STATE OF CALIFORNIA

Energy Resources Conservation
and Development Commission

In the Matter of:

The Application for Certification for the
Calico Solar Project

Docket No. 08-AFC-13

INTERVENOR DEFENDERS OF WILDLIFE

REBUTTAL TESTIMONY

July 29, 2010

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Pursuant to the Committee's scheduling order dated July 13, 2010, Defenders of Wildlife provides the following rebuttal testimony for the proposed Calico Solar Project evidentiary hearings scheduled for August 4-6, 2010. The foregoing testimony concerns the Biological Resources topic area.

Defenders of Wildlife reserves the right to supplement or revise its testimony at any time up to and including the close of the evidentiary hearings.

REBUTTAL TESTIMONY OF JEFFREY B. AARDAHL

To the best of my knowledge, all of the facts contained in this testimony (including all referenced documents) are true and correct. I am personally familiar with the facts and conclusions described within this testimony and if called as a witness, I could testify competently thereto.

Qualifications

I have an Associate degree in Forestry from Pasadena City College and a Bachelor of Science degree in Wildlife Management from Humboldt State University, California. From approximately 1974 through 2005 I was employed by the Bureau of Land Management and held several positions including wildlife management biologist, environmental coordinator, and supervisory resources management specialist. During the period from 1989 through 1995, I was the Resources Management Division Chief in Death Valley National Park; and from 1997 through 2000, I was a wildlife biologist in the Washington, D.C. headquarters of the Bureau of Land Management. I retired from the Bureau of Land Management in 2005, and have been employed by Defenders of Wildlife as a California Representative since 2009.

During my career with the Bureau of Land Management (BLM) I was involved in the following activities involving the Desert Tortoise:

- Conducted several dozen relative density survey transects throughout the western and eastern Mojave Desert.
- Assisted in preparing the wildlife element of the California Desert Conservation Area Plan of 1980 (CDCA Plan).
- Prepared and implemented the management plan for the Desert Tortoise Natural Area located in the western Mojave Desert near the Rand Mountains and Fremont Valley.
- Analyzed several hundred multiple land use project proposals and prepared environmental impact assessments and recommended mitigation measures.
- Analyzed proposed amendments to the CDCA Plan and prepared environmental impact assessments and recommended mitigation measures.

I have visited the site of the proposed Calico Solar Project several times during 2009 and 2010 for the purpose of examining the quality of the habitat, searching for Desert Tortoises and their burrow and shelter sites, Bighorn Sheep and their sign, and assessing potential habitat connectivity and movement patterns.

Statement

I have reviewed the project applicant's Application for Certification, supplemental survey reports, the Staff Assessment/Draft Environmental Impact Statement (SA/DEIS), the Supplemental Staff Assessment (SSA) and the BLM's Biological Assessment for the proposed project and have the following concerns:

1. The number of Desert Tortoises that would be directly impacted by the proposed project has not been concisely and accurately reported

The former proposed project would have affected 8230 acres of Desert Tortoise habitat and an estimated 176 Desert Tortoises based on protocol surveys conducted in the spring season of 2010. The Supplemental Staff Assessment published in July 2010 indicates that the revised project proposal now would affect 6215 acres of habitat and 57 Desert Tortoises, based on information provided by the applicant.

The supplemental staff assessment correctly states that the former proposed 8230 acre project would have impacted an estimated 176 Desert Tortoises. This estimate is based on the number actually observed during protocol surveys and modified according to a formula provided by the Fish and Wildlife Service (FWS) that accounts for rate of delectability based on environmental factors. For this project area the number observed was 104 and the total estimated population is 176. Thus, the rate of detection was 0.59 or 59%.

My analysis of the applicant's Supplement to the Application for Certification, and specifically the photo-map of locations of Desert Tortoises and their burrows within the proposed project area, resulted in significantly different direct impact projections. Specifically, the number of individuals occurring within the new avoidance area that were observed is 26, which means that the observed number within the revised project area is 104 - 26 or 78, not 57. Applying the

detection rate results in an estimated 44 being avoided and 132 directly impacted. The SSA needs to clearly state the correct number of individuals impacted based on actual number observed and the estimated population.

Based on information contained in the SA/DEIS and SSA, I conclude that the following direct effects to the Desert Tortoise and its habitat would occur:

Project Area	Est. Acres	Desert Tortoises		Percent of Total
		Observed	Est. Total	
Exclusion	1100	25	42	24
Phase I Detention Basins	550	8	14	8
Phase I Suncatcher Area	700	7	12	7
Phase II South of Railroad	2200	2	3	2
Phase II North of Railroad excl. detention basins	1600	62	105	59
Total	6150	104	176	100

2. The significance of the Desert Tortoise Population and its habitat has not been analyzed.

The proposed Calico Solar Project is located within the east-central portion of the Western Mojave Recovery Unit for the threatened Desert Tortoise, and in proximity to the boundaries of the Eastern Mojave and Northern Colorado Recovery Units.[1] The proposed Calico Solar Project would directly impact 6215 acres of Desert Tortoise habitat and an estimated 132 Desert Tortoises based on the applicant's protocol surveys performed in 2010. This is by far the largest number of individuals of this species that would be affected by any of the proposed renewable energy projects currently under permit review. In comparison, the next most-impacting proposed project, the Ivanpah SEGS, would directly impact at least 25 Desert Tortoises.

Individual Desert Tortoises observed and documented on the proposed project site by the applicant's biological consultant visually appeared healthy, and included adults, sub-adults and juveniles of both sexes, an indication that successful reproduction is occurring.

The relationship of this population and its habitat to other known populations to the east, north and south has not been adequately described and analyzed in the environmental analysis. Although the Calico solar project is not located within a recommended Desert Wildlife

[1] Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 73 pages plus appendices

Management Area (DWMA) for the recovery of the Desert Tortoise, or a BLM-designated Area of Critical Environmental Concern (ACEC) for Desert Tortoise conservation, Desert Tortoises occurring outside of these administratively designated habitat areas, such as within the proposed Calico project area, may be important in the overall recovery of this species because their habitat may provide corridors for genetic exchange and dispersal of Desert Tortoises among the DWMAs.[2] Specifically, its value in contributing to the genetic health and sustaining populations within designated DWMAs and ACECs has not been addressed.

In addition, Desert Tortoises occurring in suitable habitat outside of DWMAs and ACECs may be much less susceptible to the deleterious effects of shell disease and Upper Respiratory Tract Disease because of their lower density.[3]

3. The nature of the Desert Tortoise population that would be affected by the proposed project has not been adequately analyzed and reported

Age, sex, visual characteristics and behavior of the Desert Tortoises observed and documented during all field surveys need to be analyzed and disclosed in a supplemental report. The applicant submitted field survey data forms containing such information for Desert Tortoises observed, but the SA/DEIS and SSA lacks an analysis of this information that is necessary to characterize the nature and health of the potentially affected population.

Age and sex of observed Desert Tortoises should be analyzed and conclusions made about their reproductive health and potential from a demographic perspective. For example, the proportion of hatchlings and juveniles would indicate reproductive rate over time, and compared with those of other known populations, allow for a determination of the status and trend of the population.

Data collected during the field surveys also included visual assessments of apparent health of individuals and their behavior. The visual health profiles of the encountered individuals are important and should be included in a supplemental report.

Lastly, the photographs taken of each individual Desert Tortoise should be included in the supplemental report because they would may provide additional visual information about the age and health of the individuals to subject matter experts.

4. Habitat connectivity and Desert Tortoise movements have not been adequately analyzed.

The project applicant, FWS and BLM concluded that because Desert Tortoises occupy the northern portions of the project site, in addition to habitat generally extending to the south in the vicinity of railroad, they would be able to move in an east-west and west-east direction over time across the northern portion of the site if the remainder of their habitat to the south was lost due to the solar project, including project perimeter fencing. The staff concludes that north-south movements would be eliminated by the proposed project.

[2] Id, page 45.
[3] Id. Page 45-46, 49.

In response to concerns expressed by the FWS and BLM the applicant has proposed to exclude approximately 1100 acres in the northern portion of the project area from development in order to maintain a Desert Tortoise movement corridor. Studies of Desert Tortoise movements within, to and from the project area have not been studied and the concept of a movement corridor across the northern portion of the project area is hypothetical. Staff of the CEC and BLM concluded, in the absence of documentation from field studies, that the BNSF Railroad and I-40 act as barriers to movement of Desert Tortoises.[4] However, staff also stated that many existing railroad trestles that span drainages provide opportunities for Desert Tortoise movement.[5] Staff concluded that I-40 is a barrier to Desert Tortoise movement without providing any supporting evidence.

In fact, there are numerous bridges and culverts under I-40 and the adjacent Route 66 that are sufficiently large to allow for Desert Tortoise movement south-north and north-south through the proposed project area. If such movements occur, they may provide biological connectivity with known populations to the south within the Ord-Rodman Critical Habitat Unit which is also a designated DWMA and conservation ACEC. Staff also reported that the area located between the BNSF Railroad and I-40 contained Desert Tortoise sign, and that two Desert Tortoises were observed in this area during surveys conducted in the spring of 2010.[6]

The applicant concluded the following with regard to Desert Tortoise movements and preferred habitat:

> "Movement of desert tortoise in the vicinity of the Project, north of the railroad, is expected to be mostly in the east-west directions, and mostly in the northern area near the base of the Cady Mountains where tortoise densities are greater (Figure 2.6-3). Movement corridors are not necessarily areas where animals spend most of their time, but are areas they periodically use to move between areas of preferred habitat. The modifications to the Project boundary would expand the east-west movement corridor by about 2,900 feet and allow for tortoise and other wildlife to move past the steeper topography that may hinder regular movement through this area."[7]

Desert Tortoise densities within the project area are greater north of the railroad, but are not concentrated near the base of the Cady Mountains, which is evident from observations of individual animals plotted on Figure 2.6-3. The greatest concentration occurs within a zone targeted for Phase II of the proposed project where an estimated 105 individual Desert Tortoises comprising 59% of the entire affected population occur over an area of approximately 1600 acres.

Desert Tortoise movement studies within and adjacent to the proposed project have not been conducted, so all the statements in the SA/DEIS and SSA about movement corridors for Desert Tortoises are speculative and based on best professional judgment of the agency staff biologists.

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[4] Staff Assessment/Draft Environmental Impact Statement for the Proposed Calico Solar Energy Project, March 2010, page C.2-4.
[5] Id. Page C.2-27.
[6] Applicant's Supplement to the Application for Certification for the Calico Solar Project, May 2010, Figure 2.6-3.
[7] Id. Page 2-16.

Only locations of observations of Desert Tortoises and their burrows have been documented based on surveys conducted over a brief period of time during the spring of 2010.

In response to data requests concerning wildlife movement impacts from Defenders of Wildlife and others, the applicant on 12/4/09 submitted Figure No. 13: Modeled Potential Desert Tortoise Habitat and Desert Tortoise Movement Corridors. The habitat model is based on a recent USGS publication, but the identified Desert Tortoise movement corridors are speculative and unsupported by any field studies. Interestingly, the depicted movement corridors do not include the proposed project area even though it is located in the middle of the highest quality habitat within the region that provides continuity with habitats and populations to the northwest, south, southeast and east.

It is much more likely that movements of Desert Tortoises on the Calico project site occur in an east-west and west-east direction in the lower half across more flat terrain, and in a south-north and north-south direction in the northern half through the numerous braded washes. Jennings[8] studied Desert Tortoise movements at the Desert Tortoise Natural Area located in the western Mojave Desert. He reported that Desert Tortoises were associated over 90 percent of the time during the spring season with washes which they used for travel, excavation of burrows or dens, and for feeding.

Figure 2.6-3 also reveals that the proposed project construction area would result in narrow constrictions of the hypothetical movement corridor due to terrain features of the toe-slope of the Cady Mountains at the eastern and north central portion of the proposed project. These constrictions have not been analyzed for their potential to limit Desert Tortoise movements. Furthermore, based on terrain features associated with north-south drainages on the bajada of the Cady Mountains, Desert Tortoise movements in an east-west direction would naturally be difficult or sometimes impeded depending on the wash depth and bank slope.

The applicant and the CEC have concluded that Desert Tortoise occur in higher density near the base of the Cady Mountains, but analysis of the information provided by the applicant and analyzed by agency staff indicate otherwise.

5. Bighorn Sheep movements north and south across the proposed project area have been prematurely dismissed as an issue.

Agency staff addressed the potential impacts to Bighorn Sheep movements due to the proposed project, but limited their analysis generally to movements between the Cady Mountains and Bristol Mountains to the east, and access to seasonal foraging habitat on the bajada south of the Cady Mountains. Potential movement south across I-40 was not analyzed, apparently on the assumption that I-40 functioned as a barrier to such movement, and because there is no evidence that such movements occur.

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[8] Jennings, W. Bryan. 1997. Habitat Use and Food Preferences of the Desert Tortoise, *Gopherus agassizii*, in the Western Mojave Desert and Impacts of Off-Road Vehicles. Proceedings of the New York Turtle and Tortoise Society: Conservation, Restoration, and Management of Tortoises and turtles - An International Conference, pp. 42–45.

The absence of analysis for the potential movement of Bighorn across I-40 is somewhat puzzling given that staff in the SSA cited a recent habitat connectivity study by Spencer, et.al[9], and concluded that the proposed project "…is located within the essential connectivity area and has the potential to adversely affect wildlife movement. This area acts as an important link between wildlife populations in the eastern and western deserts. Further reading of Spencer, et al. study reveals that the area of essential connectivity links the Cady and Bristol Mountains with the Rodman, Newberry and Ord Mountains south and west of I-40. Staff did not address the Bighorn Sheep within the context of wildlife movements across an essential linkage area spanning I-40. Their analysis was limited to the Desert Tortoise.

Since Desert Bighorn habitat connectivity and movement potential across I-40 was neither addressed nor dismissed as a potential impact, the SSA included only one mitigation measure to address potential impact: Monitoring of animals detected within 2000 feet of the project construction area and possible cessation of construction activities if individuals are detected within 500 feet.

The study by Spencer, et al. contains the following statement regarding essential connectivity areas: "…in the relatively undeveloped forest and desert ecoregions—such as the Sierra Nevada and Mojave Desert—many Essential Connectivity Areas connect highly intact wilderness and park lands across private or federally managed multiple-use lands, which support mostly natural landcovers and are relatively permeable to wildlife movements. In these "low-contrast" situations, managing to sustain wildlife movements between existing protected areas may be the primary conservation approach."

Bighorn Sheep in the Cady Mountains have expanded their population from an estimated 50 to over 300 individuals since approximately 1990 based on aerial surveys performed by the Department of Fish and Game. This population is natural and has not been augmented by transplants from other herds. The Cady Mountain herd movements have not been studied through radio telemetry, so little is known about the movements of individual animals comprising the herd.

Numerous culverts and bridges occur under I-40 in proximity to the proposed project, and many are of sufficient size to allow the movement of Bighorn Sheep and other species. No wildlife movement studies involving these engineered drainages were conducted as part of the environmental review of the proposed project.

Bighorn movement under an elevated bridge on I-8 in Imperial County was noted in the Supplemental Staff Assessment for the Imperial Valley solar project. Movement was detected via radio telemetry from a collared animal. This is one instance where a bighorn was documented moving under a freeway at an elevated bridge. Since no radio telemetry study is available for the Cady Mountains bighorn, bighorn could potentially travel under I-40 without

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[9] Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

detection, especially at relatively low levels. In the absence of further study, such movement can't be dismissed.

Wehausen (personal communication 2010) indicated that recent studies to detect movements of Desert Bighorn between permanently occupied habitats based on genetic markers provide insight into herds that are isolated and those that are connected to other herds. Although studies to date did not find genetic evidence of connectivity between herds in the Cady Mountains and the Rodman, Newberry and Ord Mountains, Wehausen cautioned that the "resolution" of the genetic testing is such that a low level of gene flow across I-40 in the vicinity of the proposed project can't be ruled out.

Staff failed to identify the potential for Bighorn Sheep to move from the Cady Mountains into the Rodman, Newberry and Ord Mountains, and also failed to identify the numerous culverts and bridges under I-40 which would accommodate such movement. The proposed Calico Solar Project would be a barrier to movement, which is a significant impact under CEQA. Therefore, staff should develop conditions of certification to mitigate such impact. In my opinion, acquisition of lands with similar value as movement corridors for Bighorn Sheep and connectivity between populations is appropriate compensatory mitigation for such impacts, provided that the benefits from such mitigation enhance opportunities for Bighorn Sheep movements across I-40.

Jeffrey B. Aardahl

Curriculum Vitae

Education:

Associate of Arts in Forestry, Pasadena City College, Pasadena, California, 1968
Bachelor of Science, Biology (Wildlife Management), Humboldt State University, Arcata, California 1970.

Professional History:

2009 – Present: California Representative. Defenders of Wildlife, California Program Office, Sacramento, California.
2005 – 2006: Wildlife Biologist/Conservation Planner. Center for Biological Diversity.
2000 – 2005: Resources Management Branch Chief. Ridgecrest Field Office, Bureau of Land Management, Ridgecrest, California.
1997 – 2000: Wildlife Biologist. Headquarters Office, Bureau of Land Management, Washington, D.C.
1995 – 1997: Resources Management Branch Chief. Barstow Field Office, Bureau of Land

Management, Barstow, California.

1989 – 1995: Resources Management Division Chief. Death Valley National Park, Death Valley, California.

1976 – 1989: Wildlife Biologist. Ridgecrest Resource Area, Bureau of Land Management, Ridgecrest, California.

Professional Training:

1977 – 2002: 960 hours in diverse subjects – remote sensing, visual resources management, air quality management, wilderness management, cultural resources management, Native American relations, wildlife habitat management, deer population management, environmental protection and NEPA compliance, natural resources monitoring and assessment, Endangered Species Act compliance.

General:

1971 – 1972: U.S. Army, active duty, Honorable Discharge

STATE OF CALIFORNIA

Energy Resources Conservation
and Development Commission

In the Matter of:	Docket No. 08-AFC-13
The Application for Certification for the Calico Solar Project	

INTERVENOR DEFENDERS OF WILDLIFE

DECLARATION OF JEFF AARDAHL

I, Jeff Aardahl, declare as follows:

1. I hold the position of California Representative with Defenders of Wildlife.

2. I hold a Bachelor of Science degree in Biology. My relevant professional qualifications and experience are set forth in the attached testimony and are incorporated herein by reference.

3. I prepared the testimony attached hereto and incorporated herein by reference, relating to the biological resource impacts of the proposed Calico solar energy project.

4. It is my professional opinion that the attached testimony is true and accurate with respect to the issues that it addresses.

5. I am personally familiar with the facts and conclusions described within the attached testimony, and if called as a witness, I could testify competently thereto.

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct and that this declaration was executed

At: Gualala, California

On: July 27, 2010

Signature: Jeff Aardahl

DECLARATION OF SERVICE

I, Joshua Basofin, declare that on July 29, 2010, I served and filed copies of the Attached:

1. Defenders of Wildlife's Prehearing Conference Statement
2. Rebuttal testimony of James M. Andre
3. Declaration of James M. Andre
4. Rebuttal testimony of Jeffrey B. Aardahl
5. Declaration of Jeffrey B. Aardahl
6. Application for Subpoena of a CDFG Representative
7. Declaration for Application for Subpoena

The original documents, filed with the Docket Unit, are 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]**. 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, 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;

_X_ by personal delivery or by depositing in the United States mail at Sacramento, CA with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

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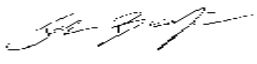
I declare under penalty of perjury that the foregoing is true and correct.



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APPLICATION FOR CERTIFICATION

For the CALICO SOLAR (Formerly SES Solar One)

Docket No. 08-AFC-13

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(Revised 7/12/10)

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