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September 21, 2011

VIA EMAIL

Craig Hoffman  
Compliance Project Manager  
California Energy Commission  
1516 Ninth Street, MS-2000  
Sacramento, California 95814

<b>DOCKET</b>	
<b>08-AFC-13C</b>	
DATE	SEP 21 2011
RECD.	SEP 21 2011

**Re: Calico Solar 08-AFC-13C  
BNSF Preliminary Comments on Calico Solar Project Infiltration Report**

Dear Mr. Hoffman:

We write on behalf of BNSF Railway Company ("BNSF") to provide the attached comments on the Infiltration Report submitted by K Road Calico Solar, LLC on September 6, 2011, for the modified Calico Solar Project as described in the March 18, 2011 Petition to Amend. Our consultant, Environ, is unable to provide full comments on the Infiltration Report until they receive input and output files, which were to be included with the Infiltration Report. In an effort, however, to assist Commission Staff in moving forward in their analysis, we are providing the attached initial comments. We would ask your assistance in having the input and output files docketed with the CEC and posted on the CEC website as quickly as possible, so that BNSF may augment the attached initial comments.

Finally, we do not believe any limitations on the CPM's obligation to consider BNSF's comments on the Infiltration Report should begin to run until we have received the input and output files. Please let us know if you have any questions, or would like an opportunity to have a workshop to discuss BNSF's initial comments.

Sincerely,



Anne Alexander

AA:

Attachment

September 21, 2011

Mr. Dustin Almaguer  
BNSF Railway Company  
2500 Lou Menk Drive  
AOB-3  
Fort Worth, Texas 76131

Re: Calico Solar Infiltration Report

Dear Mr. Almaguer,

As you requested, I have reviewed the Infiltration Report (the "Report") dated September 6, 2011 prepared by Tetra Tech on behalf of Calico Solar in accordance with Soil & Water Condition 13 (S&W-13). This Report describes the potential impacts of the proposed project on rainfall infiltration and storm water runoff within and around the project site, and predicts the future levels of inundation of storm runoff on the project site and downstream properties. Specific comments and observations on the Infiltration Report are as follows:

- S&W-13 requires the infiltration report to include a calculation of the amount of storm water runoff for 1) the existing soil conditions, 2) the temporarily disturbed conditions resulting from construction, and 3) the final conditions after the installation of SunCatchers and the construction of roads and buildings is complete. The Report includes calculations for 1) and 3), but does not include calculations for 2).

Although the Report contains calculations for 3), the Report does not provide adequate support and explanation for the assumptions supporting these analyses.

- In its August 30, 2011 letter responding to BNSF's August 10 Data Request, Calico indicated that the hydrologic model input and output files predicting peak flows would be included in the Report. However, these input and output files are not included in the Report. I am therefore limited in performing a more in-depth analysis of the models and confirmation of the consistency of the actual files with the description of the model as provided in the Report.
- The hydrologic analysis in the Report is based on two linked modeling approaches, which compute the runoff hydrographs that would be tributary to the project site from upstream properties. The first modeling approach uses a computerized version of the unit hydrograph models prescribed by the San Bernardino County Hydrology Manual. These hydrographs are then used as boundary conditions in a dynamic two-dimensional flow

model (FLO-2D) of sheet flow across the project property to predict the level of inundation and localized flow velocities on the property and in downstream areas. This approach is scientifically sound and should be capable of producing a defensible analysis of the existing and future storm water runoff characteristics of the site and surrounding areas. Further, the adjustment used to reflect the development of a network of secondary roads on the site in the FLO-2D model should be capable of reflecting the impact, if any, of the project on the basin lag and time-of-concentration of runoff onto downstream areas.

- These models have been applied to predict the runoff characteristics of the 2, 5, 10 and 100-year storms from 6-hr and 24 hr rainfall events, as is required by S&W-13.
- The models are also used to predict the expected runoff characteristics for the existing conditions at the site, as well as the final conditions that will exist after the project is completed. Although the Report acknowledges a requirement to also assess the runoff characteristics of the site under a disturbed (*e.g.* during construction) condition, I could not find any such analyses of such conditions in the report, or even a discussion of the expected runoff conditions as compared to the two conditions that were more rigorously assessed.
- The runoff analysis deviates from the SBC Hydrology Manual in the assumption of a greater coverage of soils with higher (HSG C and D) runoff characteristics, based on alternative soils mapping prepared by NRCS (USDA), and in the assumed antecedent moisture condition (AMC) at the onset of the design storm. Tetra Tech's rationale for these adjustments is reasonable and will lead to the prediction of a more conservative (*i.e.* higher) level of runoff.
- Flow under the BNSF railroad trestles are model-based rating curves developed using standard USA-CoE hydraulic models. This approach is scientifically sound.
- Tetra Tech has predicted that under existing conditions, periodic storm water inundation of the railroad embankment will occur for the 10-yr or greater (less frequent) storm events in the area of Trestle 5, and elsewhere at several locations for the 100-yr storm event. Based on our prior discussions, I understand this prediction is somewhat inconsistent with your operating history in which you reported that the railroad embankment had never been inundated in recent times. This seeming inconsistency may result from the fact that the model is based on certain acknowledged conservative assumptions (*e.g.* an AMC of II, corresponding to moderate moisture and runoff characteristics) which may tend to over predict the actual runoff from recent storm events that may have occurred under drier watershed conditions.

- When assessing the potential runoff from the site under a final, developed condition, Tetra Tech has adopted the applicant's prior position that the deployment of the PV panels and Sun Catchers will cause no change to the runoff characteristics of the property. Accordingly, and as a direct result of this assumption, they are also predicting there will be no change to the rate of runoff and level of flooding on downstream properties. In justifying this important assumption, Tetra Tech cites consistency in approach with other hydrologists that have considered the same issue, while at the same time acknowledging a lack of any scientific studies to demonstrate the absence of impacts to the runoff characteristics from a project of this type and scale. They also cite a New Jersey regulation that reportedly exempts solar projects from storm water management regulations, but acknowledge that they are unaware of any scientific basis to support this "policy" decision. The absence of large vacant public tracts of land in New Jersey as compared to San Bernardino County would suggest the solar projects contemplated in this regulation are likely of much smaller (most of them roof top scale), and hence unlikely to cause meaningful storm water impacts in any case.

Based on the information provided in the Report, when fully deployed, the photovoltaic (PV) panels will cover about 25 percent of the related site with an impermeable cover. The project is analogous to a roof surface which will discharge its runoff directly onto a natural pervious surface. The Sun Catchers will cover about 18 percent of their related tracts. In both cases these features would be considered by a hydrologist to be indirectly connected impervious surfaces that otherwise discharge onto a pervious area.

Tetra Tech adopted a base runoff curve number (RCN) of 83 for HSG B soils on the developed property (the same RCN as was assumed for an undeveloped site), by assuming that all of the runoff that discharges to the ground from the panels will ultimately infiltrate or runoff as if the panels never existed. Most of the hydrologic research that supports the RCN method assumes the runoff from impervious areas is captured and directly discharges to an improved drainage channel system (what is termed directly-connected imperviousness). The RCN that would normally be applied to such impervious surfaces would be 98 (highest runoff potential), which, for example, is the value assumed by Tetra Tech in this case for the parking lot areas. In situations where multiple RCN values apply, it would be typical then to adjust the overall RCN for the individual sub-watershed on an area basis (*e.g.*  $0.75*83+0.25*98 = 87$ ), a process that produces a somewhat higher runoff as compared to the value of 83 selected by Tetra Tech. Tetra Tech's justification for using a less-conservative assumption of no change in runoff characteristics is given as professional "opinion", but is not backed up by actual on-point scientific research.


It is noted that, with other modeling assumptions, Tetra Tech tended to adopt a more conservative approach. On this potentially important issue, however, they chose the opposite (less conservative) approach. The absence of specific on-point research doesn't

justify the adoption in this case of the less conservative assumption. Ultimately, the actual runoff from the developed site is likely to lie somewhere in between these two endpoints (no change vs. fully connected imperviousness). At the very least, Tetra Tech should have performed a sensitivity analysis (*i.e.* by modeling the opposite end of the spectrum - assuming the runoff from the panels would behave as a directly connected impervious surface) to better understand the potential implications of this as yet unanswered question related to onsite and downstream flooding and erosion potential. To the degree the differences in hydrologic impacts associated with the two modeling approaches are shown to be minimal, this issue then becomes a debate of form over substance. However, if the differences are shown to be potentially significant, then measures to mitigate these worst case impacts could be considered and incorporated into the project design as a means to address this potentially important area of uncertainty. Although we had recommended this approach to Tetra Tech in our earlier comments on their Work Plan, there was no evidence of their having undertaken such sensitivity analyses in this Report.

- Tetra Tech assumes that all secondary roads will be built at grade and will not alter the flow patterns of runoff across the property. This assumption may not be entirely consistent with the recommendation of Terracon in the Geotechnical Report, in which they seemingly recommend sloping the road and shoulder to direct runoff away from the road surface and shoulder in order to maintain a dry, stable road surface. If the roadway were in fact elevated, it would tend to interrupt the sheet flow of water across the site and direct the runoff into micro channels that would form parallel the roadways, thereby potentially accelerating the concentration of runoff into downstream areas. Verification of Tetra Tech's assumption of no change in secondary road grades over current elevation is needed.

Please call if you would like to discuss my observations further.

Very Truly Yours,

  
Robert L. Powell, PhD, P.E.  
Principal



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
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**FOR THE CALICO SOLAR PROJECT  
AMENDMENT**

**Docket No. 08-AFC-13C  
PROOF OF SERVICE  
(Revised 8/1/2011)**

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## DECLARATION OF SERVICE

I, Anne Alexander, declare that on September 21, 2011, I served by U.S. mail and filed copies of the attached **BNSF's Preliminary Comments on Calico Solar Infiltration Report**. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[[www.energy.ca.gov/sitingcases/calicosolar/compliance/index.html](http://www.energy.ca.gov/sitingcases/calicosolar/compliance/index.html)]**.

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

**(Check all that Apply)**

### FOR SERVICE TO ALL OTHER PARTIES:

- sent electronically to all email addresses on the Proof of Service list;  
 by personal delivery;  
 by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

**AND**

### FOR FILING WITH THE ENERGY COMMISSION:

- delivering an original paper copy and sending one electronic copy by e-mail to the address below **(preferred method)**;

**OR**

depositing in the mail an original and 12 paper copies, as follows:

### CALIFORNIA ENERGY COMMISSION

Attn: Docket No. 11-CAI-01  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
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I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

\_\_\_\_\_/s/  
Anne Alexander  
Katten Muchin Rosenman LLP

Attorneys for BNSF Railway Company