of the southern Amargosa basin, which includes the Pahrump Basin and the adjoining areas in California, is not yet well understood. Indeed, as the Applicant has acknowledged in several filings for the proceeding, including the AFC:

> *The hydrogeology of the Pahrump Valley groundwater basin is complex and the project site's connectivity to the larger basin not fully understood…The (Cardno Entrix, or Entrix) analysis shows that the project's use of groundwater may result in offsite impacts on existing domestic pumpers south of the project site and potentially throughout the larger groundwater basin.*

As an initial observation, the groundwater modeling presented by the Applicant in AFC Appendix 5.15D is unacceptably simplistic. The geometry of the drawdown contours presented in the Entrix Modeling Memos (Appendices 5-15 F and G) show near perfect circles moving away from the site, a quite simplified representation of a very complex hydrogeologic system. Moreover, California Valley, an eastward extension of the Amargosa River drainage, which drains westward to the Tecopa area, is

located immediately southwest of the proposed project site. The analytical modeling results presented by Entrix (Appendix 5.15G, Figure 9) indicate that measureable drawdown in the alluvial aquifer would extend into the California Valley area with pumping during the project's initial life at the proposed rates.

It is critically important to note that the USGS Death Valley Regional Flow System regional groundwater model (the only accepted regional representation of groundwater flows--although coarse-scaled) posits that groundwater flows from Pahrump Valley into the Amargosa River. The Applicant has not used that model in its analyses on project impacts.

Recent preliminary geochemical results of spring waters in the Amargosa Basin conducted by the Source Group also suggest that alluvial groundwater is of major importance to spring flow in the Amargosa River region. Whether alluvial flow from the Pahrump Valley into California and Chicago Valleys and then into the Amargosa is occurring is unknown. Given significant analytical uncertainties in the face of risks to flow in the Wild and Scenic Amargosa River and its tributaries, it would certainly be prudent to require, at the very least, some additional hydrogeological investigations before permitting the installation of groundwater wells for the construction and operation the HHSEGS project.

Despite significant existing information questioning the regional effects of the proposed pumping by the project, (including the Entrix-modeled effects of flow between the project area and California Valley), the Entrix report (AFC Appendix 5-15D) rationalizes its omission to inquire about pumping effects propagating into the southwest portion of the basin beyond the immediate vicinity of the project's proposed well locations. That rationale is based on unproven assumptions about hydrology: project wells would withdraw groundwater from the alluvial, or basin-fill, aquifer that overlies an extensive deeper, lower carbonate aquifer. The authors of the Entrix report claim these two aquifers are separate. However, USGS reports cited in the Entrix study (which note the lack of verified information about relationship between the two aquifers) -- contrary to the Entrix assertion – assume the two aquifers are in communication, especially in the southwest portion of the valley. The diagram (Figure 7) on Page 3-4 of the Entrix report (derived from the Malmberg paper, *Hydrology of the Valley-Fill and Carbonate-Rock Reservoirs, Pahrump Valley, Nevada-California)* which seems to illustrate a separation between the two aquifers, is apparently based on an assumption about a tuff layer that would largely prevent communication between the aquifers. Malmberg, however, notes that this particular diagram shows only:

*…the **probable** general relationship between the valley-fill and carbonate-rock reservoirs. **If** the tuff in the lower part of the valley is widespread**, as is suggested** by the diagrammatic section, the hydraulic continuity between the two systems beneath the valley floor would be poor**; nevertheless, the lateral continuity may be reasonably good**. Thus beneath the valley floor, the two ground water reservoirs are considered to function mainly as independent flow systems, although **interflow almost certainly occurs laterally along the contact between them.** (emphasis added)*

Although the new geochemical work (anticipated to be released in early 2012) suggests that flow from Pahrump Valley into Chicago Valley and thence into the Amargosa *could be* less important in comparison to the overall flow system in the Amargosa Basin, those results should be properly placed in a wider context and confirmed by sampling from new wells that need to be drilled in the area between the project site and the Amargosa River.

The carbonate aquifer is assumed to support flow in the Amargosa River and its spring tributaries. The Entrix report properly notes (on page 3-4) that pumping from the carbonate aquifer:

> *…can create broad cones of depression that can extend miles to tens of miles from the well. The aquifer sustains numerous springs, primarily in adjacent basins such as the Amargosa Valley to the west, that are home to threatened and endangered species. Groundwater extractions from this aquifer could affect sensitive ecological resources, which makes it an unacceptable selection for the project water supply.*

In the face of absent information the report's assertion that pumping from the project's wells in the alluvial aquifer will not affect flow in the carbonate aquifer is said to be confirmed by "existing monitoring wells in (the) carbonate aquifer" that show "an upward gradient indicating a confining unit is present that separates the basin fill aquifer from the carbonate aquifer." That assertion is not supported—there are no wells reported in the vicinity of the project, nor data suggesting that that gradient exists. This fact was again acknowledged by the Applicant in their December 19,2011 Data Response Set 1C, where in their response to Data Request #82 (on page 34 of the filing) they indicate that:

> *Although there are no wells completed in the carbonate aquifer in the Pahrump Valley, its properties can be determined from investigations in nearby areas.*

However, it it not appropriate or sufficient to assume conditions and properties within the Pahrump Valley -- based on investigations in others areas that do not have the same unique properties – when making a determination of significance in relation to the HHSEGS' impacts on groundwater in the Pahrump Valley.

In fact, little is known about the complex hydrology of the southern section of the DVRFS, including the extent to which there is communication between the carbonate and alluvial aquifer, or communication within the alluvial aquifer between the proposed project area and California Valley. In the absence of data that the Applicant readily admits, the Energy Commission must assume a strong influence of groundwater flow within the basin fill aquifer and the lower carbonate aquifer on springs in the Shoshone – Tecopa area, and that projected drawdown caused by HHSEGS pumping will propagate into and adversely affect the Amargosa Wild and Scenic River.

To address these uncertainties, and provide solid scientific support for the BLM's upcoming Amargosa Wild and Scenic River Comprehensive Management Plan (CRMP) that is meant to protect the flow in the Amargosa and its tributaries, the BLM, the US Geological Survey, the Amargosa Conservancy, and the Nature Conservancy last year launched a multi-year series of collaborative studies to develop a more complete picture of the plumbing of this important desert watershed. While some early results are in hand, much of that work requires additional funding, and will take several years to complete.

The HHSEGS proposal to pump regional groundwater from aquifer systems that are hydrologically linked to the Amargosa Wild and Scenic River raises serious questions about the potentially significant long-term effects of this pumping---which postdate the river's protective designation. Goals enshrined in the Wild and Scenic legislation—to protect existing flow and quality of designated streams-- requires the BLM to first determine, then protect, groundwater sources contributing to the rare surface expression of water in this arid region against human intervention. The Energy Commission should

consider in detail how the requisite hydrological understanding will be acquired and how that information will be used to protect surface and near-surface water sources.

Thank you for this opportunity to comment.

Donna Lamm
Executive Director