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July 29, 2010

DOCKET
08-AFC-13
DATE JUL 29 2010
RECD. JUL 29 2010

California Energy Commission
Attn: Docket Office, 08-AFC-13
1516 Ninth Street
Sacramento, CA 95814

Re: Calico Solar; Docket No. 08-AFC-13

Dear Docket Clerk:

Please process the enclosed REBUTTAL TESTIMONY OF BORIS POFF ON BEHALF OF CALIFORNIA UNIONS FOR RELIABLE ENERGY ON SOIL AND WATER RESOURCES FOR THE CALICO SOLAR PROJECT, conform the copy of the enclosed letter, and return the copy in the envelope provided.

Thank you.

Sincerely,

/s/

Loulena A. Miles

LAM:bh
Enclosures

2309-081a

STATE OF CALIFORNIA
California Energy Commission

In the Matter of: The Application for Certification for the **CALICO SOLAR PROJECT** (formerly SES Solar One)	Docket No. 08-AFC-13

REBUTTAL TESTIMONY OF BORIS POFF ON BEHALF OF CALIFORNIA UNIONS FOR RELIABLE ENERGY ON SOIL AND WATER RESOURCES FOR THE CALICO SOLAR PROJECT

July 29, 2010

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INTRODUCTION

The following rebuttal testimony is in response to the Supplemental Staff Assessment (SSA) prepared by CEC Staff (July, 2010), Opening Testimony prepared by the Applicant (June 30, 2010) and their attachments.

RESPONSE TO CEC'S SUPPLEMENTAL STAFF ASSESSMENT

The SSA fails to address several crucial aspects of the Soil and Water issues in the project area. As such, my comments on the SSA are focused on (1) the inadequate description and understanding of the affected environment in which the project is located (desert pavement and cryptobiotic crust); (2) the potential on and off-site impacts to these environments once disturbed; (3) the inadequate data collection, testing and modeling of these disturbances and impacts; (4) inadequate data from which to evaluate the impacts to the transmission upgrades required for the project; (5) insufficient data on the project water supply; and (6) insufficient consideration of the effects of climate change on the before mentioned areas of concern.

RESPONSE TO OPENING TESTIMONY BY APPLICANT (EXHIBITS 56, 74, 77)

Exhibits 56, 74 and 77 of the applicant's opening testimony are concerned with the water resources of the project. In particular exhibit 56 is the discussion and analysis of water supply in the Supplement to AFC, originally submitted on 5/14/10. Exhibit 76 is the testimony by RK Scott, which discusses the Applicant's proposed primary water source, the testing performed on that well, and the potential for significant adverse impacts on the local ground water. However, as mentioned below and pointed out in the SSA, important facts assumed therein are not supported by the exhibits. Exhibit 74, which is the testimony by M. Moore and provides a description of the surface water hydrologic setting for the project, inadequately addresses soils and water quality impacts due to erosion and sedimentation and proposes changes to the Conditions of Certification Soil&Water 3. The proposed changes to only monitor and inspect after year 10-year event could allow undesired and unacceptable erosion to go unchecked and unnoticed. Instead I believe that the Conditions of Certification proposed in the SSA provide enough guidance to mitigate those impacts Staff has envisioned. However, because of the gross inadequacy of the description of the affected environment and consequently inadequate description of the potential impacts, most of the Conditions of Certification are inadequate as well.

INADEQUACY IN DESCRIPTION OF THE AFFECTED ENVIRONMENT

Elements of the environmental setting were grossly inadequate, and as such, limited the description of the project impacts, hindered the impact analyses, and ultimately undermined the adequacy of the proposed mitigation. As pointed out in the SSA the "current soil survey data is limited in much of the Mojave Desert due to the lower potential for agricultural use. Detailed soil mapping has not been performed by NRCS for the site. However, soil mapping in the general area is being conducted by NRCS." I happen to be on the steering committee for the NRCS mapping effort in the Mojave National Preserve, which is located mostly east of the project site. Two environmental settings that are found on the project site and are of special concern to the NRCS because they are poorly understood are:

1. Desert pavement and its influence on hydrologic and sedimentation processes (which was not acknowledged or analyzed); and
2. Cryptobiotic crust and its influence on hydrologic and sedimentation processes (which was not acknowledged).

DESERT PAVEMENT

It is my opinion that the physical properties of the desert pavement at the site have neither been adequately nor correctly characterized by the Applicant or Staff. Any alterations to the desert pavement and distinct geomorphic surfaces across the project site have the potential to dramatically affect infiltration and runoff compared to the existing conditions (Sharifi et al. 1999, Okin et al. 2000, Okin 2002) (also see Figures 1 and 2) resulting in potentially significant impacts to water quality, sedimentation and biological processes through the degradation of the washes. The applicant is relying on information on the formation of desert pavement from a *biology* report (PWA 2010). This report incorrectly describes the formation of desert pavement as "fine sediment [that] has been selectively scoured away by wind or water action over time." Instead of erosion, desert pavement is created by the slow accumulation of soil below the evolving stone pavement, as described in a series of papers in the scientific literature (e.g., McFadden et al. 1987, Wells et al. 1995. Anderson et al. 2002) which studied the development of desert pavements in the Mojave Desert (along Kelbaker Road between Kelso and Baker, San Bernardino County in the Cima volcanic field just north of the project site).

It is important to fully understand the existing conditions in order to be able to identify the potential impacts, which will be dramatically different in a "crust" that evolved from erosion compared to top layer that is created by accumulation. A crust that was created through erosion will just erode further once disturbed. Whereas a crust formed by accumulation will cease to accumulate once disturbed and begin erosion instead, and drastically add sediment to the run-off process. Further, the proper understanding of the evolution of desert pavement directly ties into the understanding of its resilience and self healing abilities to minor anthropogenic disturbances. Major disturbances, such as those related to construction and corresponding erosion may lead to the crossing of thresholds where desert pavement may never again recover. However, minor disturbances may restore themselves over centuries if the mature Av horizon (eolian material that accumulates at the surface of desert soils, most often beneath a desert pavement) remains intact (Pelletier et al. 2007). In the context of project construction and subsequent maintenance activities (i.e., servicing the Power Conversion Unit, monthly mirror washing, etc.), this is unlikely to occur. Even shallow grading, as proposed in this project, will disturb the desert pavement and leave the Av horizon exposed to erosion (Okin et al. 2000). Under such a condition, while it has been observed that there are no statistical differences in the short term runoff characteristics with the clast cover removed (Chen et al. 2009), it has been observed that sediment production from the impacted surface can be significant over time (see Figures 1 and 2).

The increased sedimentation from the grading activities as well as from the placement of solar arrays directly in the washes would significantly impact the morphology of the washes, and subsequent delivery of runoff laden with very fine sediments (i.e., clays and silts) farther downstream. There, this fine material is likely to be picked up and transported off-site by winds (Okin et al 2000). Additionally, deep grading, another potential impact of the proposed project, will likely destroy the Av horizon and locally increase infiltration, decrease runoff, increase transmission losses, and significantly impact the movement of soluble salts from the leach zone beneath the desert pavement. Depending on the desert pavement type and the level of disturbance to the leach zone (climate change or human disturbance), increased infiltration and transmission losses could drive soluble salts downward into the groundwater, thereby increasing groundwater salinity (Graham et al. 2008). Furthermore, disturbance of the desert pavement could have significant indirect impacts on neighboring pavement types and established vegetation, since vegetation is linked to pavement type, clast cover, and influenced by proximity to leached soluble salts (Wood et al. 2005).

CRYPTOBIOTIC CRUST

Although a detailed surface soils assessment, including identification of the presence of a cryptobiotic crust, was not undertaken, it is highly likely that cryptobiotic crust is widespread across the site. Cryptobiotic crust, which is very common and widely distributed across desert landscapes, plays an important role in making nitrogen available to desert plants (Wohlfahrt et al. 2007). I have personally encountered cryptobiotic crust at similar elevations and in locations comparable and close to the project site as well as in other areas throughout the Mojave Desert. In my opinion the impacts to the cryptobiotic crust were not analyzed, nor were mitigation techniques provided.

The cryptobiotic crust[1] is a highly specialized community of cyanobacteria, mosses, and lichen and are prevalent in the project area. The living organisms present in the desert soils create a surface crust of soil particles bound together by organic material. The thickness of these crusts can reach up to 10 cm. The crusts are important members of the desert ecosystem and contribute to the well-being of other plants by stabilizing sand and dirt, promoting moisture retention, and fixing atmospheric nitrogen. Because of their thin, fiberous nature, cryptobiotic soils are extremely fragile systems. Some species in the soil can recover within a few years of disturbance, but slow growing species may require more than a century to recover.

Disruption of the crust will result in decreased organism diversity, soil nutrients, stability, and organic matter. The crusts significantly aid infiltration of precipitation and anthropogenic disturbance can dramatically increase surface runoff and increase the rate of soil loss by an order of magnitude. These increases in sediment laden runoff could significantly impact the morphology of the existing washes. Also, wind erosion is substantially more prevalent with disruption of the crust. Crusts that may remain intact downstream of the project site will inevitably be buried (and therefore permanently impacted) through windblown and water transported erosion.

INADEQUACY IN DESCRIPTION OF PROJECT IMPACTS

The applicant and the SSA failed to adequately analyze or describe project impacts. This failure is partially due to the failure to consider and describe important elements of the project setting.

Sedimentation and Morphology

The SSA concluded that morphological impacts to the washes would be significant due to increased sedimentation from the solar arrays from soil erosion due to grading impacts and subsequent changes to the sediment transport character of the washes to include scour effects, created by the solar dish towers. Further the SSA pointed out that:

> "[T]he applicant's Draft Drainage, Erosion, and Sedimentation Control Plan [DESCP] may mitigate the potential on site project-related storm water and sediment impacts. However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts in the Draft Plan are imprecise and have limitations and uncertainties associated with them such that the magnitude of potential impacts that could occur cannot be determined precisely."

While staff drafted Conditions of Certification **SOIL&WATER-1, -2** and **-3** to define specific methods of design analysis, development of best management practices, and monitoring and reporting procedures to mitigate impacts related to flooding, erosion, sedimentation, and stream morphological changes, these Conditions of Certification do not take into consideration the potential increases in surface runoff from damaged desert pavement and cryptobiotic crust as described above. The consequences of their manipulation are either poorly understood or simply ignored by the applicant and the Staff. Hence, the

[1] http://www.soilcrust.org/crust.pdf.

SSA failed to adequately address the impacts of environmental modification and its potential to significantly change hydrologic characteristics (i.e., runoff duration, frequency, volume), which, in turn, can significantly degrade the washes.

However, in the SSA, Staff recognizes - and I concur - that while "the DESCP provides the plan for the use of BMPs to mitigate erosion and sedimentation impacts caused by site grading…the measures discussed in the DESCP… are generally effective on most projects, [and] Staff believes that the circumstances of the proposed project are unusual and require additional mitigation. Specifically, this is a very large project that will be constructed on active alluvial fans, which dramatically increases the potential for soil erosion."

If a developer were to put in 10 subdivisions (and this project site is larger), a standard project, DESCP would not be adequate to mitigate the impacts either for several reasons. The principle hazards associated with alluvial fan flooding are high velocity, debris-laden floods and debris flows with highly uncertain flow paths. The dynamic geologic nature and consequent unpredictability of alluvial fan flooding presents unique challenges in designing a DESCP. Highly erosive soils mixed with water, rocks and boulders can travel at speeds recorded at over 50 miles per hour (Miller 1989). Undeveloped alluvial fans permit the overland flow of large amounts of flood water and sediment. When an almost entire alluvial fan is converted into a huge industrial site with metal poles the dynamic of the flow paths and debris flow will change and should be adequately modeled before any effective DESCP can be conceived.
Further, Staff pointed out that:

> "[B]asins or other forms of flood protection have not been addressed for the three drainages that traverse private property near the center of the project and enter the proposed solar array. Impacts due to flooding in these areas are potentially significant without adequate mitigation. This leaves portions of the project subject to significant adverse impact due to flooding."

It should also be noted that *so far no designs to mitigate these potential flood-related impacts have been proposed*.

Additionally, the effective percent impervious cover (PIC) will increase under project conditions, in the aggregate, as a combination of site infrastructure (i.e., paved roads, building pads, solar disc footings), access road compaction, destruction of desert pavement and cryptobiotic crust, and application of soil binders. These aggregate changes in PIC were not adequately considered and can have a significant impact on the morphology of the washes. While small increases in effective PIC were perceived to be negligible in the SSA, small changes in effective PIC can result in significant impacts to onsite and offsite resources if not properly accounted for in the analyses supporting the project.

Air/Water Quality
The applicant and Staff did not consider the water quality impacts of runoff laden with sediment from degraded desert pavement and cryptobiotic crust delivered downstream and offsite, as well as the potential for the increased sediments to be transported offsite by wind.

The large-scale disturbance that is to occur on the geomorphic surfaces of the Project will lead to extensive new aeolian activity. Given the predominant southwestern wind direction, this will mean that a plume of sand, eroded from the disturbed area, will begin to extend from the southern edge of the Project. Okin et al. (2001a, 2001b, 2006, and 2009) have investigated the impacts of this sort of sand plume originating from disturbed soils on nearby vegetation communities that were not directly disturbed.

Of course, any disturbance of the soil surface that encourages increased aeolian activity in a soil with dust-sized (< 50 um) particles will also lead to the production of dust. The potential for the wind-driven impact on the area immediately downwind of the Project is a significant impact that was not considered.

INADEQUACY IN ANALYSIS OF DISTURBANCES AND IMPACTS

It is my opinion that the core analyses conducted by the applicant and integrated into the SSA are insufficient to adequately analyze the impacts. Therefore, there is no adequate basis to compare impacts to soil and water resources in the various alternatives.

The applicant completed a hydrologic study and hydraulic modeling of the major stream channels on the project site. The applicant has proposed the construction of large debris basins in channels upstream of the proposed solar array. The most recently-submitted design indicates that dams will be constructed to temporarily retain flows in the basins. The applicant has not submitted the comprehensive detail that staff would need to analyze the ability of the basins to retain maximum flows and protect the project from flooding. As a result, staff has recommended adoption of Conditions of Certification **GEO-2** and **-3**, which contain performance standards that ensure that the design of the debris basin dams will comply with current engineering practices and existing regulations and prevent significant impacts. Further, Staff states that any proposed design must comply with requirements set forth in Conditions of Certification **SOIL&WATER-1**, **-2**, **-3** and **-8**, to ensure that no adverse impacts due to flooding will occur. However, because the analysis of the disturbances and impacts are inadequate, these proposed Conditions of Certification are inadequate as well and should be expanded on.

Additional Surveys, Data Collection and Analysis Required

I believe that the current level and type of analysis provided by the applicant is insufficient. Failure to undertake additional surveys, data collection and analysis, and design of appropriate mitigation actions as described below will result in significant unmitigated impacts to the desert pavement and cryptobiotic soils, with corresponding dramatic increases in sediment and wind erosion, and significant impacts:

1. Perform rainfall/runoff/sediment yield plot studies on different geomorphic surfaces (perhaps at multiple proposed solar sites) under existing and project (with and without BMPs) conditions.
2. Justify and/or quantify desert pavement, cryptobiotic crust, and BMP effectiveness (especially the soil binders given their proposed broad application) on stabilizing soils and runoff generation, using empirical data if available, site testing, or sensitivity modeling.
3. Revise the soil loss calculations, using a GIS-based approach (several examples exist in the literature), and use the information (from the above recommendations) as input into the sediment transport model.
4. Confirm whether solar dish runoff under intense runoff will not concentrate below the bottom lip of the solar dish and initiate gully erosion.
5. Confirm whether access road cuts will not intercept and concentrate runoff, inducing gully erosion, especially if they coincide with backfilled trenches.
6. The sediment transport modeling must be completed with the appropriate inputs. 2D or 3D sediment transport modeling should be undertaken for existing and project conditions, to include all representative project elements (i.e., BMP effectiveness, solar dish towers in the washes, etc.). If this does not occur, there is not sufficient modeling to conclude that impacts from the project will be less than significant with proposed mitigation.

7. Long-term changes in fluvial morphology should be assessed within and downstream of the project site as a result of the project and also as a result of climate change. Long-term hydrologic simulations that may be required as short-term (or design flood) outcomes only provide a "snapshot" from the starting condition. The long term degradation of the project site as well as downstream washes is therefore likely to be underestimated.
8. Until further detailed sediment transport analyses suggest no significant impact, solar dish towers should not be constructed in the washes.

SOIL BINDERS AND LINEAR SEDIMENT BARRIERS

Soil binders are proposed to be used to treat soil erosion by wind and water. The erosion control plans in the DESCP suggest extensive use of soil binders throughout the project site with little specifics on the placement of linear sediment barriers. The potential impacts of the soil binders on the natural characteristics of the desert pavement (specifically soil infiltration, runoff generation, and soil erosion), in addition to specifics on binder deterioration and reapplication rates, and downslope flow convergence leading to gully erosion, was not investigated nor stated. As such, more information is needed pertaining to the use of soil binders.

It is noted here that placement of linear sediment barriers on a project of this scope is better left to the final phases of the design. However, the effectiveness of these treatments at controlling sediment needs to be quantified during the identification and analysis of Project impacts for use in the soil loss calculations. Final designs are not required to quantify the expected effectiveness of these treatments.

Transmission Lines

Another impact that was inadequately addressed by the Applicant and Staff is the proposed transmission corridor needed to transmit the power generated at Calico. The applicant identified 346 drainage features that would cross the existing and/or proposed transmission corridor simply sing Google Earth aerial images (SES 2008). The amount of actual drainages is likely higher. While transmission lines themselves, aside from their foundation and required lay-down areas for construction, do not usually impact the desert environment significantly, the roads associated with these transmission lines potentially do, especially when crossing desert pavement, drainage features and mountain ranges. These roads have the potential to alter drainage patterns, vegetation patterns and habitats (as a consequence of hydrologic alterations) (Belnap et al. 2008) and should be evaluated accordingly.

PROJECT WATER SUPPLY

I agree with the Staff that there is significant uncertainty in the long-term reliability of the proposed water supply. The applicant states in Exhibit 56 that "…the aquifer penetrated by the well can support water demands for the Calico Solar site during construction and the lifespan of its operations, and pumping of the well at the prescribed rates will have no significant impact to water levels in the area." However, this statement is based on inadequate and insufficient testing and mere speculation.

Specifically, on page 2-2 in Exhibit 56, URS states that a) the boundary of the aquifer "basin to the east is *not well documented*; the mountains may only provide a partial groundwater barrier"; and b) "Because there are no records of other wells or borings drilled to this depth in the basin, *the areal extent of the aquifer is not known*." c) "Natural recharge into the basin is estimated to be about 300 afy and the storage capacity of the aquifer has been estimated to be approximately 270,000 acre-feet (af). However, *little data exists to confirm these estimated values*…" Thus, the SSA does not provide any estimates of the aquifer's storage capacity due to the lack of data.

As shown in Soil & Water Table 2, Staff points out that the 300 afy of recharge used by the applicant is a number of unknown origin. However, staff opts to use the recharge figures of 200 – 400 afy as suggested by the USGS, using a GIS model. Further, staff chooses - for this particular project - to ignore the recharge value of 0 afy using Maxey-Eakin Method, which is a very commonly used method for the Mojave Desert. Basic aquifer basin balance mathematics suggests that output equals input. Given that there is 0 output, it would suggest that there is also 0 input. It is my professional opinion that the Maxey-Eakin Method is well established and should not be ignored just because the results are inconvenient for this Project.

In the Drawdown Analysis (Section 5.2.3 on page 5-4 in Exhibit 56) URS qualifies its conclusion by stating that "the geology in the area appears to be *variable and additional drawdown may occur* as a result of *long-term pumping effects*." Further, URS believes that "it is likely that the aquifer penetrated by Well #3 is not confined." While the rate at which Well #3 was tested (100 gpm - gallons per minute) was appropriate since the peak rate of water extraction for the project would be 93 gpm (for five years) (93 gpm = 150 acre feet/year) and 100 gpm is within the suggested +/- 10 percent of the pump rate, the duration for the test should have been 72 hrs for an unconfined aquifer instead of 24 hrs. The pump test for Well #1 (a step test up to 8 gpm instead of the expected Project usage of at least 93 gpm) was utterly inadequate for the project's water requirements.

Based upon the information provided in Exhibit 56, it is my professional opinion that it is irresponsible to consider Well #3 a reliable and primary water source for the Calico Solar project until additional monitoring wells on and offsite, in addition to adequate pump tests – as described above – can confirm the assumptions made by the applicant. It is my opinion that there are serious questions regarding the long-term viability of this water supply. I would recommend that this Project not be permitted without a back-up water supply and monitoring of the groundwater supply, as suggested by Staff's **SOIL&WATER-9**.

Further, although the Applicant did consider impacts to the zone of influence from potential groundwater drawdown as a result of Project pumping, the Applicant did so using inadequate and insufficient data as described above. Although the Applicant concluded that water extraction would have negligible impacts on water quantity, the Applicant failed to look at impacts relating to long-term water availability in the region and the need for a back-up water supply. Finally, none of these issues have been considered under a climate change scenario.

Cadiz Water Supply

I will not be providing an analysis of the Cadiz water supply, because the Applicant had asked the CEC not to consider this water supply in the application. However, should the Applicant change their mind I will submit testimony at that time.

CLIMATE CHANGE

Climate change can have an influential role in shaping the project's impacts on the environment in terms of hydrologic response and soil erosion. Provided that intense summer storms are responsible for a majority of the runoff that occurs at the project site, the Nature Conservancy Climate Wizard (http://www.climatewizard.org/) would suggest that summer rainfall in southeastern California may increase by as much as 50% by 2080 in the summer, which could be accompanied by significant increases in rainfall intensity and erosivity (Angel et al. 2005). Significant increases in rainfall quantity, intensity, and erosivity will have a profound impact on the landscape, especially on the morphology of the washes where solar dishes are proposed. Changes to the morphology of the washes would significantly impact the structural stability and flood preparedness of the solar dishes placed in the washes, coupled with increased sedimentation from the graded service roads as well as solar arrays. This large scale erosion will subsequently have significant air quality impacts to downwind resources if project design and BMPs

don't adequately incorporate the best scientific data available about future changes in the region's climate.

While rainfall intensity is predicted to increase, at the same time recharge is predicted to decrease for several reason. (1) Aquifer recharge in the Mojave Desert occurs mostly in the winter when rainfall events are low in intensity and long in duration. However, the shift from precipitation events occurring less in the winter and more in the summer will lead to more run-off and less infiltration, which equals less recharge. (2) Increased temperatures will lead to increased evapotranspiration, even if precipitation remains unchanged (Seager et al. 2007, Diffenbaugh 2008, Kerr 2008). See Figures 3 and 4. As shown in Figure 5, the increase in variability in precipitation patterns are already noticeable. While there have been distinct wet (1910s and 1940s) and dry (1920s and 1950s) periods over the past century, the wettest and driest years have already occurred this century (within the past 10 years).

Climate change, and its potential to amplifying project-related impacts on disturbed desert pavement, crytpobiotic crust and the project's water supply was not considered. In particular, for the project's water supply this could mean that the estimates for the aquifer recharge should be approximately 50% lower towards the end of the project lifespan.

Climate change, and its potential to amplify downstream/wind project-related impacts, such as erosion, sedimentation and dust creation, was not considered. Neither were the implications of less aquifer recharge by the predicted decrease in precipitation/infiltration. Amplification of project-related impacts means the impacts will be more severe and long-lasting under potential climate change scenarios.

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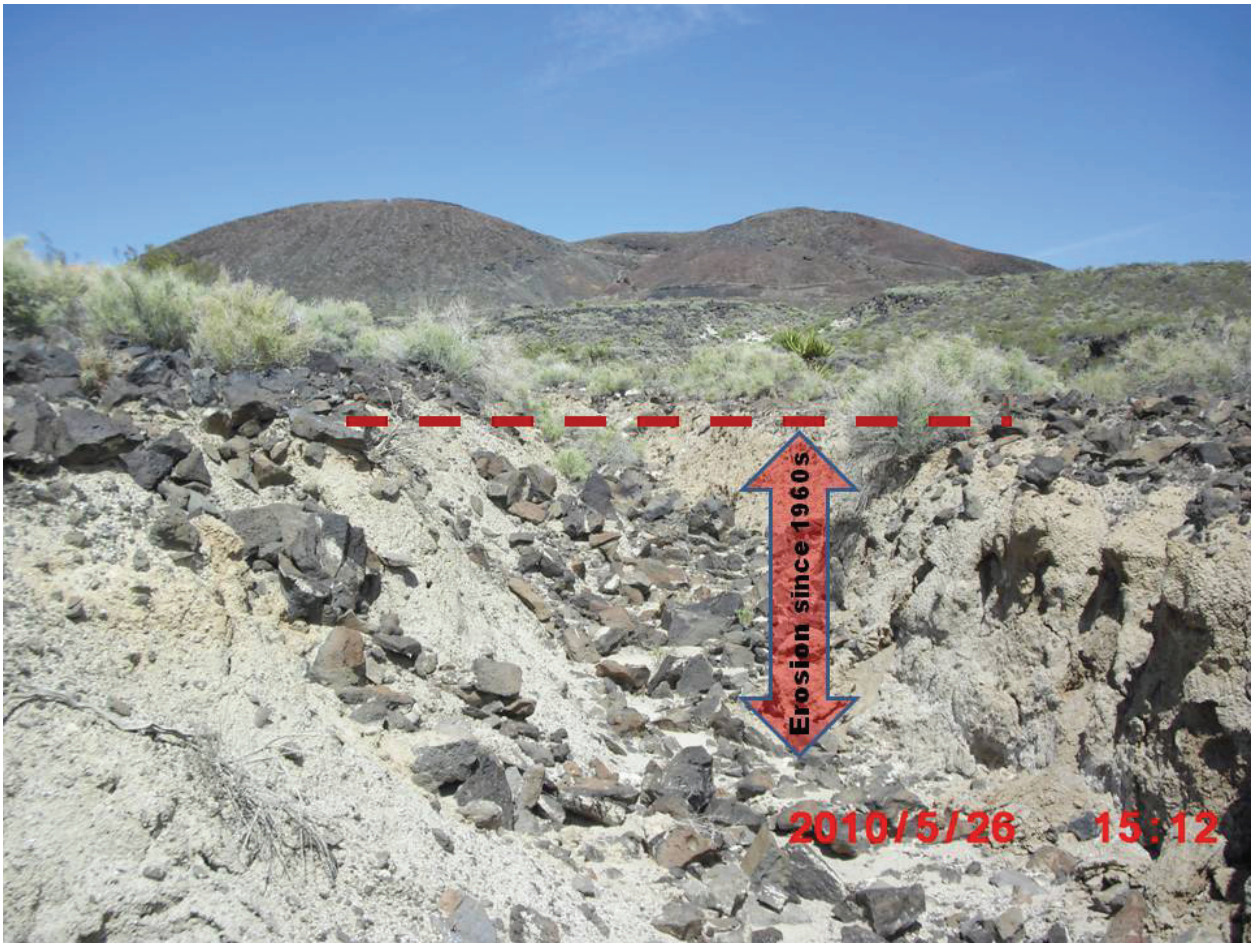

Figure 1: Erosion caused by run-off along a mining road where desert pavement was removed in the 1960s. Here the top layer was simply bulldozed to the side exposing the accumulated Av Horizon. This mining road is located approx. 45 miles north-east of the project area. The pre-mining road conditions of this area were flat and uninterrupted.

Figure 2: As in the proposed project area, the desert pavement itself consists of a thin layer of rocks which has captured sand and dust over the millennia. Once the top layer is removed the accumulated sand, clay and silt below the desert pavement is easily eroded away as shown in this photo.

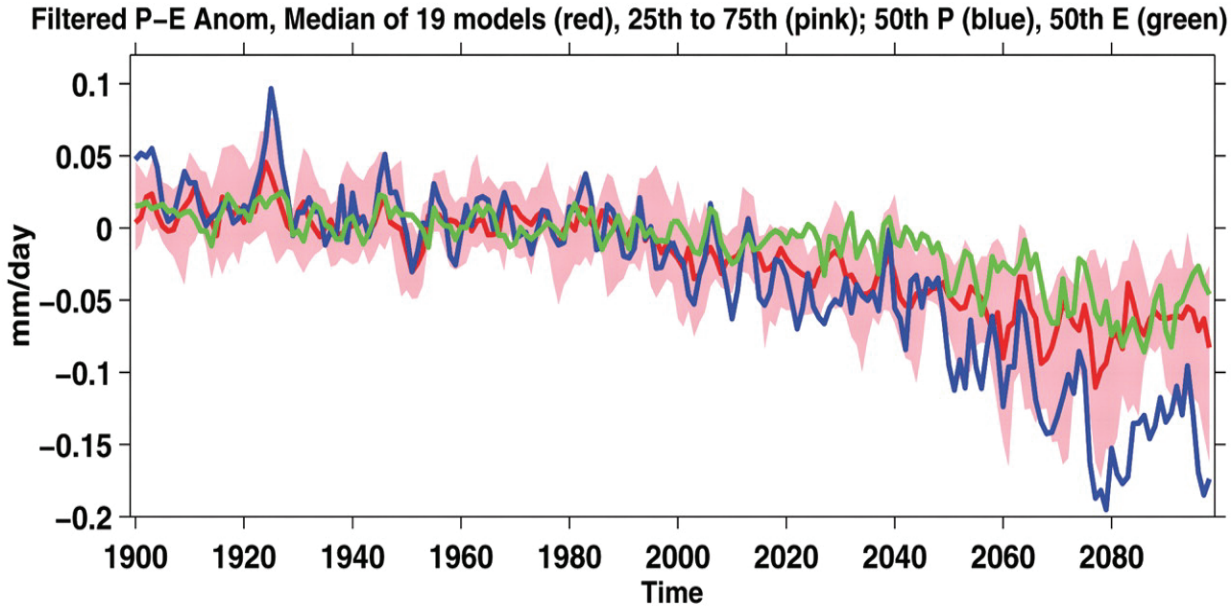

Figure 3: Modelled changes in annual mean precipitation minus evaporation over the American Southwest (125{degrees}W to 95{degrees}W and 25{degrees}N to 40{degrees}N, land areas only), averaged over ensemble members for each of the 19 models, from Seager et al., Science 316, 1181 - 1184 (2007).

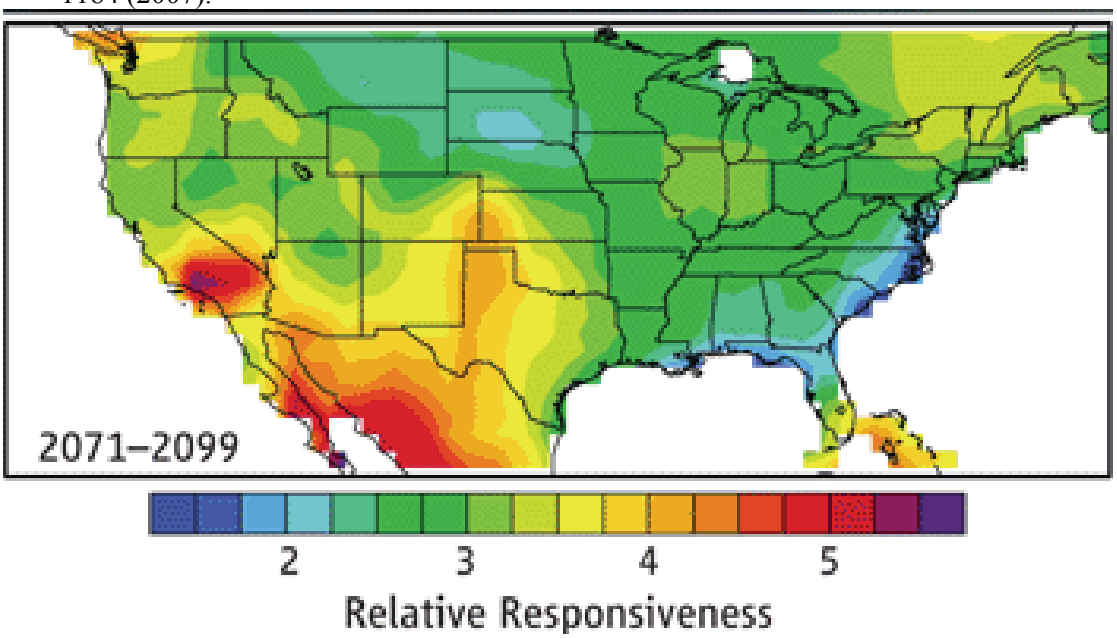

Figure 4: Results of 15 GCMs from the IPCC Fourth Assessment Report show areas of the southwestern United States and northern Mexico as the most persistent hotspots for climate change. Responsiveness of the southwestern hotspot comes from increased variability in precipitation from one year to the next (not from progressive warming or a long-term rise or fall in precipitation) (Diffenbaugh et al. 2008, Kerr 2008).

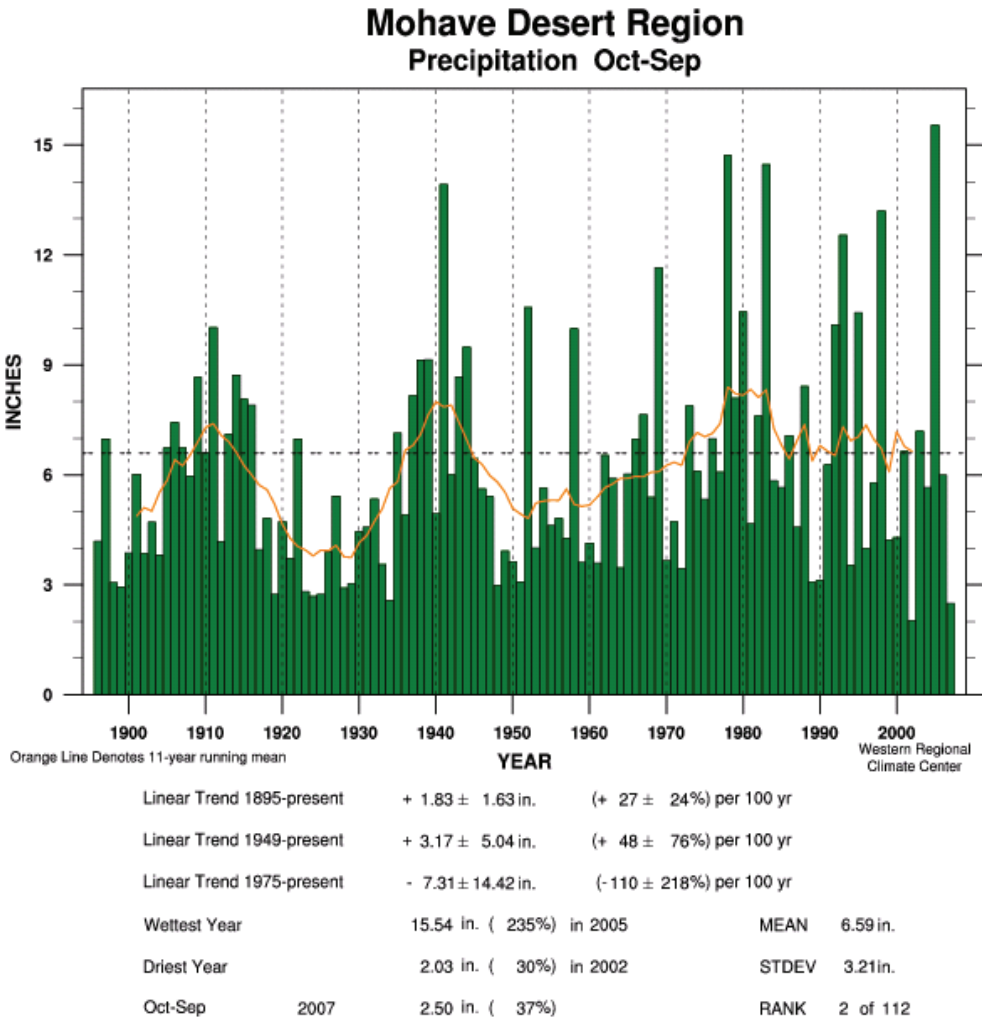

Figure 5: Precipitation for the Mojave Desert Region for water years (Oct. – Sept.) starting in 1895. Note that the wettest and driest years on record all have happened in this century, indicating that the hotspot in the desert southwest suggested in Figure 5 is already occurring.

Calico Solar – 08-AFC-13
DECLARATION OF SERVICE

I, Bonnie Heeley, declare that on July 29, 2010, I served and filed copies of the attached Rebuttal Testimony of Boris Poff on Behalf of California Unions for Reliable Energy on Soil and Water Resources for the Calico Solar Project dated July 29, 2010. 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/CalicoSolar_POS.pdf. The document has 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 electronically to all email addresses on the Proof of Service list; and by depositing in the U.S. mail at South San Francisco, CA, with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list to those addresses NOT marked "email preferred."

AND

By sending an original paper copy and one electronic copy, mailed and emailed respectively to:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-13
1516 Ninth Street, MS 4
Sacramento, CA 95814-5512
docket@energy.state.us.ca.

I declare under penalty of perjury that the foregoing is true and correct. Executed at South San Francisco, CA, on July 29, 2010

_____/s/_____
Bonnie Heeley

CALIFORNIA ENERGY COMMISSION
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