

From the desk of Greg P. Smestad, Ph.D.
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Friday, May 21, 2010

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Project Manager
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California Energy Commission
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emailed to: cmeyer@energy.state.ca.us

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Re: Comments regarding the Imperial Valley Solar Project (CEC #08-AFC-5) Draft EIS –
Impacts to the Juan Bautista de Anza National Historic Trail

Dear Mr. Meyer and Mr. Strobaugh;

As a private citizen and a consulting party on the National Historic Preservation Act 106 process, I would like to respectfully submit the comments below on the draft EIS (DEIS) for the Imperial Valley Solar Project (listed as docket CEC #08-AFC-5 and formerly known as the SES Solar Two Project). First, I would like to mention that that I am a 8th generation Californian and a descendent of members of the Juan Bautista de Anza expedition of 1775-1776 (Anza expedition). I have written the on-line and printed version of the Juan Bautista de Anza National Historic Trail (JUBA NHT) guide¹ for the National Park Service, NPS. In addition, I have 20 years of R&D experience in the field of solar energy and solar materials and have served as an editor for an international journal in that field during that time. I am also a peer reviewer for

¹ Online version: Greg Bernal-Mendoza Smestad, *A Guide to the Juan Bautista de Anza National Historic Trail*, [National Park Service, <http://www.nps.gov/juba/>]. A print version with audio CD is available as *Antepasados XI* (San Diego CA: Los Californianos, 2005).

government-funded photovoltaic solar R&D in the U.S. and abroad, and for venture capitalists investing in renewable energy. More about all of these activities can be learned at my web site. This said, **I wish to express my concurrence and support for comments submitted by the George J. Turnbull, Acting Regional Director, Pacific West Region, NPS L7615 (PWR-JUBA)**, received in the docket May 4, 2010. I offer my own comments below on the DEIS.

The sites related to the JUBA NHT include Anza expedition campsites #47 (Yuha Well, coordinates UTM: 605238 E, 3620362 N; Lat/Long: 32 degrees 42' 57.98" N, 115 degrees 52' 37.90" W) and #48 (within 500 meters east & west of Lat/Long: 32 degrees 48' 58.68" N, 115 degrees 51' 05.15" W along the arroyo north of Plaster City). These are south and north of the proposed project site, respectively. Campsites #47 and #48 are separated by an open and foreboding desert landscape that is unique in both its scale and importance in the history of the colonization of California and the founding of San Francisco, San José and Los Angeles. Our historical, cultural and archaeological resources should be protected and preserved so that future generations of American citizens can enjoy recreational activities and first-hand experiences that could enhance our appreciation of our collective history and heritage. **Some effort should therefore be made in the final EIS to describe whether similar projects on other U.S. National Historic Trails (e.g. the Lewis and Clark trail) set a precedent for construction on such historical, cultural and archaeological resources.**

The *cultural resources* include indications of historic (and pre-historic) trails and paths, and signs of historic trails or routes. Since the Anza expedition utilized Native American guides, and since the trails on many of the segments of the Anza trail were also Native American trails that were used for many hundreds - if not thousands - of years, the final EIS should report on results from studies that use tools and techniques (in conjunction with the historic diaries and maps from the Anza expedition) to more accurately and precisely locate the historic route of the Anza trail within the NHT corridor. **Trails that have been used over many years might be detected from soil compactness or via remote sensing techniques** such as an examination of existing images from satellites possessing infrared (IR) filters. This might allow the trail's possible preservation while utilizing the surrounding areas for activities such as solar power production. **This is my first suggestion on the DEIS and it relates to its Cultural Resources section. Specifically, the text at pages C.2-47, C.2-113, and C.2-132 should be edited to reflect a stronger commitment to identifying the trail** beyond our understanding of it at the time of its Federal recognition (a decade ago). With this improved and refined knowledge, it should be preserved to the greatest extent possible. It is a reasonable mitigation to ask of the applicant, BLM and NPS to identify and preserve the route of the Anza expedition using the most modern tools, techniques and analysis currently available.

The Cultural Resources section of the EIS and/or its appendices should also include the December 12th and 13th, 1775 diary entries of Father Pedro Font and Captain Juan Bautista de Anza, because they provide information about the cultural significance of the proposed site of the project and they help to locate the route of the expedition through it. Translations of these entries are published in print and on-line and can be obtained by consultation with the NPS JUBA NHT office in Oakland, CA.

Anza expedition historic campsite #49 is the San Sebastian Marsh (near the Anza Borrego Desert State Park). It relates to the interpretation of the previously described historic campsites, because the 240 men, women and children of the 1775-1776 Anza expedition, together with over 1000 head of livestock, made it from Yuha Wells to San Sebastian without water in between. The trek was made across the lands of what is today the proposed solar

project. It was the most critical and dangerous segments of the 1,400 mile journey. In addition to these three campsites (47-49), there is also an Anza overlook marker/monument site (coordinates UTM: 602921 E, 3618052 N; Lat/Long: 32 degrees 41' 43.50" N, 115 degrees 54' 07.32" W). Though not officially on the NHT or corridor, it affords a unique overview and vantage point of the route of the Anza expedition looking approximately north. One should add that there are Native American geoglyphs quite near this site. Campsites 47-49 are visible from the monument. It is an easy-to-access recreational spot that is enjoyed near the driving and recreation route of the JUBA NHT.

With the above description and background in mind, I would like to bring to your attention the **Visual Resources section** of the DEIS. I refer to:

- ◆ CEC-700-2010-002-SA-DEIS Visual Resources Fig. 2
- ◆ 2010-01-22_Juan_Bautista_de_Anza_National_Historic_Trail_Visual_Impact_Analysis_TN-55011-3
- ◆ 2010-04-28_Applicant_Glint_and_Glare_Study_TN-56457.

The Key Observation Points (KOPs) in the DEIS are different than in those in the other studies posted at the CEC web-site. The numbers are the same, but the locations are different in these three documents. In addition, there were errors in those studies that I pointed out to the applicant and the BLM that are being remedied and corrected for the sake of accuracy. **The results of these studies should be captured and reiterated in the final EIS. Some effort should be made in the final EIS to correctly identify those KOPs with significance to JUBA NHT-related sites. The document should employ a consistent KOP numbering system and/or employ a table that describes (with Lat./Long.) the locations and significance of all the KOPs in the three documents.** A map should be included that clearly identifies the current understanding of the route/corridor of the JUBA NHT, Anza campsite locations, JUBA NHT-related sites, together with the proposed project footprint, roads and all KOPs that have been studied to date. This should be updated as new KOPS are studied. For example, **I strongly recommend that the Anza Monument and Overlook site mentioned above be studied as a KOP and reported on in the EIS with regard to Visual Resources and impacts.**

Furthermore, the 2010-04-28 Applicant Glint and Glare Study states, "*Glint may be visible to KOPs 1-6 and motorists, depending on time of day. KOPs facing northwest or west may experience glint during morning hours and KOPs facing east or northeast may experience glint during evening hours. Simulation review determined a 20-foot fence to be of minimal benefit...*"

My experience as an optics design engineer suggests that **only an experimental analysis of the project site using small test mirrors viewed from the vantage point of the JUBA NHT-related KOP sites can determine the extent of cumulative glint and glare from all SunCatchers™/trackers. This should be addressed in some way in the Visual Resources section.** I have strong concerns that the modeling for visual impact has taken into account a diffuse reflectance and object outline rather than the true specular nature of the dish mirror surface surface at the angles involved in the lines of sight at NHT-relevant KOPs. I also have serious concerns that a modeling study may not pick up all the subtle optical aspects that a more empirical approach would take. While the plots at the back of that study show the time of day and direction for the glint, the analysis does not represent the extent (and area) that the viewer will see from these sites. They do not address the *solid angle* for the effects. In other words, the vast expanse of desert that relates to the Anza NHT-related interpretation and recreation at these

sites will be filled with the glint and/or glare specified in the report, as well as the objects (e.g. trackers) themselves. Additional questions related to the JUBA NHT include:

- ◆ What is the solid angle involved (in steradians) at nearby Anza campsites and at the Anza overlook monument (coordinates given above) from the sum total of the SunCatchers? If it is discontinuous, describe this aspect and,
- ◆ What are the quantitative luminance estimates from the SunCatchers at these sites given the cumulative and additive effects of the planned number of SunCatchers at the proposed project site?

Another aspect relates to the land itself. The proposed site of this solar project is in close proximity to the Anza campsite #47 at Yuha Wells which is an oasis and sensitive environmental, archeological and cultural site important for the history of all Americans. The EIS suggests that there could be significant visual and auditory impacts at this historic Anza campsite and at the surrounding recreational and cultural areas. There is a strong possibility that the **project will disturb** the thin layer of compacted **soil & rock** that prevents the **dust** underneath from blowing in the strong winds at the site of the proposed solar project. This could result in the loss of the topology and habitat (e.g., at arroyos, washes and historic paths) at or near the project site such that future users of the land might not be able to experience the landscape as it is now or was at time of the Anza expedition. Future uses of the land would then be limited. Soil, dust and erosion studies suggest that the project site might not easily be restored later to allow the meaningful recreational and cultural use that is possible there today. Although the DEIS does discuss (on pages **C. 2-50 and -51**) the reclamation of the site once the plant closes and it outlines a condition of certification specific to the development of a more detailed plan decommissioning plan, this text and the a closure plan submitted in 2008 does not go far enough to protect the future uses of the land. **A strong recommendation to address this deficiency would be to more fully detail these dust and soil deposition aspects and to mitigate damages by monitoring (at sensitive areas within and outside of the project) dust erosion and settling (deposition) rates both prior to and during the lifetime of the project.**

Lastly, I wish to point out that the **Power Plant Efficiency section in the DEIS** does not adequately or completely report the performance of the proposed plant compared to baseline or alternative generation technologies. One should point out that the Imperial Valley Solar technology is still unproven on the 100s of MW scales represented by the proposed project. It may have a greater solar conversion efficiency than solar photovoltaic (PV) technologies for a single unit or module, but this may not be the case for the overall efficiency for the complete array of solar collectors. To illustrate this, we can begin with the CEC website which describes that *Capacity* is the amount of electric power for which a generating unit, generating station, or other electrical apparatus is rated either by the user or manufacturer. *Installed or Nameplate Capacity* is the total manufacturer-rated capacities of equipment such as generators and other system components. When staff reports on page **D.3-5 of the EIS** that the “Project would produce power at the rate of 750 MW net...”, the installed capacity is confused with dependable and peak capacity. This should be clarified in the final DEIS by using additional text and terms and simple calculations such as those below. The CEC website defines a *Capacity Factor* as a percentage that tells how much of a power plant's capacity is used over time. For a solar plant, it is defined by:

Capacity Factor =
[Annual kWh generated for each kW ac of peak capacity (in kWh per kWp)]/8760 hours per year

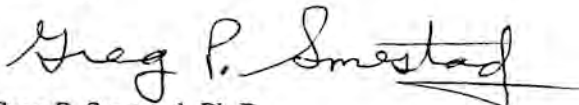
As disclosed in the proposed project's application (on the CEC web site), the total annual capacity factor for the plant is anticipated to be 25 percent. We can therefore translate the nameplate power rating to an expected annual energy production from:

$$750 \text{ MWp} \times 0.25 \times 8760 = 1,642,500 \text{ MWh/year.}$$

This compares favorably with the value cited on page **D.3-5 of the DEIS**, and its associated land use efficiency value of 249 MWh/acre-year. **The applicant's peak power rating is therefore consistent with their anticipated annual energy production and this should be reported in the final EIS. This should be clearly presented along with the calculations, details and assumptions for correcting this value using the expected hydrogen use rate.** Within the final EIS, however, one must then compare this to 312.5 MWh/acre-year with a 34% capacity factor for a large array of SunPower T20 tracker and 520 MWh/acre-year for a 26% capacity factor fixed-tilt PV installation. While these values are verified for PV, they are not for the applicant's solar thermal technology (e.g. the SunCatcher). Comparison values such as these should be reported in **the Efficiency Table 1 on pg. D.3-6 of the EIS and more text should be associated with the table** to describe that the Beacon Solar Energy Project is an established solar trough technology, the Ivanpah Solar plant is a solar tower technology and one should include the Calico Solar Project is a Tessera Solar 850 MW Stirling engine project. **If the cultural, visual, soil and environmental conditions of the land managed by the BLM are to be irrevocably changed at the site, a full disclosure of the technical merits of several Concentrating Solar Power (CSP) and Photovoltaic (PV) alternatives at the site should be described in the EIS, together with at least a qualitative comparative analysis of mitigation that would be involved in these solar technologies.**

If you have any questions on what I have written herein, or if I can be of assistance to you on matters relating to solar energy, please do not hesitate to contact me. Thank you for your attention to this matter.

Sincerely,



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