ADAMS BROADWELL JOSEPH & CARDOZO

A PROFESSIONAL CORPORATION

ATTORNEYS AT LAW

601 GATEWAY BOULEVARD, SUITE 1000
SOUTH SAN FRANCISCO, CA 94080-7037

TEL: (650) 589-1660
FAX: (650) 589-5062
rkoss@adamsbroadwell.com

SACRAMENTO OFFICE

520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4721
TEL: (916) 444-6201
FAX: (916) 444-6209

DANIEL L. CARDOZO
THOMAS A. ENSLOW
TANYA A. GULESSERIAN
JASON W. HOLDER
MARC D. JOSEPH
ELIZABETH KLEBANER
RACHAEL E. KOSS
LOULENA A. MILES
ROBYN C. PURCHIA

FELLOW
AARON G. EZROJ

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL
GLORIA D. SMITH

June 25, 2010

DOCKET
09-AFC-8
DATE JUN 25 2010
RECD. JUN 25 2010

California Energy Commission
Attn Docket No. 09-AFC-8
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

Re: Genesis Solar Energy Project; 09-AFC-8

Dear Docket Clerk:

Enclosed are an original and one copy of Prehearing Conference Statement of California Unions for Reliable Energy.

Please docket the original, conform the copy and return the copy in the envelope provided.

Thank you for your assistance.

Sincerely,

/S/

Rachael E. Koss

REK:bh
Enclosures

2364-094a

printed on recycled paper

STATE OF CALIFORNIA
California Energy Commission

In the Matter of: The Application for Certification for the Genesis Solar Energy Project	Docket No. 09-AFC-8

PREHEARING CONFERENCE STATEMENT OF CALIFORNIA UNIONS FOR RELIABLE ENERGY

June 25, 2010

Tanya A. Gulesserian
Rachael E. Koss
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
(650) 589-1660 Voice
(650) 589-5062 Facsimile
rkoss@adamsbroadwell.com
tgulesserian@adamsbroadwell.com

Attorneys for the CALIFORNIA
UNIONS FOR RELIABLE ENERGY

Pursuant to the April 1, 2010 Revised Notice of Prehearing Conference and Evidentiary Hearing and Order and May 28, 2010 Revised Committee Scheduling Order, California Unions for Reliable Energy ("CURE") submits this prehearing conference statement. Each informational item requested by the Committee is discussed below.

1. Topic Areas That Are Complete and Ready to Proceed to Evidentiary Hearing

All resource areas with the exception of Air Quality, Biological Resources, Cultural Resources, Socioeconomics, and Transmission System Engineering are complete and ready to proceed to evidentiary hearing.

2. Topic Areas That Require Further Analysis and Which Are Not Ready for Adjudication

The following resource areas are not ready for adjudication:

a. Air Quality

In preparing the Staff Assessment, Staff is required to determine compliance with all laws, ordinances, regulations, and standards ("LORS"). The Mojave Desert Air Quality Management District ("MDAQMD") has not issued a Final Determination of Compliance ("FDOC") for the Project. Until the MDAQMD issues the FDOC, Staff cannot find that the Project complies will LORS. According to Staff, the "FDOC will contain revisions to conditions" and "Staff will provide any revised FDOC findings or conditions of certification in a Supplemental Staff Assessment addendum after receipt of the FDOC."[1] CURE requests at least 30 days

[1] Revised Staff Assessment ("RSA"), p. C.1-41.

from the date of issuance of the Supplemental Staff Assessment to review and prepare testimony regarding air quality, if necessary.

b. Biological Resources

The Commission is required under CEQA to analyze the whole of the Project which has the potential to result in a direct physical change in the environment.[2] In this case, "the whole of the Project" includes Genesis Solar, LLC's ("Applicant") proposed 250 MW power plant, a 6.5 mile transmission line (and the recent six pole transmission line extension), distribution and telecommunication lines and other linear facilities, and an expansion of the approved Colorado River substation needed to deliver the Project's power to the grid. Because the Applicant failed to provide crucial information regarding potential significant impacts on biological resources from each of these Project components, Staff has not analyzed all impacts associated with the whole of the Project. Consequently, it is impossible for Staff to conclude (and impossible for any other party or the public to determine) whether the Revised Staff Assessment's ("RSA") conditions of certification for numerous significant impacts will reduce those impacts to below a level of significance.

According to the RSA, Staff lacks the following information pertaining to biological resources:

(1) "Staff has no information from the Applicant regarding the habitat types that would be permanently and temporarily impacted by the construction of the six power poles, but infers that the six new poles and the maintenance road would be constructed within sand dune habitat."[3]

[2] 14 Cal. Code Reg. § 15378; *see also Laurel Heights Improvement Assn. v. Regents of the University of California* (1988) 47 Cal.3d 376.
[3] RSA, p. C.2-69.

(2) "Staff does not have sufficient information to revise Table 6, the summary of impacts to different habitat types, or to specify mitigation acreages for the impacts to sand dunes, Sonoran creosote scrub or state waters. Those revisions require specific information as to the extent of impacts to each habitat type."[4]

(3) Staff lacks the necessary information to analyze the impacts to biological resources from the Project's proposed distribution and telecommunications line.[5]

(4) Staff lacks the "species-specific survey results" and has "limited occurrence information" in order to accurately and adequately assess Project impacts to Couch's spadefoot toads.[6] "[H]abitat surveys in 2010 would be required to identify potential spadefoot toad breeding habitat along the linear alignment. Staff will work with the Applicant to develop the appropriate survey methods…"[7]

(5) Staff could not specifically evaluate "the potential for the Project to injure or disturb breeding or wintering golden eagles" without results from the Applicant's golden eagle inventories.[8]

(6) "Staff has little project-specific information regarding the habitat types that would be permanently or temporarily impacted by the Colorado River Substation expansion, but infers that it would be constructed within sand dune habitat…Late summer/fall botanical surveys might also reveal the presence of sensitive plant species in the vicinity of the proposed substation expansion."[9]

Although Staff reviewed *preliminary* survey information for the Colorado River substation expansion,[10] it has not yet reviewed *final* survey results and analysis. Thus, Staff recognizes that its proposed avoidance, minimization and mitigation measures (such as those described in Staff's proposed Conditions of Certification **BIO-19) "*could potentially*"** reduce Project impacts to less than

[4] Id.
[5] RSA, p. C.2-71.
[6] Id. p. C.2-86.
[7] Id.
[8] Id., p. C.2-89.
[9] Id., p. C.2-125.
[10] Id.

significant levels. Importantly, however, Staff concluded that without "site-specific information about the location of proposed project features in relation to sensitive plant species," Staff "***cannot address the feasibility*** of implementing effective avoidance measures as a means of reducing significant impacts."[11]

It appears that Staff may rely on the Solar Millennium Blythe project (09-AFC-6) ("Blythe") for analysis of impacts associated with the Colorado River Substation expansion.[12] However, the Revised Staff Assessment for the Blythe project states:

> The California Public Utilities Commission staff have asked the Energy Commission to include a permitting-level analysis of the proposed Colorado River substation expansion that is under their permitting authority. Consultants are currently preparing this report and it will be included as part of the Supplemental Staff Assessment.[13]

This analysis is not complete. Moreover, any analysis of impacts associated with the Colorado River Substation expansion must be included in the Genesis proceeding. CURE requests at least 30 days from the date of issuance of the analysis of the Colorado River Substation expansion to review and prepare any necessary testimony.

Because Staff has yet to incorporate analyses regarding the whole of the Project, facts regarding the Project's potentially significant impacts to biological resources have not yet been fully developed in the record of this proceeding. It is imprudent and a waste of the Commission's and the parties' resources to proceed to evidentiary hearings on an incomplete record. As this Committee is well aware,

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[11] Id., p. C.2-126 (emphasis added).
[12] RSA, p. C.2-126.
[13] Blythe Revised Staff Assessment, Executive Summary, pp. 12-13.

CEQA requires that conclusions regarding Project impacts and the efficacy of proposed mitigation be based on substantial evidence. Substantial evidence is defined as "*enough relevant* information and *reasonable* inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached."[14] Pursuant to sections 1723.5(a) and 1748(d) of the Commission's regulations, the Applicant has the burden to submit information in support of the Applicant's Project. Pursuant to sections 1723.5(d) and 1742, Staff must conduct environmental review of the Applicant's Project and prepare a report ***prior*** to evidentiary hearings.

At this time, the Applicant has not yet met its burden to provide the Commission with information supporting its application and Staff's report is incomplete. Thus, the parties need more time to meet their evidentiary obligations regarding the Project's impacts to biological resources and compliance with LORS, and biological resources are not ready for evidentiary hearings.

c. Cultural Resources

The record of this proceeding lacks crucial information that is necessary for the Commission to make findings regarding the Project's potentially significant impacts to cultural resources and the Project's consistency with LORS. Staff tacitly acknowledges that its analysis is incomplete. Specifically, the RSA states the following: (1) "the indirect impacts to the contributing elements of the [Prehistoric Trails Network Cultural Landscape] PTNCL have only been partially identified"; and (2) "the impacts to ethnographic resources have not yet been evaluated.

[14] *Uphold Our Heritage v. Town of Woodside* (2007) 147 Cal.App.4th 587, 596 (emphasis added).

Consequently, Staff does not know if these resources are significant, or if any mitigation is needed or appropriate."[15] However, impacts to the ancient trails network must be fully identified, impacts to ethnographic resources must be fully analyzed, and mitigation for significant impacts to ethnographic resources must be proposed ***before*** cultural resources can be adjudicated.

Furthermore, in performing its analysis, Staff relied on draft archaeological survey reports.[16] According to the BLM State archaeologist, publishing a draft report "would be tantamount to publishing a[n] incorrect document."[17] If draft archaeological survey reports are "incorrect," Staff should not base its analysis on them. Consequently, until the final archaeological survey reports are released and Staff reviews the reports and revises its analysis, Staff's assessment will be inadequate and cultural resources cannot be adjudicated. CURE requests at least 30 days from the date of issuance of a final archaeological survey report to review and prepare supplemental testimony regarding cultural resources, if necessary. Until that time, cultural resources is not ready for evidentiary hearings.

d. Socioeconomics

The RSA does not include a Socioeconomics and Environmental Justice section and states that the section will be included in the Supplemental Staff Assessment.[18] CURE requests at least 30 days from the date of issuance of the Supplemental Staff Assessment to review and prepare testimony regarding

[15] RSA, pp. C.3-2-3.
[16] RSA, p. C.3-4.
[17] Transcript for Consolidated Hearing on Issues Concerning US Bureau of Land Management Cultural Resources Data, June 9, 2010, p. 75.
[18] RSA, p. C.8-1.

socioeconomics, if necessary. Until that time, socioeconomics is not ready for evidentiary hearings.

e. Transmission System Engineering

The interconnection of the Project and other generators may require upgrades to the Southern California Edison transmission system, including an *expansion* of *the not yet built* Colorado River substation. The adjudication of the Project's reliability and its downstream transmission impacts cannot proceed until after the California Independent System Operator ("CAISO") issues the results of its Phase II Interconnection Study and the parties have had an opportunity to review its contents and to provide testimony to the Commission. The Phase II Interconnection Study will provide evidence of the reliability impacts of the proposed transmission upgrades to SCE's transmission system on which the Project will depend.

The RSA states that an analysis of Transmission System Engineering issues related to the Colorado River Substation will be included in "TSE Appendix A" which is due to be released on July 18, 2010.[19] CURE requests at least 30 days from the issuance of the TSE Appendix A to review and submit testimony on transmission system engineering, if needed.

3. Resource Areas That Are in Dispute

CURE currently disputes the following resources areas: Biological Resources, Cultural Resources, Hazardous Materials, Soil and Water Resources, and Waste Management. A brief description of the disputed issues follows:

[19] Id., p. A-10.

a. Biological Resources

There are numerous unresolved issues related to biological resources. First, the RSA fails to establish an accurate baseline to measure the Project's potentially significant impacts to special-status plants, groundwater dependent vegetation, Couch's spadefoot toad, and golden eagles. As a result, impacts have not been adequately analyzed for these species and it is impossible to determine whether proposed mitigation measures will reduce impacts to these species to below a level of significance.

Second, the RSA fails to adequately identify the Project's potentially significant impacts to numerous species including the Gila woodpecker, Nelson's bighorn sheep, burro deer, Yuma mountain lion, and Mojave fringe-toed lizards.

Third, the RSA fails to provide adequate mitigation measures for significant impacts to special-status bats, American badger, kit fox, and birds.

Finally, the Applicant's proposed changes to Staff's conditions of certification regarding impacts to wildlife from Project noise, impacts to burrowing owls, Mojave fringe-toed lizard, special-status plants, and groundwater dependent vegetation, the selection criteria for compensation lands, and impacts from the Project's use of evaporation ponds are not supported and should be rejected.

b. Cultural Resources

There are several unresolved issues related to cultural resources. First, because the Project has not complied with standard archaeological practice for CEQA compliance, there are numerous data gaps in the record. Specifically, the

Applicant has not conducted Phase II site excavations that provide information about the size, integrity and nature of individual cultural resources. Thus, Staff's significance determinations are inappropriately based on extrapolations from the Phase I survey data. Consequently, the RSA fails to adequately analyze the Project's potential adverse impacts to cultural resources and fails to identify and consider mitigation measures to reduce those impacts.

Second, Staff incorrectly assumes that all 27 archaeological resources are significant only with respect to scientific research importance. As a result, Staff also incorrectly assumes that data recovery will mitigate the sites' destruction. However, these sites may contain additional heritage values. The RSA fails to consider potential heritage values in its analysis and proposed mitigation. CEQA Guidelines state, "[p]reservation in place is the preferred manner of mitigating impacts to archaeological sites."[20] Importantly, because of the nature of an archaeological site's significance values, there are many cases where preservation in place is the only appropriate mitigation measure. Yet, Staff fails to consider this CEQA preferred mitigation measure.

Finally, Staff proposes to mitigate adverse impacts associated with the Project's destruction of archaeological sites with mechanical excavation of backhoe trenches. However, the use of backhoe trenches to excavate large and complex prehistoric sites may destroy archaeological remains. Thus, the proposed mitigation is inappropriate and inadequate.

[20] CEQA Guidelines, § 15126.4(b)2(A).

c. Hazardous Materials and Waste Management

The Project may result in potentially significant impacts from spills of heat transfer fluid ("HTF"), Therminol VP-1, a hazardous material that poses acute and chronic health hazards. HTF spills at another solar power plant operated by the same Applicant have been numerous and much larger than those analyzed in the RSA. For example, the RSA considers the need to annually treat an estimated 750 cubic yards of contaminated soil at the Project's Land Treatment Unit that would result from spilled HTF. However, HTF spills at similar facilities have been on the order of thousands of gallons.

HTF spills also involve different types of spills that were never described by the Project Applicant, may require additional Project facilities for cleanup and treatment, and involve different environmental and public health impacts that were not analyzed in the RSA. Specifically, HTF spills may result in potentially significant impacts and required mitigation from spills of free-standing HTF on top of the soil that involve clean-up in a "filtration facility" that have not been described or analyzed, and for which there is no mitigation.

In addition, the presence of benzene, a known human carcinogen, as an HTF degradation product in vapor and soil poses significant health risks that have not been analyzed or mitigated. The Applicant must be required to monitor for the presence of benzene in soil and groundwater.

Finally, an unexploded ordinance ("UXO") survey must be completed prior to Project certification. The Project is located within General Patton's World War II

Desert Training Center where military maneuvers were conducted. Specifically, the Project lies within the "gunnery range" of the Desert Training Center. The Phase I Environmental Site Assessment for the Project concluded that there is potential for UXO on the Project site and therefore, in the interest of safety, recommended a UXO screening. To date, a UXO screening has not been conducted.

d. Soil and Water Resources

The Applicant's analyses used to evaluate significant impacts to water resources in the RSA: (1) are insufficient to determine the adequacy of existing groundwater supply to meet proposed Project needs; (2) rely on an existing groundwater well data set with numerous data gaps, the uncertainties of which have not been quantified properly with respect to long-term Project water demands and available supply; (3) do not accurately account for extractions of groundwater in storage from the adjacent Palo Verde Mesa Groundwater Basin ("PVMGB") or the Colorado River; (4) erroneously assume that total groundwater in storage within the Chuckwalla Valley Groundwater Basin ("CVGB") may be considered accessible to both the proposed Project and other foreseeable projects, without proper consideration of long-term sustainability of the water supply; and (5) do not account for the uncertainty in future potential CVGB recharge and Colorado River water "accounting surface" levels resulting from prolonged drought and/or climate changes.

As a result, the Project would result in potentially significant unmitigated impacts to the CVGB water balance and to groundwater supply for both existing

and other proposed projects with the CVGB. In addition, the Project will result in significant unmitigated impacts to groundwater supply within the PVMGB and adjudicated Colorado River. Dry cooling is a feasible mitigation measure that should be required in order to reduce the Project's impacts to water resources.

In addition, in its testimony, the Applicant misinterprets and misapplies the intent and results of hydraulic modeling by the U.S. Geological Survey regarding Lower Colorado River management "accounting surface" water levels. Thus, its proposed changes to Soil & Water 15 and 19 concerning Project impacts upon the Colorado River should be rejected.

4. Witnesses, Topic Areas, Testimony

Each of CURE's proposed witnesses and a summary of their testimony is discussed below. A copy of their qualifications is attached as Exhibit A. CURE reserves the right to submit additional testimony at the evidentiary hearings.

a. Scott Cashen, M.S. (*Time estimate for direct testimony: 3 hours*)

Scott Cashen will testify on the topic area of Biological Resources. Mr. Cashen will testify regarding the Project's potentially significant impacts to and mitigation measures for numerous special-status plants, the State-threatened Gila woodpecker, Couch's spadefoot toad, a California Species of Special Concern and Bureau of Land Management sensitive species, the federally protected golden eagle, Nelson's bighorn sheep, the Mojave fringe-toed lizard, and groundwater dependent vegetation. Mr. Cashen will also testify regarding mitigation for potentially significant impacts of construction noise on birds, mitigation measures designed to

reduce wildlife hazard from evaporation ponds, mitigation for burrowing owls, and compensatory mitigation for impacts to biological resources.

b. Greg Okin, PhD (*Time estimate for direct testimony: 1 hour*)

Greg Okin will testify on the topic area of Biological Resources and Soil and Water Resources. Mr. Okin will testify regarding the Project's potentially significant hydrological impacts on vegetation, the potential impacts on erosion and soil mobilization from the Project, and mitigation measures for significant impacts from wind erosion.

c. David Whitley, PhD (*Time estimate for direct testimony: 1 hour*)

David Whitley will testify on the topic of Cultural Resources. Mr. Whitley will testify regarding significant impact determinations for archaeological resources and the identification of adequate and appropriate mitigation measures, including (but not limited to) the avoidance of resources.

d. Matthew F. Hagemann, P.G. (*Time estimate for direct testimony: 1 hour*)

Matthew Hagemann will testify on the topic areas of Hazardous Materials and Waste Management. Mr. Hagemann will testify regarding significant impacts, required analyses and mitigation for HTF spills, leaks, and Project facilities required to address HTF spills. Mr. Hagemann will also testify regarding potentially significant impacts due to unexploded ordinance from former military activities on the Project site and the mitigation measures necessary to reduce those impacts.

e. David Marcus (*Time estimate for direct testimony: 1 hour*)

David Marcus will testify on the topic area of Soil and Water Resources. Mr. Marcus will testify regarding dry cooling as a feasible mitigation measure for power plant cooling.

f. Eric D. Hendrix (*Time estimate for direct testimony: 2 hours*)

Eric Hendrix will testify on the topic area of Soil and Water Resources. Mr. Hendrix will testify regarding significant impacts associated with the Project's water use and mitigation measures for those impacts.

5. Topic Areas for Cross-Examination

CURE requires one hour of cross-examination for each of the Applicant's and Staff's witnesses presenting testimony in the following areas: Biological Resources, Cultural Resources, Hazardous Materials, Waste Management, Soil and Water Resources. At this point, it is unclear which of the Applicant's witnesses are sponsoring specific areas of testimony.

CURE also reserves the right to cross-examine witnesses in any of the other topic areas at the evidentiary hearing.

6. CURE's List of Exhibits and Request for Official

The following is CURE's tentative list of exhibits, in sequential order. CURE reserves the right to supplement this exhibit list with additional documents, analyses and other information at any time up to and including the close of the evidentiary hearings.

In addition to the exhibits enumerated below, CURE requests that the Committee take official notice pursuant to Title 20, section 1213 of the California Code of Regulations of the U.S. Bureau's of Land Management California Desert Conservation Area Plan ("CDCA"), as amended in 2002.

EXHIBIT	WITNESS	DESCRIPTION	CATEGORY
500	Scott Cashen	Testimony of Scott Cashen on Behalf of the California Unions for Reliable Energy on Biological Resources for the Genesis Solar Energy Project	Biological Resources
501	Scott Cashen	Cashen Declaration	Biological Resources
502	Scott Cashen	Cashen C.V.	Biological Resources
503	Scott Cashen	Documented occurrences of Gila woodpeckers (map)	Biological Resources
504	Scott Cashen	CalPIF monitoring sites, breeding status, and current range for the Gila Woodpecker in California (map)	Biological Resources
505	Scott Cashen	Memo to Craig Hoffman from Heather Blair (2/5/10) Re Abengoa Mojave Solar Project – time-sensitive issues and informational needs	Biological Resources
506	Scott Cashen	J. E. Pagel, D.M. Whittington, G.T. Allen, US Fish and Wildlife Service, Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (2/2010)	Biological Resources
507	Scott Cashen	Rebuttal Testimony of Scott Cashen on Behalf of the California Unions for Reliable Energy on Biological Resources for the Genesis Solar Project	Biological Resources
508	Scott Cashen	Cashen Declaration	Biological Resources
509	Greg Okin	Testimony of Greg Okin on Behalf of the California Unions for Reliable Energy on Soil and Water Resources and Biological Resources for the Genesis Solar Energy Project	Soil/Water Biological Resources
510	Greg Okin	Okin Declaration	Soil/Water Biological Resources
511	Greg Okin	Okin C.V.	Soil/Water Biological Resources
512	David Whitley	Rebuttal Testimony of David S. Whitley on Behalf of the California Unions for Reliable Energy on Cultural Resources for the Genesis Solar Energy Project	Cultural Resources
513	David Whitley	Whitley Declaration	Cultural Resources
514	David Whitley	Whitley C.V.	Cultural Resources
515		Programmatic Agreement Among The Bureau of Land Management-California, The California Energy Commission, Next Era Genesis Solar	Cultural Resources

		LLC, And The California State Historic Preservation Officer, Regarding the Next Era Genesis Ford Dry Lake Solar Project, Riverside County, California	
516		Hearing Transcript 10-CRD-1 re Consolidated Hearing on Issues Concerning BLM Cultural Resources Data (6/19/10)	Cultural Resources
517	Matthew F. Hagemann	Testimony of Matthew F. Hagemann on Behalf of the California Unions for Reliable Energy on Hazardous Materials and Waste Management of the Genesis Solar Energy Project	Hazardous Materials Waste Management
518	Matthew F. Hagemann	Hagemann Declaration	Hazardous Materials Waste Management
519	Matthew F. Hagemann	Hagemann C.V.	Hazardous Materials Waste Management
520	Matthew F. Hagemann	Spill Reports at SEGS (5/99 and 7/07)	Hazardous Materials Waste Management
521	Matthew F. Hagemann	Desert Training Center/California Maneuver Area map, identifying the Project within an area identified as a "gunnery range"	Hazardous Materials Waste Management
522	Matthew F. Hagemann	WW-II era map of the CAMA	Hazardous Materials Waste Management
523	Eric D. Hendrix	Testimony of Eric D. Hendrix on Behalf of the California Unions for Reliable Energy on Soil and Water Resources of the Genesis Solar Energy Project	Soil/Water
524	Eric D. Hendrix	Hendrix Declaration	Soil/Water
525	Eric D. Hendrix	Hendrix C.V.	Soil/Water
526	Eric D. Hendrix	Rebuttal Testimony of Eric D. Hendrix on Behalf of the California Unions for Reliable Energy on Soil and Water Resources of the Genesis Solar Energy Project	Soil/Water
527	Eric D. Hendrix	Hendrix Declaration	Soil/Water
528	David Marcus	Testimony of David Marcus on Behalf of the California Unions for Reliable Energy on Soil and Water Resources for the Genesis Solar Energy Project	Soil/Water
529	David Marcus	Marcus Declaration	Soil/Water
530	David Marcus	Marcus C.V.	Soil/Water
531	David Marcus	Dry cooling versus applicant-proposed technology chart	Soil/Water
532		MWD Comment letter to the CEC and BLM re DEIS/SA for the NextEra	Soil/Water

		Energy Resources Genesis Project and Possible California Desert Conservation Area Plan Amendment (6/15/2010)	
533		CEC Decision and Scoping Order for the Genesis Solar Energy Project (2/2/10)	Soil/Water
534		State Water Resources Control Board letter to Melissa Jones, CEC, re State Policies for Water Quality Control and their applicability to Power Plant Licensing (1/20/10)	Soil/Water
535		Steven C. Hvinden, U.S. Dept. of the Interior, memo to Holly Roberts, Bureau of Land Management re Federal Register Notice Dated November 23, 2009, Entitled Notice of Intent to Prepare Two Environmental Impact Statements/Staff Assessments for the Proposed Chevron Energy Solutions/Solar Millennium Palen and Blythe Solar Power Plants, Riverside County, CA and Possible Land Use Plan Amendments (12/21/09)	Soil/Water
536		Gerald R. Zimmerman, Colorado River Board letter to Alan H. Solomon, CEC, (3/22/10) requiring a Section 5 BCPA contractual entitlement	Soil/Water
537	Janet Laurain	Gerald R. Zimmerman, Colorado River Board letter to Janet Laurian, responding to Public Records Act request for the Blythe Solar Power Project (2/22/10)	Soil/Water
538	Janet Laurain	Solar Millennium LLC/Chevron Energy Solutions Blythe and Palen Solar Power Projects Presentation (1/6/10)	Soil/Water
539	Janet Laurain	Laurain Declaration [Re Ex. 537 and 538]	Soil/Water
540		Boulder Canyon Project Agreement Requesting Apportionment of California's Share of the Waters of the Colorado River Among the Applicants in the State (8/18/31)	Soil/Water
541		U.S. Geological Survey Update of the Accounting Surface Along the Lower Colorado River Scientific Investigations Report 2009-5113	Soil/Water

7. Scheduling Matters

CURE proposes the following schedule for the remainder of this proceeding.

PROPOSED SCHEDULE

Event	Date
Evidentiary Hearings on Soil and Water Resources, Hazardous Materials, Waste Management, and non-disputed issues	July 12-13, 2010
Staff publishes TSE Appendix A	July 18, 2010
Staff publishes Supplemental Staff Assessment	TBD
Applicant and Intervenors submit supplemental testimony on Air Quality, Biological Resources, Cultural Resources, Socioeconomics, and Transmission System Engineering	30 days after publication of the SSA or July 18, 2010, whichever is later
All parties submit supplemental rebuttal testimony	40 days after publication of the SSA or July 18, 2010, whichever is later
Parties file revised prehearing conference statements	42 days after publications of the SSA or July 18, 2010, whichever is later
Evidentiary Hearings on Air Quality, Biological Resources, Cultural Resources, Socioeconomics, and Transmission System Engineering	50 days after publication of the SSA or July 18, 2010, whichever is later
Parties File Post-Hearing Opening Briefs	4 weeks after Evidentiary Hearings on SSA/TSE Appendix A
Parties File Post-Hearing Reply Briefs	6 weeks after Evidentiary Hearings on SSA/TSE Appendix A
PMPD Issued	6-8 weeks after Evidentiary Hearings on close
Commission Hearing on PMPD	Near end of comment period on PMPD
Comments Due on PMPD	30 days after PMPD released
Revised PMPD Issued Responding to Comments	45 days after PMPD released
Comments Due on Revised PMPD	15 days after Revised PMPD released
Final Commission Decision	After comment period closes on Revised PMPD

8. Proposed Modifications to Conditions of Certification

CURE's proposed modifications to Conditions of Certification are presented in CURE's testimony.

Dated: June 25, 2010

Respectfully submitted,

/s/

Rachael E. Koss
Tanya A. Gulesserian
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
(650) 589-1660 Voice
(650) 589-5062 Facsimile
rkoss@adamsbroadwell.com

EXHIBIT A

Scott Cashen, M.S.
Senior Biologist / Forest Ecologist
3264 Hudson Avenue, Walnut Creek, CA 94597. (925) 256-9185. scottcashen@gmail.com

In his 17 years in the profession, Scott Cashen has consulted on projects pertaining to wildlife and fisheries ecology, avian biology, wetland restoration, and forest management. Because of his varied experience, Mr. Cashen is knowledgeable of the link between the various disciplines of natural resource management, and he is a versatile scientist.

Mr. Cashen's employment experience includes work as an expert witness, wildlife biologist, consulting forester, and instructor of Wildlife Management. He has worked throughout California, and he is knowledgeable of the different terrestrial and aquatic species and habitats present in the state.

Mr. Cashen is an accomplished birder and is able to identify bird species by sight and sound. His knowledge has enabled him to survey birds throughout the United States and instruct others on avian identification. Mr. Cashen's research on avian use of restored wetlands is currently being used by the United States Fish and Wildlife Service to design wetlands for specific "target" species, and as a model for other restored wildlife habitat monitoring projects in Pennsylvania. In addition to his bird experience, Mr. Cashen has surveyed for carnivores, bighorn sheep, and other mammals; special-status amphibian species; and various fish species.

PROFESSIONAL EXPERIENCE

Litigation Support / Expert Witness

Mr. Cashen serves as the biological resources expert for the San Francisco law firm of Adams Broadwell Joseph & Cardozo. He is responsible for reviewing CEQA/NEPA documents, assessing biological resource issues, preparing written comments, providing public testimony, and interfacing with public resource agencies.

REPRESENTATIVE EXPERIENCE

- Victorville 2 Solar-Gas Hybrid Power Project: Victorville, CA (338-acre natural gas and solar energy facility) – Review of CEQA equivalent documents and preparation of written documents.
- Avenal Energy Power Plant: Avenal, CA (148-acre natural gas facility) – Review of CEQA equivalent documents and preparation of written documents.
- Ivanpah Solar Electric Generating System: Ivanpah, CA (3700-acre solar facility) – Review of CEQA equivalent documents and preparation of written documents.
- Carrizo Energy Solar Farm: San Luis Obispo County, CA (640-acre solar energy facility) – Review of CEQA equivalent documents. Preparation of data requests, comments on Preliminary Staff Assessment, comments on wildlife corridor model

(CEQA equivalent documents).

- Live Oak Master Plan: Hanford, CA (390-acre housing development) – Review of CEQA documents and preparation of comment letter.
- Rollingwood: Vallejo, CA (214-unit housing development) – Review of CEQA documents and preparation of comment letter.
- Columbus Salame: Fairfield, CA (430,000 ft² food processing plant) – Review of CEQA documents and preparation of comment letter.
- Concord Naval Weapons Station: Concord, CA (5028-acre redevelopment) – Review of CEQA documents, preparation of comment letters, and provision of public testimony at County hearings.
- Chula Vista Bayfront Master Plan: Chula Vista, CA (556-acre development) – Review of CEQA documents and preparation of comment letter.
- Beacon Solar Energy Project: California City, CA (2012-acre solar facility) – Review of CEQA equivalent and NEPA documents. Preparation of data requests, comments on Preliminary Staff Assessment, comments on Incidental Take Permit Application. Expert witness providing testimony at California Energy Commission hearings.
- Solar One Power Project: San Bernardino County, CA (8230-acre solar facility) – Review of CEQA equivalent and NEPA documents and preparation of data requests. Expert witness providing testimony at California Energy Commission hearings.
- Solar Two Power Project: Imperial County, CA (6500-acre solar facility) – Review of CEQA equivalent and NEPA documents. Preparation of data requests and other documents for case record. Expert witness providing testimony at California Energy Commission hearings.
- Alves Ranch: Pittsburgh, CA (320-acre housing development) – Review of CEQA documents.
- Roddy Ranch: Antioch, CA (640-acre housing and hotel development) – Review of CEQA documents and preparation of comment letter.
- Aviano: Antioch, CA (320-acre housing development) – Review of CEQA documents.
- Western GeoPower Power Plant and Steamfield: Geyserville, CA (887-acre geothermal facility) – Review of CEQA documents and preparation of comment letter.
- Sprint-Nextel Tower: Walnut Creek, CA (communications tower in open space preserve) - Review of project documents and preparation of comment letter.

Project Management

Mr. Cashen has managed several large-scale and high profile natural resources investigations. High profile projects involving multiple resources often require consideration of differing viewpoints on how resources should be managed, and they are usually subject to intense scrutiny. Mr. Cashen is accustomed to these challenges, and he

is experienced in facilitating the collaborative process to meet project objectives. In addition, the perception of high profile projects can be easily undermined if inexcusable mistakes are made. To prevent this, Mr. Cashen bases his work on solid scientific principles and proven sampling designs. He also solicits input from all project stakeholders, and provides project stakeholders with regular feedback on project progress. Mr. Cashen's educational and project background in several different natural resource disciplines enable him to consult on multiple natural resources simultaneously and address the many facets of contemporary land management in a cost-effective manner.

REPRESENTATIVE EXPERIENCE

- Forest health improvement projects – Biological Resources *(CDF: San Diego and Riverside Counties)*
- San Diego Bark Beetle Tree Removal Project – Biological Resources, Forestry, and Cultural Resources *(San Diego Gas & Electric: San Diego Co.)*
- San Diego Bark Beetle Tree Removal Project - Forestry *(San Diego County/NRCS)*
- Mather Lake Resource Management Study and Plan – Biological Resources, Hydrology, Soils, Recreation, Public Access, CEQA compliance, Historic Use *(Sacramento County: Sacramento)*
- "KV" Spotted Owl and Northern Goshawk Inventory *(USFS: Plumas NF)*
- Amphibian Inventory Project *(USFS: Plumas NF)*
- San Mateo Creek Steelhead Restoration Project – TES species, Habitat Mapping, Hydrology, Invasive Species Eradication, Statistical Analysis *(Trout Unlimited and CA Coastal Conservancy: Orange County)*
- Hillslope Monitoring Project – Forest Practice Research *(CDF: throughout California)*
- Placer County Vernal Pool Study – Plant and Animal Inventory, Statistical Analysis *(Placer County: throughout Placer County)*
- Weidemann Ranch Mitigation Project – Mitigation Monitoring and Environmental Compliance *(Toll Brothers, Inc.: San Ramon)*
- Delta Meadows State Park Special-status Species Inventory – Plant and Animal Species Inventory, Special-status Species *(CA State Parks: Locke)*
- Ion Communities Biological Resource Assessments – Biological Resource Assessments *(Ion Communities: Riverside and San Bernardino Counties)*
- Del Rio Hills Biological Resource Assessment – Biological Resource Assessments *(The Wyro Company: Rio Vista)*

Biological Resources

Mr. Cashen has a diverse background in biology. His experience includes studies of a variety of fish and wildlife species, and work in many of California's ecosystems. Mr. Cashen's specialties include conducting comprehensive biological resource assessments, habitat restoration, species inventories, and scientific investigations. Mr. Cashen has led investigations on several special-status species, including ones focusing on the foothill yellow-legged frog, mountain yellow-legged frog, steelhead, burrowing owl, California spotted owl, northern goshawk, willow flycatcher, and forest carnivores. Mr. Cashen was responsible for the special-status species inventory of Delta Meadows State Park, and for conducting a research study for Placer County's Natural Community Conservation Plan.

REPRESENTATIVE EXPERIENCE

Avian

- Study design and Lead Investigator - Delta Meadows State Park Special-status Species Inventory *(CA State Parks: Locke)*
- Study design and lead bird surveyor - Placer County Vernal Pool Study *(Placer County: throughout Placer County)*
- Surveyor - Willow flycatcher habitat mapping *(USFS: Plumas NF)*
- Independent surveyor - Tolay Creek, Cullinan Ranch, and Gundacanal Village restoration projects *(Ducks Unlimited/USGS: San Pablo Bay)*
- Study design and Lead Investigator - Bird use of restored wetlands research *(Pennsylvania Game Commission: throughout Pennsylvania)*
- Study design and surveyor - Baseline inventory of bird species at a 400-acre site in Napa County *(HCV Associates: Napa)*
- Surveyor - Baseline inventory of bird abundance following diesel spill *(LFR Levine-Fricke: Suisun Bay)*
- Study design and lead bird surveyor - Green Valley Creek Riparian Restoration Site *(City of Fairfield: Fairfield, CA)*
- Surveyor - Burrowing owl relocation and monitoring of artificial habitat *(US Navy: Dixon, CA)*
- Surveyor - Pre-construction raptor and burrowing owl surveys *(various clients and locations)*
- Surveyor - Backcountry bird inventory *(National Park Service: Eagle, Alaska)*
- Lead surveyor - Tidal salt marsh bird surveys (*Point Reyes Bird Observatory: throughout Bay Area*)

Amphibian

- Crew Leader - Red-legged frog, foothill yellow-legged frog, and mountain yellow-legged frog surveys *(USFS: Plumas NF)*
- Surveyor - Foothill yellow-legged frog surveys *(PG&E: North Fork Feather River)*
- Surveyor - Mountain yellow-legged frog surveys *(El Dorado Irrigation District: Desolation Wilderness)*
- Crew Leader - Bullfrog eradication *(Trout Unlimited: Cleveland NF)*

Fish and Aquatic Resources

- Surveyor - Hardhead minnow and other fish surveys *(USFS: Plumas NF)*
- Surveyor - Weber Creek aquatic habitat mapping (*El Dorado Irrigation District: Placerville, CA*)
- Surveyor - Green Valley Creek aquatic habitat mapping *(City of Fairfield: Fairfield, CA)*
- GPS Specialist - Salmonid spawning habitat mapping *(CDFG: Sacramento River)*
- Surveyor - Fish composition and abundance study (*PG&E: Upper North Fork Feather River and Lake Almanor*)
- Crew Leader - Surveys of steelhead abundance and habitat use *(CA Coastal Conservancy: Gualala River estuary)*
- Crew Leader - Exotic species identification and eradication *(Trout Unlimited: Cleveland NF)*

Mammals

- Principal Investigator – Peninsular bighorn sheep resource use and behavior study (*California State Parks: Freeman Properties*)
- Scientific Advisor – Red Panda survey and monitoring methods *(The Red Panda Network: CA and Nepal)*
- Surveyor - Forest carnivore surveys *(University of CA: Tahoe NF)*
- Surveyor - Relocation and monitoring of salt marsh harvest mice and other small mammals *(US Navy: Skagg's Island, CA)*

Natural Resource Investigations / Multiple Species Studies

- Scientific Review Team Member – Member of the science review team assessing the effectiveness of the US Forest Service's implementation of the Herger-Feinstein Quincy Library Group Act.

- Lead Consultant - Baseline biological resource assessments and habitat mapping for CDF management units *(CDF: San Diego, San Bernardino, and Riverside Counties)*
- Biological Resources Expert – Peer review of CEQA/NEPA documents (*Adams Broadwell Joseph & Cardoza: California)*
- Lead Consultant - Pre- and post harvest biological resource assessments of tree removal sites *(SDG&E: San Diego County)*
- Crew Leader - T&E species habitat evaluation for BA in support of a steelhead restoration plan *(Trout Unlimited: Cleveland NF)*
- Lead Investigator - Resource Management Study and Plan for Mather Lake Regional Park *(County of Sacramento: Sacramento, CA)*
- Lead Investigator - Wrote Biological Resources Assessment for 1,070-acre Alfaro Ranch property *(Yuba County, CA)*
- Lead Investigator - Wildlife Strike Hazard Management Plan *(HCV Associates: Napa)*
- Lead Investigator - Del Rio Hills Biological Resource Assessment *(The Wyro Company: Rio Vista, CA)*
- Lead Investigator – Ion Communities project sites (*Ion Communities: Riverside and San Bernardino Counties*)
- Surveyor – Tahoe Pilot Project: CWHR validation *(University of California: Tahoe NF)*

Forestry

Mr. Cashen has five years of experience working as a consulting forester on projects throughout California. During that time, Mr. Cashen has consulted with landowners and timber harvesters on best forest management practices; and he has worked on a variety of forestry tasks including selective tree marking, forest inventory, harvest layout, erosion control, and supervision of logging operations. Mr. Cashen's experience with many different natural resources enable him to provide a holistic approach to forest management, rather than just management of timber resources.

REPRESENTATIVE EXPERIENCE

- Lead Consultant - CDF fuels treatment projects *(CDF: San Diego, Riverside, and San Bernardino Counties)*
- Lead Consultant and supervisor of harvest activities – San Diego Gas and Electric Bark Beetle Tree Removal Project *(SDG&E: San Diego)*
- Crew Leader - Hillslope Monitoring Program *(CDF: throughout California)*
- Consulting Forester – Inventory and selective harvest projects *(various clients throughout California)*

EDUCATION / SPECIAL TRAINING

M.S. Wildlife and Fisheries Science, The Pennsylvania State University (1998)

B.S. Resource Management, The University of California-Berkeley (1992)
Forestry Field Program, Meadow Valley, California, Summer (1991)

PERMITS

U.S. Fish and Wildlife Service Section 10(a)(1)(A) Recovery Permit for the Peninsular bighorn sheep

CA Department of Fish and Game Scientific Collecting Permit

PROFESSIONAL ORGANIZATIONS / ASSOCIATIONS

The Wildlife Society

Society of American Foresters

Mt. Diablo Audubon Society

OTHER AFFILIATIONS

Scientific Advisor and Grant Writer – *The Red Panda Network*

Scientific Advisor – *Mt. Diablo Audubon Society*

Grant Writer – *American Conservation Experience*

Land Committee Member – *Save Mt. Diablo*

TEACHING EXPERIENCE

Instructor: Wildlife Management, The Pennsylvania State University, 1998

Teaching Assistant: Ornithology, The Pennsylvania State University, 1996-1997

GREGORY STEWART OKIN

Department of Geography
1255 Bunche Hall
University of California
Los Angeles, CA 90095

E-mail: *okin@ucla.edu*
Cel: (310) 746-6964
Tel: (310) 825-1071
Fax: (310) 206-5976

EDUCATION

Postdoctoral Research:	Department of Geography, University of California, Santa Barbara, Mentor: Oliver A. Chadwick	2001-2002
Ph.D.	Geochemistry, California Institute of Technology Wind-Driven Desertification: Process Modeling, Remote Monitoring, and Forecasting. Thesis Advisors: Bruce Murray, William H. Schlesinger.	2001
M.S.	Geology, California Institute of Technology	1997
B.A.	Chemistry & Philosophy (Double Major), Middlebury College	1995

APPOINTMENTS AND POSITIONS

Editor, *Reviews of Geophysics*	2010 – Present
University of California, Los Angeles, Dept. of Geography, Associate Professor	2008 – Present
New Mexico State University, Dept. of Plant and Environmental Science, Adjunct	2007 – Present
University of California, Los Angeles, Dept. of Geography, Assistant Professor	2006 – 2008
University of Virginia, Dept. of Environmental Sciences, Assistant Professor	2002 – 2006
University of California, Santa Barbara, Dept. of Geography, Postdoctoral Researcher	2001 – 2002
California Institute of Technology, Div. of Geol. and Plan. Sci., Graduate Student	1995 – 2001
Middlebury College, Undergraduate Student Researcher	1994 – 1995
University of Denver, Dept. of Chemistry, Undergraduate Researcher	1994 – 1995

GRANTS AND CONTRACTS

University of California, Los Angeles (2006-present)

Jornada Basin LTER V: Landscape Linkages in Arid and Semiarid Ecosystems. (NSF-LTER). Current NSF Long Term Ecological Research grant to study desertification and remediation processes in the Chihuahuan Desert. Co-Investigator. PI: Peters. Total Grant: $4.92M.

The Effect of Sandblasting on Desert Plant Physiology. (Sol Leshin Program for Collaboration between UCLA and BGU in Plant Sciences & Social Sciences & Humanities) Grant with Haim Tsoar of Ben Gurion University to conduct experiments on sandblasting of US and Israeli plant species. PI: Okin. Total Grant: $25,000.

Determining rates of dust emission and wind erosion on US Rangelands: A National Assessment. (National Resource Conservation Service) Grant to conduct field measurements for calibration of a wind erosion model. PI: Okin. Total Grant: $150,000.

Distribution and Dynamics of Belowground Carbon in Savannas. (NSF-DEB). Grant to study belowground carbon in the Kalahari Desert of Botswana. PI: Okin. Total Grant: $700,000. Additional REU and RET supplement in 2008. Additional REU supplement in 2008-2010.

Quantifying feedbacks between groundwater decline, wind erosion, and ecological change in desert vegetation. (NSF-EAR). Grant to study vegetation change and wind erosion associated with groundwater decline in the Owens Valley of California. PI: Elmore. Total Grant ~$450,000.

Field spectroscopy in support of aeolian geomorphology, snow hydrology, and teaching at UCLA. (NSF-EAR). Grant to acquire an ASD FieldSpec portable spectroradiometer and accessories. PI: Okin. Total Grant: $89,000.

Dust Hotspots: An advanced method for characterizing desert dust sources. (UCLA FRG). Grant to use LIDAR to detect patterns of dust emission in the Chihuahuan Desert. PI: Okin. Total Grant: $10,000.

University of Virginia (2002 – 2006)

Remote Spectral Identification of Human Activities. (DOD) Grant to study the spectral signature of human activities in arid and semiarid environments with the purpose of improving remote intelligence. Grant supports UVA Ph.D. student and UCLA visiting student Cheney Shreve. PI: Okin (2005-2006), Fuentes (2006-2008). Total Grant to date: $70,000. 2006-2008

The Role of Wind Erosion in Ecosystem Change in Desert Grasslands. (NSF-DEB Ecosystem Studies) Grant to measure and model the effects of wind on nutrient loss and vegetation change in grasslands of the Southwest. PI: Okin. Total Grant: $500, 000. Includes REU Supplemental Grant in 2006. 2003-2006

Hydrological and nutrient controls on the structure and function of southern African savannas: A multi-scale approach. (NASA-IDS) Grant to assess the feedback and stability of interactions in the savanna ecosystems of southern Africa. Co-Investigator. PI: Shugart. Total Grant: $900,000 2004-2007

Feedbacks between vegetation change and dust emission in deserts: a novel observational approach. (UVA Fund for Excellence in Science and Technology) Grant to assess the use of LIDAR for landscape-scale analysis of wind erosion and dust emission. PI: Okin. Total Grant: $50,000 2005-2006

Planning Visit: Nutrient, hydrologic, and physiological controls on belowground productivity and carbon sequestration in Kalahari savanna ecosystems. Funds for visit to Botswana for planning of savanna carbon sequestration proposal. PI: Okin. Total funds: $22,000. 2005-2006

California Institute of Technology, Graduate Student (1995 – 2001)

Supercomputing Visualization Workbench. (Caltech President's Fund) Grant to develop high-performance imaging spectrometer data analysis tools. Principal grant author and research leader. PI: Murray. 1998-1999

Time Critical Observations for Arid Region Greening. (NASA-OES) Grant to collect and analyze AVIRIS data and field spectra. Principal grant author and research leader. PI: Murray. 1997-1998

FELLOWSHIPS AND AWARDS

Editors' Citation for Excellence in Refereeing for JGR-Atmospheres 2008
UCLA Academic Advancement Program Faculty Appreciation Award 2008

NASA Earth Sciences Enterprise Fellowship	1998-2000
Koons Fellowship in Geological and Planetary Sciences	1998
Conoco Fellowship in Geological and Planetary Science	1995-1996
Valedictorian, Middlebury College Class of 1995	1995
Junior Phi Beta Kappa	1994
NSF REU Fellowship, University of Denver	1994

OTHER RESEARCH EXPERIENCE

Middlebury College, Undergraduate Student (1991 – 1995)

Variable-Field Variable-Temperature Magnetic Circular Dichroism of Co(II) Monomers and Dimers. Undergraduate Chemistry Thesis. PI: Larrabee. 1994-1995

University of Denver, Undergraduate Researcher (1994 – 1995)

Laser-induced emission from NFCl radicals isolated in low-temperature argon matrices. Summer Research. Mentor: Gilbert. 1994-1995

PUBLICATIONS

Journal Articles Submitted or In Preparation

Katjiua, Mutjinde, L. Wang, P. D'Odorico, G. S. Okin, Submitted, Nutrient and water limitations in savanna vegetation along the Kalahari rainfall gradient, *Journal of Arid Environments*

Ballantine, J.A., N.M. Mahowald, G.S. Okin, T. Dunne, Submitted, Temporal and spatial influences of precipitation and landforms on low visibility in North Africa. *Journal of Geophysical Research.*

Ravi, S., P. D'Odorico, D.D. Breshears, J.P. Field, A.S. Goudie, T.E. Huxman, G.S. Okin, R.J. Swap, A.D. Thomas, S. van Pelt, J.J. Whicker, T.M. Zobeck, submitted, Aeolian processes and the biosphere: Interactions and feedback loops, *Reviews of Geophysics.*

Okin, G.S., P. D'Odorico, In Preparation, Counterintuitive effect of climate fluctuations on grass invasions in fireproof desert shrublands, *New Phytologist*

Stewart, J., A.J. Parsons, J. Wainwright, G.S. Okin, B.T. Bestelmeyer, E.L. Fredrickson, W.H. Schlesinger, In Preparation, Modelling emergent patterns of dynamic desert ecosystems as a function of changing landscape connectivity, *Ecological Modelling.*

Alvarez, L.J., H.E. Epstein, J. Li, G.S. Okin, submitted, The effects of grass reduction and increased wind erosion on photosynthesis rates of desert grassland plants. *Oecologia.*

Shreve, C.M., G.S. Okin, T.H. Painter, In Preparation, Spatial and temporal trends in fractional snow covered area and daytime land surface temperature in the Tibetan Plateau 2000-2007 using MODIS data. *Environmental Science Letters.*

Alvarez, L.J., G.S. Okin, H.E. Epstein, in preparation, Evaluation of current shear stress partitioning models in a sparsely vegetated ecosystem, *Journal of Geophysical Research-Earth Surfaces.*

Alvarez, L.J., G.S. Okin, H.E. Epstein, J. Li, in preparation, Spatial distribution of vegetation in a desert environment.

Alvarez, L.J., G.S. Okin, H.E. Epstein, J. Li, in preparation, Community responses to wind erosion.

Peer-Reviewed Journal Articles and Articles in Press

Okin, G.S., 2010. The contribution of brown vegetation to vegetation dynamics, *Ecology*, v. 91, pp. 743-755.

Estes, L.D., P.R. Reillo, A.G. Mwangi, G.S. Okin, H.H. Shugart, 2010 Remote sensing of forest structural complexity indices or habitat and species distribution modeling, *Remote Sensing of Environment*, 14, p. 792-804.

Field, J.P., J. Belnap, D.D. Breshears, J.C. Neff, G.S. Okin, J.J. Whicker, T.H Painter, S. Ravi, M.C. Reheis,

R.L. Reynolds, In Press, The ecology of dust: local- to global-scale terrestrial perspectives, *Frontiers in Ecology and the Environment.*

Myint, S.W., A. Brazel, G.S. Okin, A. Buyantuyev, In Press. Combined effects of impervious surface and vegetation cover on the urban heat island effect in a rapidly expanding desert city, *IEEE Journal of Selected Topics in Earth Observations and Remote Sensing.*

Li, J., G.S. Okin, H.E. Epstein, 2009, Effects of enhanced wind erosion on surface soil texture and characteristics of windblown sediments, *Journal of Geophysical Research-Biogeosciences, 114.*

Ravi, S., P. D'Odorico, L. Wang, C. White, G.S. Okin, S.A. Macko, S. Collins, in press, Post-fire resource redistribution in desert grasslands: A possible negative feedback on land degradation, *Ecosystems*, 12(3): 434-444.

Shreve, C.M., G.S. Okin, T.H. Painter, 2009, Introduction of a new optical snow index and validation of optical snow indices for estimating fractional snow cover in the Western Tibetan Plateau. *Journal of Glaciology*, 55(192): 737-745.

Li, J., G.S. Okin, L.J. Alvarez, and H.E. Epstein, 2009, Sediment deposition and soil nutrient heterogeneity in two desert grassland ecosystems, southern New Mexico, *Plant and Soil*, 319(1-2): 67-84..

Wang, L., P. D'Odorico, G.S. Okin, S. Macko, 2009, Isotopic composition and anion chemistry of soil profiles along the Kalahari Transect, *Journal of Arid Environments*, 73(4-5): 480-486..

Wang, L., Okin, G.S., Macko, S.A., 2009, Satellite prediction of soil $\delta^{13}C$ distributions in a southern African savanna, *Journal of Geochemical Exploration*, 102, 137-141.

Gu, J., X. Li, C. Huang, G.S. Okin, 2009, A simplified data assimilation method for reconstructing time-series MODIS NDVI data, *Advances in Space Research*, 44, 501-509.

Wang, L., G.S. Okin, K. K. Caylor, S. Macko, 2009, Spatial heterogeneity and sources of soil carbon in southern African savannas, *Geoderma*, 149, 402-408.

Okin, G. S., P. D'Odorico, and S. R. Archer, 2009, Impact of feedbacks on Chihuahuan desert grasslands: Transience and metastability, *Journal Geophysical Research - Biogeosciences*, 114, G01004, doi:10.1029/2008JG000833

Okin, G.S. A.J. Parsons, J. Wainwright, J.E. Herrick, B.T. Bestelmeyer, D.P.C. Peters, and E.L. Fredrickson, 2009, Do changes in connectivity explain desertification? *BioScience*, 59 (3): 237-244.

Mahowald, N., T.D. Jickells, A.R. Baker, P. Artaxo, C.R. Benitez-Nelson, G. Bergametti, T.C. Bond, Y. Chen, D.D. Cohen, B. Herut, N. Kubilay, R. Losno, C. Luo, W. Maenhaut, K.A. McGee, G.S. Okin, R.L. Siefert, S. Tsukuda, 2008. The global distribution of atmospheric phosphorus deposition and anthropogenic impacts, *Global Biogeochemical Cycles.* 22, GB4026, 10.1029/2008GB003240.

Myint, S., G.S. Okin, In Press, Modeling urban land covers using multiple endmember spectral mixture analysis, *International Journal of Remote Sensing.*

Elmore, A.J., J.M. Kaste, G.S. Okin, M.S. Fantle, 2008. Groundwater influences on atmospheric dust generation in deserts, *Journal of Arid Environments*, 72(10), 1753-1756.

Marshall, J.D., J.M Blair, D.P.C. Peters, G.S. Okin, A. Rango, M. Williams, 2008, Predicting and understanding ecosystem responses to climate change at continental scales, *Frontiers in Ecology and the Environment*, 6(5) pp 273-280. doi: 10.1890/070165

Li, J., G.S. Okin, L.J. Alvarez, and H.E. Epstein, 2008, Effects of wind erosion on the spatial heterogeneity of soil nutrients in two desert grassland communities, *Biogeochemistry*, 8(1) pp. 73-88, 10.1007/s10533-008-9195-6.

Okin, G.S., N. Mladenov, L. Wang, D. Cassel, K. K. Caylor, and S. Ringrose, 2008, Spatial patterns of soil nutrients in two southern African savannas, *JGR-Biogeosciences, 113:G02011.*

Estes, L.D., G.S. Okin, A.G. Mwangi, H.H. Shugart, 2008, Identifying a large forest herbivore's habitat: a multi-scale approach combining field data and imagery from four sensors, *Remote Sensing of Environment*, 112: 2033-2050.

Okin, G. S., 2008, A new model of wind erosion in the presence of vegetation, Journal of Geophysical Research-Earth Surface, 113, F02S10, doi:10.1029/2007JF000758.

Ravi, S., D'Odorico, P., and G.S. Okin, 2007, Hydrologic and aeolian controls on vegetation patterns in arid

landscapes, *Geophysical Research Letters*, 34, L24S23, doi:10.1029/2007GL031023.

D'Odorico, P., K.K. Caylor, G.S. Okin, T.M. Scanlon, 2007, On soil moisture-vegetation feedbacks in dryland plant ecosystems, *JGR-Biogeosciences, 112*, G04010, DOI: 10.1029/2006JG000379

Li, J., G.S. Okin, L.J. Alvarez, and H.E. Epstein, 2007, Quantitative assessment of wind erosion and soil nutrient loss in desert grasslands of the southwestern United States, *Biogeochemistry*, 10.1007/s10533-007-9142-y, 85(3) 317-332.

Diekmann, L., D. Lawrence, and G.S. Okin, 2007. Changes in the spatial variation of soil properties following shifting cultivation in a Mexican dry tropical forest, *Biogeochemistry*, 10.1007/s10533-007-9107-1.

Okin, G.S., 2007, Relative Spectral Mixture Analysis - a multitemporal index of total vegetation cover, *Remote Sensing of Environment*, 106(4), 467-479.

Wang, L., G.S. Okin, J. Wang, H.E. Epstein, and S. Macko, 2007, Predicting ^{15}N concentration from Reflectance Spectra (400-2500 nm) at Leaf and Canopy Scales, *Geophysical Research Letters*, 35, L02401, doi:10.1029/2006GL028506

Scull, P. and G.S. Okin, 2007, Sampling challenges posed by continental scale soil landscape modeling, *Science of the Total Environment*, 372, 645-656.

McGlynn, I.O., and G.S. Okin, 2006, Characterization of shrub distribution using high spatial resolution remote sensing: ecosystem implication for a former Chihuahuan Desert grassland. *Remote Sensing of Environment*, 101, 554-566.

Ravi, S., T.M. Zobeck, T.M. Over, G.S. Okin, and P. D'Odorico, 2006, On the effect of wet bonding forces in air-dry soils on threshold friction velocity of wind erosion, *Sedimentology*, doi: 10.1111/j.1365-3091.2006.00775.x,

Okin, G.S., D.A. Gillettte, and J.E. Herrick, 2006, Multi-scale controls on and consequences of aeolian processes in landscape change in arid and semiarid environments, *Journal of Arid Environments*, 65, 253-275.

Mahowald N.M, P.E. Artaxo, A.R. Baker, D. Jickells, G.S. Okin, J.T. Randerson, and A.R. Townsend, 2005. Impacts of biomass burning emissions and land use on Amazonian atmospheric phosphorus cycling and deposition, *Global Biogeochemical Cycles*, 19, No. 4, GB4030, 10.1029/2005GB002541.

Scull, P., G. Okin, O.A. Chadwick, and J. Franklin, 2005. A comparison of methods to predict soil surface texture in an alluvial basin, *Professional Geographer*, 57(3), 423-437.

Ballantine, J.A.C., G. S. Okin, D.E. Prentiss, and D.A. Roberts, 2005. Mapping North African landforms using continental-scale unmixing of MODIS imagery, *Remote Sensing of Environment*, 47(4) 470-483.

Okin, G.S., 2005. Dependence of wind erosion on surface heterogeneity, *Journal of Geophysical Research*, 110, D11208.

Okin, G.S., and T.H. Painter, 2004, Effect of grain size on spectral reflectance of sandy desert surfaces, *Remote Sensing of Environment*, 89(3) pp 272-280.

Okin, G.S., N. M. Mahowald, O.A. Chadwick, P.E. Artaxo, 2004, The impact of desert dust on the biogeochemistry of phosphorus in terrestrial ecosystems, *Global Biogeochemical Cycles*, 18(2), 10.1029/2003GB002145.

Okin, G.S., and M.C. Reheis, 2002, An ENSO predictor of wind erosion and dust emission in the southwest United States: *Geophysical Research Letters*. V 29, no. 9. 10.1029/2001GL014494.

Okin, G.S., W.J. Okin, B. Murray, and D.A. Roberts, 2001, Practical limits on hyperspectral vegetation discrimination in arid and semiarid environments: *Remote Sensing of Environment*, v. 77, 212-225.

Okin, G.S., and D.A. Gillette, 2001, Distribution of vegetation in wind-dominated landscapes: Implications for wind erosion modeling and landscape processes: *Journal of Geophysical Research*, v. 106, 9673-9683.

Okin, G.S., W.H. Schlesinger, and B. Murray, 2001, Degradation of Sandy Arid Shrubland Environments: Observations, process modeling and management implications: *Journal of Arid Environments*, v. 47, 123-144.

Gilbert, J.V., and G.S. Okin, 1995, Laser-induced emission from NFCl radicals isolated in low-temperature argon matrices, *Journal of Physical Chemistry*, v. 99, p. 11365-11369.

Larrabee, J.A., C.M. Alessi, E.T. Asiedu, J.O. Cook, K.R. Hoeming, L.J. Klingler, G.S. Okin, S.G. Santee, and T.L. Volkert, 1997, Magnetic circular dichroism spectroscopy as a probe of geometric and electronic structure of Cobalt(II)- substituted proteins: Ground-state zero-field splitting as a coordination number indicator, *Journal of the American Chemical Society*, v. 119, p. 4182-4196.

Mulinax, R.L., G.S. Okin, and R.D. Coombe, 1995, Gas-Phase synthesis, structure, and dissociation of boron triazide, *Journal of Physical Chemistry*, v. 99, p. 6294-6300.

Refereed Book Chapters

Wang, L., G.S. Okin, S.A. Macko, In Press, Remote sensing of nitrogen and carbon isotopic composition in terrestrial ecosystems in *Isoscapes*, Springer Netherlands.

Okin, G.S., 2002, Toward a Unified View of Biophysical Land Degradation Processes in Arid and Semi-arid Lands, in *Global Desertification: Do Humans Cause Deserts?* J.F. Reynolds & D.M. Stafford Smith, eds. Dahlem University Press, Berlin, pp. 95-109.

Robbins, P.F., N. Abel, H. Jiang, M. Mortimore, M. Mulligan, G.S. Okin, D.M. Stafford Smith, B.L. Turner II, 2002, Desertification at the community scale: sustaining dynamic human-environment systems in *Global Desertification: Do Humans Cause Deserts?* J.F. Reynolds & D.M. Stafford Smith, eds. Dahlem University Press, Berlin, pp. 326-355.

Okin, G.S., B. Murray, and W.H. Schlesinger, 2001, Desertification in an arid shrubland in the southwestern United States: Process modeling and validation, *in Land Degradation: Papers Selected from Contributions to the Sixth meeting of the International Geographical Union's Commission on Land Degradation and Desertification, Perth, Western Australia, 20-28 September 1999*, pp. 53-70, edited by A. Conacher, Kluwer Academic Publishers, Dordrecht.

Unrefereed Book Chapters

Li, J. and G.S. Okin, in press, Carbon and nitrogen dynamics with enhanced wind erosion-Model evaluation and prediction in *Title TBD*, Nova Publishers.

Hartley A.E., N. Barger, J. Belnap, G.S. Okin. 2007. Nutrient Cycling in Dryland Ecosystems. In: Marschner P, Rengel Z (eds) Nutrient Cycling in Terrestrial Ecosystems. Soil Biology Series. Springer Verlag.

Okin, G.S., and D.A. Gillette, 2004, Modelling wind erosion and dust emission on vegetated surfaces *in Spatial Modelling of the Terrestrial Environment* R. Kelly, N. Drake, and S. Barr, eds, John Wiley and Sons, pp. 137-156.

Okin, G.S. and D. A. Roberts, 2004, Remote Sensing in Arid Environments: Challenges and Opportunities, *in Manual of Remote Sensing, Remote Sensing for Natural Resource Management and Environmental Monitoring*, Volume 5, S. Ustin, ed., John Wiley and Sons, New York.

Other Publications

Epstein, H.E., G.S. Okin, J. Li, L.J. Alvarez, 2009 Wind erosion and ecosystem consequences following vegetation removal in a Chihuahuan Desert grassland, *Newsletter of the Global Land Project International Project Office*, n. 5, June 2009, pp. 3 – 4.

INVITED PRESENTATIONS

Okin, G.S., New Perspectives on Desertification, August 31, 2009, Univ. Eduardo Mondlane, Dept. of Forestry Engineering.

Okin, G.S., Connectivity and Ecohydrological Feedbacks in Desertification, AGU Chapman Conference on Examining Ecohydrological Feedbacks of Landscape Change along Elevation Gradients in Semiarid Regions, Sun Valley, Idaho, October 5 – 9, 2009.

Okin, G.S. Aeolian Geomorphology: a lesson in scaling, Civil and Environmental Engineering, UCLA, January 20, 2009.

Okin, G.S. Wind as a geomorphic agent: "Connecting" aeolian studies with hillslope hydrology, January 16, 2009, Smith Lecture Series in the Department of Geological Sciences, University of Michigan, Ann Arbor, MI.

Wang, L. and G.S. Okin, Earth system understanding through the use of satellite products, April 8-10, 2007, Isoscapes 2008, Santa Barbara, CA.

Okin, G.S. Deserts as exemplars of the importance of connectivity in geomorphology, February 4, 2008, UCLA Earth and Space Sciences.

Okin, G.S. Wind erosion in the presence of nonerodible elements, April 12, 2007, Division of Geological and Planetary Sciences, California Institute of Technology.

Okin, G.S., Transport in a "dead world?" The importance of aeolian processes in desertification, March 9, 2007, Geography Department Seminar, Indiana University, Bloomington, IN.

Okin, G.S., Wind erosion in the presence of vegetation, February 9, 2007, Geology Department seminar, University of Texas, El Paso, TX.

Okin, G.S., Wind erosion feedbacks to desertification, February 8, 2007, Earth System seminar, University of Texas, El Paso, TX.

Okin, G.S. Aeolian processes in deserts, UCLA Eos Seminar, November 13, 2007, Los Angeles, CA.

Okin, G.S., Aeolian processes can create islands of fertility, Jornada LTER Research Symposium, July 13, 2006, Las Cruces, NM.

Okin, G.S., J. Li, L Hartman, H.E. Epstein, Impact of Aeolian Processes on Soil Surface Resource Distribution, AAG Annual Meeting, 2006.

Mahowald, N., D. Muhs, S. Levis, M. Yoshioka, P. Rasch, C. Zender, G. Okin, and T. Painter, Deposition changes in the past and the future, AGU Fall Meeting, 2005.

Mladenov, N., G. S. Okin, D. Cassel, and K.K. Caylor, Geostatistical analyses reveal nutrient-vegetation relationships in savanna soils, AGU Fall Meeting, 2005.

Hartman, L., G.S. Okin, H.E. Epstein, J. Li, Interactions among wind erosion, vegetation, and dust flux in the Jornada Experimental Range, Jornada Research Symposium, July 14, 2005, Las Cruces, NM.

Okin, G.S., T.H. Painter, 2005, Grain size effects on spectral reflectance of desert soil surfaces, Desert Trafficability Workshop, Winthrop, Washington, January 21-23.

Okin, G.S., 2004, Deserts: The Cradle of Civilization, University of Virginia, Department of Environmental Sciences Undergraduate Seminar.

Okin, G.S., 2004, The role of spatial heterogeneity in modeling wind erosion, Boulder, CO.

Okin, G.S., 2004, The role of wind erosion in ecosystem change, Jornada LTER Research Symposium, Las Cruces, NM.

Okin, G.S., 2004, Blowing in the Wind, Harvard University Department of Earth and Planetary Sciences.

Okin, G.S., 2004, Multiscale Controls on Wind Erosion and Dust Emission, University of Arizona Department of Soil, Water, and Environmental Sciences.

Okin, G.S., 2004, Multiscale Controls on Wind Erosion and Dust Emission, University of California, Santa Barbara, Department of Geography.

Okin, G.S., 2004, Spatially explicit stochastic modeling of wind erosion and dust emission. Geological Society of America, Washington, D.C.

Okin, G. S., N. Mahowald, O.A. Chadwick, P. Artaxo, 2003. The Influence of Desert Dust on the Biogeochemistry of Phosphorus in Terrestrial Ecosystems, The Soil Science Society of America Annual Meeting, Denver, CO.

Okin, G. S., 2002, Land use, land cover change, and desert dust, 2nd IANABIS workshop, San Luis Potosi, Mexico.

OTHER PROFESSIONAL PRESENTATIONS (Incomplete List)

Ribeiro, N., G.S. Okin, H.H. Shugart, R.J. Swap, the influence of rainfall, vegetation, elephants and people on fire frequency of miombo woodlands, northern Mozambique, IGARSS 2009, July 13-17, 2009, Cape Town, South Africa

Ravi S., P. D'Odorico, S.L. Collins, C. White, G.S. Okin, S. Macko, and L. Wang, Aeolian processes at the plant-interspace scale: Implications for patch dynamics, Ecological Society of America Annual Meeting, Milwaukee, WI, August 3 – 8, 2008.

Hewins, D.B., H.L. Throop, S.R. Archer, G.S. Okin, Soil-litter mixing enhances decomposition rates in a Chihuahuan Desert grassland Ecological Society of America Annual Meeting, Milwaukee, WI, August 3 – 8, 2008.

Herrick, J.E., D.P.C. Peters, N.K. Hansen, J.C. Ritchie, H.C. Monger and G.S. Okin, 2008, Application of soil physical models to predict soil deposition effects on plant establishment, Ecological Society of America Annual Meeting, Milwaukee, WI, August 3 – 8, 2008.

Wainwright, J. A.J. Parsons, J. Stewart, G.S. Okin, L. Tumbull, R.E. Brazier, Ecogeomorphology and Scale: Desertification due to Woody Shrub Encroachment in the US Southwest, 7th International Conference on Geomorphology (IAG), Melbourne, Australia, July 6 – 11, 2009.

Ravi, S., P. D'Odorico, L. Wang, S.L. Collins, C.S. White, G.S. Okin, 2008, Resource homogenization in degraded arid landscapes induced by fire-erosion interactions, American Geophysical Union, Fall Meeting.

Vest, K.R., A.J. Elmore, G.S. Okin, 2008, Wind erosion and vegetation structure in groundwater affected plant communities, American Geophysical Union, Fall Meeting.

Ballantine, J.C., N.M. Mahowald, G.S. Okin, 2008, The influence of source landforms, antecedent precipititation, and windspeed on dust events in North Africa, American Geophysical Union, Fall Meeting.

Shreve, C.M., G.S. Okin, 2008, Spatiotemporal dynamics of snow cover in the western Tibetan Plateau using a MODIS derived fractional snow cover index, American Geophysical Union, Fall Meeting.

Ribeiro, N.S., G.S. Okin, H.H. Shugart, and R.J. Swap, 2008, The influence of rainfall, vegetation, elephants and people on fire frequency of Miombo woodlands, northern Mozambique, American Geophysical Union, Fall Meeting.

Okin, G.S., A.J. Parsons, J. Wainwright, J.E. Herrick, B.T. Bestelmeyer, D.P.C. Peters, E.L. Fredrickson, 2008, Do changes in connectivity explain desertification?, American Geophysical Union, Fall Meeting.

Stewart, J., J. Wainwright, A.J. Parsons, G.S. Okin, B.T. Bestelmeyer, E.L. Fredrickson, W.H. Schlesinger, 2008, Dynamics and resilience of desert ecosystems under changing climate, American Geophysical Union, Fall Meeting.

Mahowald, N.M. et al. Human perturbation to atmospheric phosphorus, American Geophysical Union, Fall Meeting.

Herrick, J.E., D.P.C. Peters, B.T. Bestelmeyer, G.S. Okin, N.K. Hansen and K.M. Havstad, Predicting soil erosion and deposition effects on plant establishment: a key to increasing restoration success, Joint VIII IRC / XXI IGC Congress, Hohhot, Inner Mongolia, China 29 June 2008.

D'Odorico, P., G.S. Okin, Ecohydrological feedbacks and ecosystem stability at the desert margins, International workshop on environmental changes and sustainable development in arid and semiarid regions, Alashan Left Banner (Bayinhaote) Inner Mongolia, China, September 10-17, 2007.

Okin, G.S., The key role of landscape connectivity in desertification, International workshop on

environmental changes and sustainable development in arid and semiarid regions, Alashan Left Banner (Bayinhaote) Inner Mongolia, China, September 10-17, 2007.

Ravi, S., P. D'Odorico, L. Wang, C.S. White, S.L. Collins, G.S. Okin, Hydrological and aeolian controls in the dynamics of "resource islands" in fire-prone arid landscapes, International workshop on environmental changes and sustainable development in arid and semiarid regions, Alashan Left Banner (Bayinhaote) Inner Mongolia, China, September 10-17, 2007.

Wainwright, J., A.J. Parsons, J. Stewart, G.S. Okin, L. Turnbull, E.N. Mueller, Holistic approaches to a patchy problem: ecohydrological interactions in desertification, British Ecological Society Annual Meeting, University of Edinburgh, September 10-12, 2007.

Ravi, S., P. D'Odorico, G.S. Okin, 2007, Hydrologic and aeolian controls on vegetation patterns in arid landscapes, ESA/SER Joint Meeting, San Jose, CA, August 5 – 10.

Wang, L., G.S. Okin, and S. Macko, 2007, Spatial heterogeneity of soil $\delta^{13}C$ and $\delta^{15}N$, ESA/SER Joint Meeting, San Jose, CA, August 5 – 10.

Ravi, S., P. D'Odorico, G.S. Okin, 2007, Hydrologic and aeolian controls on vegetation patterns in arid landscapes, 2007 AGU Joint Assembly, Acapulco, Mexico, May 22-25.

Caylor, K.K., P. D'Odorico, G.S. Okin, 2007, Evidence and implications of soil moisture-vegetation feedbacks in semiarid savannas, 2007 AGU Joint Assembly, Acapulco, Mexico, May 22-25.

Myint, S., G.S. Okin, 2007, Quantifying impervious surfaces in the Phoenix metropolitan area using multiple endmember spectral mixture analysis, American Association of Geographers Annual Meeting, April 17 – 21, San Francisco, CA.

Okin, G.S., I.O. McGlynn, D.A. Gillette, 2006, A new model for representation of nonerodible elements in wind erosion studies, International Conference on Aeolian Research (ICAR) VI, July 24-28, University of Guelph, Guelph, Ontorio, Canada.

Li, J., G.S. Okin, L. Hartman, H.E. Epstein, 2006, Impacts of Wind Erosion on the Distribution of Soil Nutrients in Desert Grasslands, International Conference on Aeolian Research (ICAR) VI, July 24-28, University of Guelph, Guelph, Ontorio, Canada.

Ballantine, J.A., G.S. Okin, 2006, The influence of landforms on dust generation in North Africa, International Conference on Aeolian Research (ICAR) VI, July 24-28, University of Guelph, Guelph, Ontorio, Canada.

Li, J., G.S. Okin, L. Hartman, H.E. Epstein, 2006, Changes in Soil Nutrients in Response to Wind Erosion in Desert Grasslands of the Southwestern United States, LTER All-Scientists Meeting (ASM), September 20-23, Estes Park, CO.

Hartman, L.J., H.E. Epstein, J. Li, G.S. Okin, 2006, Wind erosion and vegetation interactions in a desert ecosystem, American Geophysical Union, Fall Meeting.

Li, J., G.S. Okin, L. Hartman, H.E. Epstein. Impacts of Wind Erosion on the Characteristics of Sand and Dust Flux in Southern New Mexico. American Geophysical Union Fall Meeting, San Francisco, CA, Dec. 2006.

Hartman, L.J., H.E. Epstein, G.S. Okin, J. Li, 2006, Wind erosion and vegetation interactions in a desert ecosystem. Ecological Society of America Annual Meeting, Aug. 2006.

Mahowald N.M, P.E. Artaxo, A.R. Baker, D. Jickells, G.S. Okin, J.T. Randerson, A.R. Townsend, Impacts of biomass burning emissions and land use on Amazonian atmospheric phosphorus cycling and deposition, American Geophysical Union, Fall Meeting, 2005.

Ballantine, J.A.C., G.S. Okin, and N. M. Mahowald, Meteorological conditions during extreme dust events in North Africa, American Geophysical Union, Fall Meeting, 2005.

McGlynn, I.O., G. S. Okin, J. Li, L. Hartmann, The Importance of Spatial Connectivity in Wind Erosion, American Geophysical Union, Fall Meeting, 2005.

Li, J., G. Okin, L. Hartman and H. Epstein, Depletion and Redistribution of Soil Nutrients in Response to Wind Erosion in Desert Grasslands of the Southwestern United States, American Geophysical Union, Fall Meeting, 2005.

Ballantine, J. A. C. and G.S. Okin, 2005, The conditions associated with dust storm generation in North Africa, GSA Abstracts with Programs, Vol 37, No 7. GSA Fall Meeting, Salt Lake City, UT.

Scull, P. and G.S. Okin, 2005, A comparison of two proposed sampling strategies designed to perform a geochemical soil survey of North America, American Association of Geographers Annual Meeting, 5 – 9 April, Denver, Colorado.

Ravi, S., T.M. Zobeck, T.M Over, G.S. Okin, P. D'Odorico, 2005, The wet bonding forces in soils and their effect on threshold friction velocity of wind erosion, European Geosciences Union General Assembly, 2-7 April, Vienna, Austria.

Li, J. and G.S. Okin, 2005, Soil Nutrient Distribution in Response to Wind Erosion in a Desert Grassland, 20th Annual Department of Environmental Sciences Student Research Symposium, University of Virginia. *Winner Best Ph.D. Research Presentation.*

Li, J. and G.S. Okin, 2004, Soil Nutrient Distribution in Response to Wind Erosion in a Desert Grassland, Soil Science Society of America Fall Meeting, Seattle, WA.

Okin, G.S., 2003, The role of spatial heterogeneity in dust and nutrient emission in deserts. American Geophysical Union, Denver, CO.

J.A. Ballantine, G.S. Okin, D.A. Roberts, N. Mahowald, 2003, Identifying potential dust sources in North Africa and modeling patterns of emissions from these sources, American Geophysical Union, San Francisco, CA. *Winner Excellent Student Presentation.*

Okin, G.S., 2003, Stochastic Modeling of Desert Dust Emission: Bridging the scale gap, Geological Society of America, Denver, CO.

Reynolds, R. P. Chavez, Jr., M. Reheis, T. Gill, G. Clow, R. Forester, J. Yount, H. Goldstein, F. Urban, R. Fulton, and G.S. Okin, 2003, Sources, transport paths, and impacts of atmospheric dust in the American Southwest, 2nd Workshop on Mineral Dust, Paris.

Okin, G. S., D.A. Roberts, 2002, Discrimination of invasive species in a South African semiarid landscape with Hyperion, The 10th Annual AVIRIS Workshop, Jet Propulsion Laboratory, Pasadena, California.

Okin, G. S. and D.A. Gillette, 2002, Spatially explicit regional wind erosion and dust emission modeling: Incorporating large- and small-scale variability. 5th ICAR Conference, Lubbock, Texas.

Okin, G.S., 2001, Identification of areas of potential wind erosion in the Sandveld, South Africa, Understanding future dryland changes from past dynamics, IGCP 413 Workshop, Upington, South Africa.

Okin, G.S. and Reheis, M.C., 2001, Determining Climate Thresholds for Wind Erosion in the Mojave Desert: Using ENSO-Related Interannual Variability to Assess Potential Desertification, COMLAND Conference, Institute de Geografia, UNAM, Mexico City, Mexico.

Okin, G. S., 2001, Evaluating Vulnerability to Wind-driven Desertification by Combining Hyperspectral and Multispectral Data Analysis, IGBP Open Science Conference, Amsterdam.

Reheis, M.C., G.S. Okin, 2000, A 15-Year Record of Relations Among ENSO, Potential Wind Erosion, and Dust Deposition in the Western Mojave Desert: Potential Applications to Land Use Planning, Understanding future dryland changes from past dynamics, IGCP 413 Workshop, Desert Studies Center, Zzyzx, California.

Okin, G.S., D.A. Roberts, 2000, Linear unmixing of simulated, noisy spectra: vegetation detection limits in areas of low cover, *in* Green, R.O., ed., The 2000 AVIRIS Workshop: Pasadena, California, Jet Propulsion Laboratory.

Okin, G.S., H. Siegel, J. Collier, C.D. Miller,W.J. Okin, D.A. Roberts, B. Murray, D.W. Curkendall, T.H. Painter, 1999, The Supercomputing Visualization Workbench for the classification and analysis of AVIRIS data, *in* Green, R.O., ed., The 1999 AVIRIS Workshop: Pasadena, California, Jet Propulsion Laboratory.

Okin, W.J., G.S. Okin, D.A. Roberts, and B. Murray, 1999, Multiple Endmember Spectral Mixture Analysis: Endmember choice in an arid shrubland, *in* Green, R.O., ed., The 1999 AVIRIS Workshop: Pasadena, California, Jet Propulsion Laboratory.

Okin, G.S., 1999, Advanced Remote Sensing of Semiarid Grasslands, Friends of the Jornada Symposium, New Mexico State University, Las Cruces, New Mexico.

Okin, G.S., W.J. Okin, D.A. Roberts, B. Murray, 1999, Mobilized Sand in an Arid Shrubland: Mapping Anthropogenic Land Cover Change with AVIRIS, American Geophysical Union, Fall Meeting.

Okin, G.S., B. Murray, W.H. Schlesinger, 1999, Desertification in an Arid Shrubland in the Southwestern US: Process Modeling and Validation, COMLAND Conference on Land Degradation and Desertification, Perth, Australia.

Okin, G.S., 1998, A nascent model of desertification in the hyperarid Mojave: Impact of aeolian sand mobilization and crust destruction, Jornada LTER Research Symposium, New Mexico State University, Las Cruces, New Mexico.

Okin, G.S., W.J. Okin, D.A. Roberts, and B.C. Murray, 1998, Multiple endmember spectral mixture analysis: application to an arid/semi-arid landscape, *in* Green, R.O., ed., 7th JPL Airborne Earth Science Workshop: AVIRIS, Volume 1: Jet Propulsion Laboratory, Pasadena, CA, Jet Propulsion Laboratory, Pasadena, CA, p. 291-300.

Okin, G.S., M.M. Tice, S.H. Bauknight, T.W. Ray, B. Murray, 1997, Arid Land Degradation Processes and Monitoring in the Mojave: A Progress Report, Desert Research Symposium, San Bernardino County Museum, San Bernardino, California.

Okin, G.S., 1997, Towards Sustainable Land Use: Leading Desertification Indicators, Western Geography Graduate Student Conference, Tucson, Arizona.

TEACHING EXPERIENCE

University of California, Los Angeles

Earth's Physical Environment (GEOG 1)	Fall, 2006-8
Soils and Environment (GEOG/EEB/ENVIRO 127)	Winter, 2007-9
Modeling the Environment (GEOG 166)	Spring, 2008-9
Remote Sensing of Environment (GEOG 269)	Winter, 2008

University of Virginia

Physical Geology	Spring, 2003 & 2004
Introduction to Remote Sensing	Fall, 2003 & 2004
Advanced Remote Sensing	Spring, 2004 & 2005
Remote Sensing	January, 2005
Two-week short course on the physics and techniques of remote sensing	
Soils and Geomorphology	Spring, 2005

California Institute of Technology

Teaching Assistant (Earth as a Planet, Mineral Spectroscopy, Global Biogeochemical Cycles, Radioisotope Geochemistry, Terrestrial Surface Systems)

STUDENTS

Committee Chair: Kebonyethata Dintwe (M.A., in progress), Marie Javdani (Ph.D., in progress), Patrick Kahn (Ph.D., in progress), Junran Li (Ph.D., 2008), Ian McGlynn (M.S., 2006), Chency Shreve (UVA, Ph.D., i2009), David Rachal (NMSU Plant and Environmental Sciences, Ph.D., in progress)
Committee Member: Anne Priest (UVA M.S., 2005), James Eaton (UVA M.S., 2004), Lucy Diekmann (UVA M.S., 2003), Sujith Ravi (UVA M.S., 2004; Ph.D. 2008), Natasha Ribeiro (UVA Ph.D., 2007), Mike O'Connell (UVA Ph.D., 2009), Lyndon Estes (UVA Ph.D, 2008), Lorelei Alvarez (UVA Ph.D., in progress), Will Hobbs (UCLA Geography Ph.D. 2009), Jelena Tomic (UCLA ESS, Ph.D. in progress), Travis Brooks (UCLA EEB, Ph.D. in progress), Paul Levine (UCLA Geography, Ph.D. in progress), Vena Chu (UCLA Geography, M.S., 2009), Dayna Quick (UCSB, Geography, Ph.D., in progress), Keith Gaddis (UCLA EEB, Ph.D., In Progress)
Undergraduate Thesis Students: Allen Smith (UVA 2003-4), David Cassel (UVA 2005-6)

SERVICE ACTIVITIES

University of California, Los Angeles
- Geography Department
  - Graduate Affairs Committee — 2006-present
- University Service
  - Reviewer, ISR Summer Fellowships
  - Member, Faculty advisory committee, Stunt Ranch Santa Monica Reserve — 2007-present
  - Member, Environmental Science Major Oversight Committee — 2008-present
  - Member, Faculty advisory committee, ISR — 2009-present
  - Member, Center for Tropical Research — 2008-present
  - Panelist, "Negotiation skills for academic careers", UCLA Career Center, March 17 — 2007
  - Panelist, "Mastering the academic interview", UCLA Career Center, October 26 — 2006

University of Virginia, Department of Environmental Sciences
- Departmental Committees
  - Graduate admissions — 2002-2005
  - Distinguished Majors Program — 2002-2004
  - Undergraduate academic requirements committee (UGARC) — 2002-2005
  - Computing — 2003-2005
  - Graduate academic requirements committee (GARC) — 2004-2005
- University Service
  - Undergraduate Academic Advisor — 2002-2004
  - Faculty Associate, Center for South Asian Studies — 2002-2005
  - Faculty Associate, Center for East Asian Studies — 2002-2005
  - Member, Friends of the LGBT Resource Center Board — 2005-2006
  - Member, LGBT Resource Center Advisory Board — 2005-2006

Service to the Profession
- Member, UN/GESAMP Working Group (38) on The Atmospheric Input of Chemicals to the Ocean — 2008-present
- Co-convener special session on "Dynamics and interactions of belowground carbon pools in dryland ecosystems", AGU Joint Assembly, Acapulco, Mexico — 2007
- Co-convener special session on "Soil-Water-Nutrient Interactions With Savanna Vegetation", AGU Fall Meeting — 2005
- Co-convener special session on "Intracontinental Mass and Energy Transport Between Alpine and Desert Ecosystems", AGU Fall Meeting — 2005

Co-convener special session on "Ecosystem Effects of Dust Deposition", AGU Fall Meeting	2003
Task force on wind erosion, International Geographic Union, Commission on Land Degradation	1997-2004
Member, Geological Society of America	2001-present
Member, American Geophysical Union	1997-present
Member, American Association of Geographers	2005-present
Member, Soil Science Society of America	2006-present

SYNERGISTIC ACTIVITIES

Development of the UCLA IMAGE laboratory An innovative multidisciplinary laboratory for research and teaching	2009-present
UCLA Environmental Science Major Oversight Committee Participate in curricular decisions for this new multi-displinary major at UCLA	2008-present
Faculty advisory committee, Stunt Ranch Santa Monica Reserve Participate in research, training, and educational decisionmaking for this UC Reserve	2007-present
Development of Relative Spectral Mixture Analysis A new MODIS-based phenological remote sensing technique	2007-present
Panelist, UCLA Career Center "Negotiation skills for academic careers", "Mastering the academic interview"	2006-2007

David S. Whitley, Ph.D., RPA
Principal/Principal Archaeologist

Total Years of Experience: 35 years

Education:

Ph.D.	1982/Anthropology/University of California, Los Angeles
M.A.	1979/Geography/University of California, Los Angeles
B.A.	1976/Anthropology and Geography/University of California, Los Angeles

Registrations:

1979	Register of Professional Archaeologists

Professional Profile:

David S. Whitley, Ph.D., specializes in the prehistoric archaeology and ethnography of far western North America, with particular interests in sacred sites, rock art, chronometrics and cultural heritage management. He has also worked in southern Africa, the European Upper Paleolithic and Guatemala. His professional publications include 17 books/monographs and approximately 100 articles and chapters. Included among his recent books are *The Rock Art of California* (University of Utah Press, 2000), the edited volume *Handbook of Rock Art Research* (AltaMira Press, 2001), and *Introduction to Rock Art Research* (Left Coast Press, 2005), which received a *Choice* Outstanding Academic Book Award for 2006. His latest book is *Cave Paintings and the Human Spirit*: *The Origin of Creativity and Belief* (Prometheus Books, 2009).

Whitley has written the nominations for 470 sites that are now listed on the NRHP, and has a nomination for an 89 site NHL district that is currently under consideration. For a decade he served on the Council of Directors of the ICOMOS International Rock Art Committee. In 2001 he received the Thomas King Award from the Society for California Archaeology for Excellence in Cultural Resource Management.

Selected Project Experience:

Coso NHL Management Plan, NAWS China Lake, Inyo County, California, 2009-ongoing. Co-Principal Investigator and report co-author of a management plan for the Coso NHL district, a 57-square-mile area containing the largest concentration of petroglyph sites in North America. This has involved coordination with stakeholders, including Native American tribes; the development of management and conservation protocols; and the identification and prioritization of future preservation tasks for the only rock art NHL west of the Rockies.

Carrizo Plain Ecological Reserve Land Management Plan, Jodi McGraw Consulting, Carrizo Plain, San Luis Obispo County, California, ongoing. Principal investigator, field director and report author for an archaeological reconnaissance, overview and management plan for cultural resources on four California Department of Fish and Game units totaling 39,016 acres; and authorship of cultural sections for a Fish and Game Land Management Plan.

Draft Environmental Impact Statement, Twentynine Palms Marine MAGTF Land Expansion, TEC Inc., San Bernardino County, California, ongoing. Co-Principal Investigator and co-author for cultural resources sections of a NEPA draft EIS for a proposed 150,000-acre land expansion.

Tejon Mountain Village Project, Tejon Mountain Village LLC, Tejon Ranch, Kern and Los Angeles counties, California, 1999-2009. Principal Investigator and report author for a Phase I survey of 28,000 acres and Phase II testing of 38 prehistoric sites, for CEQA compliance.

Assessment of CA-INY-434 and -7117, Epsilon Systems Solutions, NAWS China Lake, Inyo County, California, 2008. Principal Investigator, field director and report author for condition assessments of petroglyph sites CA-INY-434 and -7117, involving site documentation and mapping; evaluation of current conditions and identification of natural and cultural impacts to the sites; and management recommendations for long-term preservation.

Rosamond Space-Port Survey, United Engineering Group, Rosamond, Kern County, California, 2008. Principal Investigator, field director and report author for Phase I archaeological survey of 546 acres, resulting in the identification and recording of nine sites.

Clipper Windpower Class III Inventory, Clipper Windpower, Inc. Barstow, San Bernardino County, California, 2008. Principal Investigator, field director and report author for Class III inventory of seven anemometer pads and access roads.

Boeing Corporation Santa Susana Field Lab Projects, MWH Americas, Inc., Los Angeles County, California, 2001-2008. Principal investigator, field director and report author for six Class III inventories/Phase I surveys required for maintenance, hazardous waste clean-up and other activities on the Santa Susana Field Lab; and evaluation and preliminary condition assessment for NRHP listed rock art site CA-LAN-1072 (Burro Flats).

Carrizo Plain National Monument Projects, Carrizo Plain National Monument/BLM Bakersfield Field Office, San Luis Obispo and Kern counties, California, 2001-2008. Principal Investigator, field director and senior report author for six projects/contracts, consisting of NHPA Class II and III inventories of over 14,400 acres for Section 110 compliance; documentation and condition assessment of the Saucito pictograph site; NRHP nomination and listing, at national level of significance, of a 24 site district, for Section 106 compliance; and a NHL nomination of an 89-site district for Section 106 compliance.

Dead End Canyon Site Assessment, Epsilon Systems Solutions, NAWS China Lake, Inyo County, California, 2007. Principal Investigator, field director and report author for a petroglyph site condition assessment; and an NRHP evaluation of a large village for Section 106 compliance, involving surface collection and mapping of house pits.

Lancaster Retention Basin Survey, Impact Sciences, Lancaster, Los Angeles County, California, 2007. Principal investigator and report author for Phase I archaeological survey of 1.5-acre retention basin.

Vintage Well Pad Survey, Vintage Production California, Tejon Ranch, Kern County, California, 2006. Principal Investigator and report author for a Phase I archaeological survey of a well-pad.

Hueneme Pipeline Survey, City of Hueneme, Wastewater Division, Hueneme, Ventura County, California, 2006. Principal Investigator, field director, report author for a Class III inventory/Phase I survey of a 3400 linear feet pipeline route, requiring SHPO consultation.

Searles Lake High-Stand Shoreline Survey, Bureau of Land Management, San Bernardino County, California, 2005. Principal Investigator, field director and report author for a Class III inventory of the high-stand (Late Pleistocene) pluvial lake shoreline (2,343 acres) of the Christmas Canyon sub-basin of Searles Valley.

Tejon Ranch Water Management and Exchange WRMWSD 850 Canal/Reservoir No. 1 Pumpback Project, Tejon Ranch Company, Tejon Ranch, Kern County, California, 2003-2004. Principal Investigator, field director and report author for a Phase I archaeological survey of 1268 acres related to water rights and usage.

Christmas Canyon Site Assessment, Bureau of Land Management, San Bernardino County, California, 2003. Principal Investigator, field director and report author for an assessment of 16 surface sites within the Christmas Canyon area of the Searles Lake Basin.

Hoover Dam By-Pass Project, CH2M Hill, Colorado River Valley, California and Nevada, 2000. Principal Investigator and report co-author of an ethnohistoric overview and Traditional Cultural Properties nomination for sites associated with the Hoover Dam By-Pass.

Newhall Ranch Projects, Newhall Land and Farms/Lennar Homes, Valencia, Los Angeles County, California, 1993-2009. Principal Investigator, field director and report author for 24 separate studies/contracts involving Phase I CEQA studies and NHPA Class III inventories of approximately 20,000 acres, Class II test excavations at 11 prehistoric sites, and Class III data recovery at one site.

Golden Queen Mine Projects, Golden Queen Mining Company, Rosamond, Kern County, California, 1994-2007. Principal Investigator, field director and report author for five projects/contracts involving a CEQA Phase I study of 640 acres total, Phase II test excavations

of nine historical (1900-1910 mining related) sites, and Phase III data recoveries (including HABS/HAER documentation) of four sites, one of which was a large historical mining ghost town with about 60 structures.

Fort Irwin Rock Art Projects, NTC Fort Irwin, Barstow, San Bernardino County, California, 1997-1999. Principal Investigator, field director and report author for three projects/contracts, involving a NHPA Class III inventory of 2000 acres at "The Whale;" rock art site documentation and assessment of three petroglyph sites; testing, rock art documentation and Section 106 evaluation at Sally's Rockshelter.

BLM Land Exchange Inventories and Assessment, Conservation Partners, Inc., Santa Barbara, Tulare, Kern and Kings counties, California, 1999-2000. Principal Investigator, field director and report author for seven projects/contracts requiring Class III inventories of 5,221 acres, and one project requiring limited testing and determinations of NRHP eligibility for four sites.

Class II Inventory, NAWS China Lake, Inyo and San Bernardino counties, California, 1982-1983. Co-principal Investigator, field director and report co-author of a sample survey of the North and South Ranges of the China Lake NWC, representing approximately 10,000 inventoried acres.

LADWP Well Pad Study, Los Angeles Department of Water and Power, Inyo County, California, 1982. Principal Investigator, field director and report author, archaeological assessments of four geothermal well pads locations in the Coso KGRA, adjacent to Sugarloaf Mountain.

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

2503 Eastbluff Dr.
Suite 206
Newport Beach, California92660
Tel: (949) 887-9013
Fax: (949) 717-0069
Email: mhagemann@swape.com

Matthew F. Hagemann, P.G.

Geologic and Hydrogeologic Characterization
Investigation and Remediation Strategies
Regulatory Compliance
CEQA Review
Expert Witness

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certification:

California Professional Geologist, License Number 8571.

Professional Experience:

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Senior Environmental Analyst, Komex H2O Science, Inc (2000 – 2003);
- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);

- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

Senior Regulatory and Litigation Support Analyst:

With SWAPE, Matt's responsibilities have included:

- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a project to provide technical assistance to a comunity adjacent to a former Naval shipyard under a grant from the U.S. EPA.
- Lead analyst in the review of numerous environmental impact reports under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions and geologic hazards.
- Lead analyst in the review of environmental issues in applications before the California Energy Commission.
- Technical assistance and litigation support for vapor intrusion concerns.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.
- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of

wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.
- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.

- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and Hagemann, M., 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and Hagemann, M.F. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

RESUME

DAVID I. MARCUS
P.O. Box 1287
Berkeley, CA 94701-1287

January 2010

Employment

Self-employed, March 1981 - Present

Consultant on energy and electricity issues. Clients have included Imperial Irrigation District, the cities of Albuquerque and Boulder, the Rural Electrification Administration (REA), BPA, EPA, the Attorney Generals of California and New Mexico, alternative energy and cogeneration developers, environmental groups, labor unions, other energy consultants, and the Navajo Nation. Projects have included economic analyses of utility resource options and power contracts, utility restructuring, utility bankruptcy, nuclear power plants, non-utility cogeneration plants, and offshore oil and hydroelectric projects. Experienced user of production cost models to evaluate utility economics. Very familiar with western U.S. grid (WSCC) electric resources and transmission systems and their operation and economics. Have also performed EIS reviews, need analyses of proposed coal, gas and hydro powerplants, transmission lines, and coal mines. Have presented expert testimony before FERC, the California Energy Commission, the Public Utility Commissions of California, New Mexico, and Colorado, the Interstate Commerce Commission, and the U.S. Congress.

Environmental Defense Fund (EDF), October 1983 - April 1985

Economic analyst, employed half time at EDF's Berkeley, CA office. Analyzed nuclear power plant economics and coal plant sulfur emissions in New York state, using ELFIN model. Wrote critique of Federal coal leasing proposals for New Mexico and analysis of southwest U.S. markets for proposed New Mexico coal-fired power plants.

California Energy Commission (CEC), January 1980 - February 1981

Advisor to Commissioner. Wrote "California Electricity Needs," Chapter 1 of Electricity Tomorrow, part of the CEC's 1980 Biennial Report. Testified before California PUC and coauthored CEC staff brief on alternatives to the proposed 2500 megawatt Allen-Warner Valley coal project.

CEC, October 1977 - December 1979

Worked for CEC's Policy and Program Evaluation Office. Analyzed supply-side alternatives to the proposed Sundesert nuclear power plant and the proposed Point Concepcion LNG terminal. Was the CEC's technical expert in PG&E et. al. vs. CEC lawsuit, in which the U.S. Supreme Court ultimately upheld the CEC's authority to regulate nuclear powerplant siting.

Energy and Resources Group, U.C. Berkeley, Summer 1976

Developed a computer program to estimate the number of fatalities in the first month after a major meltdown accident at a nuclear power plant.

Federal Energy Agency (FEA), April- May 1976

Consultant on North Slope Crude. Where To? How?, a study by FEA's San Francisco office on the disposition of Alaskan oil.

Angeles Chapter, Sierra Club, September 1974 - August 1975

Reviewed EIRs and EISs. Chaired EIR Subcommittee of the Conservation Committee of the Angeles Chapter, January - August 1975.

Bechtel Power Corporation (BPC), June 1973 - April 1974

Planning and Scheduling Engineer at BPC's Norwalk, California office. Worked on construction planning for the Vogtle nuclear power plant (in Georgia).

Education

Energy and Resources Group, U.C. Berkeley, 1975 - 1977

M.A. in Energy and Resources. Two year master's degree program, with course work ranging from economics to engineering, law to public policy. Master's thesis on the causes of the 1972-77 boom in the price of yellowcake (uranium ore). Fully supported by scholarship from National Science Foundation.

University of California, San Diego, 1969 - 1973

B.A. in Mathematics. Graduated with honors. Junior year abroad at Trinity College, Dublin, Ireland.

Professional Publications

"Rate Making for Sales of Power to Public Utilities," with Michael D. Yokell, in Public Utilities Fortnightly, August 2, 1984.

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RESUME OF ERIC D. HENDRIX

Vice President, Geology
Principal Hydrogeologist

Education

Master of Science, Geology
University of California, Los Angeles

Bachelor of Science, Geological Sciences
California State University, Long Beach

Registration

Certified Hydrogeologist, California, No. 431
Certified Engineering Geologist, California, No. 1531
Registered Professional Geologist, California, No. 4899
Registered Geologist, Arizona, No. 26977
Registered Environmental Assessor, California, No. 2495
California Community Colleges Instructor Credential

Professional Responsibilities

As Vice President of Geology for Mission Geoscience, Mr. Hendrix:

- Manages technical operations & business development for all water resources development & remediation, hydrology and seismic risk evaluation services
- Oversees Corporate Engineering Geologic & Hydrogeologic Technical Quality Control program.
- Coordinates litigation support services for water resources/water rights matters, environmental engineering standard-of-care, and environmental remediation, compliance ad toxic tort projects (CERCLA contribution, RCRA, SDWA, CWA)

Professional History

- Senior Hydrogeologist, Applied Environmental Services, Inc., Laguna Hills, California.
- Senior Engineering Geologist, Zeiser/Kling Consultants Inc., Costa Mesa, California.
- Engineering Geologist, Leighton & Associates, Inc., Irvine, California
- Research Assistant, Precambrian Paleobiology Research Group, UCLA

Experience

Mr. Hendrix has over 25 years of complex hydrologic and hydrogeologic project experience, involving surface and ground water assessment, development, management, remediation, protection & litigation, including the following:

Remediation management for complex dissolved and separate-phase (NAPL) hydrocarbon groundwater plumes in multiple potable aquifers, large petroleum refinery, Carson, CA

Remediation management for complex dissolved and separate-phase (NAPL) hydrocarbon groundwater plumes in potable aquifer, large petroleum refinery, Paramount, CA

Remediation management of heavy-distillate NAPL contamination of complex faulted aquifer, petroleum refinery, Signal Hill, CA

Remediation of chlorinated solvent plume in potable aquifer, large aerospace manufacturing facility, Torrance, CA

Remediation of chlorinated solvent plume in potable aquifer, large aerospace manufacturing facility, Fullerton, CA

Aquifer testing & remediation of chlorinated solvent plume in Superfund NPL site, City of Industry, San Gabriel Valley Groundwater Basin

Aquifer characterization and fate & transport investigation, complex groundwater contamination site involving multiple chlorinated solvent sources, for litigation support, Santa Barbara, CA

Aquifer characterization, testing & assessment of potential contaminant plume capture by production wells, for litigation support, former Kaiser Steel Mill, Ontario, CA

Assessment of groundwater production sustainability for proposed large solar energy facility, Pleasant Valley Groundwater basin, Fresno County, CA (for State Energy Commission CEQA process)

CEQA / SB 610 water supply analysis for large commercial development project, Sacramento County, CA

CEQA Flood Hydrology & Coastal Erosion Investigation, City of Dana Point General Plan

Storm water runoff and pollutant loading study for harbor expansion, City of Dana Point

Surface flooding risk analysis for high-pressure MWD water pipelines, Rancho Santa Fe, CA

Surface water hydrology & pollutant loading study associated with large planned complex development, Irvine Lake, CA

Storm water runoff study related to wetlands development and CWA Section 404 streambed alteration, San Juan Capistrano

Groundwater model development to assess impacts of sewage discharge on production wells, Wrightwood, CA

Groundwater model development to assess impacts of hazardous waste landfill leachate on production well quality, Colton, CA

Groundwater model development to evaluate potential off-site migration of dissolved chlorinated solvent plume at large aerospace manufacturing facility, Torrance, CA

Seepage and groundwater source investigation for large landslide impacting hillside residential area, for litigation support, Anaheim, CA

Hydrologic investigation to determine sources of water causing hydrocollapse of fill slopes, for litigation support, Covina, CA

Watershed runoff and groundwater recharge study for new school construction, Cajon Valley, CA

Evaluation of seepage impacts to landslide occurrence, various sites throughout Orange, Los Angeles, Riverside and San Diego County

Surface and Subsurface Hydrogeologic Investigation & Production Well Feasibility Study, Wilder Ranch EIR & Specific Plan, Santa Cruz County, CA

Natural spring water supply feasibility investigations, La Jolla Indian Reservation, San Diego County, CA

Groundwater development investigations, Warner Springs and Lake Henshaw Basin, San Diego County, CA

Operational Yield Investigation and Draft AB 3030 Management Plan, Charnock Groundwater Basin, Los Angeles County, CA

Sentney Wellfield Development & Safe Yield Evaluation, Central Groundwater Basin, Los Angeles County, CA

Wellhead Protection, Aquifer Testing and Regional Contaminant Investigation, Concerto Wellfield, Forebay of Orange County Groundwater Basin

Wellhead Protection Investigation and Aquifer Testing, Claremont Groundwater Basin, Los Angeles County

Regional Groundwater Basin Evaluation, Groundwater Model Development and Wellhead Protection Study, USEPA Santa Monica Regional MTBE Contamination Project

Associations Member of Executive Committee,
Society of Sedimentary Geology (SEPM), Pacific Section
National Groundwater Association/Association of
Groundwater Scientists and Engineers (NGWA/AGWSE)
California Groundwater Resources Association (GRA)
Association of California Water Agencies (ACWA)
Association of Environmental & Engineering Geologists
American Society of Civil Engineers (ASCE)
American Association of Petroleum Geologists
(Division of Environmental Geosciences/Charter Member)
Geological Society of America *(Hydrogeology,*
Engineering Geology, Sedimentary Geology and
Quaternary Geology Divisions)

Awards & Honors

Dibblee Geological Foundation, Honorary Map Dedication DF-384, Rosamond & Rogers Lake Quadrangles, 2008

Sigma Xi Graduate Research Fellowship, UCLA, 1984-1986

Invited Speaker, Geological Society of America Penrose Conference, 1986, Ventura, CA, Miocene Tectonic Reconstruction of California

Invited Speaker, 2001 Geological Society of America Cordilleran Section Field Trip, Central Transverse Ranges & San Andreas Fault

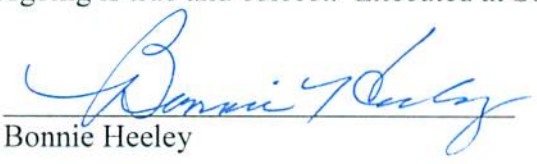
Publications

(separate list available upon request)

PROOF OF SERVICE

I, Bonnie Heeley, declare that on June 25, 2010 I served and filed copies of the attached **Prehearing Conference Statement of California Unions for Reliable Energy**. 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/genesis. 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." I also sent a copy via email and an original and one copy via U.S. mail to the California Energy Commission Docket Office.

I declare under penalty of perjury that the foregoing is true and correct. Executed at South San Francisco, CA on June 25, 2010.



Bonnie Heeley

CALIFORNIA ENERGY COMMISSION Attn: Docket No. 09-AFC-8 1516 Ninth Street MS 4 Sacramento, CA 95814-5512 docket@energy.state.ca.us	Ryan O'Keefe, Vice President Genesis Solar LLC 700 Universe Boulevard Juno Beach, Florida 33408 Ryan.okeefe@nexteraenergy.com **EMAIL ONLY**	Scott Busa/Project Director Meg Russell/Project Mgr Duane McCloud/Lead Engr NextEra Energy 700 Universe Boulevard Juno Beach, FL 33408 Scott.busa@nexteraenergy.com Meg.Russell@nexteraenergy.com Daune.mccloud@nexteraenergy.com Matt Handel/Vice Pres. Matt.Handel@nesteraenergy.com **VIA EMAIL ONLY** Kenny Stein, Environmental Srvs Mgr Kenneth.Stein@nexteraenergy.com **VIA EMAIL ONLY**
Mike Pappalardo Permitting Manager 3368 Videra Drive Eugene, OR 97405 Mike.pappalardo@nexteraenergy.com	James Kimura, Project Engineer Worley Parsons 2330 East Bidwell St., #150 Folsom, CA 95630 James.Kimura@WorleyParsons.com	Tricia Bernhardt/Project Manager Tetra Tech, EC 143 Union Blvd, Suite 1010 Lakewood, CO 80228 Tricia.bernhardt@tteci.com
Kerry Hattevik, Director West Region Regulatory Affairs 829 Arlington Boulevard El Cerrito, CA 94530 Kerry.hattevik@nexteraenergy.com	Scott Galati Galati & Blek, LLP 455 Capitol Mall, Suite 350 Sacramento, CA 95814 sgalati@gb-llp.com	California ISO e-recipient@caiso.com VIA EMAIL ONLY

Allison Shaffer/Project Mgr. Bureau of Land Management Palm Springs South Coast Field Office 1201 Bird Center Drive Palm Springs, CA 92262 Allison_Shaffer@blm.gov	James D. Boyd Commissioner/Presiding Member California Energy Commission 1516 Ninth Street Sacramento, CA 95814 jboyd@energy.state.ca.us	Robert Weisenmiller Commissioner/Associate Member California Energy Commission 1516 Ninth Street Sacramento, CA 95814 rweisenm@energy.state.ca.us
Kenneth Celli, Hearing Officer California Energy Commission 1516 Ninth Street Sacramento, CA 95814 kcelli@energy.state.ca.us	Mike Monasmith Siting Project Manager California Energy Commission 1516 Ninth Street Sacramento, CA 95814 mmonasmi@energy.state.ca.us	Caryn Holmes, Staff Counsel California Energy Commission 1516 Ninth Street Sacramento, CA 95814 cholmes@energy.state.ca.us
Robin Mayer, Staff Counsel California Energy Commission 1516 Ninth Street Sacramento, CA 95814 rmayer@energy.state.ca.us	Jennifer Jennings Public Adviser's Office California Energy Commission 1516 Ninth Street Sacramento, CA 95814 publicadviser@energy.state.ca.us	Tanya A. Gulesserian Marc D. Joseph Rachael E. Koss Adams Broadwell Joseph & Cardozo 601 Gateway Boulevard, Suite 1000 South San Francisco, CA 94080 tgulesserian@adamsbroadwell.com rkoss@adamsbroadwell.com
Michael E. Boyd, President Californians for Renewable Energy, Inc. (CARE) 5439 Soquel Drive Soquel, CA 95073-2659 michaelboyd@sbcglobal.net	Alfredo Figueroa 424 North Carlton Blythe, CA 92225 lacunadeaztlan@aol.com	Tom Budlong 3216 Mandeville Cyn Rd. Los Angeles, CA 90049-1016 tombudlong@roadrunner.com
Larry Silver California Environmental Law Project Counsel to Mr. Budlong VIA EMAIL ONLY larrysilver@celproject.net	Lisa T. Belenky, Sr. Attorney Center for Biological Diversity 351 California St. #600 San Francisoc, CA 94104 lbelenky@biologicaldiversity.org	Ileene Anderson Public Lands Desert Director Center for Biological Diversity PMB 447, 8033 sunset Blvd. Los Angeles, CA ianderson@biologicaldiversity.org