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September 26, 2011

VIA EMAIL

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

**Re: Calico Solar 08-AFC-13C
BNSF Comments on Calico Solar Project Geotechnical Engineering Report**

Dear Mr. Hoffman:

We write on behalf of BNSF Railway Company ("BNSF") to provide the attached comments on the Geotechnical Engineering Report submitted by K Road Calico Solar, LLC on August 23, 2011, for the modified Calico Solar Project as described in the March 18, 2011 Petition to Amend. Please let us know if you have any questions.

Sincerely,



Anne Alexander

AA:

Attachment

DOCKET	
08-AFC-13C	
DATE	SEP 26 2011
RECD.	SEP 26 2011

September 26, 2011

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

Re: Calico Solar Geotechnical Report

Dear Mr. Almaguer,

As you requested I have reviewed the Geotechnical Engineering Report prepared by Terracon Consultants Inc. on behalf of Calico Solar in accordance with Soil & Water Condition 8(4)(c). The Report provides the general categories of information required under this Condition, including geotechnical recommendations for design of roadways, buildings and supporting structures for the Sun Catchers and PV arrays. Specific comments and observations on the Report are as follows:

- For purposes of foundation design, the site is underlain by two distinct soil units comprised of:

Zone 1 — a sandy unit with varying amounts of silts and gravels; this unit covers the majority of the site; and

Zone 2 — a fat, expansive clay unit, overlain by a thin veneer of sandy soils; this unit is found bordering Hector Road in the western portion of the site.

The thickness of these units varies. In most areas of the site Zone 1 soils were drilled to 25, and in a few cases to over 50 feet, with the underlying bedrock not being encountered. Shallow sandstone bedrock was found at as little as 10 feet bgs, however, in the southeast corner of the property (Borings B-51 and 52).

- Soils in Zone 1 are well drained and can be readily compacted to form foundations for building and Sun Catcher units. Soils in Zone 2 would make poor foundational soils under buildings and Sun Catcher units. Terracon states that no Sun Catchers will be built in the Zone 2 area.
- The sandy/gravelly soils of Zone 1 tend to become loose and make for a poor foundation or road base when wetted; accordingly Terracon recommends that all building and roadways have “shoulders” that slope at least 10% for 5 feet from the compacted surface to direct storm water away from the foundation or road surface. To the extent this type of grading is used on onsite roads, it will slightly elevate the ground surface and may tend to interrupt the natural sheet flow of water across the site, thereby creating localized pathways of flow, with increased erosion potential, along the shoulder paralleling the

road alignment. This is an issue that will need to be considered and mitigating measures incorporated into the site grading and storm water management plans.

- The first few feet of soil in Zone 1 is fairly loose, but at about five feet bgs soil becomes dense to very dense. The density of the deeper soils may create difficulty in being able to drive piling for the Sun Catcher foundations. Their back up plan is to drill and drive the piling casings. The potential for this added construction activity needs to be considered when estimating the level of site disturbance and sediment transport that may occur during the construction period.
- No ground water was encountered during Terracon's boring program to a depth of about 55 feet bgs. Apparently the applicant intends to use ground water from a well it constructed on adjoining property to provide water for construction and later operation of the facility. The applicant is required to prepare a ground water monitoring plan under S&W 7, to describe the manner in which it will monitor the impact if any of water extraction on its property. The goals and objectives, and information needs, of this monitoring plan have not been fulfilled by this Geotechnical Engineering Report, so this will presumably be the subject of a later deliverable.
- Overturning moments for the Sun Catcher units are assumed to be 250 kips-ft, but the basis of this loading (e.g. whether from wind loads in the event the Sun Catcher is fully deployed during a Santa Anna condition; or from a seismic - MCE event) is not described. Both types of loadings should be considered in the foundation design for the Sun Catcher units. There is insufficient information to assess whether Terracon's assumed overturning moment on these units is appropriately conservative.
- There are two regional fault zones noted by Terracon as being within 4 and 16 miles of the site capable of producing a MCE (approximately 7 in magnitude) with a peak ground acceleration of about 0.26g. There are also two local fault zones noted as passing through the site, but the trenching of these local faults (which was apparently initially proposed by Terracon) was not performed as part of this investigation. There was no explanation as to why this local fault investigation was not performed, or whether these fault zones could be capable of creating larger ground acceleration on the project site as compared to the nearby regional faults. It is unclear therefore whether the seismic loading they have assumed in this report is appropriately conservative.
- Terracon calls for the use of "stabilizers" on road surfaces to improve soil cohesion and thereby reduce rates of roadway erosion. There is no information of what specific additive they are recommending and importantly what if any effect it would have on infiltration/runoff from the roadway surfaces. This will be a collateral issue that will need to be addressed in the Infiltration Report Soil & Water Condition 13.
- Based on my review of the Geotechnical report, there is no evidence that Terracon anticipated building debris, detention or retention basins or other structural controls, such as those recommended in the April 23, 2009 Existing Condition Hydrologic and Hydraulic Study by Huitt-Zollars for the purpose of protecting the solar project from scour and debris flows due to rainfall runoff. Had such basins been anticipated, Terracon likely would have performed additional studies to evaluate infiltration rates and the

stability of impoundment berms. Given the recommendation by Huitt-Zollars to construct such basins, I anticipate additional geotechnical studies to evaluate infiltration and stability will have to be performed as part of the project design.

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

Very Truly Yours,

A handwritten signature in cursive script that reads "Robert L. Powell". The signature is written in black ink and is positioned above the typed name.

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