STATE OF CALIFORNIA

Energy Resources Conservation and Development Commission

In the Matter of:	DOCKET NO. 07-AFC-5
APPLICATION FOR CERTIFICATION FOR THE IVANPAH SOLAR ELECTRIC GENERATING SYSTEM	

IVANPAH SOLAR ELECTRIC GENERATING SYSTEM (ISEGS) (07-AFC-5)

INTERVENOR WESTERN WATERSHEDS PROJECT'S OPENING TESTIMONY FOR TOPICS TO BE HEARD IN JANUARY 2010, EXHIBIT LIST, AND PROOF OF SERVICE

Submitted to the
California Energy Commission
Submitted by

Michael J. Connor, Ph.D.
California Director
Western Watersheds Project
PO Box 2364
Reseda, CA 91337-2364
(818) 345-0425
mjconnor@westernwatersheds.org

December 18, 2009

INTERVENOR WESTERN WATERSHEDS PROJECT'S OPENING TESTIMONY FOR TOPICS TO BE HEARD IN JANUARY, 2010

Pursuant to the *Revised Notice of Prehearing Conferences and Evidentiary Hearing* issued November 23, 2009, Intervenor Western Watersheds Project provides this opening testimony for topics to be heard in January, 2010. To the best of our knowledge, all of the facts contained in this testimony (including all referenced documents) are true and correct.

1. Prior Filings

In addition to the statements herein, we submit as testimony the following documents submitted in this proceeding:

- Letter submitted March 4, 2009 by Western Watersheds Project to John Kessler, Project Manager, Siting, Transmission and Environmental Protection Division, California Energy Commission Re: Ivanpah Solar Electric Generating System (ISEGS) (07-AFC-5) Preliminary Staff Assessment. [Re-submitted as Document 500]
- Letter submitted May 13, 2009 by Western Watersheds Project RE: Draft Desert Tortoise Translocation/Relocation Plan for the Ivanpah Solar Electric Generating System March 2009. [Re-submitted as Document 501]
- Intervenor and Preliminary Prehearing Conference Statement submitted by Western Watersheds Project on November 16, 2009.

2. Testimony Submitted.

Testimony of Dr. Michael J. Connor regarding impacts to desert tortoise. His declaration including qualifications and testimony, and a copy of his *curriculum vitae* are attached. (Attachment A)

3. List of Exhibits.

D. List of Documents

Exhibit Number	Author and Title
500	Letter submitted March 4, 2009 by Western Watersheds Project to John Kessler, Project Manager, California Energy Commission Re: Ivanpah Solar Electric Generating System (ISEGS) (07-AFC-5) Preliminary Staff Assessment.
501	Letter submitted May 13, 2009 by Western Watersheds Project RE: Draft Desert Tortoise Translocation/Relocation Plan for the Ivanpah Solar Electric Generating System March 2009.
502	Berry, K. H., Morafka, D. J. and Murphy, R. W. 2002. Defining the desert tortoise(s): our first priority for a coherent conservation strategy. Chelonian Conservation and Biology 4: 249-262.
503	U.S. Fish and Wildlife Service. 1994. Figure 9 from: Desert Tortoise (Mojave Population) Recovery Plan. USFWS, Portland, Oregon.

504 U.S. Fish and Wildlife Service. 2009. Range-wide Monitoring of the Mojave Population of the Desert Tortoise: 2007 Annual Report. Report by the Desert Tortoise Recovery Office, USFWS, Reno, Nevada.

505 Lamb, T. 1986. Genetic variation in mitochondrial DNA of the Desert Tortoise, *Gopherus agassizii*, in California. Proce. Desert Tortoise Council Symp. 1986: 45-52.

506 Lamb, T., Avise, J. C. and Gibbons, J. W. 1989. Phylogeographic patterns in mitochondrial DNA of the desert tortoise (*Xerobates agassizi*), and evolutionary relationships among the North American gopher tortoises. Evolution. 43(1): 76-87.

507 Murphy, R. W., Berry, K. H., Edwards, T. and Mcluckie, A. M. 2007. A Genetic Assessment of the Recovery Units for the Mojave Population of the Desert Tortoise, *Gopherus agassizii*. Chelonian Conservation and Biology 6(2): 229–251.

508 CNDDB 2009. Report for Desert Tortoise Occurrence 2. California Natural Diversity Database, California Department of Fish and Game.

509 CNDDB 2009a. Map showing the polygon for Desert Tortoise Occurrence 2. California overlaid on a topographic base-map from the Natural Diversity Database, California Department of Fish and Game.

510 Britten, H. B., Riddle, B. R., Brussard, P. F., Marlow, R. and Lee, Jr., T. E. 1997. Genetic delineation of management units for the desert tortoise, *Gopherus agassizii*, in the northeastern Mojave Desert. Copeia 1997: 523-30.

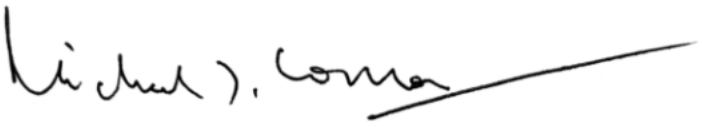
511 Berry et al., 1984. Plate 6-13 "Desert Tortoise Crucial Habitat in California Ivanpah Valley" from Berry, K. H. (1984) The Status of the Desert Tortoise (*Gopherus agassizii*) in the United States. US Fish and Wildlife Services on Purchase Order No. 11210-0083-81, Page 6-30.

512 Spang, E.F., Lamb, G. W., Rowley, F., Radtkey, W. H., Olendorff, R. R., Dahlem, E. A. and Sloane, S. 1988. Desert Tortoise Habitat Management on the Public Lands: a Rangewide Plan. USDI Bureau of Land Management, November 1988. 23 pp.

513 Oftedal, O. T. and Allen, M. E. 1996. Nutrition as a Major Facet of Reptile Conservation. Zoo Biology 15: 491 - 497.

Dated: December 18, 2009

Respectfully submitted,



Michael J. Connor, Ph.D.
California Director
Western Watersheds Project
PO Box 2364
Reseda, CA 91337-2364
(818) 345-0425
mjconnor@westernwatersheds.org

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In the Matter of: APPLICATION FOR CERTIFICATION FOR THE IVANPAH SOLAR ELECTRIC GENERATING SYSTEM	DOCKET NO. 07-AFC-5

IVANPAH SOLAR ELECTRIC GENERATING SYSTEM (ISEGS)
(Docket 07-AFC-5)

INTERVENOR WESTERN WATERSHEDS PROJECT
Declaration of Michael J. Connor
Regarding Impacts to Desert Tortoise from the Proposed Ivanpah Solar Electric Generating System

I, Michael J. Connor, declare as follows:

1) I am the California Director for Western Watersheds Project. I have worked for Western Watersheds Project since spring 2007.
2) My relevant professional qualifications and experience are set forth in the attached *curriculum vitae* and the attached testimony and are incorporated herein by reference.
3) I prepared the testimony attached hereto and incorporated herein by reference, relating to the impacts of the Project on desert tortoise.
4) I prepared the testimony attached hereto and incorporated herein by reference relating to the proposed Project in the Ivanpah Valley in San Bernardino County.
5) It is my professional opinion that the attached testimony is true and accurate with respect to the issues that they address.
6) 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 that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 12/18/09

Signed: Michael J. Connor

At: Reseda, California

STATE OF CALIFORNIA

Energy Resources Conservation and Development Commission

In the Matter of: APPLICATION FOR CERTIFICATION FOR THE IVANPAH SOLAR ELECTRIC GENERATING SYSTEM	DOCKET NO. 07-AFC-5

TESTIMONY OF MICHAEL J. CONNOR REGARDING IMPACTS TO DESERT TORTOISE

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 a Ph.D. in Biology (in intermediary metabolism) and a B.Sc. in combined honors (Biology and Chemistry) from the University of Aston in the United Kingdom. I have published extensively in the academic literature, largely in the field of experimental laboratory science (see attached c.v.).

I am the California Director for Western Watersheds Project. Western Watersheds Project works to protect and conserve the public lands, wildlife and natural resources of the American West through education, scientific study, public policy initiatives, and litigation. My responsibilities include review and analysis of environmental documents, research, and educational activities, focusing on wildlife and habitat issues including desert tortoise. Prior to that, I served as Executive Director for the Desert Tortoise Preserve Committee. The Desert Tortoise Preserve Committee is a non-profit organization formed for the purpose of promoting the welfare of the California State Reptile, the Desert Tortoise in its native wild state in the southwestern United States by establishing and managing preserves within the southwestern United States where there are habitats and ecosystems which support the desert tortoise and other associated species. Before becoming Executive Director of the Desert Tortoise Preserve Committee in March 1999, I worked for 16 years in the University of California at Los Angeles School of Medicine as Adjunct Associate professor and concurrently in part for the Department of Veterans Affairs in the VA Wadsworth Agent Orange laboratory.

I am familiar with the extensive literature on the desert tortoise and have attended and presented at eight of the last nine Annual Desert Tortoise Council Symposia. I have analyzed numerous agency environmental documents relating to actions in desert tortoise habitat including range-wide, regional and site-specific projects. For example, I commented extensively on the administrative and public drafts of the proposed revised Desert Tortoise (Mojave Population) Recovery Plan, the 2007 draft range-wide monitoring report, and the BLM's recent Fort Irwin Desert Tortoise Translocation Environmental Assessment. I am familiar with the BLM's desert planning efforts. Between January 1999 and June 2006, I represented the desert tortoise interest groups (Desert Tortoise Preserve Committee, Desert Tortoise Council, California Turtle and Tortoise Club) in the BLM's CDCA Planning Efforts (NECO, NEMO and WEMO) and was a member of the West Mojave planning effort steering committee. I coauthored the Petition to List the Sonoran Desert Tortoise that was filed in October 2008. In August 2009, the Fish and Wildlife Service issued a 90-day finding that the petition presented substantial information indicating that the Sonoran desert tortoise may meet the criteria for recognition as a distinct population segment and that the petition presents substantial scientific information indicating that listing the population may be warranted on all five criteria the Service uses in its evaluation.

I have visited the Ivanpah Valley many times. I visited the actual project site in May 2009 and intend to revisit the project site in early spring 2010. I have also reviewed agency documents related to this area including submitting extensive comments and a protest of the BLM Needles Field Office's 2008 Proposed Grazing Decision for the Clark Mountain Allotment. The project site is located within this allotment.

STATEMENT

I have reviewed the PSA/DEIS and the associated applicant's documents. In my opinion, the analysis of impacts to desert tortoise that will be entailed by this major project is woefully inadequate. Although the PSA/DEIS at 6.2-29 recognizes that the affected desert tortoises are within the Northeastern Mojave Recovery Unit and are an Evolutionarily Significant Unit, the document provides no discussion of the significance of the ESU and provides no analysis of impacts to the ESU. It fails to provide crucial baseline information such as the size of the ESU in California. In my opinion, without an adequate documentation of this resource and without an adequate analysis of the impacts to it, it is impossible to compare alternatives or to devise mitigation measures that will assure full mitigation of the impacts.

The 1994 Desert Tortoise Recovery Plan recognized six Recovery Units within the Mojave desert tortoise population. A Recovery Unit is a geographic area harboring an evolutionarily distinct population of desert tortoise or Evolutionarily Significant Unit (ESU). An ESU is a population, or group of populations, that represents significant adaptive variation within a species (USFWS 1994). The six desert tortoise ESUs were identified by the recovery team on the basis of genetic, morphological, behavioral, and ecological data. Five of the six ESUs occur in California. The proposed ISEGS site lies

within the Northeastern Mojave Recovery Unit. This recovery unit extends from the Ivanpah Valley in California through Nevada and into extreme southwestern Utah and northwestern Arizona (USFWS 1994 Figure 9). The recovery unit shows some degree of heterogeneity (Lamb *et al.*, 1989; Britten et al, 1997; USFWS 1994, USFWS 2008).

In California, the Northeastern Mojave desert tortoises are restricted to the Ivanpah Valley with the boundaries marked by the Clark, Ivanpah, and New York Mountains. The California Natural Diversity Database (CNDDB) estimates the size of the desert tortoise habitat within the Recovery Unit in California at 184,519.6 acres (CNDDB 2009). The CNDDB polygon excludes most of the Ivanpah Dry Lake bed but includes Interstate 15, Nipton Road, Nipton, Ivanpah, the railroad, the Primm golf course, some mountainous terrain and other unsuitable habitat (see CNDDB 2009b for a map showing the polygon). It thus overestimates the amount of desert tortoise habitat. To estimate the proportion of desert tortoise habitat in the North Ivanpah Valley I split the CNDDB polygon along I-15 using ArcView GIS software. Based on this, I estimate the North Ivanpah Valley to account for about 24% of all desert tortoise habitat in the Northeastern Mojave Recovery Unit in California.

Tortoises in the Ivanpah Valley differ from other desert tortoise populations in California (Lamb, 1986; Lamb *et al.*, 1989). Northeastern Mojave desert tortoises exhibit the greatest genetic differentiation of the five recognized units occurring in California (Murphy *et al.*, 2007). According to the PSA, the desert tortoise population in the North Ivanpah Valley is also unique because it is the highest elevation at which this species is known to reside in the state (PSA/DEIS at 6.2-29).

The limited range, overall importance to genetic diversity, and behavioral adaptations underlie the need to conserve this desert tortoise population in California. This is especially important given the threats posed by global climate change. As the USFWS 2008 Draft Revised Recovery Plan notes, "Climatic regimes are believed to influence the distribution of plants and animals through species-specific physiological thresholds of temperature and precipitation tolerance. Warming temperatures and altered precipitation patterns may result in distributions shifting northward and/or to higher elevations, depending on resource availability (Walther et al. 2002). We may expect this response in the desert tortoise to reduce the viability of lands currently identified as "refuges" or critical habitat for the species." (USFWS 2008 at 133)

The most recent range wide monitoring survey report shows that tortoise densities within the Northeastern Mojave Recovery Unit are the lowest of the six recognized Recovery Units, with an estimated density of 1.7 tortoises/square km or 4.4 tortoises/square mile based on surveys conducted in 2007 (USFWS 2009). However, that estimate does not include the Ivanpah Valley which historically had some of the highest tortoise densities in the Recovery Unit. The USFWS currently includes the Ivanpah Valley within its Ivanpah monitoring stratum; the majority of the stratum is located west of the Ivanpah Mountains in the Eastern Mojave Recovery Unit (see Figure 7 in USFWS 2009). For the 2007 survey, only one of the sixteen transects was within the Ivanpah Valley. Both factors make using the Ivanpah monitoring stratum data problematic for

estimating tortoise densities in the Ivanpah Valley. There is a permanent study plot located in the southern end of the valley in an area that was identified as having a high tortoise density in the 1984 status report (Berry et al., 1984 Plate 6-13). The study plot population declined between 1986 and 2002. More recent density estimates are not yet available.

The 1984 status report tortoise density map of the Ivanpah Valley indicates that tortoise densities in the North Ivanpah Valley ranged from 20-100/sq mile with about half of the habitat (including the area of the power plant footprint) in the range of 50-100/sq mile (Berry et al., 1984 Plate 6-13). In 1988, the BLM began categorizing desert tortoise habitat under its range wide plan for desert tortoise habitat management (Spang et al, 1988). The North Ivanpah area was categorized as category 1 habitat. The 1994 Recovery Plan included the North Ivanpah Valley in its proposed Ivanpah DWMA (see USFWS 1994 Figure 9). However, in its 2002 NEMO Plan the BLM chose to exclude the North Ivanpah Valley from the DWMA. Under the NEMO plan, habitat categories 1 and 2 are scrapped and any tortoise habitat outside a DWMA is to be managed as category 3 habitat. Thus the designation category 3 does not mean that the habitat is degraded or that it contains low tortoise densities, it simply means it is not within a DWMA. The North Ivanpah area includes excellent tortoise habitat and I concur with the statement in the FSA that, "The ISEGS project area provides high quality habitat for this species, with low levels of disturbance and high plant species diversity" (FSA/DEIS at 6.2-29).

The proposed project will directly, indirectly and cumulatively impact California's Northeastern Mojave tortoise population. The impacts include destruction and loss of habitat, take of tortoises, habitat fragmentation, population fragmentation, loss of connectivity, and loss of viability.

The footprint of the proposed power plant will consume some 4,073 acres (about 6.4 square miles) of desert tortoise habitat. Based on the CNDDB data referenced above, this amounts to 2.2% of the Northeastern Mojave Recovery Unit in California. Since the CNDDB data is an overestimate, the actual percentage loss is higher and may be considerably higher. Mitigating a direct impact of this scale is difficult. However, other major projects are also being proposed in the North Ivanpah Valley not the least of which is an additional power plant and the DesertExpress railway. In the face of the massive cumulative habitat loss and fragmentation that will occur if these projects proceed, it is difficult for me to imagine how any viable tortoise population could persist in the North Ivanpah Valley. As such, the cumulative impacts threaten to eliminate nearly a quarter of the range of the Northeastern Mojave ESU in California.

The FSA/DEIS is unclear as to how many tortoises will be directly affected by the proposed power plant and cites only the numbers of animals seen in various surveys. Table 5 of the August 2009 survey report (Supplemental Data Response, Set 2I at 9) provides estimated numbers of tortoises found on Ivanpah 1, 2 and 3 for comparison with the later surveys performed in the proposed relocation areas. From this data, the estimated abundances are 5.8 tortoises/sq km on Ivanpah 1, 1.7 tortoises/sq km on

Ivanpah 2, and 1.5 tortoises/sq km on Ivanpah 1. These values are comparable to or higher than the 1.7 tortoises/square km estimated for the Recovery Unit in the Range-wide Survey.

The surveys on the relocation sites reviewed in Supplemental Data Response, Set 2I were performed outside the protocol season (PSA/DEIS at 6.2-50). The project applicant's survey report did not mention this nor did it provide the dates of the surveys. The USFWS protocol survey relies on using standard values for estimating the proportion of desert tortoises above ground and available for detection (Pa). These Pa values are based on average proportions of transmittered tortoises found above ground from earlier range-wide line-distance sampling surveys conducted during the spring survey season. Tortoise activity is highly seasonal. The proportion of tortoises above ground changes with time and may decrease dramatically in July. Because of this, use of the standard Pa values will underestimate abundance. A reasonable estimate of the abundance of tortoises in the relocation areas is essential to evaluate potential impacts to resident tortoises from the proposed relocation. The density of tortoises on the project site and the density of resident tortoises in the proposed relocation and translocation areas should be determined using appropriate survey techniques so that the extent of the impacts can be determined.

The habitat surveys conducted in the relocation areas do not include surveys of the annual plants that tortoises depend upon for their survival (USFWS 1994). The nutritional status of wild tortoises may depend more on availability of plant species of high nutritional quality than on overall amounts of annual vegetation (Oftedahl and Allen, 1996). Without data on the quantity and quality of available forage it is unclear if the current carrying capacity of the proposed relocation sites is sufficient to support additional tortoises. The is important since the 1984 status report tortoise density map of the Ivanpah Valley (Berry et al., 1984 Plate 6-13) indicates that historic tortoise densities in the North Ivanpah Valley were not uniform and may have been lower at the relocation sites compared to the project site.

The FSA/DEIS mentions connectivity as an issue at FSA/DEIS 6.2-57 that "will be discussed in more detail below". Connectivity is included in the list at FSA/DEIS 6.2-72 but no discussion or analysis is provided. The cumulative effects section should analyze impacts to connectivity between the tortoises in the Northeastern Mojave Recovery Unit and the adjacent Eastern Mojave Recovery Unit. The FSA/DEIS mentions fragmentation of habitat but provides no analysis of the viability of the fragmented populations.

The take minimization measures for desert tortoise do not appear to minimize take. The FSA notes that FWS stated that fencing along I-15 is critical before any tortoise translocations are undertaken because translocated or relocated tortoises may make long distance movements (FSA/DEIS at 6.2-50). However Bio-9 for tortoise does not require that the fencing be in place.

The FSA/DEIS must describe the impacts of the proposed action and explain how these impacts will be mitigated. The FSA/DEIS proposes mitigating impacts at the power plant site by acquiring habitat and implementing recovery actions in the Eastern Mojave Desert Tortoise Recovery Unit (FSA/DEIS at 1-19). This is populated by a different desert tortoise ESU. In my opinion, proposing mitigation measures for a different tortoise population will not fully mitigate impacts to the affected ESU. I am aware that there are a number of ESUs of other species listed under the California Endangered Species Act (CESA). The FSA/DEIS notes at 1-19, 6.2-3, 6.2-52, 6.2-54, and 6.2-55 that formal guidance has not been obtained by CEC staff from CDFG describing their requirements for satisfying CESA. As the State agency that will be issuing the permits, the CEC should be working with CDFG to ensure that impacts to the Northeastern Mojave ESU are addressed and fully mitigated.

In summary, it is my opinion that the direct, indirect, and cumulatively impacts of the proposed project on the threatened desert tortoise will be severe. The impacts will likely endanger California's Northeastern Mojave desert tortoise population, and will place the desert tortoise, California's state reptile, at risk.

Curriculum Vitae
Michael Joseph Connor, Ph.D.

Work Address:	Western Watersheds Project California Office
	P.O. Box 2364
	Reseda, CA 91337
Telephone:	(818) 345 0425
E-mail:	<mjconnor@westerwatershedsproject.org>

Professional Experience

2007 – Present
California Director, Western Watersheds Project.
My responsibilities include review and analysis of environmental documents, research, educational activities, focusing on wildlife and wildlife habitat issues on the public lands.

1998 – 2006
Executive Director, Desert Tortoise Preserve Committee.

1989 – 1998
Adjunct Associate Professor, Division of Dermatology, Department of Medicine, UCLA School of Medicine.

1987 – 1998
Research Biologist, GS-13. Research Service, Agent Orange Laboratory, VA Wadsworth Medical Center, West Los Angeles.

1984 – 1989
Adjunct Assistant Professor, Div. Dermatology, Dept. Medicine, UCLA.

1981 – 1984
Assistant Research Biochemist, Div. Dermatology, Dept. Medicine, UCLA.

1980 – 1981
Research Fellow, Biochemistry Department, Scripps Clinic and Research Foundation, La Jolla, CA 92037.

Education

1975 – 1979 Ph.D., Aston University, Birmingham, UK

1972 – 1975 B.Sc. in Biology and Chemistry, Aston University, Birmingham, UK.

PUBLICATIONS

Papers and Book Chapters

1. Bailey, C. J., Atkins, T. W., Connor, M. J., Manley, C. G. and Matty, A. J.: Diurnal variations of food consumption, plasma glucose and plasma insulin concentrations in lean and obese hyperglycaemic mice. **Hormone Res.** 6: 380-386, 1975.

2. Connor, M. J., Blair, J. A. and Barford, P. A.: Isolation, purification, characterization and metabolism of high molecular weight folate from rat liver. **Biochem. Soc. Trans.** 5: 1319-1320, 1975.

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4. Connor, M. J., Pheasant, A. E. and Blair, J. A.: The identification of *p*-acetamidobenzoate as a folate degradation product in rat urine. **Biochem. J.** 178: 795-797, 1979.

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12. Connor, M. J., Lowe, N. J., Breeding, J. and Chalet, M.: Inhibition of ultraviolet-B skin carcinogenesis by all-*trans*-retinoic acid regimens that inhibit ornithine decarboxylase induction. **Cancer Res.** 43: 171-174, 1983.

13. Connor, M. J. and Lowe, N. J.: The induction of ornithine decarboxylase activity and DNA synthesis in hairless mouse epidermis by retinoids. **Cancer Res.** 43: 5174-5177, 1983.

14. Connor, M. J., Wheeler, L. A. and Lowe, N. J.: The induction of prophage expression in different *Salmonella typhimurium* strains by DNA cross-linking and monoadduct forming psoralens and longwave ultraviolet light. **Carcinogenesis** 4: 1451-1454, 1983.

15. Lowe, N. J., Connor, M. J. and Breeding, J.: Inhibition of ultraviolet-B induced epidermal ornithine decarboxylase and carcinogenesis by topical retinoic acid. In **Modulation and Mediation of**

Cancer by Vitamins (F. L. Meyskens and K. N. Prasad eds.) pp 78-80, Karger Press, Basal, Switzerland, 1983.

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30. Connor, M. J. and Smit, M.H.: Terminal group oxidation of retinol by mouse epidermis; inhibition *in vitro* and *in vivo*. **Biochem. J.**, 244: 489-492, 1987.

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California Energy Resources Conservation and Development Commission

In the Matter of: APPLICATION FOR CERTIFICATION FOR THE IVANPAH SOLAR ELECTRIC GENERATING SYSTEM	DOCKET NO. 07-AFC-5

DECLARATION OF SERVICE

I, Michael J. Connor, declare that on December 18, 2009, I served and filed copies of the attached INTERVENOR WESTERN WATERSHEDS PROJECT'S OPENING TESTIMONY FOR TOPICS TO BE HEARD IN JANUARY, 2010, EXHIBIT LIST, AND PROOF OF SERVICE dated December 18, 2009. The document has been sent to 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::

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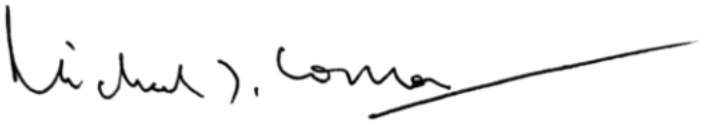
Sacramento, CA 95814-5512
docket@energy.state.ca.us

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



Michael J. Connor, Ph.D.

Sent via email to: sdeyoung@brightsourceenergy.com; tstewart@brightsourceenergy.com; jcarrier@ch2m.com; jdh@eslawfirm.com; e-recipient@caiso.com; tom_hurshman@blm.gov; Raymond_Lee@ca.blm.gov; dfgpalm@adelphia.net; tgulesserian@adamsbroadwell.com; mjconnor@westernwatersheds.org; gloria.smith@sierraclub.org; devorah.ancel@sierraclub.org; joanne.spalding@sierraclub.org; gssilliman@csupomona.edu; jbasofin@defenders.org; atomictoadranch@netzero.net; gsuba@cnps.org; thansen@cnps.org; granites@telis.org; bbrizzee@cc.sbcounty.gov; jbyron@energy.state.ca.us; jboyd@energy.state.ca.us; pkramer@energy.state.ca.us; jkessler@energy.state.ca.us; dratliff@energy.state.ca.us; publicadviser@energy.state.ca.us; docket@energy.state.ca.us; lbelenky@biologicaldiversity.org; ianderson@biologicaldiversity.org

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CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 07-AFC-5
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

Electronic Copies of all exhibits were sent on a disk via U.S. Mail to:

Solar Partners, LLC
John Woolard,
Chief Executive Officer
1999 Harrison Street, Suite #500
Oakland, CA 94612

John L. Carrier, J. D.
2485 Natomas Park Dr. #600
Sacramento, CA 95833-2937

Jeffery D. Harris
Ellison, Schneider& Harris L.L.P.
2600 Capitol Avenue, Ste. 400
Sacramento, CA 95816-5905

Tom Hurshman,
Project Manager
Bureau of Land Management
2465 South Townsend Ave.
Montrose, CO 81401

Raymond C. Lee, Field Manager
Bureau of Land Management
1303 South U.S. Highway 95
Needles, CA 92363

Becky Jones
California Department of
Fish & Game
36431 41st Street East
Palmdale, CA 93552

California Unions for Reliable Energy
("CURE")
Tanya A. Gulesserian
Marc D. Joseph
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Ste 1000

South San Francisco, CA 94080

Basin and Range Watch
Laura Cunningham
Kevin Emmerich
P.O. Box 70
Beatty, NV 89003

California Native Plant Society
Greg Suba, Tara Hansen & Jim Andre
2707 K Street, Suite 1
Sacramento, California 95816-5113

County of San Bernardino
Bart W. Brizzee, Deputy Co. Counsel
385 N. Arrowhead Avenue, 4th Fl.
San Bernardino, California 92415