April 29, 2010

Eric Solorio
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: Ridgecrest Solar Power Project (RSPP), Docket No. 09-AFC-9, Addendum to Preliminary Geotechnical Investigation Report

Dear Mr. Solorio:

As requested, attached please find our Addendum to the Preliminary Geotechnical Investigation Report. This addendum addresses anticipated pre-development and post-development storm water infiltration at the RSPP site. This supplements and/or provides clarification of the information provided in the August 26, 2009 "Preliminary Geotechnical Report". The conclusions and recommendations in our August 26, 2009 report remain valid.

This has been docketed in accordance with CEC requirements.

If you have any questions, please feel free to contact me at 510-809-4662 (office) or 949-433-4049 (cell).

Sincerely,

Billy Owens
Director, Project Development

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION For the *RIDGECREST SOLAR POWER PROJECT*

Docket No. 09-AFC-9

PROOF OF SERVICE (Revised 4/12/2010)

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*indicates change

DECLARATION OF SERVICE

I, Elizabeth Copley, declare that on April 29, 2010, I served and filed copies of the attached Ridgecrest Solar Power Project (Docket No. 09-AFC-9) Addendum to Preliminary Geotechnical Investigation 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:

[http://www.energy.ca.gov/sitingcases/solar_millennium_ridgecrest].

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:

(C*heck all that Apply*)

For service to all other parties:

X sent electronically to all email addresses on the Proof of Service list;

_ by personal delivery;

X 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:

X sending an original paper copy and one electronic copy, mailed and emailed Respectively, 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. 09-AFC-9
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

KLEINFELDER
Bright People. Right Solutions.

April 22, 2010
Project No. 104961

Solar Millennium, LLC
625 Shattuck Avenue, Suite 270
Berkeley, California 94709-1611

Attention: Mr. Billy Owens

Subject: Addendum to Preliminary Geotechnical Investigation Report
Solar Millennium Concentrating Solar Power Project
Ridgecrest, Kern County, California

Dear Mr. Owens:

As requested by Mr. Bill Hagmaier P.E., AECOM, and as authorized by you, we have prepared this addendum letter regarding the anticipated predevelopment and post development stormwater infiltration at the subject site. This letter supplements and/or provides clarification of the information provided in our August 26, 2009 "Preliminary Geotechnical Investigation Report" for the subject project. The conclusions and recommendations presented in our August 26, 2009 report remain valid.

PROJECT AND SITE DESCRIPTION

We understand that Solar Millennium intends to develop an approximately 1,440-acre area within a 3,920-acre project site. The project plans to generate approximately 250 megawatts (MW) of power with a single power plant utilizing two solar fields. Based on the information provided to date, the power block will include associated structures and equipment such as a switch yard, retention/detention basin(s), cooling tower(s), steam turbines, and numerous lightly loaded structures. Building construction will include a single-story warehouse facility (approximately 30 feet tall) and a single-story administrative building.

The entire site is generally undeveloped and covered with desert vegetation, jeep trails, and includes natural drainage swales or channels. A power transmission line traverses northwest-southeast at the west side of the site. The entire site has an overall topographic relief of about 200 feet, with generally level areas, some mildly undulating terrain, and rock outcroppings with elevations up to 2,892 feet at the southeastern portion of the site. We understand that post-development site grades will be on the order of 1% (current grades are approximately 2%).

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SOIL CONDITIONS AND TESTING

The near surface soils in this area of the Mohave Desert generally consist of silty sand and clayey sand. At the locations of our field explorations presented in our August 26, 2009 report, silty and clayey sand with gravel, gravelly sand, and sandy gravel with some cobbles were encountered to the depth of explorations. Some fine to coarse gravel, and cobbles up to 4 inches, were encountered in some of the borings. Drilling was very difficult in most of the borings. With the exception of one boring, B-8, the average field blow count (corrected for standard penetration test sampler type) in the upper 5 feet at the site is greater than 50 blows for 6 inches (typically blow counts are reported in blows per foot with 50 blows per foot indicating very dense conditions).

Sampling and Laboratory Testing

We collected driven samples of the near surface soils at various boring locations across the site that were sent to our laboratory for moisture content and dry density testing. The laboratory moisture contents ranged from 1.4 to 3.8 percent. Laboratory dry densities ranged from 96 to 115 pounds per cubic foot (pcf). Based on the high blow counts discussed above, we anticipate that some of the samples experienced disturbance resulting in lower dry densities than what actually may occur in-situ.

We also collected bulk soil samples at selected boring and test pit locations and sent them to our laboratory for maximum dry density and optimum moisture content testing (ASTM 1557). Theoretical maximum dry densities and optimum moisture contents ranged from 115 to 128 pcf and 6 to 8 percent respectively. The laboratory dry density and moisture content of a drive sample collected at approximately 2 feet below ground surface in boring B-1, was 115 pcf and 2.6 percent, respectively. The theoretical maximum dry density and optimum moisture content of a bulk sample collected from 0 to 5 feet in the same boring was 115 pcf and 6 percent, respectively. This indicates that there are areas of the site that are more dense than what is typically achieved during earthwork activities during construction.

Infiltration Testing

We performed percolation testing at three boring locations at the site (borings B-5, B-11, and B-12). The measured infiltration rates, factored as suggested by EPA, ranged from approximately 660 to 1,600 minutes per inch (0.09 to 0.04 in/hr). Hydraulic conductivity (permeability) correlations based on laboratory grain size distribution testing ranged from 4,600 to 7,300 minutes per inch (0.008 to 0.01 in/hr). Comparison of the laboratory test hydraulic correlations and in-situ test results appear within an order of magnitude of each other. It is important to note that the small-scale testing from the borehole percolation tests cannot model the complexity of the effect interbedded layering has on vertical infiltration. Borehole testing tends to overestimate actual long-term infiltration rates experienced by infiltration systems.

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RUNOFF/EROSION EVALUATION vs. INFILTRATION SYSTEM EVALUATION

The infiltration testing and hydraulic conductivity correlation discussed above was performed for preliminary evaluation of septic systems and stormwater infiltration best management practices (BMPs). The infiltration information provided in our August 26, 2009 report and discussed above may be used when considering the permeability of the near surface soils as it relates to runoff/erosion evaluation. However we consider or evaluate soil permeability for runoff/erosion differently than when selecting infiltration BMPs.

The primary difference between evaluating infiltration for septic systems or stormwater BMPs versus runoff/erosion evaluation is how we consider infiltration rates. Infiltration rates for evaluating stormwater BMPs or septic systems generally accounts for saturated soil conditions of days, weeks or months. Therefore, we use long-term infiltration rates (IR_L) for selection, sizing, and locating septic and infiltration BMP systems. IR_L used for design of infiltration BMPs typically include additional reduction factors to account for repeated wetting/drying, maintenance, siltation, biofouling and soil variability of the infiltration media.

Infiltration rates for evaluation of runoff/erosion generally considers saturated soil durations of only minutes to hours. Therefore, we use short-term infiltration rates (IR_S) for runoff/erosion.

Additionally, IR_L is greatly dependent on the hydraulic gradient and the height of the water temporarily stored in the septic or infiltration BMP whereas hydraulic gradient is not considered for IR_S and evaluation of runoff/erosion. Additional discussion of runoff/erosion evaluation is presented in the following paragraphs.

Infiltration Process

When precipitation reaches the ground, it can either infiltrate into the ground where it can be stored as soil moisture, eventually to be released back into the atmosphere through evapotranspiration; or if the soil profile has reached capacity then it becomes runoff and enters the surface hydrological system. Whether the precipitation that falls percolates into the soil or runs off the surface is dependent on the physical parameters associated with the following factors:

- The precipitation regime – intensity, type (rain or snow), frequency, primary season;
- Site attributes – slope, surface roughness, soil permeability;
- Cover – type and density of vegetation, percent of surface covered;
- Practices – structural improvements constructed to control surface water.

Several of these factors remain unchanged with development, e.g. rainfall intensity and duration; other factors are subject to drastic alteration when a site is developed. These can include the complete removal of all vegetation, changes to the slope and surface roughness, changes to the soil's permeability from mixing and re-grading, and the installation of water control structures.

Erosion/Soil Loss

When the soil profile becomes fully saturated and can no longer hold any further moisture, surface runoff is initiated. Soil erosion across the surface may occur depending upon surface and climatological conditions. Calculations of potential annual soil loss are based upon the average 2-yr, 6-hr rainfall, slope, vegetative cover and soil composition (the greater the silt content of a soil the higher its inherent erodibility). Values for soil loss are calculated in tons per acre per year. The permeability of soils varies tremendously across the horizontal and vertical axis of the landscape. Soils are often more permeable in the upper horizons than in the lower subsoil. We observed these conditions in several of the Ridgecrest test pits where sandier surface layers are underlain by layers with greater amounts of clay.

Design Storms and Runoff

Hydrological calculations for determining stormwater system design or evaluating erosion potential utilize a variety of methods to estimate runoff. Common to these methods are input values for rainfall intensity, drainage area, and a runoff coefficient to estimate the expected runoff from a given surface/vegetative condition. Curve Numbers (CN) are used in estimating the percentage of runoff from a given soil and vegetation combination. The higher the number, the greater the amount of runoff. Runoff calculations used for the design of stormwater facilities are typically based upon a selected design storm which can range from 2- to 100-year events. For this project, we anticipate design based on 10- or 25-yr storm events. Stormwater retention or detention ponds, infiltration swales, and conveyances are designed to either pass the water volume over a specified time period or hold these design storms.

PRE- AND POST-DEVELOPMENT STORMWATER INFILTRATION

Based on the results of our limited fieldwork and laboratory testing, the near surface soils at the site are generally uniform (with the exception of incised natural drainages across the site and the basaltic volcanic rock outcrop located near the southeastern corner of the site). The near surface soils consisting of silty and clayey sands are generally very dense with in-situ moisture contents 4 to 6 percent less than optimum moisture.

Stormwater Infiltration

We anticipate that the post-development soil conditions across the site, for stormwater infiltration, will approximate pre-development soil conditions with infiltration system rates typically very low to nil over the life of the project.

Runoff Infiltration

We anticipate that the post-development soil conditions across the site, for runoff/erosion, will approximate pre-development soil conditions in that infiltration or runoff/erosion evaluation and would not change significantly. However, the complete removal of all vegetation, changes to the slope and surface roughness that are planned will affect the infiltration rates at the surface Rates for calculating infiltration rates for soil loss modeling are derived from published values for soil series identified at the Ridgecrest site. Infiltration values are not a direct input in the soil loss model but are a component of the soil factor. The values used in modeling the Ridgecrest soils are mid-range values between sands at the high end of infiltration rates and clays at the low end of infiltration.

CLOSURE

This letter has been prepared to provide supplemental information and clarification of soil permeability related data presented in our August 26, 2009 report. The conclusions and recommendations presented in our August 26, 2009 report remain valid. This letter is subject to the limitations presented in our August 26, 2009 report.

We appreciate the opportunity to provide continuing services on this project. If you have any questions or need additional information, please contact this office.

Respectfully submitted,

KLEINFELDER WEST, INC.

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