Tessera Solar
power from stirling energy systems

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08-AFC-13
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September 8, 2010

Mr. Christopher Meyer
CEC Project Manager
Attn: Docket No. 08-AFC-13
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

RE: Calico Solar (formerly Solar One) Project (08-AFC-13)
Applicant's Submittal of Detention Basin Removal Analysis from Dr. Chang and Applicant's Proposed Revisions to Soil and Water 8

Dear Mr. Meyer:

Tessera Solar hereby submits Detention Basin Analysis from Dr. Chang and Proposed Revisions to Soil and Water 8. I certify under penalty of perjury that the foregoing is true, correct, and complete to the best of my knowledge.

Sincerely,

Felicia L. Bellows
Vice President of Development

CHANG Consultants
Hydrology•Hydraulics•Sedimentation
P.O. Box 9492 (required for regular mail)
6001 Avenida Alteras
Rancho Santa Fe, CA 92067-4492
(858) 756-9050, (858) 692-0761, FAX: (858) 756-9460
E-mail: changh@cox.net Web Site: http://chang.sdsu.edu/

ASSESSMENT OF DETENTION BASINS/DEBRIS BASINS FOR CALICO SOLAR SITE

Prepared for Tessera Energy

Prepared by Howard H. Chang, Ph.D., P.E.
September 8, 2010

This report has been prepared for Tessera Energy to provide an assessment of the detention/debris basins that are being considered for the Calico Solar project site. Recommendations for the detention/debris basins are provided. In addition, hydrologic impacts of the SunCatchers on the project site are analyzed.

Fluvial Geomorphology of Existing Alluvial Fan and Washes: The Calico Solar project site has alluvial fans on both sides of the railroad. In fact, alluvial fans form the dominant land features at the project site. Such alluvial fans have formed over the long-term geologic time. The terrain of a fan has established an approximate equilibrium in response to the natural inflows of water and sediment. The flat terrain of the alluvial fan reflects the dominant mode of continued sediment deposition. In fluvial geomorphology, stream flows tends to spread out to from wide flat areas during sediment deposition. On the other hand, a stream tends to slide back into its banks in the process of erosion. A gulley forms in the case of continued erosion and flow concentration.

On the generally flat terrain of alluvial fans, storm flows occur as sheet flows that are characterized by shallow depths and low velocities. The velocity of flow on the alluvial fan is directly related to the flow depth. Figure 1 is a graphical relation showing the flow velocity computed as a function of the flow depth for the alluvial fan north of the railroad. For existing washes on the alluvial fan, the bankfull depths seldom exceed one foot. For such shallow flow depths, the flow velocities are generally lower than 4 feet per second. At very large discharges, the flow simply spreads out to large adjacent areas without an appreciable increase of the flow depth or velocity.

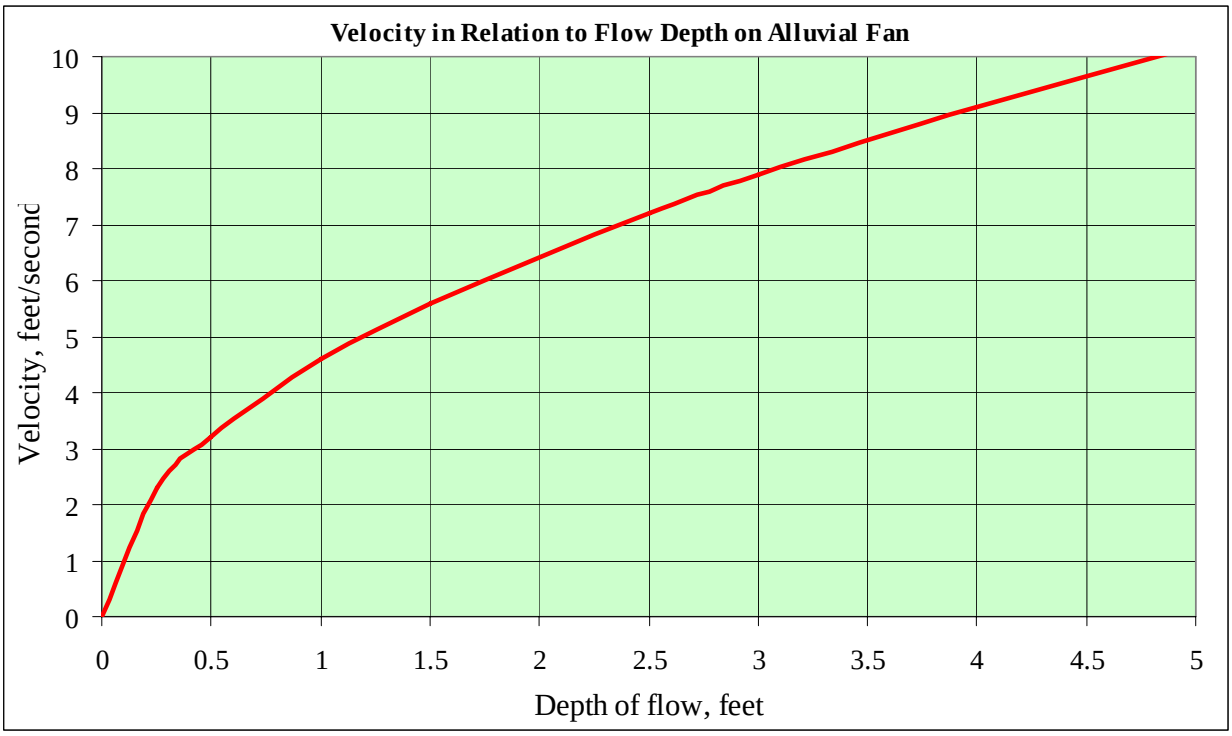

Figure 1. Flow velocity in relation of flow depth for washes on alluvial fan north of railroad

In the theory of sediment transport, the rate of sediment movement is very sensitive to the flow velocity. A small increase of the flow velocity is associated with more rapid increase of sediment load. Because of the shallow flow depth and low flow velocity, the existing washes are not subject to substantial changes during storms. In other words, they are relatively stable in morphology.

Effects of Detention Basins: Detention basins (or debris basins) are being considered for the Calico Solar site. These basins would be installed along the foothills on the northern edge of the project site. The purpose of the detention basins is to reduce the storm discharge reaching the SunCatcher field. A detention basin is shaped like a small pond; it captures the flow from the watershed. The basin provides storm water storage to reduce the outflow discharge toward downstream. The small pond, while attenuates the storm discharge, also captures the sediment flow from the watershed to result in a reduction of sediment flow toward downstream. A detention basin traps most of the sand and other coarser sediments that form the topography of the alluvial fan.

Under existing conditions, the dominant land features of the alluvial fans consist of surface flow in small washes. Such washes with wide spread flows have shallow depths, small velocities, low sediment transport, low erosion potential, and stream channel stability. The mild trend of sediment deposition tends to maintain the wide and shallow flow pattern. It also prevents the formation of deep and narrower channels. At discharges higher than the bankfull value, the excess flow simply spreads out to adjacent areas.

The detention basins would reduce the sediment supply to the alluvial fan in addition to discharge reduction. The effects on sediment or debris reduction far outweigh the effects of discharge reduction. Such changes to the flow and sediment alter the natural equilibrium that

formed over the geologic time. In response to sediment reduction, the hungry storm water would erode sediment from the alluvial fan to meet its sediment carrying capacity. With continued maintenance of the debris basins, the sediment deficit storm flow would cause the formation of deeper stream channels. Such stream channels should also grow in size with time and storm flows would thus become more concentrated with time. The formation of stream channels is detrimental to stream channel stability since concentrated stream flows have greater depths, higher flow velocities, and greater potential for stream channel changes. The current fluvial regime (or equilibrium) would be altered by such changes.

Effects of Detention Basins on Alluvial Fans near the Railroad: The effects of the detention basins change with distance. They have the most important effects on the upper reaches of the washes on the alluvial fan. The effects decrease with distance toward downstream. For washes near the railroad, the effects are of long term nature. No detention basins are being considered for certain washes south of the railroad. As long as no detention basins will be installed on a wash, there should also be no effects.

Effects of SunCatchers on Alluvial Fans: SunCatchers will be installed at the project site with a low density (one unit on 0.28 acre of land area). The structural support for a SunCatchers is 2 feet in diameter. The structural supports of SunCatchers may affect the surface roughness of the alluvial fan. However, the area of a structural support is 3.14 square feet and it is on 0.28 acre of land area. The area ratio is 2.63×10^{-4}, or 0.00263%. The project site has scattered vegetation with a low density. The structural supports for the solar units do not cause significant changes to the existing surface roughness of the alluvial fan. In other words, the proposed solar units will have insignificant effects on the arid-land hydrology of the project site.

In a recent study, I made specific recommendations regarding to the installation of SunCatchers at the project site. It is recommended that SunCatchers stay away from those washes with larger flow depths and greater potential for erosion and sediment. These measures will not only provide safety for the SunCatchers but also avoid significant SunCatcher impacts on the flow and sediment transport at the project site.

Recommendations for Detention Basins: The detention basins would change the existing equilibrium of the fluvial system at the project site. The results include concentrated stream flows with greater depths, higher flow velocities, erosion, and stream channel changes. The current fluvial regime (or equilibrium) would be altered by such changes. Alteration of the existing regime will result in stream channel instability. In addition, such changes can be a safety hazard for SunCatchers. Because of the potential adverse impacts of the detention basins on the fluvial system, the installation of detention basins is not recommended for the Calico Solar project site.

Applicant's Proposed Revisions to Soil&Water-8

SOIL&WATER-8

The project shall achieve the following performance standards:

1. Project construction shall not alter the existing drainage watershed boundaries.

2. Project construction shall not adversely affect any single railroad structure through changes in the volume of water or velocity of storm water runoff reaching the railroad structure.

3. No SunCatcher shall be placed within a wash where the 100-year, 24-hour water surface elevation would be more than 1.5 feet above the base of the pedestal.

4. No SunCatcher shall be placed within a wash where the local plus general scour exceeds four feet in depth.

5. Post development runoff shall be equal to or less than predevelopment runoff.

6. The project and reports prepared for the project shall comply with the requirements of the San Bernardino County Drainage Manual (SBCDM), including requirements for the retention basins for the Main Services Complex.

7. The project shall not significantly alter sediment transport through the project site.

To ensure achievement of these performance standards, the project owner shall do the following:

A. Prior to installing any SunCatcher dishes, the project owner shall submit a final hydrology report to the CPM that demonstrates compliance with the seven performance standards listed above. The report shall include a HEC-RAS study for each of the significant washes that contains enough cross sections to adequately describe the water surface elevations and floodplain boundaries; shall address sediment transport issues as a result of project improvements, i.e., increases or decreases to local areas and the general area within the development; and shall be prepared pursuant to local standards of practice and the SBCDM.

B. Prior to installing any SunCatcher dishes, the final hydrology report described above shall be made available to BNSF for review. If BNSF so requests, following review of the final hydrology report, the project owner shall pay for, and submit to BNSF and the CPM, a revised final hydrology report, which will address and evaluate the BNSF comments and concerns, if any, concerning the SunCatcher field affects on the existing drainage system to ensure that current performance standards with respect to the BNSF facilities are met.

C. The Project Owner shall submit 60-percent and 90-percent design drawings for the grading and drainage facilities to the CPM for review and comment. The 60-percent and 90-percent drawings shall be accompanied by a basis of design report to convey and support the design approach.

Verification: No later than 90 days after publication of the Energy Commission Decision, the 60-percent set of design drawings and accompanying basis of design report shall be submitted to the CPM for review and approval. The project owner shall submit the 90-percent design drawings and accompanying basis of design report to the CPM for review and approval after the person who originally drew the plan or their duly authorized agent addresses the CPM's 60-percent submittal comments and required changes. Prior to installing any SunCatchers, the 100-percent design drawings and specifications (construction documents) shall be submitted along with the final basis of design report signed and sealed by a Registered Professional Engineer in the State of California, as well as the final hydrology report, to the CPM for review and approval.

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 CALICO SOLAR** (Formerly SES Solar One)*

Docket No. 08-AFC-13

PROOF OF SERVICE
(Revised 8/9/10)

APPLICANT
Felicia Bellows
Vice President of Development
& Project Manager
Tessera Solar
4800 North Scottsdale Road,
#5500
Scottsdale, AZ 85251
felicia.bellows@tesserasolar.com

CONSULTANT
Angela Leiba
AFC Project Manager
URS Corporation
1615 Murray Canyon Rd.,
#1000
San Diego, CA 92108
angela_leiba@URSCorp.com

APPLICANT'S COUNSEL
Allan J. Thompson
Attorney at Law
21 C Orinda Way #314
Orinda, CA 94563
allanori@comcast.net

Ella Foley Gannon, Partner
Bingham McCutchen, LLP
Three Embarcadero Center
San Francisco, CA 94111
ella.gannon@bingham.com

INTERESTED AGENCIES
California ISO
e-recipient@caiso.com

Jim Stobaugh
BLM – Nevada State Office
P.O. Box 12000
Reno, NV 89520
jim_stobaugh@blm.gov

Rich Rotte, Project Manager
Bureau of Land Management
Barstow Field Office
2601 Barstow Road
Barstow, CA 92311
richard_rotte@blm.gov

Becky Jones
California Department of
Fish & Game
36431 41st Street East
Palmdale, CA 93552
dfgpalm@adelphia.net

INTERVENORS
County of San Bernardino
Ruth E. Stringer,
County Counsel
Bart W. Brizzee,
Deputy County Counsel
385 N. Arrowhead Avenue,
4th Floor
San Bernardino, CA 92415-
bbrizzee@cc.sbcounty.gov

California Unions for Reliable
Energy (CURE)
c/o: Loulena A. Miles,
Marc D. Joseph
Adams Broadwell Joseph
& Cardozo
601 Gateway Boulevard, Ste. 1000
South San Francisco, CA 94080
lmiles@adamsbroadwell.com

Defenders of Wildlife
Joshua Basofin
1303 J Street, Suite 270
Sacramento, California 95814
e-mail service preferred
jbasofin@defenders.org

Society for the Conservation of
Bighorn Sheep
Bob Burke & Gary Thomas
P.O. Box 1407
Yermo, CA 92398
cameracoordinator@sheepsociety.com

Basin and Range Watch
Laura Cunningham &
Kevin Emmerich
P.O. Box 70
Beatty, NV 89003
atomictoadranch@netzero.net

*indicates change

INTERVENORS CONT.

Patrick C. Jackson
600 N. Darwood Avenue
San Dimas, CA 91773
e-mail service preferred
ochsjack@earthlink.net

Gloria D. Smith, Senior Attorney
*Travis Ritchie
Sierra Club
85 Second Street, Second floor
San Francisco, CA 94105
gloria.smith@sierraclub.org
travis.ritchie@sierraclub.org

Newberry Community
Service District
Wayne W. Weierbach
P.O. Box 206
Newberry Springs, CA 92365
newberryCSD@gmail.com

Cynthia Lea Burch
Steven A. Lamb
Anne Alexander
Katten Muchin Rosenman LLP
2029 Century Park East,
Ste. 2700
Los Angeles, CA 90067-3012
Cynthia.burch@kattenlaw.com
Steven.lamb@kattenlaw.com
Anne.alexander@kattenlaw.com

ENERGY COMMISSION

ANTHONY EGGERT
Commissioner and Presiding Member
aeggert@energy.state.ca.us

JEFFREY D. BYRON
Commissioner and Associate Member
jbyron@energy.state.ca.us

Paul Kramer
Hearing Officer
pkramer@energy.state.ca.us

Lorraine White, Adviser to
Commissioner Eggert
e-mail service preferred
lwhite@energy.state.ca.us

Kristy Chew, Adviser to
Commissioner Byron
e-mail service preferred
kchew@energy.state.ca.us

Caryn Holmes
Staff Counsel
cholmes@energy.state.ca.us

Steve Adams
Co-Staff Counsel
sadams@energy.state.ca.us

Christopher Meyer
Project Manager
cmeyer@energy.state.ca.us

Jennifer Jennings
Public Adviser
e-mail service preferred
publicadviser@energy.state.ca.us

*indicates change

DECLARATION OF SERVICE

I, Darin Neufeld, declare that on September 8, 2010, I served and filed copies of the attached Applicant's Submittal of Detention Basin Removal Analysis from Dr. Chang and Applicant's Proposed Revisions to Soil and Water 8. 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/solarone].

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:

__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. 08-AFC-13
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, 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.

Original Signed By
Darin Neufeld

*indicates change